



**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>	Title: Sihwa Tidal Power Plant CDM Project Reference number: 0349
<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 2.0
<b>Completion date of the verification and certification report</b>	12/10/2020
<b>Monitoring period number and duration of this monitoring period</b>	17 <sup>th</sup> monitoring period (4 <sup>th</sup> monitoring period in the 2 <sup>nd</sup> crediting period) Duration: 01/01/2020 ~ 30/06/2020 (first day and last day included)
<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 17.0) 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>	N/A No conditional sectional 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>	125,200 tCO <sub>2e</sub> $251,089 \text{ tCO}_{2e} \times \frac{182 \text{ days}}{365 \text{ days}} = 125,200 \text{ tCO}_{2e}$
<b>Certified amount of GHG emission reductions or GHG removals for this monitoring period</b>	116,969 tCO <sub>2e</sub>
<b>Name and UNFCCC reference number of the DOE</b>	Korean Standards Association / E-0039
<b>Name, position and signature of the approver of the verification and certification report</b>	JinSeong Park Director General of Certification Division 

## SECTION A. Executive summary

>>

Korean Standards Association (KSA) has been commissioned by Korea Water Resources Corporation (K-water) (hereafter the PP) to carry out the verification of emission reductions reported from "Sihwa Tidal Power Plant CDM Project" (hereafter the project activity) for the 17<sup>th</sup> monitoring period from 01/01/2020 to 30/06/2020.

This verification is based on the draft Monitoring Report (ver.1.0, dated on 27/08/2020), the final Monitoring Report (ver. 02, dated on 05/10/2020), the applied monitoring methodology (ACM0002 Grid-connected electricity generation from renewable sources, version 17.0), monitoring plan as described in the registered PDD, Validation Report, emission calculation spreadsheet and supporting documents made available to KSA by the project participants.

In KSA's opinion, the reported GHG emission reduction for the period from 01/01/2020 to 30/06/2020, as reported in the Monitoring Report (version 02, 05/10/2020) for the project, are fairly stated. The GHG emission reductions were correctly calculated without material misstatements based on the approved monitoring methodology ACM0002 (Version 17.0) and the monitoring plan and formulae given in the registered PDD. The project was registered as a CDM project on 18/06/2006 under UNFCCC with the registration number 0349.

Korean Standards Association (KSA) is able to certify that the project has achieved the emission reductions during the monitoring period mentioned above, amount 116,969 tons of CO<sub>2</sub> equivalent. The verification shall ensure that reported emission reductions are complete and accurate in order to be certified. The verification has based on the requirements in the Validation and Verification Standard for project activities (VVS) version 2.0, and employed a risk-based approach, focusing on the identification of significant reporting risks.

As a result of verification activity, KSA confirms that claimed emission reduction 116,969 tCO<sub>2e</sub> during 17<sup>th</sup> monitoring period (01/01/2020 to 30/06/2020) is correctly calculated on the basis of approved applied methodology ACM0002 version 17.0, monitoring plan and formulae given in the registered PDD.

## 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	ER	Sohn	Kyull	KSA	V	V	V	V
2.	Verifier	ER	Choi	SeungKeun	KSA	V	-	-	V
3.	Verifier	IR	Moon	HyunMan	KSA	V	V	V	V
4.	Verifier	ER	Hong	SeoungHyeong	KSA	V	V	V	V

**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	ER	Park	SeongYong	KSA
2	Approver	IR	Park	JinSeong	KSA

**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.	Human error in the quantification of emissions	L	It is likely to occur when personnel are unfamiliar with or not well trained regarding, emissions process or data recording.	1) Documents review - the registered PDD and validation report - the previous verification report including 16 <sup>th</sup> monitoring report 2) personnel experience/ training - Request the senior's review - Interview with power plant operation manager
2	Design of data control	L	Use of spreadsheets without adequate controls related to data changes/ updates, version tracking, traceability security.	1) Check the activity data - Export Electricity to grid through the electric trading system - Import Electricity from grid through the bills - Emission factor through the registered PDD 2) Check the activity data applied to spread sheet and the function formula
3	Omissions and misstatements in data transfer from raw data into ER spreadsheet	M	Ineffective quality control of data transfer due to unclear QA/QC procedure.	1) All data are recorded electronically to K-water 2) Compare raw data (import & export electricity) and data in spreadsheet. 3) Be careful about the activity data into the emission reductions spreadsheet.
4	Missing data due to failure of measurement equipment	L	The monitoring plan defines emergency procedures in case a meter fails. No back-up meters are installed or available onsite.	Data collection effort throughout the crediting period (QA/QC) as below; 1) Eligibility verification 2) Review the data trend for import and export electricity. 3) Back-up meters for export are installed. 4) Database

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

>>

As per the “para 326 of VVS version 2.0, the project activity is a large-scale CDM project activity achieving total emission reduction 300,000 ton of CO<sub>2e</sub> per year or less, as such a 2 percent materiality threshold is applied.

At the beginning of the verification, the verification team have assessed the nature, scale and complexity of the project activity by carrying out a strategic analysis of all activities relevant to the project activity.

The verification was basically carried out as per the verification plan. However, based on the actual situation on-site and the errors, omissions and misstatements identified during the verification minor deviations from the original plan occurred. However, due to the insignificance no major revision of the overall plan was required, especially there are no need for additional/less location to be visited during the on-site.

## SECTION D. Means of verification

### D.1. Desk/document review

>>

The verification of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the initial version of Monitoring Report<sup>/01/</sup> submitted to the KSA. Qualitative information comprises information on internal management system, emissions reduction calculation procedure, procedures for transfer of data, frequency of emission reports and review and internal quality control. The monitoring report submitted by the project participant was also made available on the UNFCCC CDM website.

Documents reviewed at this stage were as follows:

- Monitoring report (initial version 01.0, 27/08/2020 and final version 02, 05/10/2020)<sup>/01/</sup>
- Emission reductions calculation spreadsheet (Version 01.0, 27/08/2020)<sup>/02/</sup>
- Registered PDD (version 4.0)<sup>/03/</sup>
- Validation Report<sup>/04/</sup>
- Validation Report for PRC-0349-004<sup>/05/</sup>
- Previous (16<sup>th</sup>) Monitoring Report<sup>/06/</sup>
- Previous (16<sup>th</sup>) Verification Report<sup>/07/</sup>
- Applied monitoring methodology, ACM0002 version 17.0<sup>/09/</sup>
- Other supplementary documents listed in 'Appendix 3' below

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

Duration of on-site inspection: 23/09/2020 to 23/09/2020				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assess the implementation and operation status	Sihwa tidal power plant	23/09/2020	Sohn, Kyull Moon, HyunMan Hong, SeungHyeong
2	Review the information (from data generation, aggregation, to recording, calculation and reporting) for monitoring parameters			
3	Interviews with the operational personnel			
4	Cross check between information provided in the MR and measured data Electric trading system (ERP).			
5	Check of monitoring equipment including calibration records			
6	Review the calculation in determining the GHG emission and emission reduction			
7	Identification of the QA/QC procedure			

**D.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kim	Deog-Je	K-water	23/09/2020	General Management	Sohn, Kyull Moon, HyunMan Hong, SeungHyeong
					Development of Monitoring report, including GHG emission reduction calculation	
2	Sung	Ju-Yeon			Project implementation and monitoring	
3	Lee	Myung-Won				

**D.4. Sampling approach**

&gt;&gt;

Sampling approach is not applied during verification process.

The only measured data –net electricity supplied to the grid as a result of project activity – are monitored by watt-hour meters that have been installed and confirmed by national regulations, then measured data are electronically transferred and archived both into the PPs “renewable energy metering system” and into KPX (Korea Power Exchange) database.

So, verification team was able to access archived numbers for whole monitoring period, and was able to download as excel format, then easily compared with numbers in the monitoring report.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	1	-	-
Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	1	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and	-	-	-

standardized baselines			
Compliance of monitoring activities with the registered monitoring plan	2	-	-
Compliance with the calibration frequency requirements for measuring instruments	1	-	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
<b>Total</b>	<b>5</b>	<b>0</b>	<b>0</b>

## SECTION E. Verification findings

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

<b>Means of verification</b>	Verification team have cross checked all sections of the Monitoring Report <sup>/01/</sup> against the latest and valid version of Monitoring report form (CDM-MR-FORM) version 07.0 <sup>/12/</sup> . Each section in the report include proper information that required by relevant guidance. Verification team confirmed the CDM-MR-FORM version 07.0 <sup>/12/</sup> is correctly modified and applied. The latest instructions for filling out the MR have been followed.
<b>Findings</b>	CL01, refer to Appendix 4. Based on the review of the revised MR, CL01 is appropriate and found satisfied.
<b>Conclusion</b>	Verification team confirms that monitoring report is complied with relevant the latest reporting template CDM-MR-FORM (Version 07.0) <sup>/12/</sup> and the instructions for filling out the monitoring report form attached.

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

>>

Verification team reviewed the previous verification report<sup>/07/</sup> and validation report<sup>/04/</sup>, but no FARs were issued.

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

<b>Means of verification</b>	<p>The project activity is a project to reduce the GHG emissions by using tidal power to generate electricity. Verification team have carried out on-site assessment to verify implementation and operation against the description in the registered PDD (version 4.0)<sup>/03/</sup>.</p> <p>1) Physical project Implementation Verification team reviewed following documents to confirm implementation timeline described in the monitoring report:</p> <ul style="list-style-type: none"> <li>- Completion report for Sihwa tidal power plant<sup>/15/</sup></li> <li>- Inspection certificate prior to the Operation<sup>/16/</sup></li> <li>- Start up business notification to the government<sup>/17/</sup></li> <li>- Approval for initial connection to the grid<sup>/18/</sup></li> <li>- Report on the date for commencement of operation<sup>/19/</sup></li> </ul> <p>Verification team found that project implementation timeline listed in section A.1 of the monitoring is correct as below.</p> <ul style="list-style-type: none"> <li>- Construction period: 31/12/2004 – 14/11/2011</li> <li>- Operation started on 13/04/2011</li> <li>- Commissioning period: 28/03/2011 to 29/02/2012</li> </ul>
------------------------------	---

	<ul style="list-style-type: none"> <li>- Commercial operation started on 01/03/2012</li> <li>- Continuous operation until now.</li> </ul> <p>2) Description of the project activity</p> <p>The project activity is to generate the electricity from renewable source by installing tidal power plants at Sihwa lake. To verify implementation status of the project activity, verification team has reviewed following documents:</p> <ul style="list-style-type: none"> <li>- Registered PDD and approved revised PDD<sup>/03/</sup></li> <li>- Monitoring report<sup>/01/</sup></li> <li>- Previous verification report<sup>/07/</sup></li> <li>- Applied methodology ACM0002 version 17.0<sup>/09/</sup></li> <li>- Completion report for Sihwa tidal power plant<sup>/15/</sup></li> <li>- Inspection certificate prior to the operation<sup>/16/</sup></li> <li>- Start up business notification to the government<sup>/17/</sup></li> <li>- Single line diagram<sup>/24/</sup></li> <li>- Metering register for KPX<sup>/25/</sup></li> </ul> <p>Implementation status, such as Installed capacity and physical specification, is as described in the registered PDD<sup>/03/</sup>. In addition, monitoring points and measuring equipment are inspected during site assessment, and found that actual monitoring status is complied with monitoring plan in the registered PDD<sup>/03/</sup>.</p> <p>Verification team confirms that;</p> <ul style="list-style-type: none"> <li>- 25.4 MW/Unit x 10 Units are installed and operating</li> <li>- 6 watt-hour meters for electricity export are installed (3 main &amp; 3 sub)</li> <li>- 4 watt-hour meters for electricity import are installed</li> <li>- No project emission and leakage sources are identified</li> </ul> <p>3) Post-Registration Changes</p> <p>No changes which can impact on emission reductions have been happened during this monitoring period. But Post-Registration Changes (PRCs) which happened during the previous monitoring period are described at section E.4 of this report.</p> <p>4) Verification</p> <p>Verification team have performed on-site visit to verify the actual implementation of the PA against the description in the registered PDD (V4.0) as follows</p> <ul style="list-style-type: none"> <li>- The project activity that generate the electricity using tidal power is in place.</li> <li>- The operation status of the tidal power plant including starting date of the PA and the start date of the commercial operation was checked through the previous verification report.</li> <li>- Tidal power plant is properly operating through maintenance of turbine and generators for project activity by PP.</li> </ul>
<b>Findings</b>	N/A
<b>Conclusion</b>	<p>Verification team confirms that the project activity has been properly implemented as planned in the registered PDD<sup>/03/</sup>.</p> <ul style="list-style-type: none"> <li>- Implementation status is as described in the registered PDD<sup>/03/</sup></li> <li>- Relevant dates such as starting date of operation listed in the PDD is confirmed</li> <li>- There is no cause of any increase in the actual GHG emission reductions achieved by the registered PDD<sup>/03/</sup> in the current monitoring period that was reported in the Monitoring Report<sup>/01/</sup>.</li> </ul>

**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>**

>> N/A

No temporary deviations have been identified during this monitoring period.

But there was a temporary deviation during 01/04/2017 to 30/06/2018 (12<sup>th</sup> and 13<sup>th</sup> verification) approved by the Board as below;

- PRC-0349-005 (Approved on 01/03/2019)
- K-water changed monitoring method of parameter  $GEN_y$  and  $EF_{BM}$ .

**E.4.2. Corrections**

>> N/A

No corrections have been identified during this monitoring period.

But 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**

>> N/A

No changes to the start date of the crediting period have been identified during this monitoring period.

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

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

>> N/A

No inclusion of a monitoring plan has been identified for this monitoring period.

---

<sup>1</sup> Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

#### 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

>> N/A

No changes have been identified for this monitoring period.

But there were permanent changes from registered monitoring plan as below during 1st 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 meters.
  - 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

>> N/A

No changes have been identified for this monitoring period

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

>> N/A

#### 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>	Verification team have verified the monitoring plan against the applied methodology ACM 0002 (version 17.0) <sup>/09/</sup> to confirm the compliance, then conducted on-site assessment. Verification team have found that the monitoring system of the project activity is complete and in accordance with the applied monitoring methodology ACM 0002 (version 17.0) <sup>/09/</sup> . The monitoring procedures reflect the content of the monitoring plan. The applied monitoring methodology and sustaining records were sufficient to enable verification of emission reductions.
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	KSA verification team confirms that the monitoring plan is in accordance with the approved monitoring methodology ACM 0002 version 17.0 <sup>/09/</sup> applied by project activity.

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

##### E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

<b>Means of verification</b>	Verification team have verified the data and parameters fixed ex ante in the Monitoring Report against the registered PDD <sup>/03/</sup> , validation report <sup>/04/</sup> and applied methodology ACM0002 version 17.0 <sup>/09/</sup> .
------------------------------	--

## 1. Parameter Symbol for data and parameters fixed ex-ante.

Methodology	Registered PDD	MR	Checked
Combined margin CO <sub>2</sub> emission factor for the project electricity system in year y	$EF_{grid,CM,y}$	$EF_{grid,CM,y}$	OK
Operating margin CO <sub>2</sub> emission factor for the project electricity system in year y	$EF_{grid,OM,y}$	$EF_{grid,OM,y}$	
Build margin CO <sub>2</sub> emission factor for the project electricity system in year y	$EF_{grid,BM,y}$	$EF_{grid,BM,y}$	

## 2. Parameter in the monitoring report (MR)

No.	Parameter in the PDD and MR	Description	Checked
1	$EF_{grid,CM,y}$	Combined margin CO <sub>2</sub> emission factor for the project electricity system in year y	As per the registered PDD, 0.5197 tCO <sub>2</sub> /MWh for $EF_{grid,CM,y}$ was appropriately applied to the monitoring report and the emission reductions calculation sheet
2	$EF_{grid,OM,y}$	Operating margin CO <sub>2</sub> emission factor for the project electricity system in year y	As per the registered PDD, 0.7043 tCO <sub>2</sub> /MWh for $EF_{grid,OM,y}$ was appropriately applied to the monitoring report and the emission reductions calculation sheet
3	$EF_{grid,BM,y}$	Build margin CO <sub>2</sub> emission factor for the project electricity system in year y	As per the registered PDD, 0.4582 tCO <sub>2</sub> /MWh for $EF_{grid,BM,y}$ was appropriately applied to the monitoring report and the emission reductions calculation sheet

3. Source of Data are based on the registered PDD<sup>/03/</sup> and Validation Report<sup>/04/</sup>

## 4. Assessment/observation

- The value is ex-ante fixed for the 2<sup>nd</sup> 7 years renewable crediting period as per registered PDD<sup>/03/</sup>.
- Combined Margin factor ( $EF_{grid,CM,y}$ ) is used to calculate the emission reductions.
- Fixed value is correctly applied to calculation of emission reductions in the monitoring report and supplementary excel spreadsheet.
- To obtain emission reductions for this monitoring period, the PP applied accurate value into calculation of combined margin emission factor ( $EF_{grid,CM,y}$ ).

**Findings**

No findings were raised.

**Conclusion**

Verification team confirm that the ex-ante parameter is correctly applied and the value of the ex-ante parameter in the MR is consistent with the same in the registered PDD<sup>/03/</sup> and the validation Report<sup>/04/</sup>.

## E.6.2. Data and parameters monitored

<b>Means of verification</b>	<p>The monitoring parameters in the GHG emission reduction calculation have been monitored in accordance with the monitoring plan described in the registered PDD<sup>/03/</sup>. The monitoring mechanism, including the data collection and report, is effective and reliable. During the site visit, personnel involved at the appropriate level of operation of project activity have been interviewed.</p> <p>Verification team have assessed all relevant monitoring parameter as listed in chapter B.7.1 of the monitoring plan in the registered PDD<sup>/03/</sup> as follows;</p> <ol style="list-style-type: none"> <li>1) Appropriateness of the applied measurement/determination method.</li> <li>2) Correctness of the values applied for ER calculation.</li> <li>3) Accuracy and the applied QA/QC measures.</li> </ol> <p>Verification team have assessed whether relevant monitoring parameter and defined in the registered PDD and the applied methodology are correctly described in the monitoring report as bellows;</p> <p>1. Parameter Symbol for data and parameters monitored.</p> <table border="1"> <thead> <tr> <th>Methodology</th><th>Registered PDD</th><th>MR</th><th>Checked</th></tr> </thead> <tbody> <tr> <td>Quantity of net amount of electricity generation fed into the grid.</td><td><math>EG_{PJ,y}</math></td><td><math>EG_{PJ,y}</math></td><td>OK</td></tr> </tbody> </table> <p>2. Parameter in the monitoring report (MR)</p> <ol style="list-style-type: none"> <li>1) Parameter in PDD and MR: <math>EG_{PJ,y}</math></li> <li>2) Description: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year, y.</li> <li>3) Source of data</li> </ol> <p>The amount of monthly electricity export to the grid based on the daily electricity data record and import from the grid based on the monthly electricity data records were measured by the main export watt-hour meters and import watt-hour meters during the 17<sup>th</sup> monitoring period from 01/01/2020 to 30/06/2020 as below table;</p> <table border="1"> <thead> <tr> <th colspan="2" rowspan="2">Period</th><th colspan="3">Generated electricity (kWh) by the project activity.</th></tr> <tr> <th>Export (<math>EG_{export,y}</math>)</th><th>Import (<math>EG_{import,y}</math>)</th><th>Net (<math>EG_{PJ,y}</math>)</th></tr> </thead> <tbody> <tr> <td rowspan="6">2020</td><td>Jan</td><td>38,549,037</td><td>312,588</td><td>38,236,449</td></tr> <tr> <td>Feb</td><td>37,796,298</td><td>294,000</td><td>37,502,298</td></tr> <tr> <td>Mar</td><td>40,314,907</td><td>302,400</td><td>40,012,507</td></tr> <tr> <td>Apr</td><td>37,814,324</td><td>294,000</td><td>37,520,324</td></tr> <tr> <td>May</td><td>36,992,747</td><td>341,040</td><td>36,651,707</td></tr> <tr> <td>Jun</td><td>35,500,256</td><td>352,812</td><td>35,147,444</td></tr> <tr> <td colspan="2">Total</td><td>226,967,569</td><td>1,896,840</td><td>225,070,729</td></tr> </tbody> </table> <p>4) Purpose of data is to calculate the baseline emission.</p>	Methodology	Registered PDD	MR	Checked	Quantity of net amount of electricity generation fed into the grid.	$EG_{PJ,y}$	$EG_{PJ,y}$	OK	Period		Generated electricity (kWh) by the project activity.			Export ( $EG_{export,y}$ )	Import ( $EG_{import,y}$ )	Net ( $EG_{PJ,y}$ )	2020	Jan	38,549,037	312,588	38,236,449	Feb	37,796,298	294,000	37,502,298	Mar	40,314,907	302,400	40,012,507	Apr	37,814,324	294,000	37,520,324	May	36,992,747	341,040	36,651,707	Jun	35,500,256	352,812	35,147,444	Total		226,967,569	1,896,840	225,070,729
Methodology	Registered PDD	MR	Checked																																												
Quantity of net amount of electricity generation fed into the grid.	$EG_{PJ,y}$	$EG_{PJ,y}$	OK																																												
Period		Generated electricity (kWh) by the project activity.																																													
		Export ( $EG_{export,y}$ )	Import ( $EG_{import,y}$ )	Net ( $EG_{PJ,y}$ )																																											
2020	Jan	38,549,037	312,588	38,236,449																																											
	Feb	37,796,298	294,000	37,502,298																																											
	Mar	40,314,907	302,400	40,012,507																																											
	Apr	37,814,324	294,000	37,520,324																																											
	May	36,992,747	341,040	36,651,707																																											
	Jun	35,500,256	352,812	35,147,444																																											
Total		226,967,569	1,896,840	225,070,729																																											

	<p>3. Assessment/observation</p> <p>Through the desk review and on-site assessment, a complete set of data covering the whole monitoring period and the relevant documentary evidence were provided to KSA.</p> <p>Verification team cross-checked the export electricity data in Monitoring Report against the data system of both the PP and KPX<sup>/27/</sup> and found both data are the same with monitoring report. Also, verification team cross-checked the import electricity data in Monitoring report against KEPCO's bill<sup>/26/</sup> and found both data are the same.</p> <p>&lt;Data generation system&gt;</p> <p>During on-site assessment, verification team checked the monitoring diagram "[Fig] 2 Skeleton Diagram of the tidal power plant" in the monitoring report and found the actual monitoring points correct.</p> <p>(i) Electricity transmitted to the grid</p> <p>Through the documents review and on-site inspection, verification team confirm that 3 main watt-hour meters and additional 3 back-up watt-hour meters are installed to monitor electricity export to the grid at the project site as the registered PDD<sup>/03/</sup>. The accuracy of 3 main watt-hour meters are <math>\pm 0.2S</math> while 3 back-up watt-hour meters are <math>\pm 0.5S</math>.</p> <p>(ii) Electricity imported from the grid</p> <p>Measured values at 4 import watt-hour meters are continuously transmitted KEPCO data base and then KEPCO issued the bill every month based on the record. Monitoring report is correctly applied the bill for the monitoring period. Verification team have checked all of KEPCO bill<sup>/26/</sup> for monitoring period and found it correct.</p> <p>&lt;Calculation and reporting&gt;</p> <p>(i) Electricity transmitted to the grid</p> <p>Verification team checked the PPs information system/30/ and KPX's system<sup>/27/</sup> and calculated the total amount of the electricity transmitted to the grid and found it appropriate. Verification team confirms that the electricity transmitted to the grid is 226,967.569 MWh and the values in Monitoring Report<sup>/01/</sup> is correct.</p> <p>(ii) Electricity imported from the grid</p> <p>PP applied the value from KEPCO bill. Verification team confirms that the electricity imported from the grid is 1,896.840 MWh and the values in the Monitoring Report<sup>/01/</sup> is correct.</p> <p>(iii) Net electricity transmitted to the grid</p> <p>Verification team confirms that the net amount of electricity transmitted to the grid 225,070.729 MWh (<math>EG_{out} - EG_{in} = 226,967.569 - 1,896.840 = 225,070.729</math> MWh) in the monitoring report is accurate.</p>
<b>Findings</b>	<p>CL04 and CL05, refer to Appendix 4.</p> <p>Based on the review of the revised MR, CL04 and CL05 are appropriate and found satisfied.</p>
<b>Conclusion</b>	<p>Verification team confirms that;</p> <ul style="list-style-type: none"> <li>- Net amount of electricity transmitted to the grid is correctly decided in accordance with monitoring plan in the registered PDD<sup>/03/</sup> and applied methodology<sup>/09/</sup>.</li> <li>- All the parameters described in the registered monitoring plan have been monitored;</li> </ul>

	<ul style="list-style-type: none"> <li>- The responsibilities and authorities for monitoring and reporting are in accordance with those stated in the registered monitoring plan</li> <li>- The monitoring results are consistently measured and recorded as per the registered monitoring plan.</li> <li>- Quality assurance and quality control procedure have been applied in accordance with the registered monitoring plan.</li> </ul> <p>Verification team confirm that information flow (from data generation, aggregation, to recording, calculation and reporting) is appropriately implemented in accordance with the monitoring plan in the registered PDD.</p>
--	--

### E.6.3. Implementation of sampling plan

Means of verification	N/A
Findings	N/A
Conclusion	Sampling plan is not developed in the registered PDD <sup>/03/</sup> .

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

Means of verification	<p>Verification team have performed the documents review of the calibration records of the monitoring meters to confirm the compliance of the calibration as follows;</p> <ul style="list-style-type: none"> <li>- Previous monitoring report (16<sup>th</sup>)<sup>/06/</sup></li> <li>- Previous verification report (16<sup>th</sup>)<sup>/07/</sup></li> <li>- Metering registers for KPX<sup>/25/</sup></li> <li>- Calibration reports<sup>/28/</sup></li> <li>- Monitoring plan in the registered PDD<sup>/03/</sup></li> <li>- National regulations (Act on the operation of electricity market<sup>/20/</sup>, Measures Act<sup>/21/</sup>, Electric Utility Act<sup>/23/</sup> and etc.)</li> </ul> <p>Verification team have checked calibration records<sup>/28/</sup> for the meters whether the calibration cover this monitoring period.</p> <ul style="list-style-type: none"> <li>- The validity period of the calibrations for the main meters and back up meters cover this monitoring period from 01/01/2020 to 30/06/2020.</li> <li>- The calibration frequency for the main meters and back up meters are every 4 years and in line with the registered PDD and also in accordance with the national regulation (Act on the operation of electricity market<sup>/20/</sup> and Measures act<sup>/21/</sup>)</li> <li>- The calibration for the main meters and back up meters were conducted in the presence of KPX. Calibration reports<sup>/28/</sup> described that the main meters and back-up meters are in proper functional within the tolerance (<math>\pm 0.2\%</math> for the main meters and <math>\pm 0.5\%</math> for the back-up meters)</li> <li>- The meters for import electricity are still within the validity period. The import watt-hour meters are under KEPCO. They were calibrated on 08/12/2016 before on-site installation as per the national regulation "Measures act"<sup>/21/</sup> and calibration frequency (7 years) described in the monitoring plan are within the validity period.</li> </ul> <p>The meters for import electricity are controlled by KEPCO (not PPs) based on Measures Act. The validity period of calibration period is regulated and managed at the end of the month of the calibration period according to KEPCO's regulation. Therefore, 30/04/2024 and 31/12/2023 are correct for the calibration validity period of the import watt-hour meters.</p>
-----------------------	--

	Meters			Freq.	Calibration Status		Remarks
	Items	M Points	S/N.		Last	Scheduled	
	Export (main)	M1	PT-909A408-01	4 years	04/10/2018	03/10/2022	Valid
		M3	PT-909A407-01		04/10/2018	03/10/2022	
		M5	PT-909A409-01		04/10/2018	03/10/2022	
	Export (Back up)	M2	53048163	4 years	04/10/2018	03/10/2022	
		M4	53048164		04/10/2018	03/10/2022	
		M6	53048162		04/10/2018	03/10/2022	
	Import (main)	M7	9000071	7 years	04/04/2017	30/04/2024	Valid
		M8	9000072		04/04/2017	30/04/2024	
M9		9000073	04/04/2017		30/04/2024		
Import (back-up)	M10	25102001711	7 years	08/12/2016	31/12/2023		
Verification team checked that serial number of each meter which are described in the monitoring report <sup>/01/</sup> at the project site.							
Findings	CL03, refer to Appendix 4. Based on the review of the revised MR, CL03 is appropriate and found satisfied.						
Conclusion	Verification team confirms that the net electricity supplied to the grid in the whole monitoring period from 01/01/2020 to 30/06/2020 were fully monitored by these calibrated watt-hour meters. Through the review of the calibration records <sup>/28/</sup> , on-site inspection of monitoring equipment and interview with the operators, verification team confirms that all watt-hour meters are appropriately controlled in accordance with the monitoring plan in the registered PDD <sup>.03/</sup> .						

## 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>Verification team have cross-checked the baseline GHG emissions calculation in the Monitoring report<sup>/01/</sup> against the ER calculation spreadsheet<sup>/02/</sup>, the ACM0002 version 17.0<sup>/09/</sup> and the registered PDD<sup>/03/</sup>.</p> <p>The net electricity supplied to the grid in the Monitoring report<sup>/01/</sup> are also cross-checked against KPX data (supplied to the grid)<sup>/27/</sup> and KEPCO bills (supplied from the grid)<sup>/26/</sup> through the K-water ERP system<sup>/30/</sup>.</p> <p>According to the registered PDD<sup>/03/</sup> and the applied methodology ACM0002 version 17.0<sup>/03/</sup>, the formula for baseline emissions are calculated as follows;</p> $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ <p>Where:</p> <p><math>BE_y</math>: the baseline emission in year y (<math>tCO_2</math>)</p> <p><math>EG_{PJ,y}</math>: quantity of the net electricity supplied to the grid by the project activity in year y (MWh)</p>
------------------------------	--

	<p><math>EF_{grid,CM,y}</math> : The combined margin emission factor for grid connected power generation in year <math>y</math> (<math>tCO_2/MWh</math>)</p> <p>Therefore, the baseline emission reductions are during this monitoring period as below;</p> $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ $= 225,070.729 \text{ MWh} \times 0.5197 \text{ tCO}_2/\text{MWh}$ $= 116,969.257 \text{ tCO}_2$ $\doteq 116,969 \text{ tCO}_2$ <p>The baseline emissions are calculated to be 116,969 tCO<sub>2</sub></p> <p>During the verification the calculation of baseline has been checked. In detail the following has been verified:</p> <ul style="list-style-type: none"> <li>• Transparency: it has been checked whether the calculation of baseline emission is fully traceable and where used, the Excel calculation<sup>/02/</sup> provides all calculation formulae.</li> <li>• Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied.</li> <li>• Correctness: it has been checked whether the applied formulae and methods for calculation baseline emissions are in accordance with the monitoring plan in the registered PDD/<sup>03/</sup> and the applied methodology<sup>/09/</sup>.</li> <li>• Completeness: it has been checked whether all calculations are complete and without omissions.</li> </ul> <p>The following sources of information has been used in this section.</p> <ul style="list-style-type: none"> <li>• Monitoring Report<sup>/01/</sup></li> <li>• The registered PDD<sup>/03/</sup></li> <li>• Excel spreadsheet<sup>/02/</sup></li> <li>• ACM0002 version 17.0<sup>/09/</sup></li> </ul>
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	Verification team confirms that baseline emission is appropriately calculated as per the formulae and methods described in the registered PDD <sup>/03/</sup> and the applied methodology <sup>/09/</sup> .

### E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

<b>Means of verification</b>	<p>As per ACM0002 Version 17.0<sup>/09/</sup>, the registered PDD<sup>/03/</sup>, the validation report<sup>/04/</sup> and the previous monitoring report<sup>/03/</sup> &amp; verification report<sup>/04/</sup>, the project emission is zero.</p> <p>Therefore, <math>PE_y = 0 \text{ tCO}_2</math></p> <p>Verification team reviewed reference documents and conducted site inspection to confirm it.</p>
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	Verification team confirms that the project emissions are 0 tCO <sub>2</sub> as per the registered PDD <sup>/03/</sup> and the applied methodology <sup>/09/</sup> .

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

<b>Means of verification</b>	<p>According to the ACM0002 Version 17.0<sup>/09/</sup>, the registered PDD<sup>/03/</sup>, the validation report<sup>/04/</sup> and the previous monitoring report<sup>/06/</sup> &amp; verification report<sup>/07/</sup>, no leakage emissions (<math>LE_y</math>) is needed to be considered.</p> <p>Therefore, <math>LE_y = 0 \text{ tCO}_2</math></p>
------------------------------	---

<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	Verification team confirms that no leakage emission is needed to be calculated as per the registered PDD <sup>/03/</sup> and the applied methodology <sup>/09/</sup> .

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

<b>Means of verification</b>	<p>The verification team have cross-checked the GHG emission reductions calculation in the Monitoring report<sup>/01/</sup> against the ER calculation spreadsheet<sup>/02/</sup> and the registered PDD<sup>/03/</sup>.</p> <p>According to the applied methodology ACM0002 version 17.0<sup>/09/</sup> and the registered PDD<sup>/03/</sup>, the emission reductions resulting from the project activity are calculated based on the following formula.</p> $ER_y = BE_y - PE_y - LE_y$ $= 116,969 \text{ tCO}_2 - 0 \text{ tCO}_2 - 0 \text{ tCO}_2$ $= 116,969 \text{ tCO}_2$ <p>Where ER<sub>y</sub>: Emission Reductions in year y (tCO<sub>2</sub>/y)  BE<sub>y</sub>: Baseline Emissions in year y (tCO<sub>2</sub>/y)  PE<sub>y</sub>: Project Emissions in year y (tCO<sub>2</sub>/y)  LE<sub>y</sub>: Leakage Emissions in year y (tCO<sub>2</sub>/y)</p> <p>The emission reductions during this monitoring period are calculated to be 116,969tCO<sub>2</sub></p>
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	<p>KSA confirms that:</p> <ul style="list-style-type: none"> <li>• All data and parameters were monitored in accordance with the registered PDD<sup>/03/</sup>;</li> <li>• Monitoring data are verified and cross-checked;</li> <li>• Complete set of data have been correctly applied to emission reduction calculation;</li> <li>• Calculation of baseline, project, and leakage emission have been performed in accordance with the formula and methods described in the registered PDD<sup>/03/</sup> and the applied methodology<sup>/09/</sup>; and,</li> <li>• All assumptions, emission factors and default values applied to the calculation are appropriate.</li> </ul>

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

Means of verification	Verification team have checked the estimated annual emission reductions in the registered PDD <sup>/03/</sup> and converted the estimated reductions into 182 days of the corresponding this monitoring period.											
	Claimed emission reduction during this monitoring period is 116,969 tCO <sub>2</sub> which is slightly less than the estimated value for 182 days in registered PDD <sup>/03/</sup> (125,200 tCO <sub>2</sub> ).											
	<table><tr><th>Subjects</th><th>Emission Reductions (ERs)</th><th>Remarks</th></tr><tr><td>Expected ERs</td><td>125,200 tCO<sub>2</sub></td><td>251,089tCO<sub>2</sub>/year × 182/365year = 125,200 tCO<sub>2</sub></td></tr><tr><td>Actual ERs</td><td>116,969 tCO<sub>2e</sub></td><td></td></tr></table>			Subjects	Emission Reductions (ERs)	Remarks	Expected ERs	125,200 tCO <sub>2</sub>	251,089tCO <sub>2</sub> /year × 182/365year = 125,200 tCO <sub>2</sub>	Actual ERs	116,969 tCO <sub>2e</sub>	
	Subjects	Emission Reductions (ERs)	Remarks									
	Expected ERs	125,200 tCO <sub>2</sub>	251,089tCO <sub>2</sub> /year × 182/365year = 125,200 tCO <sub>2</sub>									
Actual ERs	116,969 tCO <sub>2e</sub>											
Comparing with the expected emission reductions in the registered PDD <sup>/03/</sup> , the												

	emission reductions have been slightly decreased during this monitoring period due to the unexpected tidal activities and the periodic maintenance.
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	Emission reductions for this monitoring period are decreased by 6.57% compared to the registered PDD. But verification team confirms that the actual of emission reductions of 116,969tCO <sub>2</sub> are deemed reasonable.

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

<b>Means of verification</b>	To identify the difference from estimated value in the registered PDD <sup>103/</sup> , verification team compared the values applied to the calculation such as the combined margin CO <sub>2</sub> emission factor and amount of net electricity generations.  These decrease of emission reductions are due to the unexpected tidal activities and the periodic maintenance activities.
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	The decrease of emission reductions is caused by natural phenomena and the periodic facility maintenance, not caused by the PP. Therefore, verification team confirms that the fluctuations in emission reduction are not caused to any errors, misstatement, or omissions.

**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>	This monitoring period starts from 01/01/2020, therefore the GHG emission reductions up to 31/12/2012 are not applicable. The GHG emission reductions during this monitoring period from 01/01/2013 are 116,969 tCO <sub>2</sub> .
<b>Findings</b>	No findings were raised.
<b>Conclusion</b>	The actual monitoring period does not fall into the first commitment period.

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

<b>Means of verification</b>	Not applicable
<b>Findings</b>	Not applicable
<b>Conclusion</b>	Not applicable

**E.10. Global stakeholder consultation**

<b>Means of verification</b>	No comment were received during the global stakeholder consultation.
<b>Findings</b>	Not applicable
<b>Conclusion</b>	Not applicable

**SECTION F. Internal quality control**

&gt;&gt;

The draft final verification report including the verification findings before submitted to UNFCCC for request of issuance was subjected an independent internal technical review to confirm that all verification activities had been completed according to the KSA procedures.

Also, the technical verifier is qualified by KSA's qualification scheme for CDM validation and verification. As a result of the internal technical review process, the verification opinion and the topic specific assessments as prepared by the verification team may be confirmed or revised.

**SECTION G. Verification opinion**

&gt;&gt;

Korean Standards Association (KSA) has performed the verification of the emission reductions reported for the project activity "Sihwa Tidal Power Plant CDM Project" in Korea, UNFCCC

reference number 0349, for the period 01/01/2020 to 30/06/2020, with regard to the relevant requirements for CDM project activities.

Project participants of the "Sihwa Tidal Power Plant CDM Project" are responsible for;

- The preparation of GHG emission data and the reported GHG emission reductions from the project activity on the basis set out in the monitoring plan contained in the registered PDD version 04.0<sup>/03/</sup> dated 20/09/2018.
- The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions of the project activity.

It is the responsibility of KSA to express an independent verification opinion about the project activity's conformity with the requirements of paragraph 62 of CDM modalities and procedures and on the reported GHG emission reductions from the project activity.

Based on the documented evidence and corroborated by an on-site assessment, KSA confirms that;

- All operations of the project activity are implemented and installed as planned in the registered PDD<sup>/03/</sup>.
- The installed equipment essential for generating emission reductions run reliable and are calibrated appropriately.
- The monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable CDM requirements.
- Monitoring system are in place and functional
- Monitoring complies with the monitoring plan in the registered PDD<sup>/03/</sup>.
- The monitoring plan in the registered PDD<sup>/03/</sup> is as per the applied baseline and monitoring methodology<sup>/09/</sup>.

In KSA's opinion, the project's reported GHG emission reductions for the period from 01/01/2020 to 30/06/2020, as reported in the Monitoring Report version 2.0 dated 05/10/2020 for the project activity, is fairly stated. The emission reductions have been correctly calculated without material misstatements on the basis of the approved monitoring methodology ACM0002 version 17.0<sup>/09/</sup> and the monitoring plan and formulae given in the registered PDD<sup>/03/</sup>.

## SECTION H. Certification statement

>>

Korean Standards Association (KSA) has performed the verification of the registered CDM project "Sihwa Tidal Power Plant CDM Project (reference no: 0349)" in Korea for 17<sup>th</sup> monitoring period from 01/01/2020 to 30/06/2020.

The verification consisted of the following three phases;

- i) desk review of the registered and revised project design document<sup>/03/</sup>, applied baseline and monitoring methodology version 17.0<sup>/09/</sup>, monitoring report<sup>/01/</sup> and additional documents provided by the PP;
- ii) on-site assessment and interviews with the project participants;
- iii) resolution of outstanding issues and the issuance of the of the final verification report and statements.

The project participant is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the monitoring plan indicated in the registered Project Design Document.

This verification has been conducted based on the monitoring report<sup>/01/</sup> dated 27/08/2020, the final monitoring report(version 2.0) dated 05/10/2020, monitoring plan as described in the registered PDD<sup>/03/</sup>, validation report<sup>/04/</sup>, the emission reductions calculation spreadsheet<sup>/02/</sup> and supporting documents made available to KSA by the project participant.

The GHG emission reductions were correctly calculated without material misstatements based on the approved monitoring methodology ACM0002 version 17.0<sup>/09/</sup> and the monitoring plan contained in the registered and approved PDD<sup>/03/</sup>. Hence, Korean Standards Association certifies that the reported emission reductions from the project activity equated to 116,969 tCO<sub>2</sub>.

## Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
EB	Executive Board
FAR	Forward Action Request
IPCC	Intergovernmental Panel on Climate Change
KEPCO	Korea Electric Power Corporation
KESCO	Korea Electric Safety Corporation
KPX	Korea Power Exchange
KSA	Korean Standards Association
UNFCCC	United Nations Framework Convention on Climate Change

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

<b>Name</b>	<b>Sohn, Kyull</b>	<b>Choi, SeungKeun</b>	<b>Moon, HyunMan</b>	<b>Hong, SeungHyeong</b>	<b>Park, SeongYong</b>
Role	Verification Team Leader	Verifier	Verifier	Verifier	Technical reviewer
Competence in relevant sector	Competent in T.A. 1.2	Competent in T.A. 1.2	Competent in T.A. 1.2	N/A	Competent in T.A. 1.2
Responsibility	Document Review Interview Findings Resolution & VR preparation	Document Review Findings & Resolution	Document Review Interview Findings & Resolution	Document Review Interview Findings & Resolution	Technical review

# KSA

## CDM Validator/Verifier Certificate

Kyull Sohn

Certificate No. : CDM-001

Technical Area : 1.1, 1.2, 2.1, 3.1, 13.1, 13.2

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM

2020.04.01.

VALID UNTIL

2023.03.31.

PRESIDENT OF KSA



**KOREAN STANDARDS ASSOCIATION**

Digital Transformation Center, 5, Teheran-ro 69-gil, Gangnam-gu, Seoul, Korea

# KSA

## GHG Validator/Verifier Certificate

SeungKeun Choi

Certificate No. : CDM-015

Technical Area : 1.1, 1.2, 2.1, 3.1, 13.1, 13.2

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM

2019.04.04

VALID UNTIL

2022.04.03

PRESIDENT OF KSA



**KOREAN STANDARDS ASSOCIATION**

20F, Kotech Center Bldg, 305 Teheran-ro, Gangnam-gu, Seoul, Korea

# KSA

## CDM Validator/Verifier Certificate

HyunMan Moon

Certificate No. : CDM-030

Technical Area : 1.2, 3.1, 15.1

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM

2020.04.01.

VALID UNTIL

2023.03.31.

PRESIDENT OF KSA



**KOREAN STANDARDS ASSOCIATION**

Digital Transformation Center, 5, Teheran-ro 69-gil, Gangnam-gu, Seoul, Korea

# KSA

## CDM Validator/Verifier Certificate

SeungHyeong Hong

Certificate No. : CDM-032

Technical Area : -

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM

2019.05.01

VALID UNTIL

2021.04.30

PRESIDENT OF KSA



**KOREAN STANDARDS ASSOCIATION**

20F, Kotech Center Bldg, 305 Teheran-ro, Gangnam-gu, Seoul, Korea

# KSA

## CDM Validator/Verifier Certificate

SeongYong Park

Certificate No. : CDM-014

Technical Area : 1.1, 1.2, 4.1, 5.1, 9.2, 13.1, 15.1

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM

2020.04.01.

VALID UNTIL

2023.03.31.

PRESIDENT OF KSA



**KOREAN STANDARDS ASSOCIATION**

Digital Transformation Center, 5, Teheran-ro 69-gil, Gangnam-gu, Seoul, Korea

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
01	K-water (PP)	Monitoring report	Ver.01.0 27/08/2020 Ver.02.0 05/10/2020	PP
02	K-water (PP)	Emission reduction calculation spreadsheet	Ver.01.0 27/08/2020	PP
03	K-water (PP)	Registered PDD	Version 04.0	PP
04	TUV SUD (DOE)	Validation report	<a href="https://cdm.unfccc.int/filestorage/X/Q/O/XQOI5EC9JK24ZLSU37160FNGPRWHDV/VR_rev.pdf?t=T1R8cWd6b2phfDCy0TV02IOUexMyChS8_RF_">https://cdm.unfccc.int/filestorage/X/Q/O/XQOI5EC9JK24ZLSU37160FNGPRWHDV/VR_rev.pdf?t=T1R8cWd6b2phfDCy0TV02IOUexMyChS8_RF_</a>	Others
05	TUV SUD (DOE)	Validation report (PRC 04) 20/10/2018	<a href="https://cdm.unfccc.int/filestorage/4/E/C/4ECTFUB2IW7AXVG10J6PR9OND8YQM3/PRC_rev.pdf?t=ZUJ8cWd6bz5fDADfbcRJ14MpDbRLhgMlqyE">https://cdm.unfccc.int/filestorage/4/E/C/4ECTFUB2IW7AXVG10J6PR9OND8YQM3/PRC_rev.pdf?t=ZUJ8cWd6bz5fDADfbcRJ14MpDbRLhgMlqyE</a>	Others
06	K-water (PP)	Previous monitoring report	<a href="https://cdm.unfccc.int/filestorage/I/Q/G/IQG0ODF27ZLWM1STXB58VEA9HYJ3N6/MR_ref.0349_MP16?t=OVF8cWh6ZzZyDCaB13kdYoy3G_9WRGFQkH-">https://cdm.unfccc.int/filestorage/I/Q/G/IQG0ODF27ZLWM1STXB58VEA9HYJ3N6/MR_ref.0349_MP16?t=OVF8cWh6ZzZyDCaB13kdYoy3G_9WRGFQkH-</a>	Others
07	KFQ (DOE)	Previous verification report	<a href="https://cdm.unfccc.int/filestorage/W/G/2/WG2RYU5BDV149XJSP7KCNTZ3EQLI80/Certification_ref.0349_MP16?t=NVh8cWh6ZzU5fDBOjmO-CCyjBMcySEJexLda">https://cdm.unfccc.int/filestorage/W/G/2/WG2RYU5BDV149XJSP7KCNTZ3EQLI80/Certification_ref.0349_MP16?t=NVh8cWh6ZzU5fDBOjmO-CCyjBMcySEJexLda</a>	Others
08	UNFCCC	CDM validation and verification standard	Version 2.0	Others
09	UNFCCC	Methodology ACM0002	Version 17.0	Others
10	UNFCCC	Guideline of application of materiality in verifications	Version 2.0	Others
11	UNFCCC	Clarification SSC_159	<a href="http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_UUWG2PUTEEJA5NOO3F95BWJE3E651Q">http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_UUWG2PUTEEJA5NOO3F95BWJE3E651Q</a>	Others
12	UNFCCC	Monitoring report form	Version 7.0	Others
13	UNFCCC	Verification and certification report form	Version 3.0	Others
14	KSA	KSA CDM Manual and procedure	Version 10.0	Others
15	K-water (PP)	Completion report for Sihwa tidal power plant	28/11/2011	Others
16	KESCO	Inspection certificate prior to the operation	28/11/2011	Others
17	Ministry of Trade, industry and Energy	Start-up business notification to the government	06/02/2012	Others
18	KPX	Approval for initial connection to the grid	12/04/2011	Others
19	K-water (PP)	Report on the date for commencement of operation	06/03/2012	Others
20	Host country	Rules on operation of electric utility	01/10/2020	Others

		market (Act on operation of electricity market)		
21	Host country	Measures Act	12/12/2017	Others
22	Host country	Electric Utility Act	31/03/2020	Others
23	K-water (PP)	ex-EIA report	02/2015	Others
24	K-water (PP)	Single Line Diagram	06/2009	PP
25	K-water (PP)	Metering Register for KPX		
26	KEPCO	Bills for electricity import	For monitoring period	PP
27	KPX	Electric trading system	For monitoring period	PP
28	KPX	Calibration report for transmission - Main watt-hour meter (M1, M3 & M5): on 22/10/2015 - Back-up watt-hour meter (M2, M4 & M6): on 22/10/2015	22/10/2015	PP
29	K-water	K-water CDM Manuel		PP
30	K-water	K-water ERP system		PP
31	K-water	Revised plan for major maintenance plan for water turbine generator	27/04/2020	PP
32	K-water	Daily Operational log at 19/03/2020 (25/02/2020, lunar)	19/03/2020	PP

## 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> DD/MM/YYYY
<b>Description of FAR</b>				
N/A				
<b>Project participant response</b>				<b>Date:</b> DD/MM/YYYY
N/A				
<b>Documentation provided by project participant</b>				
N/A				
<b>DOE assessment</b>				<b>Date:</b> DD/MM/YYYY
N/A				

Table 2. CL from this verification

<b>CL ID</b>	CL 01	<b>Section no.</b>	E.1	<b>Date:</b> 25/09/2020
<b>Description of CL</b>				
<i>Some information in Figure 2 are too faint to read. PPs are required to clarify this.</i>				
<b>Project participant response</b>				<b>Date:</b> 05/10/2020
<i>The information in Fig 2 has been modified to check the related information.</i>				
<b>Documentation provided by project participant</b>				
<i>- The revised Monitoring Report.</i>				
<b>DOE assessment</b>				<b>Date:</b> 09/10/2020
Verification team checked the revised Monitoring Report. The information in Fig 2 are enough to readable and sufficient to verify. Thus, CL01 was checked and satisfied. CL 01 is closed.				

<b>CL ID</b>	CL 02	<b>Section no.</b>	E.4.1	<b>Date:</b> 25/09/2020
<b>Description of CL</b>				
<i>The information described in section 2.1 of MR does not fall within this monitoring period. PP are required to clarify this.</i>				
<b>Project participant response</b>				<b>Date:</b> 05/10/2020
<i>There is no temporary deviation from the registered monitoring plan, standardized baselines or other methodological regulatory documents during this monitoring period. We, PPs, deleted the existing temporary deviation information during the 15<sup>th</sup> Monitoring Period.</i>				
<b>Documentation provided by project participant</b>				
<i>- The revised Monitoring Report.</i>				
<b>DOE assessment</b>				<b>Date:</b> 09/10/2020
Verification team confirmed that there is no temporary deviation during this monitoring period. The temporary deviation information in the previous Monitoring Report was the 15 <sup>th</sup> monitoring period. Verification team checked the revised Monitoring Report and the result is correct. Thus, CL02 was checked and satisfied. CL 02 is closed.				

<b>CL ID</b>	CL 03	<b>Section no.</b>	E.7.0	<b>Date:</b> 25/09/2020
<b>Description of CL</b>				
<i>Calibration frequency for export watt-hour meters are not consistent within the Monitoring Report. Example) 4 years, 3.5 years <math>\pm</math> 6 months.</i>				
<b>Project participant response</b>				<b>Date:</b> 05/10/2020
<i>4 years is the maximum calibration period specified in the relevant regulation, and 3.5 years <math>\pm</math> 6 months the calibration period specified in the related laws.</i>				
<b>Documentation provided by project participant</b>				
N/A				

DOE assessment	Date: 09/10/2020
<p>Verification team reviewed the following documents including the related laws.</p> <ol style="list-style-type: none"> <li>1) Validation report for PRC-0349-004 (by TUV SUD South Asia)</li> <li>2) Validation report for renewal of crediting period (Ver 5.0, by TUV SUD South Asia)</li> <li>3) Registered PDD (Ver. 4.0)</li> <li>4) Measures Act in Korea dated 12/12/2017</li> <li>5) Rules on the operation of electricity market dated 01/10/2020</li> </ol> <p>Verification team confirmed that the calibration frequency for export meter is 3.5 years <math>\pm</math> 6 months if capacity exceeds 1MW in the registered PDD and the national laws ("Measures Act" and "Rules on the operation of electricity market"). In the "Rule on the operation of electricity market", the watt-hour meter is regulated to be calibrated withing a maximum of 4 years in consideration of the power plant's O&amp;M schedule and operation status.</p> <p>Therefore, the calibration frequency is 4 years and the result is correct.</p> <p>Thus, CL03 was checked and satisfied. CL 03 is closed.</p>	

CL ID	CL 04	Section no.	E.6.2	Date: 25/09/2020
<b>Description of CL</b>				
Source of data for the quantity of net generation ( $EG_{PJ,y}$ ) described in the registered PDD are not specified such as $EG_{export,y}$ and $EG_{import,y}$				
<b>Project participant response</b>				Date: 05/10/2020
<p>PPs specified the source of data for the quantity of net generation (<math>EG_{PJ,y}</math>) described in the registered PDD including <math>EG_{export,y}</math> and <math>EG_{import,y}</math>.</p> $EG_{PJ,y} = EG_{export,y} - EG_{import,y}$ $= 226,967.569 \text{ MWh} - 1,896.840 \text{ MWh}$ $= 225,070.729 \text{ MWh}$ <p>Also, the combined margin CO<sub>2</sub> factor is revised <math>EF_{grid,y}</math> to <math>EF_{grid,CM,y}</math></p>				
<b>Documentation provided by project participant</b>				
Revised Monitoring Report				
<b>DOE assessment</b>				Date: 09/10/2020
<p>Verification team checked the Monitoring Plan in the registered PDD.</p> <p>PP revised correctly in the revised MR for the source of data for the quantity of net generation (<math>EG_{PJ,y}</math>) namely, net electricity generation (<math>EG_{PJ,y}</math>) = total electricity transmitted to the grid (<math>EG_{export,y}</math>) – total imported electricity from grid (<math>EG_{import,y}</math>) and the combined margin CO<sub>2</sub> factor (<math>EF_{grid,CM,y}</math>) described in the registered PDD.</p> <p>Thus, CL04 was checked and satisfied. CL 04 is closed.</p>				

CL ID	CL 05	Section no.	E.6.2	Date: 25/09/2020
<b>Description of CL</b>				
The amount of power generation on 19/03/2020, without any explanation of the operating event, was very small compared to other dates. Please explain the reason.				
<b>Project participant response</b>				Date: 05/10/2020
<p>The day (19/03/2020) is a monthly neap tide period with a small starting drop (less than 4.5), so only some generators are operating to run cost-effectively.</p> <p>PP attached the daily operational log for #2, 4, 7 &amp; 10.</p>				
<b>Documentation provided by project participant</b>				
<ul style="list-style-type: none"> <li>- The daily operational log at 19/03/2020 (for #2, 4, 7 &amp; 10)<sup>/32/</sup></li> <li>- Revised plan for major maintenance plan for water turbine generator<sup>/31/</sup></li> </ul>				
<b>DOE assessment</b>				Date: 09/10/2020
<p>Verification team reviewed "the daily operation log for #2, 4, 7 &amp; 10" and "Emission reduction calculation sheet". Tide is mainly caused by the moon, but it is also affected by the sun.</p> <p>Neap tide period occurs naturally, and the verification team confirmed that the amount of power generation was small even in other periods.</p> <p>Thus, CL05 was checked and satisfied. CL 05 is closed.</p>				

Table 3. CAR from this verification

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

Table 4. FAR from this verification

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

## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);</li> <li>• Make structural and editorial improvements.</li> </ul>
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		