




**Verification and certification report form for  
CDM project activities  
(Version 03.0)**

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

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the project activity</b>	<ul style="list-style-type: none"> <li>Title: Sihwa Tidal Power Plant CDM Project</li> <li>Reference number: 0349</li> </ul>
<b>Scale of the project activity</b>	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
<b>Version number of the verification and certification report</b>	Version 02.0
<b>Completion date of the verification and certification report</b>	28/10/2019
<b>Monitoring period number and duration of this monitoring period</b>	15 <sup>th</sup> monitoring period (2 <sup>nd</sup> monitoring period in the 2 <sup>nd</sup> crediting period) Duration: 01/01/2019 ~ 30/06/2019
<b>Version number of the monitoring report to which this report applies</b>	Version 02.0
<b>Crediting period of the project activity corresponding to this monitoring period</b>	01/07/2018 ~ 30/06/2025 (Renewable, 7 years)
<b>Project participants</b>	Korea Water Resources Corporation (K-water)
<b>Host Party</b>	Republic of Korea
<b>Applied methodologies and standardized baselines</b>	ACM0002 (Version 17) Grid-connected electricity generation from renewable sources
<b>Mandatory sectoral scopes</b>	1-Energy industries (renewable - / non-renewable sources)
<b>Conditional sectoral scopes, if applicable</b>	No conditional sectoral scope(s) linked to the applied methodology
<b>Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD</b>	124,512 t CO <sub>2</sub> e 251,089 tCO <sub>2</sub> e / 365 days × 181 days = 124,512 t CO <sub>2</sub> e
<b>Certified amount of GHG emission reductions or GHG removals for this monitoring period</b>	119,202 t CO <sub>2</sub> e
<b>Name and UNFCCC reference number of the DOE</b>	<input type="checkbox"/> Name : Korean Foundation for Quality (KFQ) <input type="checkbox"/> Reference number : E-0025
<b>Name, position and signature of the approver of the verification and certification report</b>	Yu Shim JEONG  Technical Managing Director

## **SECTION A. Executive summary**

Korean Foundation for Quality (hereinafter KFQ) has performed periodic verification of the CDM project “Sihwa Tidal Power Plant CDM Project” in Ansan city, Republic of Korea, UNFCCC Registration Ref. No. 0349 for the period from 01/01/2019 to 30/06/2019.

### **Verification objective**

Verification is the periodic, thorough and independent assessment and ex-post determination by a Designated Operational Entity (hereinafter DOE) of the monitored reductions in greenhouse gas (hereinafter GHG) emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period. Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Sihwa Tidal Power Plant CDM Project” for the period from 01/01/2019 to 30/06/2019 in accordance with paragraph 62 of CDM modalities and procedures.

### **Verification scope**

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place.
- The monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of CERs and verifiable and in accordance with applicable CDM requirements.
- The monitoring plan complies with the monitoring methodology and the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology including applicable tools and compliance with any guidance provided by the CDM Executive Board regarding deviations from the provisions of a registered plan and/or methodology.
- Data is recorded and stored as per the monitoring methodology ACM0002 (Version 17), and the calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

Furthermore, it was KFQ's objective to identify any concerns related to the conformity of the actual project activity and its operation with the registered project design document and determine whether any deviation or proposed or actual changes in the implementation or operation of the project activity comply with the requirements of the Project Standard.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified. The verification is incorporating both quantitative and qualitative information on emission reductions.

### **Verification process**

KFQ has made publicly available the monitoring report received from the project participant (hereinafter PP). Only verification activities after the publication of the Monitoring report (hereinafter MR) on the UNFCCC CDM website have been used as a basis for conclusion of verification.

The verification process includes desk review of the MR published (and any updated versions, if available), emission reduction calculation spreadsheets and other supporting documents and data.

Further, on-site assessments and interviews with those involved in project management and operations are conducted. This is followed by preparation of draft verification report summarizing desk review and on-site assessment findings (i.e. CARs, CLs, and FARs). Upon successful closing of the CARs, CLs and FARs raised (if any), the final verification report is prepared. The draft verification report reviewed by a technical reviewer according to KFQ's internal quality assurance procedures. If no further findings are raised the final verification report is prepared and reviewed once again.

The data presented in the MR were assessed by review of the detailed project documentation and relevant records of data, as well as by interviews with personnel at Korea Water Resources Corporation (hereinafter K-water) Sihwa Tidal Power Plant, and observation of collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results, as well as to verify the correct application of the approved monitoring methodology. Furthermore, this has enabled the verification team to assess and determine that the implementation and operation of the project activity as well as the steps taken to report emission reductions in compliance with the CDM criteria and relevant guidance provided by the Board. In addition, all parameters, as required (and as applicable) by the monitoring methodology ACM0002 (Version 17) as well as the monitoring plan in the registered PDD and the management system were assessed during the on-site visit.

#### Description of the project activity

The "Sihwa Tidal Power Plant CDM Project" generates electricity utilizing the difference of ebb and flow of tide which emits zero GHG into the air, and increase of sea/inner water circulation by this activity will improve the water quality that has been decreased during Sihwa Lake's salt-to-fresh water process. The project activity consists in 10 units of 25.4MW turbines and generators and the capacity of the project activity is 254 MW. The electricity generated by the project activity is supplied to the Korea Electric Power Corporation (hereinafter KEPCO) grid (national grid).

The physical components including the equipment for turbines and generators were confirmed as described in the registered PDD.

Project Title	Sihwa Tidal Power Plant CDM Project (PDD Version 04.0, dated 20/09/2018)	
UNFCCC Registration Number	0349	
Project Participant	Korea Water Resources Corporation (K-water)	
Location of the project	Address	Daebudong-dong, Danwon-gu, Ansan city, Gyeonggi-do, Republic of Korea
	GPS Coordinates	Longitude: 126°36'36"E Latitude: 37°18'46"N
Date of registration	18 June 2006 (1 <sup>st</sup> crediting period, 01/07/2011 ~ 30/06/2018)	
Date of renewal	04 January 2019 (2 <sup>nd</sup> crediting period, 01/07/2018 ~ 30/06/2025)	
Monitoring period of this verification	01 January 2019 to 30 June 2019 (2 <sup>nd</sup> monitoring period in the 2 <sup>nd</sup> crediting period)	

#### Conclusion

KFQ has performed the verification of the emission reductions reported for the project activity 'Sihwa Tidal Power Plant CDM Project' in the Republic of Korea (UNFCCC Registration Ref. No. 0349) for the period from 01/01/2019 to 30/06/2019.

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. All relevant records of data from K-water internal system and KEPCO have been examined and verified for the reporting period.

The verification team has during its preparation identified the key reporting risks and used the assessment to determine to which extent the project operator's internal system was adequate for mitigation of these key reporting risks. In addition, other areas that can have an impact in reported emission reductions have also undergone detailed audit testing.

KFQ also confirms that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported, both determined using the valid and registered project's baseline, its monitoring plan in the registered PDD and its associated documents.

The implementation of the project resulted in 119,202 t CO<sub>2</sub>e of emission reductions during the monitoring period from 01/01/2019 to 30/06/2019 which is within the crediting period from 01/07/2018 to 30/06/2025. In our opinion, the GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (Version 17) and monitoring plan in the Project Design Document of Version 04.0 dated 20/09/2018.

KFQ is able to certify that the emission reductions from the 'Sihwa Tidal Power Plant CDM project' in Republic of Korea during the period from 01/01/2019 to 30/06/2019 amount to 119,202 t CO<sub>2</sub>e.

## SECTION B. Verification team, technical reviewer and approver

### B.1. Verification 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	Interviews	Verification findings
1.	Team Leader (*)	IR	JANG	Pyung Hee	KFQ	√	√	√	√
2.	Verifier (*)	IR	LEE	Mi Jung	KFQ	√	-	-	√
3.	Verifier (*)	IR	PARK	Su Hyun	KFQ	√	-	-	√
4.	Verifier (*)	IR	MOON	Sung Sam	KFQ	√	√	√	√
5.	Verifier	IR	PARK	Sun Hwan	KFQ	√	√	√	√

(\*) means a personnel with technical expertise in technical area 1.2.

**B.2. Technical reviewer and approver of the verification and certification report**

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	CHO	Jin Seok	KFQ
2.	Approver	IR	JEONG	Yu Shim	KFQ

Please refer to Appendix 2 below for demonstration of how the team meets the competence required for the verification.

**SECTION C. Application of materiality****C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	<i>Number of Monitoring parameters</i>	L	<i>Not large number of monitoring points to measure directly.</i>	<i>The KFQ verification team included five verifiers in total and three of them participated in on-site to review all monitoring parameters in a complete and detailed manner.</i>
2	<i>Error rate in MR</i>	L	<i>This is 15<sup>th</sup> monitoring period (2<sup>nd</sup> monitoring period of 2<sup>nd</sup> crediting period). The PP has a high maturity in compilation of MR.</i>	<i>In response of that risk, the KFQ verification team focuses on systematic consistency and error checks</i>
3	<i>Familiarity with Monitoring system</i>	L	<i>This is 15<sup>th</sup> monitoring period (2<sup>nd</sup> monitoring period of 2<sup>nd</sup> crediting period). There are no any special changes of monitoring system, i.e. process and monitoring point since the project activity was begun.</i>	<i>In response to that risk, the KFQ verification team checks the existence of all measuring instruments and their calibration even though PP is familiar with monitoring system.</i>
4	<i>QA/QC</i>	L	<i>Stable QA/QC system has been implemented and with QMS &amp; EMS.</i>	<i>Focus on crosschecking between raw data from “central control system of K-water” and references, i.e. Korea Power Exchange (hereinafter KPX) data and receipt of sales issued by KPX and KEPCO.</i>
5	<i>Data flow</i>	M	<i>Transferred to the spread sheet automatically.</i>	<i>For ER calculation, crosscheck raw data with spread sheet on a random sampling basis extent to ensure the functioning of transferring system.</i>
6	<i>Calculation</i>	M	<i>Calculation is performed in excel spreadsheet applying formulae.</i>	<i>In response of that risk, the KFQ verification team checks any omissions of events affecting emission reductions.</i>

KFQ's verification plan is based on understanding the risks associated with GHG emission data and the controls to mitigate those risks. KFQ planned the verification by obtaining evidence and other information and explanations that KFQ considers necessary to give reasonable assurance on the reported GHG emission reductions on the basis of risk level identified and materiality concept in accordance with “Guideline on the application of materiality in verifications (Version 02)”.

**C.2. Consideration of materiality in conducting the verification**

There was one finding detected, but it does not affect the amount of emission reductions. Since the finding was considered as a simple error rather than a systematic reoccurring error, the verification team decided that no additional audit procedures need to be conducted in order to reach a reasonable level of assurance that the claimed emission reductions in the MR are free from material error, omission or misstatement. Accordingly, verification and sampling plan were not revised.

**SECTION D. Means of verification****D.1. Desk/document review**

KFQ's verification is based on the monitoring documentation provided by the PP especially the MR (Version 01 dated 26/08/2019, published on 04/09/2019) and the CDM Project spreadsheets. Furthermore, the registered PDD and validation report were reviewed as well as the monitoring plan, previous verification reports, the applied baseline and monitoring methodology and any other information and references relevant to the project activity's emission reductions (e.g. IPCC reports, etc.). A complete list of all documents reviewed is shown in Appendix 3 of this verification report. KFQ's verification process takes into consideration all the CDM Rules and Guidance applicable to the project activity, e.g. CDM Validation and Verification Standard for Project Activities, CDM Project Standard, CDM Project Cycle Procedure, Checklist for requests for issuance for project activities and relevant decisions, clarifications and guidance from the CMP and the CDM EB.

During the desk review, KFQ has applied the standard auditing techniques to assess the quality of information provided. The following activities were performed:

- Verify the compliance of the MR with the guidance for completing the monitoring report form
- Verify the completeness of the data and the information presented in the MR;
- Review the monitoring plan and monitoring methodology. Check the compliance of the MR with respect to the monitoring plan in the registered PDD and verify that the applied methodology was carried out. Particular attention to coverage of all monitoring parameters, the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid,
- Review the calculations and assumptions used to obtain the GHG data and ER;
- Evaluate the data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

**D.2. On-site inspection**

Detailed verification of all data contained in the MR was performed during the site visit at Sihwa Tidal Power Plant on 26/09/2019. During the site visit, the personnel were interviewed or assisted the verification team. KFQ has applied the standard auditing techniques to assess the quality of information provided in the on-site inspection. The following aspects of the CDM project activity have been confirmed:

- The implementation and operation of the CDM project activities;
- The information flow for generating, aggregating, recording, calculation and reporting of the monitoring parameters; and
- The operational and data collection procedures and their implementation in accordance with monitoring plan.

Further, the following activities were performed:

- A cross-check between information provided in the MR and data from other sources such as plant log books, Records of electricity generated, electricity exported and electricity imported, or similar data sources;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the monitoring plan and ACM0002 (Version 17);
- A review of calculations and assumptions made in determining the GHG data and emission reductions; and
- An identification that quality control and quality assurance procedures are in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

Duration of on-site inspection: 26/09/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	Confirmation of the correct & complete implementation and operation of the Project Activity and check of all physical features as described in the PDD are in place.	Ansan	26/09/2019	Pyung Hee JANG Sung Sam MOON Sun Hwan PARK
2	Review of the complete data flow from data generation, aggregation, recording, calculation to reporting of the monitoring parameters.			
3	Confirmation of the complete & correct implementation of procedures for the operation and data collection.			
4	Verification of the information provided in the MR and documentation with other sources.			
5	Check of the monitoring equipment against the PDD, the monitoring plan as well as the approved methodology, including check of calibration & maintenance, etc. in relation to that equipment.			
6	Identification whether suitable QA/QC procedures are in place in order to prevent errors or to enable the corrections of errors and omissions in the reported parameters			

### D.3. Interviews

A list of the persons interviewed during this verification activity is included in table below.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	KIM	Deog Je	K-water	26/09/2019	General support	Pyung Hee JANG Sung Sam MOON Sun Hwan PARK
2	KIM	Min Jin	K-water		CDM coordination	
3	LEE	Myung Won	K-water		Plant operation	

### D.4. Sampling approach

As per the requirements set out in CDM Validation and Verification Standard for Project Activity (Version 02.0), random sampling has been applied, as relevant for the present case in the Project Activity, where no sampling approach was applied by the PP.

Since automatic transferred system to the spread sheet is in place, crosscheck for data in spread sheet against raw data was done based on random sampling after confirming measure for raw

data in the central control system of K-water. Sampling plan which the verification team planned needed not to be revised as no omission in the detection process of events related to emission reductions were found. All abnormal figures in data on the ER sheet, the locations and calibrations of all measurement instruments as well as its intervals (Measuring frequency, Reading frequency, Recording frequency) were assessed.

#### **D.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised**

<b>Areas of verification findings</b>	<b>No. of CL</b>	<b>No. of CAR</b>	<b>No. of FAR</b>
Compliance of the monitoring report with the monitoring report form	0	0	0
Compliance of the project implementation and operation with the registered PDD	1	0	0
Post-registration changes	0	0	0
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	0	0	0
Compliance of monitoring activities with the registered monitoring plan	0	0	0
Compliance with the calibration frequency requirements for measuring instruments	0	0	0
Assessment of data and calculation of emission reductions or net removals	0	0	0
Assessment of reported sustainable development co-benefits	0	0	0
Global stakeholder consultation	0	0	0
Others (please specify)	0	0	0
<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>

The objective of this phase of the verification was to resolve any issues which were needed to be clarified prior to KFQ's conclusion that i) the project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD, ii) the monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan including any guidance provided by the Board regarding deviation from the provisions of a registered/revised plan and/or methodology and iii) the data and calculation of GHG emission reductions are correct.

A corrective action request (CAR) is issued, where:

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- ii. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- iii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impact the quantity of emission reductions;
- iv. Issues identified in a FAR during validation or previous verification(s) to be verified during next verification have not been resolved by the project participants.

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

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.



One CL was raised for this monitoring period, which was closed successfully after PP have submitted MR Version 02.0

## SECTION E. Verification findings

### E.1. Compliance of the monitoring report with the monitoring report form

<b>Means of verification</b>	KFQ has checked the MR provided by the PP against the latest MR form in order to determine whether the MR is in compliance with it.
<b>Findings</b>	It was found that there are no deviations between the MR and the latest monitoring report form (Version 07.0)
<b>Conclusion</b>	The verification team concludes that the MR (Version 02.0) is in compliance with the latest monitoring report form (Version 07.0) and the instruction therein.

### E.2. Remaining forward action requests from validation and/or previous verifications

FAR was not issued from previous verification.

### E.3. Compliance of the project implementation and operation with the registered project design document

<b>Means of verification</b>	<p><b>Physical project implementation</b> During the on-site visit, the KFQ verification team visually inspected the installations of the tidal power plant and all instrumentation necessary for the monitoring of the emission reductions and check, whether all physical features of the CDM Project activity, including the data collection systems and storage, have been implemented in accordance with the registered PDD.</p> <p><b>Project operation</b> The verification team checked the operational records and other relevant information (Appendix 3) and interviewed relevant plant staff on the actual operation of the plant. Also, documented daily operation report, daily exported electricity record, the central control system of K-water especially with regard to times with events as indicated in the MR were checked.</p> <p><b>Management system and quality control and quality assurance</b> The documents such as 'Internal Manual in Emergency', 'Sihwa Tidal Power Plant Operation Manual' and 'Monitoring Manual' have been reviewed. Furthermore, the latest organizational arrangements were checked by means of interviews with relevant staff from K-water.</p> <p><b>Consecutive monitoring period</b> The verification team checked monitoring period of previous verifications through interviews with staff from K-water as well as history of requests for issuance provided by UNFCCC website to confirm consecutive monitoring periods of this project activity</p>
<b>Findings</b>	<p><b>Physical project implementation</b> The project activity was registered on 18 June 2006 and the construction was completed on 14 November 2011. After then the operation started on 13 April 2011 and the commercial operation started on 1 March 2012 which was checked through notification sent by PP to the Government.</p> <p>Due to delay of the construction, the PP changed the 1<sup>st</sup> crediting period from 01 July 2009~30 June 2016 to 01 July 2011~30 June 2018, and this change accepted by UNFCCC. The first crediting period (01/07/2011~30/06/2018) renewed and second crediting period was approved on 4 January 2019 for the period of 01/07/2018 ~ 30/06/2025. This monitoring period is the second monitoring of the second crediting period</p> <p>The detail implementation history as follow:</p>

Activities	Time (period)	Remarks
Construction	31/12/2004~14/11/2011	Construction completion report
Starting date of operation	13/04/2011	Grid connection approval
Commission period	28/03/2011~29/02/2012	Test run plan
Start date of commercial operation	01/03/2012	Start-up business notification to the government (Ministry of Knowledge Economy)
Continued operation	13/04/2011~present	Grid connection approval
1 <sup>st</sup> ~13 <sup>th</sup> monitoring period (1 <sup>st</sup> crediting period)	01/07/2011~30/06/2018	1 <sup>st</sup> ~14 <sup>th</sup> monitoring reports and verification reports
14 <sup>th</sup> monitoring period (2 <sup>nd</sup> crediting period)	01/07/2018~31/12/2018	
Approval date of crediting period renewal	04/01/2019	Validation report for crediting period renewal

The implementation status of the project activity was the same during the monitoring period and found to be in accordance with the relevant documentation.

All physical features (technology, project equipment and monitoring/metering equipment) of the project are in place as per the registered PDD. And there is no any change such as capacity, number of units, addition of component, extension of technology, actual operational parameters differing from the expected parameters etc. PDD.

#### Project operation

The Sihwa Tidal Power Plant as well as the central control system of K-water were in normal operation during this monitoring period.

Operation of the monitoring system & data collection system were operational during the monitoring period - the maintenance/calibration periods of the monitoring instruments performed during the monitoring period and as described in the MR are complete.

During the site visit, sample review of raw data to check all operational information were reported on the MR.

For this monitoring period, lasting 181 days, no special events, i.e. emergency and/or dispute occurred.

However, during the document review and on-site assessments the verification team identified that some generator were not operated due to periodic inspection thus amount of electricity generated by them is recorded as '0'. However, these operational events were not clearly provided in the MR (Version 01.0). **(Refer to Appendix 4/Table 2/CL ID 01)**. The PP has submitted a revised MR (version 02.0) to provide operational events during this monitoring period without any omission and verification team confirmed that provided operational events in MR (Version 02.0) is correct and fairly stated.

Period of periodic inspection	Operational events
28/03/2019~12/04/2019	Generator #1 was not operated during this periodic inspection period. Especially, generator #1~#4 were not operated due to very little head drop thus electricity generated by those generators on 30/03/2019 is zero.
12/06/2019~30/06/2019	Due to periodic inspection, generator #5 was not operated.

The verification team checked each case by checking daily operation report of above-mentioned dates and interviewing relevant plant staff on the actual operation of the plant. K-water does not open all gates at once to ensure stable generation. When the water level rises, generators # 5~10 are started first, and # 1~4 are running slowly after that. If the flow rate does not reach the constant flow

	<p>rate, the generator does not work, so power generation amount of the # 1-4 generator was recorded as '0' in that period. K-water has inspected the generators regularly every year. This inspection is usually done at low tidal levels. During this period, the generators under inspection are not working, and the power generation amount is '0' on the specific dates mentioned in the table above.</p> <p>The verification team confirmed that those operational situations described in the monitoring report correspond to the daily operation report and it was clearly described in the MR (Version 02.0).</p> <p>KFQ confirms that no emissions reductions were claimed for those periods when Sihwa tidal power plant stopped the operation in accordance with the registered PDD, applied methodology and the requirements from VVS. And it is clearly and correctly reflected in the emission reduction calculation spreadsheet.</p> <p><b>Management system and quality control and quality assurance</b>  The PP, K-water has the overall authority and responsibility for project operation. Also the PP has the responsibility for the monitoring of all parameter for the calculation of emission reduction accounting and reporting.  The central control system of K-water is designed as an automatic process, so the involvement of the personnel during the normal operation is minimized. The key parameters have been measured and recorded in the central control system of K-water and the data is cross-checked with KPX data (exported) and monthly receipts of sales issued by KEPCO (imported). All measuring meters are periodically calibrated according to the national regulation. The PP has established internal manual in emergency, Sihwa Tidal Power Plant Operation Manual, and any emergency and dispute did not occur during this monitoring period.  The designated staffs for monitoring of the project activity are duly trained as operation, technique and CDM monitoring according CDM monitoring manual. Also PP is ISO 9001 and ISO 14001 certified.</p> <p>The verification team confirms that management system and quality assurance related procedures have implemented as the monitoring plan of the registered PDD.</p> <p><b>Consecutive monitoring period</b>  This is the 15<sup>th</sup> monitoring period since registration of this project activity. A previous monitoring report was published on the UNFCCC CDM website in a consecutive manner and completed verification of their respective monitoring periods. Thus, the verification team of this monitoring period confirmed that monitoring periods of this project have been consecutive.</p>
<b>Conclusion</b>	<p>KFQ confirms that the project has been implemented according to the description in the registered PDD.</p> <p>The verification team specifically confirms that</p> <ul style="list-style-type: none"> <li>• All physical features of the proposed CDM project activity including data collection systems and storage are in place and in accordance with the registered PDD; and</li> <li>• All other relevant information provided in the MR is fully in accordance with respective information stated in the registered PDD (version 04.0);</li> <li>• The information on project operation, the management system and quality assurance are complete, correct and in accordance with the registered PDD; and</li> <li>• The management system and quality assurance and related procedures have implemented as described in the MR and in accordance with the registered PDD; and</li> <li>• The monitoring periods of this project have been consecutive.</li> </ul> <p>The raised CL (ID 01) has been completely resolved.</p>

**E.4. Post-registration changes****E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents<sup>1</sup>**

The verification team confirmed that there is no temporary deviation for this monitoring period.

However, there was temporary deviation as below during 12<sup>th</sup> and 13<sup>th</sup> verifications approved by the Board.

- PRC-0349-005 (Approved on 01/03/2019)
  - K-water changed monitoring method of parameter GENy and EF<sub>BM</sub>.

**E.4.2. Corrections**

There was no correction identified by verification team during this verification

However, there were corrections as below during 1<sup>st</sup>, 2<sup>nd</sup> and 5<sup>th</sup> verifications approved by the Board.

- PRC-0349-001 (Approved on 23/11/2012)
  - K-water updated the project participant as a result of withdrawal of Ecoeye (consulting company).
  - K-water changed the abbreviation of Korea Water Resources Corporation from KOWACO to K-water.
  - K-water corrected the version number of the applied methodology (ACM0002) from version 3 to version 4.
- PRC-0349-002 (Approved on 03/05/2013)
  - K-water corrected the geo-coordination of the power plant as follow:  
Latitude: 126°4'W → 37°18'46"N  
Longitude: 37°2'N → 126°36'36"E
- PRC-0349-003 (Approved on 30/10/2014)
  - K-water changed the abbreviation of Korea Water Resources Corporation from KOWACO to K-water.
  - K-water updated the monitoring structure according to the changes of role and responsibility of related monitoring departments

**E.4.3. Changes to the start date of the crediting period**

There were no post registration changes identified by verification team during this verification.

However, there was start date of the crediting period of the project activity change from 01/07/2009 to 01/07/2011 and it approved by the Board on 26/04/2011.

**E.4.4. Inclusion of a monitoring plan**

Not applicable

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#### **E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents**

There were no post registration changes identified by verification team during this verification.

However, there were permanent changes from registered monitoring plan as below during 1<sup>st</sup> verifications and renewal of crediting period approved by the Board.

- PRC-0349-001 (Approved on 23/11/2012)
  - K-water changed the type of watt-hour meters from bidirectional meters to unidirectional metes.
  - K-water changed the calibration frequency of watt-hour meters for measuring imported electricity from 2 years to 7 years.
- PRC-0349-004 (Approved on 04/01/2019)
  - K-water changed the monitoring plan of energy meters for exported and imported electricity to be calibrated properly in accordance with the national regulations.

#### **E.4.6. Changes to the project design**

There were no post registration changes identified by verification team during this verification.

#### **E.4.7. Changes specific to afforestation and reforestation project activities**

Not applicable

#### **E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents**

<b>Means of verification</b>	The KFQ verification team reviewed the monitoring plan contained in the registered PDD against the approved methodology applied by the project activity, ACM0002 (Version 17) and "Tool to calculate the emission factor for an electricity system" (Version 6.0).
<b>Findings</b>	The KFQ verification team found that there were no incompliance between the registered monitoring plan, the applied methodology ACM0002 (Version 17) and "Tool to calculate the emission factor for an electricity" (Version 6.0). Furthermore, it was found that there are no standardized baselines applied in the project activity.
<b>Conclusion</b>	KFQ confirms that the monitoring plan contained in the registered PDD is in accordance with the approved methodology applied by the project activity, ACM0002 (Version 17) and "Tool to calculate the emission factor for an electricity system" (Tool 07, Version 6.0).  There is no applicable standardized baselines for the project activity.

#### **E.6. Compliance of monitoring activities with the registered monitoring plan**

##### **General statement on data and parameters monitored**

<b>Means of verification</b>	The means of verification in relation to the different parts (Information flow and data collection system, monitoring parameters and Social Fund) are stated in detail in the section & tables further below.
<b>Findings</b>	The findings in relation to the different parts (information flow and data collection system, monitoring parameters are stated in detail in the section & tables further below.
<b>Conclusion</b>	KFQ confirms that the monitoring is complete and has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. The monitoring plan in the registered PDD has been properly implemented and is followed by the PP.

	<p>KFQ confirms that all parameters stated in the monitoring plan in the registered PDD have been monitored and updated as applicable, including project emission parameters, baseline emission parameters (leakage is not applicable) and management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan.</p> <p>KFQ confirms that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan in the registered PDD, the applied methodology as well as the relevant guidance provided by the CDM Executive Board. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that monitoring results are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that QA/QC procedures have been applied in accordance with the monitoring plan in the registered PDD.</p> <p>KFQ confirms that the MR lists each parameter required by the monitoring plan in the registered PDD and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided in the MR (The information flow for each parameter is further verified in the following sections).</p> <p>KFQ confirms that the monitoring methodologies and sustaining records are sufficient to enable verification of emission reductions.</p>
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#### E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	Data and parameters fixed ex-ante as listed in the MR have been crosschecked & reviewed – as applicable-against the monitoring plan in the registered PDD as well as against the applied methodology (ACM0002, Version 17) and other relevant CDM related documentation.			
Findings	Detailed assessment on ‘Data and parameters fixed ex ante’ is as below;			
	Data/parameter (unit, description)	Source of data	Value(s) applied	KFQ Findings
	EF <sub>grid,CM,y</sub> tCO <sub>2</sub> e/MWh, CO <sub>2</sub> emission factor of the grid	Registered PDD/ACM0002 , Version 17)	0.5197	Crosscheck of the value with the registered PDD & Monitoring plan and the applied methodology showed compliance of parameter
	EF <sub>grid,OM,y</sub> tCO <sub>2</sub> e/MWh, CO <sub>2</sub> emission factor of the grid	Registered PDD/ACM0002 , Version 17)	0.7043	Crosscheck of the value with the registered PDD & Monitoring plan and the applied methodology showed compliance of parameter
	EF <sub>grid,BM,y</sub> tCO <sub>2</sub> e/MWh, CO <sub>2</sub> emission factor of the grid	Registered PDD/ACM0002 , Version 17)	0.4582	Crosscheck of the value with the registered PDD & Monitoring plan and the applied methodology showed compliance of parameter
Conclusion	KFQ confirms that all data and parameters fixed ex ante such as emission factors, etc. are explicitly mentioned in the MR and have been correctly and consistently applied. All values are in compliance with relevant documentation such as the monitoring plan and the registered PDD, applied methodology ACM0002 (Version 17.0) and other CDM related documentation, where applicable.			

#### E.6.2. Data and parameters monitored

##### Information flow & data collection system

<b>Means of verification</b>	The verification team assessed the information flow (where applicable) and data collection system of all monitoring parameters by means of physical inspection of
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	<p>all major components of the information flow &amp; data collection system as well as related documentation. Interviews with relevant staff were held in order to experience the system in action. Furthermore, the following documents were reviewed and cross checked.</p> <p>Data generation and aggregation:</p> <ul style="list-style-type: none"><li>• Meters’ readings</li><li>• Calibration records and certificates</li></ul> <p>Aggregation to recording:</p> <ul style="list-style-type: none"><li>• Daily and monthly exported electricity generation data (“central control system of K-water”)</li><li>• KPX data from e-power market in KPX website (<a href="http://kpx.or.kr">http://kpx.or.kr</a>)</li><li>• Monthly imported electricity data from KEPCO i-SMART system</li><li>• Receipts of sales issued by KPX (export) and KEPCO (import)</li></ul> <p>Calculation and reporting:</p> <ul style="list-style-type: none"><li>• Crosscheck of implemented calculations in Excel sheets against the PDD formulae</li><li>• Data cross check between monthly report generated by the PP and Excel Sheets</li></ul>																																																										
Findings	<p>As stated in the MR and verified by the KFQ verification team, the common data flow system is used in the project activity for the following parameters:</p> <ul style="list-style-type: none"><li>• Net amount of electricity transmitted to the grid (<math>EG_{PJ,y}</math>)</li></ul> <p>The verification team checked 10 Watt-hour meters which are consistent with the PDD's monitoring plan. Export main meters, M1, M3 and M5 measures exported electricity to the grid and export sub meters, M2, M4 and M6 are used for malfunction of export main meters. Imported electricity is measured by import main meters, M7, M8, M9 and import sub meter, M10. The amount of power transmitted by each generator is measured in each watt-hour meter. Therefore, the sum of each electricity in <math>EG_{PJ,y}</math> is not calculated in duplicate.</p> <table><tr><th colspan="2">Generators #</th><th>#1</th><th>#2</th><th>#3</th><th>#4</th><th>#5</th><th>#6</th><th>#7</th><th>#8</th><th>#9</th><th>#10</th></tr><tr><td rowspan="2">Meter for electricity export</td><td>Main meter</td><td colspan="4">M1</td><td colspan="4">M3</td><td colspan="2">M5</td></tr><tr><td>Sub meter</td><td colspan="4">M2</td><td colspan="4">M4</td><td colspan="2">M6</td></tr><tr><td rowspan="2">Meter for electricity import</td><td>Main meter</td><td colspan="4">M7</td><td colspan="4">M8</td><td colspan="2">M9</td></tr><tr><td>Sub meter</td><td colspan="10">M10</td></tr></table> <p>The amount of electricity exported to the grid is continuously measured by export main meters, M1, M3 and M5. Each data from these 3 main meters simultaneously is transferred to the central control system of K-water which is PP’s ERP system and KPX system. The measured data is collected daily, weekly and monthly and is archived in electronic way. The amount of electricity exported to the Grid was cross-checked by K-water and KPX and it is confirmed as electricity exported to the grid from the project activity and it is confirmed through monthly KPX sales receipts.</p> <p>And the amount of electricity imported from the grid is continuously measured by import meters, M7, M8, M9 and import sub meter, M10. These 4 meters are controlled by KEPCO and measured electricity of each meters are transferred to KEPCO and recorded internal system (central control system of K-water) too. The measured imported electricity from the Grid was cross-checked against receipts of sales issued by KEPCO.</p> <p>It was found by the KFQ verification team that the information flow and data collection system were fully functional and were so during the whole verification period covered under this verification. Respective documents and results were made available to KFQ for verification.</p>	Generators #		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	Meter for electricity export	Main meter	M1				M3				M5		Sub meter	M2				M4				M6		Meter for electricity import	Main meter	M7				M8				M9		Sub meter	M10									
Generators #		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10																																																
Meter for electricity export	Main meter	M1				M3				M5																																																	
	Sub meter	M2				M4				M6																																																	
Meter for electricity import	Main meter	M7				M8				M9																																																	
	Sub meter	M10																																																									
Conclusion	<p>The KFQ verification team confirms that the information flow &amp; data collection system meets the requirements of the registered PDD and its monitoring plan as per the applied and approved methodology ACM0002 (Version 17). Intervals</p>																																																										

	(measuring frequency, reading frequency and recording frequency) are applied in accordance with the applied methodology and the monitoring plan.
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### **Assessment on data/ parameters**

Detailed assessment on data and parameters monitored is described as below;

The table out of the CDM-VCR-FORM has been used for the assessment, following rows as needed have been added: Data/Parameter, Unit, Description, Source of data used, Value(s)

<b>Data/Parameter</b>	EG <sub>PJy</sub>
<b>Data Unit</b>	MWh
<b>Description</b>	Net amount of electricity transmitted to the grid excluding electricity consumed in the plant
<b>Source of data used</b>	Watt-hour meter
<b>Value(s)</b>	229,367,616 MWh - Total electricity transmitted to the grid is 231,358,512 MWh - Total imported electricity is 1,990,896 MWh
<b>Means of verification</b>	The KFQ verification team checked, whether the monitoring activities in relation to this parameter comply with the monitoring plan in the registered PDD by physically inspecting the applied measuring meters for generation, aggregation, recording and reporting. The verification team reviewed the exported electricity generation data (hourly, daily and monthly) and cross-checked with the receipts of sales issued by KPX. We checked the measured record for imported electricity and cross-checked with the receipts of sales issued by KEPCO. Furthermore, procedures and records on calibration, maintenance and QA/QC activities have been reviewed, discussed in interviews and checked against the requirements out of the monitoring plan in the registered PDD.
<b>Findings</b>	The amount of electricity transmitted to the grid is continuously measured by export main meters (M1, M3 and M5). Each data from these 3 main meters simultaneously is transferred to the central control system of K-water which is PP's ERP system and KPX. The measured data is collected daily, weekly and monthly and is archived in electronic way. The amount of electricity transmitted was double checked by K-water and KPX then it is confirmed as electricity transmitted to the grid from the project activity. Finally, it is confirmed through monthly sales receipts issued by KPX. Each data of export sub-meters (M2, M4 and M6) is back-up for the preparedness of malfunctioning of the main meters. The verification team checked that these three sub meters were not used during this monitoring period by comparison between two relevant data, daily electricity sales downloaded from the KPX e-power market system and daily exported electricity data measured by each meter (M2, M4, M6) and archived in central control system of K-water. The verification team found that data of electricity transmitted to the grid is consistent with the MR. The amount of electricity imported from the grid is continuously measured by import meters (M7, M8, M9) and import sub meter (M10). Each data from 4 imported meters is transferred to KEPCO. These 4 meters are controlled by KEPCO. The amount of imported electricity from the grid was double checked against receipts of sales issued by KEPCO.
<b>Conclusion</b>	KFQ confirms that the Net amount of electricity transmitted to the grid excluding electricity consumed in the plant has been monitored and updated in accordance with the monitoring plan and the applied methodology ACM0002 (Version 17). Also the verification team confirms this parameter was applied correctly in the baseline emission calculation during the monitoring period as per the monitoring plan and the applied methodology.

<b>Data/Parameter</b>	EF <sub>grid,CM,y</sub>
<b>Data Unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	Combined margin CO <sub>2</sub> emission factor for the project electricity system in year y
<b>Source of data used</b>	2015, 2016, 2017 Statistics of Electric Power in Korea (2016, 2017, 2018) (KEPCO) and "2017 Status of Generation Facility (2018)" (KPX).
<b>Value(s)</b>	0.5197



<b>Means of verification</b>	The verification team check whether tCO <sub>2</sub> emission factor of the Korea grid is calculated correctly according to the methodology, ACM0002 (Version 17).
<b>Findings</b>	<p>This value was calculated as a weighted sum of the OM and BM emission factor according to the methodology, ACM0002 (Version 17). According to the methodology, ACM0002 (Version 17), the calculation of the baseline emission factor, EF<sub>grid,CM,y</sub> justified as below.</p> $EF_{grid,CM,y} = W_{OM} \times EF_{grid,OM,y} + W_{BM} \times EF_{grid,BM,y}$ <p>The weights <math>w_{OM}</math> and <math>w_{BM}</math> by default are 25% and 75% respectively according to the applied methodology and the calculation result is 0.5197 tCO<sub>2</sub>/MWh</p> $0.5197 \text{ tCO}_2/\text{MWh} = 0.25 \times 0.7043 \text{ tCO}_2/\text{MWh} + 0.75 \times 0.4582 \text{ tCO}_2/\text{MWh}$ <p>The verification team checked the value of CM and found it is consistent with the registered PDD. This value was calculated according to the "Tool to calculate the emission factor for an electricity system" (version 06.0). The applied value was derived from "2015, 2016, 2017 Statistics of Electric Power in Korea (2016, 2017, 2018)" (KEPCO) and "2017 Status of Generation Facility (2018)" (KPX).</p>
<b>Conclusion</b>	The verification team confirmed that the PP has applied the parameter fixed ante adequately in calculating the GHG emission reductions according to the registered PDD (version 04.0)

### E.6.3. Implementation of sampling plan

<b>Means of verification</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

## E.7. Compliance with the calibration frequency requirements for measuring instruments

### General statement

<b>Means of verification</b>	The means of verification in relation to the specific instruments are stated in detail in the tables further below
<b>Findings</b>	During the verification, KFQ found that the PP directly calibrated the watt-hour meter for exportation on 04/10/2018. The findings in relation to the specific instruments are stated in detail in the tables further below.
<b>Conclusion</b>	KFQ confirms that the calibration of the measuring equipment has been conducted as per the national law, applied methodology and the monitoring plan in the registered PDD. KFQ confirms, that there has not been any calibration delay for any instrument affecting the verification period and thus, there is no error to be applied on any monitored parameters.

*The table of the CDM-VCR-FORM has been used for the assessment, following rows as needed have been added: Data/Parameter, Data Unit, Description, I.D / Serial Number, Type, Accuracy level, Calibration entity, Calibration frequency, Previous calibration (when applicable), Latest calibration, Applied period of max. permissible error (when applicable). Some parameters involve several instruments, table rows have been added as needed accordingly*

<b>Data/Parameter</b>	EG <sub>PJ,y</sub>			
<b>Data Unit</b>	MWh			
<b>Description</b>	Net amount of electricity transmitted to the grid excluding electricity consumed			
<b>I.D / Serial Number</b>	Main-meter for electricity exported			
	I.D	M1	M3	M5
	Serial number	PT-0909A408-01	PT-0909A407-01	PT-0909A409-01
<b>Type</b>	Watt-hour meter (Main-meter)			

<b>Accuracy level</b>	± 0.2%												
<b>Calibration entity</b>	Test Entity: Korea Water Resources Corporation(K-water) Supervisor: Korea Power Exchange (KPX)												
<b>Calibration frequency</b>	within 3.5 years ± 6 months												
<b>Previous calibration</b>	11/10/2016 (Validity 10/10/2018)												
<b>Latest calibration</b>	04/10/2018 (Validity 03/10/2022)												
<b>Applied period of max. permissible error</b>	N/A (no calibration delay)												
<b>Means of verification</b>	The KFQ verification team has visually checked the physical existence of the meters. We checked the calibration records & meter history against the calibration requirements as per the applied methodology, the monitoring plan in the registered PDD as well as the available instrument specifications.												
<b>Findings</b>	It was found that the instrument, as stated in the MR, physically exists and could be identified by the I.D number and the serial number. It was found that the instrument has been calibrated regularly and as per the defined requirements. No delay of calibration has been observed. It was found that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.												
<b>Conclusion</b>	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology and the national law.												
<b>I.D / Serial Number</b>	<table border="1"> <tr> <th colspan="4">Sub-meter for electricity exported</th></tr> <tr> <th>I.D</th><th>M2</th><th>M4</th><th>M6</th></tr> <tr> <td>Serial number</td><td>53048163</td><td>53048164</td><td>53048162</td></tr> </table>	Sub-meter for electricity exported				I.D	M2	M4	M6	Serial number	53048163	53048164	53048162
Sub-meter for electricity exported													
I.D	M2	M4	M6										
Serial number	53048163	53048164	53048162										
<b>Type</b>	Watt-hour meter (Sub-meter)												
<b>Accuracy level</b>	±0.5%												
<b>Calibration entity</b>	Test Entity: Korea Water Resources Corporation (K-water) Supervisor: Korea Power Exchange (KPX)												
<b>Calibration frequency</b>	within 3.5 years ± 6 months												
<b>Previous calibration</b>	11/10/2016 (Validity 10/10/2018)												
<b>Latest calibration</b>	04/10/2018 (Validity 03/10/2022)												
<b>Applied period of max. permissible error</b>	N/A (no calibration delay)												
<b>Means of verification</b>	The KFQ verification team has visually checked the physical existence of the meters. We checked the calibration records & meter history against the calibration requirements as per the applied methodology, the monitoring plan in the registered PDD as well as the available instrument specifications.												
<b>Findings</b>	It was found that the instrument, as stated in the MR, physically exists and could be identified by the I.D number and the serial number. It was found that the instrument has been calibrated regularly and as per the defined requirements. No delay of calibration has been observed. It was found that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.												
<b>Conclusion</b>	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology and the national law.												
<b>Data/Parameter</b>	EG <sub>PJ,y</sub>												
<b>Data Unit</b>	MWh												
<b>Description</b>	Net amount of electricity transmitted to the grid excluding electricity consumed												
<b>I.D / Serial Number</b>	<table border="1"> <tr> <th colspan="4">Main-meter for electricity imported</th></tr> <tr> <th>I.D</th><th>M7</th><th>M8</th><th>M9</th></tr> <tr> <td>Serial number</td><td>8175017820</td><td>8175017821</td><td>8175017822</td></tr> </table>	Main-meter for electricity imported				I.D	M7	M8	M9	Serial number	8175017820	8175017821	8175017822
Main-meter for electricity imported													
I.D	M7	M8	M9										
Serial number	8175017820	8175017821	8175017822										

<b>Type</b>	Watt-hour meter (Main-meter)						
<b>Accuracy level</b>	± 0.5%						
<b>Calibration entity</b>	Korea Testing Certification Co., Ltd.						
<b>Calibration frequency</b>	Every 7 years  ※ According to the national law for electricity meter for import (Enforcement Decree of The Measures Act), meters shall be recalibrated by KEPCO every 7 years but calibration validity is counted from first day of the next month of the day that calibration was conducted.(i.e. In case of calibration was conducted on 17/11/2010, validity of it is 01/12/2010~30/11/2017).						
<b>Previous calibration</b>	22/10/2010 (Validity 31/10/2017)						
<b>Latest calibration</b>	04/04/2017 (Validity 30/04/2024)						
<b>Applied period of max. permissible error</b>	N/A (no calibration delay)						
<b>Means of verification</b>	The KFQ verification team has visually checked the physical existence of the meters. We checked the calibration records & meter history against the calibration requirements as per the applied methodology, the monitoring plan in the registered PDD as well as the available instrument specifications.						
<b>Findings</b>	It was found that the instrument, as stated in the MR, physically exists and could be identified by the I.D number and the serial number. It was found that the instrument has been calibrated regularly and as per the defined requirements. No delay of calibration has been observed. In addition, we have cross-checked the KOLAS certificate confirming that the qualification of the testing laboratory of 'Korea Testing Certification Co., Ltd.' is valid on the test date of the calibration report (04/04/2017). It was found that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.						
<b>Conclusion</b>	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology and the national law.						
<b>I.D / Serial Number</b>	<table border="1"> <tr> <td colspan="2">Sub-meter for electricity imported</td> </tr> <tr> <td>I.D</td> <td>M10</td> </tr> <tr> <td>Serial number</td> <td>25162020294</td> </tr> </table>	Sub-meter for electricity imported		I.D	M10	Serial number	25162020294
Sub-meter for electricity imported							
I.D	M10						
Serial number	25162020294						
<b>Type</b>	Watt-hour meter (Sub-meter)						
<b>Accuracy level</b>	±0.5%						
<b>Calibration entity</b>	Korea Testing Certification Co., Ltd.						
<b>Calibration frequency</b>	Every 7 years  ※ According to the national law for electricity meter for import (Enforcement Decree of The Measures Act), meters shall be recalibrated by KEPCO every 7 years but calibration validity is counted from first day of the next month of the day that calibration was conducted.(i.e. In case of calibration was conducted on 17/11/2010, validity of it is 01/12/2010~30/11/2017).						
<b>Previous calibration</b>	17/11/2010 (Validity 30/11/2017)						
<b>Latest calibration</b>	08/12/2016 (Validity 31/12/2023)						
<b>Applied period of max. permissible error</b>	N/A (no calibration delay)						
<b>Means of verification</b>	The KFQ verification team has visually checked the physical existence of the meters. We checked the calibration records & meter history against the calibration requirements as per the applied methodology, the monitoring plan in the registered PDD as well as the available instrument specifications.						
<b>Findings</b>	The KFQ verification team has visually checked the physical existence of the meters. In addition, we have cross-checked the KOLAS certificate confirming that the qualification of the testing laboratory of 'Korea Testing Certification Co., Ltd.' is valid on the issue date of the test report (09/12/2016). The KFQ validation team						

	has checked the calibration records & meter history against the calibration requirements as per the applied methodology, the monitoring plan in the registered PDD as well as the available instrument specifications.
<b>Conclusion</b>	It was found that the instrument, as stated in the MR, physically exists and could be identified by serial number. It was found that the instrument has been calibrated regularly and as per the defined requirements. No delay of calibration has been observed. It was found, that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.

## E.8. Assessment of data and calculation of emission reductions or net removals

### E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

<b>Means of verification</b>	<p>The KFQ verification team has reviewed all data, parameters and formulae with respect to calculation of the baseline GHG emissions and checked them against the requirements out of the applied methodology ACM0002 (Version 17) and the PDD as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations.</p> <p>Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PP have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available such as but not limited to the data from KPX, electricity bills from KEPCO, etc.</p>
<b>Findings</b>	<p>The baseline GHG emissions have been found to be 119,202 tCO<sub>2</sub>e for the verification period. It was found that a complete set of data covering the monitoring period has been provided by the PP. Activity levels and non-activity (ex-ante) parameter have been monitored in accordance with the monitoring plan in the registered PDD, as applicable.</p> <p>The calculation was found to be correct as well as carried out in accordance with the formulae and methods described in the monitoring methodology ACM0002 (Version 17) and the registered PDD.</p> <p>It was found that all emission factors and default values and reference values, as applicable, have been correctly justified, are explicitly mentioned in the MR and have been correctly applied. It was found that no assumptions are used that have any relevant influence on reported emission reductions.</p> <p>It was found that 'the data of electricity exported to KEPCO grid' were daily transferred to central control system of K-water and the collected data of K-water was cross-checked with the data of KPX. 'The data of electricity imported from KEPCO grid' were monthly checked by receipt of KEPCO. It is checked that there were no errors in the transfer of data for the calculation of emissions reductions. KFQ confirms that rounding of digits has been applied both correctly and conservatively.</p> <p>It was found that the spreadsheets, were made available completely by the PP and that all formulae have been correctly implemented and are accessible and traceable. Safeguarding procedures in accordance to the monitoring plan have been applied in a conservative way. Rounding of digits, where applicable, has been applied both correctly and conservatively.</p> <p>All necessary documentation is collected, referenced and aggregated and is easily accessible in spreadsheets and daily reports in electronic format. Measurements are performed by proper Watt-hour meters, and key data could be cross-checked via other sources (if applicable). Further details on cross-checks for each parameter and the information flow are given in sections E.6.2 above.</p> <p>A detailed assessment of all relevant parameters for the verification period is given in E.6.1 and E.6.2 above.</p>
<b>Conclusion</b>	<p>KFQ confirms that all required data for calculation of the baseline GHG emissions were available for the whole verification period.</p> <p>KFQ confirms that suitable cross-checking of data was possible and has been performed as described.</p> <p>KFQ confirms that the PP has followed appropriate methods and formulae for</p>

	<p>calculating baseline GHG emissions have been followed.</p> <p>KFQ confirms that any emission factors, default values and reference values – as applicable – that were applied in the calculation have been justified and correctly applied. No assumptions were used.</p> <p>KFQ confirms that the calculation of the baseline GHG emissions for the covered monitoring period is fully complete and based on suitable and verifiable evidence.</p>
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#### E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

<b>Means of verification</b>	KFQ has checked, whether project GHG emissions (if any) were determined by the PP is in accordance with the applied methodology and the monitoring plan in the registered PDD.
<b>Findings</b>	For most renewable energy project activities, P <sub>Ey</sub> =0 according to the methodology, ACM0002 (Version 17).
<b>Conclusion</b>	KFQ confirms that the PP approach with regard to project GHG emissions is correct and that no project GHG emissions need to be considered in the project based on the applied methodology.

#### E.8.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	KFQ has checked, whether leakage emissions (if any) were determined by the PP in accordance with the applied methodology and the monitoring plan in the registered PDD.
<b>Findings</b>	KFQ has found that the approach applied by the PP that leakage emissions need not to be considered (i.e. being considered zero, consequently) is in accordance to the applied methodology ACM0002 (Version 17).
<b>Conclusion</b>	KFQ confirms that the PP approaches with regard to leakage GHG emissions is correct and that no leakage GHG emissions need to be considered in the project based on the applied methodology.

#### E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

<b>Means of verification</b>	<p>KFQ has reviewed all data, parameters and formulae with respect to calculation of the baseline GHG emissions and checked them against the requirements out of the applied methodology ACM0002 (Version 17) and the registered PDD as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations.</p> <p>Furthermore, KFQ has assessed whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PP have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available such as but not limited to the data from KPX, electricity bills from KEPCO, etc.</p> <p>Means of verification in respect of baseline GHG emissions, project GHG emissions and leakage GHG emissions that form the basis for calculation of the GHG emission reductions, are stated in detail in sections E.8.1., E.8.2. and E.8.3. above.</p>
<b>Findings</b>	<p>The GHG emission reductions have been found to be 119,202 tCO<sub>2</sub>e for the verification period.</p> <p>It was found that a complete set of data covering the monitoring period has been provided by the PP. Activity levels and non-activity (ex-ante) parameter have been monitored in accordance with the monitoring plan in the registered PDD, as applicable.</p> <p>The calculation was found to be correct as well as carried out in accordance with the formulae and methods described in the monitoring methodology ACM0002 (Version 17) and the registered PDD.</p> <p>It was found that all emission factors and default values and reference values, as applicable, have been correctly justified, are explicitly mentioned in the MR and have been correctly applied. It was found that no assumptions are used that have any relevant influence on reported emission reductions.</p> <p>It was found that 'the data of electricity exported to KEPCO grid' were daily</p>

	<p>transferred to central control system of K-water and the collected data of K-water was cross-checked with the data of KPX. 'The data of electricity imported from KEPCO grid' were monthly checked by receipt of KEPCO. It is checked that there were no errors in the transfer of data for the calculation of emissions reductions. KFQ confirms that rounding of digits has been applied both correctly and conservatively.</p> <p>It was found that no re-calculations of raw data are applied during this monitoring period.</p> <p>And it was found that the spreadsheets were made available completely by the PP and that all formulae have been correctly implemented and are accessible and traceable according to the registered PDD. Safeguarding procedures in accordance to the monitoring plan have been applied in a conservative way. Rounding of digits, where applicable, has been applied both correctly and conservatively.</p> <p>All necessary documentation is collected, referenced and aggregated and is easily accessible in spreadsheets and daily reports in electronic format. Measurements are performed by proper Watt-hour meters, and key data could be cross-checked via other sources (if applicable). Further details on cross-checks for each parameter and the information flow are given in sections E.6.2 above.</p> <p>A detailed assessment of all relevant parameters for the verification period is given in E.6.1 and E.6.2 above.</p>
<b>Conclusion</b>	<p>KFQ confirms that all data set required for calculation of the baseline GHG emissions were obtained for the whole verification period and no data were missing of any non-monitoring of activity levels or non-activity parameters.</p> <p>KFQ confirms that suitable cross-checking of data was possible and has been performed as described.</p> <p>KFQ confirms that the PP have followed appropriate methods and formulae for calculating GHG emission reductions have been followed.</p> <p>KFQ confirms that any emission factors, GWPs and default values and reference values – as applicable – that were applied in the calculation have been justified and correctly applied. No assumptions were used.</p> <p>KFQ confirms that the calculation of the GHG emission for the covered monitoring period is fully complete and based on suitable and verifiable evidence.</p>

#### E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

<b>Means of verification</b>	<p>KFQ compared the ex-ante estimation of emission reductions in the registered PDD (Version 04.0) with the emission reductions reported by the PP in the MR. Furthermore, the value, especially the electricity exported to the Grid applied in the estimation of emission reductions in the registered PDD were reviewed.</p>
<b>Findings</b>	<p>The ex-ante estimation for year 2018 in the PDD is 251,089 tCO<sub>2</sub>e and it corresponds to 124,512 tCO<sub>2</sub>e during the 181 days (01/01/2019 to 30/06/2019) of the verification period. The actual emission reductions reported by the PP during the same period was 119,202 tCO<sub>2</sub>e and is thus lower than the value estimated in the PDD.</p> <p>The verification team recognized that the difference between flow tide and ebb tide caused by the Earth's rotation is influenced by the astronomical principle of the 'Nutation Period' (18.6 years) through on-site inspection. According to the staff in charge of the generator operation, this is the period from 2018 when the tide is lowered by the above principle. Therefore, it is estimated that the actual power generation is reduced compared to the power generation planned by the PP. It is difficult to ascertain exactly how much difference is scientifically generated.</p>
<b>Conclusion</b>	<p>KFQ confirms the reported emission reductions in the MR (Version 02) decreased by 4.3% compared to the ex-ante estimation of emission reductions in the registered PDD.</p> <p>KFQ confirms that the emission reductions claimed by the PP are reasonable.</p>

#### E.8.6. Remarks on difference from estimated value in registered PDD

<b>Means of verification</b>	<p>As per the specific instructions of the CDM-VCR-FORM, in this section it is to be explained how the cause of any increase in the actual GHG emission reductions in this monitoring period were assessed in accordance with the applicable verification</p>
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	requirements in the VVS. As determined in section E.8.5 above, the emission reductions of the project activity during the verification period are lower than emissions reductions estimated ex-ante in the PDD, KFQ has checked the respective explanation offered by the PP in the monitoring period.
<b>Findings</b>	The reported emission reductions in the MR (Version 02.0) are lower than the ex-ante estimation in the registered PDD. The main reason is that the power generation is decreasing according to the inspection period described above. Actual net amount of electricity transmitted to the grid (229,367 MWh) is smaller than the registered PDD (239,585 MWh) for the same period.
<b>Conclusion</b>	KFQ confirms that the difference between the actual GHG emissions reductions and the estimated value were well justified during the verification period. KFQ confirms that the emission reductions claimed by the PP are reliable.

#### **E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

<b>Means of verification</b>	The GHG emission reductions reported in the MR are 119,202 tCO <sub>2</sub> e. As described in detail in Section E of this report, all relevant aspects of the project activity have been assessed in order to determine, whether the claimed emission reductions by the PP are correctly determined, reasonable and fairly stated and based on verifiable evidence and in accordance with the applied methodology and the registered PDD.
<b>Findings</b>	It was found that the project activity is implemented and operated according to the registered PDD. The monitoring of any and all data and parameters as well as calculation of baseline GHG emissions, project GHG emissions and GHG emission reductions is complete conducted in accordance with the registered PDD, the applied methodology.
<b>Conclusion</b>	KFQ arrived at the conclusion that the GHG emission reductions reported in the MR and claimed by the PP is correctly determined with 119,202 tCO <sub>2</sub> e for the covered verification period between 01/01/2019 to 30/06/2019. This implies, that 100% of the reported GHG emission reduction in this verification period has been achieved in a period after the end of 31/12/2012. i.e. the first commitment period is untouched by this verification period.

#### **E.9. Assessment of reported sustainable development co-benefits**

<b>Means of verification</b>	The PP has neither developed sustainable development co-benefits nor monitored sustainable development co-benefits of the project activity, the section is therefore not applicable in this verification period.
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

#### **E.10. Global stakeholder consultation**

<b>Means of verification</b>	There were no comments received with regard to the stakeholder consultation conducted after the publication of the first MR in accordance with the "CDM project cycle procedure for project activities", the section is therefore not applicable in this verification period.
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

### **SECTION F. Internal quality control**

According to KFQ's Procedure for deciding whether to proceed request for issuance, the final verification report and verification findings underwent a technical review before being submitted to the project participant for requesting issuance CERs. The technical review was performed by technical review team composed of a person qualified for this project activity in accordance with KFQ's qualification scheme for CDM project validation and verification.

**SECTION G. Verification opinion**

Through the verification for the monitoring report of the CDM project activity: “Sihwa Tidal Power Plant CDM Project” in accordance with VVS (Version 02.0), KFQ could confirm that:

- The project activity has been implemented and operated as per the registered PDD (Version 04.0, 20/09/2018),
- The installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately,
- The monitoring plan in the registered PDD is as per the applied methodology,
- The monitoring plan in the monitoring report is as per the registered PDD,
- The monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, and approved methodology including applicable tool(s) and generated GHG emission reductions data,
- The GHG emission reductions in the monitoring report (Version 02) are calculated without material misstatements.

KFQ’s verification opinion refers to the project’s GHG emissions and resulting GHG emission reductions reported both determined due to the valid and registered project’s baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated, we confirm the followings:

Project Title	Sihwa Tidal Power Plant CDM Project
UNFCCC Reference Number	0349
Date of registration	18 June 2006
Date of crediting period renewal	4 January 2019
Registered PDD	20/09/2018 (Version 04.0)
Methodology applied	ACM0002 (Version 17)
Final Version of Monitoring Report	02 (14/10/2019)
2nd Crediting period (1st Crediting period)	01/07/2018 to 30/06/2025 (01/07/2011 to 30/06/2018)
Monitoring period	01/01/2019 to 30/06/2019
Total GHG emission Reductions Verified	Baseline emissions: 119,202 tonnes CO <sub>2</sub> e Project emissions: 0 tonnes CO <sub>2</sub> e Leakage: 0 tonnes CO <sub>2</sub> e Emission reductions: 119,202 tonnes CO <sub>2</sub> e

It is the opinion of KFQ that the amount of GHG emission reductions achieved by the project activity during this monitoring period is correct and that complies with all applicable CDM requirements.

**SECTION H. Certification statement**

Korean Foundation for Quality has performed the periodic verification of the emission reductions that have been reported for the CDM project activity: “Sihwa Tidal Power Plant CDM Project” (UNFCCC Registration Ref. No. 0349) for the period from 01 January 2019 to 30 June 2019.

The project participant is responsible for the collection of data in accordance with the monitoring plan in the registered PDD and the reporting of GHG emissions reductions from the project. It is KFQ’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

KFQ conducted the verification on the basis of the monitoring methodology ACM0002 (Version 17), the registered Project Design Document of 20/09/2018 (Version 04.0), the validation report (dated



28/02/2006, Rev. 03), validation opinion on renewal of crediting period (dated on 20/10/2018), approval of UNFCCC on the renewal (dated on 04/01/2019) and the monitoring report (Version 02) dated 14/10/2019. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

KFQ's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. KFQ planned and performed the verification by obtaining evidence and other information and explanations that KFQ considers necessary to give reasonable assurance on the reported GHG emission reductions.

In our opinion the GHG emissions reductions of the "Sihwa Tidal Power Plant CDM Project" (UNFCCC Registration Ref. No. 0349) for the period from 01 January 2019 to 30 June 2019 are fairly stated in the monitoring report (Version 02).

The data generation, aggregation, recording, calculation and reporting of GHG emission reductions were conducted correctly on the basis of the approved baseline and monitoring methodology ACM0002 (Version 17) and the monitoring plan contained in the registered PDD.

Hence, KFQ is able to certify that the emission reductions of the "Sihwa Tidal Power Plant CDM Project" during the period from 01 January 2019 to 30 June 2019 are 119,202 tons of CO<sub>2</sub> equivalent

**Signed on behalf of the Korean Foundation for Quality**

Signature :

A handwritten signature in black ink, appearing to read 'Y S JEONG'.

Name : Yu Shim JEONG, Technical Managing Director  
Date : 28 October 2019

## Appendix 1. Abbreviations

Abbreviations	Full texts
ACM	Approved Consolidated Methodology
AM	Approved Methodology
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification Request
CM	Combined Margin
CMP	COP/MOP Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
DOE	Designated Operational Entity
EB	Executive Board
EF	CO <sub>2</sub> emission factor
EMS	Environment Management System
ERP	Enterprise Resource Planning
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KEPCO	Korea Electric Power Corporation
KFQ	Korean Foundation for Quality
KPX	Korea Power Exchange
K-water	Korea Water Resources Corporation
MoV	Means of verification
MP	Monitoring Plan
MR	Monitoring Report
OM	Operating Margin
PDD	Project Design Document
PP	Project participant
PS	Clean Development Mechanism Project Standard
PRC	Post-Registration Change
QMS	Quality Management System
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

## Appendix 2. Competence of team members and technical reviewers



### CERTIFICATE OF COMPETENCE

**Name:** Pyung-Hee JANG

**Qualification:**

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

**Scopes of Expertise:**

**Technical Area (TA)**

- 1.1 Thermal energy generation
- 1.2 Renewables

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 31 March 2016.

Sustainability Management Institute  
Sang Yeon PARK



## CERTIFICATE OF COMPETENCE

**Name:** Mi Jung LEE

**Qualification:**

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

**Scopes of Expertise:**

**Technical Area (TA)**

- 1.1 Thermal energy generation
- 1.2 Renewables
- 3.1 Energy demand
- 5.1 Chemical Industry
- 5.2 Caprolactam, nitric and adipic acid
- 11.1 Emission of Fluorinated gases
- 11.2 Refrigerant gas production
- 13.1 Solid waste and wastewater
- 13.2 Manure

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 5 July 2019.

Sustainability Management Institute  
Yu Shim JEONG



## CERTIFICATE OF COMPETENCE

**Name:** Su Hyun PARK

**Qualification:**

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

**Scopes of Expertise:**

**Technical Area (TA)**

- 1.2 Renewables
- 5.2 Captolactam, Nitric acid, Adipic acid
- 13.1 Solid waste and wastewater

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 23 July 2019.

Sustainability Management Institute  
Mi Jung LEE



## CERTIFICATE OF COMPETENCE

**Name:** Sung Sam MOON

**Qualification:**

	Validation	Verification
-Lead auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

**Scopes of Expertise:**

**Technical Area (TA)**

1.2 Renewables

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 12 March 2019.

Sustainability Management Institute  
Mi Jung LEE



## CERTIFICATE OF COMPETENCE

**Name:** Sun Hwan Park

**Qualification:**

	Validation	Verification
-Lead auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

**Scopes of Expertise:**

**Technical Area (TA)**

5.1 Chemical Industry

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 6 August 2019.

Sustainability Management Institute  
Mi Jung LEE



## CERTIFICATE OF COMPETENCE

**Name:** Jin Seok CHO

**Qualification:**

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

**Scopes of Expertise:**

**Technical Area (TA)**

- 1.1 Thermal energy generation
- 1.2 Renewables
- 13.1 Solid waste and wastewater
- 13.2 Manure
- 5.2 Captolactam, Nitric acid, Adipic acid

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 11 March 2019

Sustainability Management Institute  
Mi Jung LEE



### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Project participant	Monitoring report	Version 01.0(26/08/2019) Version 02.0 (14/10/2019)	Project participant
2	Project participant	The emission reduction calculations (spread sheet)	Version 01 (26/08/2019)	Project participant
3	Project participant	CDM Project Design Document (Version 04.0)	20/09/2018 Published under <a href="https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view">https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view</a>	Others
4	DNV	CDM Validation Report Report No. 2005-1537 (Revision No. 03)	28/02/2006 Published under <a href="https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view?cp=1">https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view?cp=1</a>	Others
5	TÜV SÜD South Asia Private Limited	Validation Report for renewal crediting period (Version 5.0)	20/10/2018 Published under <a href="https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view">https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view</a>	Others
6	KTR	Verification and Certification Report for the “Siwha Tidal Power Plant CDM project” for the monitoring period from 01/01/2018 to 30/12/2018 (Version 02.0)	15/02/2019 <a href="https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/iProcesses/KTRCert1543903435.29/view">https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/iProcesses/KTRCert1543903435.29/view</a>	Others
7	KFQ	Validation report for PRC	PRC-0349-005 (01/03/2019)	Others
8	TÜV SÜD	Validation report for PRC	PRC-0349-004 (04/01/2019)	Others
9	KSA	Validation report for PRC	PRC-0349-003 (30/10/2014)	Others
10	KSA	Validation report for PRC	PRC-0349-002 (03/05/2013)	Others
11	KTR	Validation report for PRC	PRC-0349-001 (23/11/2012)	Others
12	Project participant	KPX calibration test participation request materials	16/05/2019	Project participant
13	Project participant	KPX calibration test participation request materials	28/11/2011	Project participant
14	Korea Power Exchange (KPX)	Grid connection approval	13/04/2011	Project participant
15	Project participant	Test run plan	08/03/2011	Project participant
16	Project participant	Start up business notification to the government (Ministry of Knowledge Economy)	06/03/2012	Project participant
17	Project participant	Equipment specification	-	Project participant
18	Project participant	Single line diagram	26/01/2010	Project participant
19	Project participant	Daily power plant operation report	19/09/2019	Project participant
20	Project participant	Power generation time and tidal data (excel)	19/09/2019	Project participant
21	ERP system (central control system of K-water)	Daily/monthly monitoring reports (excel file)	01/01/2019 ~ 30/06/2019	Project participant
22	Korea Power	KPX hourly/daily exported	01/01/2019 ~ 30/06/2019	Project

	Exchange (KPX)	electricity data from e-power market		participant
23	Project participant	Monthly imported electricity data from KEPCO i-SMART	01/01/2019 ~ 30/06/2019	Project participant
24	Korea Electric Power Corporation (KEPCO)	Receipts of sales	01/01/2019 ~ 30/06/2019	Project participant
25	Project participant	Internal Manual in Emergency'	28/02/2019	Project participant Project participant
26	Project participant	Sihwa Tidal Power Plant Operation Manual	2011	Project participant
27	Project participant	CDM monitoring manual	25/01/2019	Project participant
28	Project participant	Designation of CDM monitoring personnel	11/03/2019	Project participant
29	Project participant	K-water organization chart (old/new) and Internal letter of revision	27/03/2019	Project participant
30	Project participant	Staff training records -Monitoring & technical training -CDM monitoring and manual training -Operation & technical training	19/06/2019	Project participant
31	Korea Accreditation Board, ISO certification information network	ISO 9001, 14001 Certified	<a href="https://www.icin.or.kr/STAT/S_TAT_02_011.aspx">https://www.icin.or.kr/STAT/S_TAT_02_011.aspx</a>	Other
32 32 33	Project participant Korea Testing Certification Co., Ltd.	Calibration reports for meters, M1~M6	04/10/2018 (Latest) 07/11/2016 (Previous)	Project participant
34	Korea Testing Certification Co., Ltd.	calibration reports for meters, M7~M9	25/10/2010, 04/04/2017	Project participant
34	Korea Testing Certification Co., Ltd.	Calibration reports for meter, M10	17/11/2010, 09/12/2016	Project participant
35	Ministry of Trade, Industry and Energy	Enforcement Decree of The Measures Act	Enforced from 01/01/2018 <a href="http://www.law.go.kr/engLsSc.do?tabMenuId=tab45&amp;query=%EA%B3%84%EB%9F%89%EC%97%90%20%EA%B4%80%ED%95%9C%20%EB%B2%95%EB%A5%A0%20%EC%8B%9C%ED%96%89%EB%A0%B9%23#">http://www.law.go.kr/engLsSc.do?tabMenuId=tab45&amp;query=%EA%B3%84%EB%9F%89%EC%97%90%20%EA%B4%80%ED%95%9C%20%EB%B2%95%EB%A5%A0%20%EC%8B%9C%ED%96%89%EB%A0%B9%23#</a>	Other
36	Korea Power Exchange	Rules on the Operation of the Electricity Market	Enforced on 03/08/2018 <a href="https://www.kpx.or.kr/www/selectBbsNttView.do?key=29&amp;bbsNo=114&amp;nttNo=17769&amp;searchCtgr=&amp;searchCnd=all&amp;searchKwd=&amp;pageIndex=1&amp;integrDeptCode=">https://www.kpx.or.kr/www/selectBbsNttView.do?key=29&amp;bbsNo=114&amp;nttNo=17769&amp;searchCtgr=&amp;searchCnd=all&amp;searchKwd=&amp;pageIndex=1&amp;integrDeptCode=</a>	Other
37	CDM Executive Board	ACM0002 "Grid-connected electricity generation from renewable sources  Tool07 Methodological Tool: Tool to calculate the emission factor for an electricity system	Version 17.0 (13/05/2016) Published under: <a href="https://cdm.unfccc.int/methodologies/DB/VJ9AX539D9MLOPXN2AY9UR1N4IYGD">https://cdm.unfccc.int/methodologies/DB/VJ9AX539D9MLOPXN2AY9UR1N4IYGD</a>  Version 06.0 (01/11/2017) Published under <a href="https://cdm.unfccc.int/Refere">https://cdm.unfccc.int/Refere</a>	Other

			<a href="https://cdm.unfccc.int/Reference/tools/index.html">nce/tools/index.html</a>	
		CDM Validation and Verification Standard for project activities	Version 02.0 (29/11/2018)	
		CDM Project Standard for project activities	Version 02.0 (29/11/2018)	
		CDM project cycle procedure for project activities	Version 02.0 (29/11/2018)	
		Guideline on the application of materiality in verifications	Version 02.0 (20/02/2015)	
		Checklist for requests for issuance for project activities	Version 02.0 (23/08/2019)	
		Monitoring report form	Version 07.0 (31/05/2019)	
		Verification and certification report form for CDM project activities	Version 03.0 (31/05/2019)	
			All published under: <a href="https://cdm.unfccc.int/Reference/index.html">https://cdm.unfccc.int/Reference/index.html</a>	

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

**Table 1. Remaining FAR from validation and/or previous verifications**

<b>FAR ID</b>	N/A	<b>Section no.</b>	N/A	<b>Date:</b> N/A
<b>Description of FAR</b>				
N/A				
<b>Project participant response</b>				<b>Date:</b> N/A
N/A				
<b>Documentation provided by project participant</b>				
N/A				
<b>DOE assessment</b>				<b>Date:</b> N/A
N/A				

**Table 2. CL from this verification**

<b>CL ID</b>	01	<b>Section no.</b>	E.3	<b>Date:</b> 26/09/2019
<b>Description of CL</b>				
During the document review and on-site assessments the verification team identified that some generator were not operated due to periodic inspection thus amount of electricity generated by them is recorded as '0'. However, these operational events were not clearly provided in the MR (Version 01.0).				
<b>Project participant response</b>				<b>Date:</b> 14/10/2019
The PP has submitted a revised MR (version 02.0) to provide operational events during this monitoring period.				
<b>Documentation provided by project participant</b>				
MR (Version 02.0), Daily operation report, Power generation time				
<b>DOE assessment</b>				<b>Date:</b> 28/10/2019
The PP has submitted a revised MR (version 02.0) to provide operational events during this monitoring period without any omission and verification team confirmed that provided operational events in MR (Version 02.0) is correct and fairly stated. The verification team checked daily operation report and time of power generation to check operational events during this monitoring period and it was cross-checked by interview with staff at the project site.				

**Table 3. CAR from this verification**

<b>CAR ID</b>	N/A	<b>Section no.</b>	N/A	<b>Date:</b> N/A
<b>Description of CAR</b>				
N/A				
<b>Project participant response</b>				<b>Date:</b> N/A
N/A				
<b>Documentation provided by project participant</b>				
N/A				
<b>DOE assessment</b>				<b>Date:</b> N/A
N/A				

**Table 4. FAR from this verification**

<b>FAR ID</b>	N/A	<b>Section No.</b>	N/A	<b>Date:</b> N/A
<b>Description of FAR</b>				
N/A				
<b>Project participant response</b>				<b>Date:</b> N/A
N/A				
<b>Documentation provided by project participant</b>				
N/A				
<b>DOE assessment</b>				<b>Date:</b> N/A
N/A				