


Validation report form for post-registration changes for CDM project activities
(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the validation report form for post-registration changes for CDM project activities" at the end of this form.

VALIDATION REPORT ON POST-REGISTRATION CHANGES (PRCs)

Title and reference number of the project activity	K-water 0.96MW bundle small-scale hydroelectric power plants project (Ref. No.: 2910)
Process track	<input type="checkbox"/> Prior approval <input checked="" type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
Version number of the validation report on PRCs	02.0
Completion date of the validation report on PRCs	19/09/2017
Type(s) of PRCs	<input checked="" type="checkbox"/> Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline <input checked="" type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan to a registered project activity <input checked="" type="checkbox"/> Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline <input type="checkbox"/> Changes to the project design of a registered project activity <input type="checkbox"/> Types of changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	Version: 05.0, dated 14/09/2017
Project participant(s)	Korea Water Resources Corporation (K-water)
Host Party	Republic of Korea
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	<ul style="list-style-type: none"> • Sectoral scope: 1_Energy industries (renewable-/non-renewable sources) • Selected methodology: AMS.I.D. ver.13.0 (Grid connected renewable electricity generation) • No standardized baseline(s) applicable
Name of DOE	Korean Foundation for Quality (KFQ)

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

Soon Hong YEOM 
Managing Director of Sustainability management institute

SECTION A. Executive summary

Korean Foundation for Quality (KFQ) has performed periodic verification of the CDM project 'K-water 0.96MW bundle small-scale hydroelectric power plants project', UNFCCC Registration Ref. No. 2910 for the period from 01/06/2010 to 31/12/2011.

The project is a bundled two small-scale hydroelectric power plants - Gosan and Pangyo small scale hydroelectric power plants. There was a post-registration change (corrections to project information, temporary deviations from registered monitoring plan and permanent changes to the registered monitoring plan) identified in the course of verification for this monitoring period. The corrections, temporary deviation and permanent changes in the registered monitoring plan is in line with Appendix of CDM Project Standard for project activities (ver. 01.0) hence request for approval of the corrections is submitted under this issuance track.

Validation process

The validation process includes desk review of 'corrections to project information', 'temporary deviation from the registered monitoring plan' and 'permanent changes to the registered monitoring plan', and other supporting documents. Further, on-site assessments and interviews with those involved in project management and operations are conducted. This is followed by preparation of draft validation report summarizing desk review and on-site inspection findings (i.e. CARs, CLs, and FARs). Upon successful closing of the CARs and CLs raised (if any), the final validation report is prepared. The final report then undergoes a technical review and final approval according to KFQ's internal quality assurance procedures.

The information presented by the PP was assessed by review of the detailed project documentation as well as interviews with personnel at K-water. This has enabled the validation team to assess and determine that the corrections are in compliance with CDM Project standard and relevant guidance provided by the Board.

**General description of the project activity and summary of
'Corrections', 'Temporary deviation' and 'Permanent changes to the registered monitoring plan'**

Project Title	K-water 0.96MW bundle small-scale hydroelectric power plants project	
UNFCCC Ref. No.	2910	
Project Participant	Korea Water Resources Corporation (K-water)	
Location of the project	Gosan	Nobyeon-Dong, Suseong-Gu, Daegu metropolitan City, Republic of Korea Latitude : N35°49'47" Longitude: E128°41'42"
	Pangyo	Pangyo-Dong, Bundang-Gu, Seongnam City, Gyeonggi-do, Republic of Korea Latitude : N37°23'03" Longitude: E127°06'03"
Date of registration	29/11/2009	
Registered PDD	Version: 03.2, dated 19/06/2009	
Revised PDD	Version: 05.0, dated 14/09/2017	

Crediting period	01/06/2010 ~ 31/05/2020 (10 years of fixed crediting period)
Monitoring period of this verification	From 01/06/2010 to 31/12/2011
Sites applicable to Temporary Deviation and Temporary Deviation period	Pangyo · 01/06/2010~31/12/2010 · 01/01/2011~30/05/2011 · 01/07/2011~31/08/2011

The project, 'K-water 0.96MW bundled small-scale hydroelectric power plants project' is a bundled two small-scale hydroelectric power plants - Gosan and Pangyo small scale hydroelectric power plants.

During this 1st monitoring period (01/06/2010 to 31/12/2011), there was a post-registration change (corrections to project information, temporary deviation from registered monitoring plan and permanent changes to the registered monitoring plan) identified.

- For the corrections to the project information
 - : There is no change on the installed capacity of generators for the project activity. However, there are typographical errors identified with regard to specifications on wheel for Pangyo and geo coordination for Gosan in the registered PDD. Thus, the PP revised the PDD (ver. 05.0) by reflecting actual project information
 - : As a result, the validation team confirms the PP has corrected the information on wheel specification and geo coordination of Pangyo and Gosan respectively according to the actual project information in the revised PDD (ver. 05.0), and the changes do not affect the design of the project activity. The validation team also confirms that the corrected information reflects actual project information in line with para. 288 of VVS (ver. 01.0).

The corrections are in line with Appendix of CDM Project Standard for project activities (ver. 01.0) hence, request for approval of the corrections is submitted under this issuance track.

- For the temporary deviation from the registered monitoring plan
 - : According to the monitoring plan in the registered PDD, the quantity of electricity consumed by the plant from the Grid (hereinafter referred to as 'electricity consumption') shall be recorded monthly but it is found that monthly recording of the electricity consumption of Pangyo have been missed for 14 months (01/06/2010~31/12/2010, 01/01/2011~30/05/2011, 01/07/2011~31/08/2011) and only the gross electricity consumption were recorded on 31/12/2010, 30/05/2011, 30/06/2011 and 31/08/2011. Accordingly, the PP sought a conservative approach with regard to the application of the electricity consumption during the deviation period to determine the missed electricity consumption of Pangyo. The PP compared the two options, and applied the highest values as electricity consumption during the temporary deviation period in a conservative manner. The validation team confirms the alternative measure for deviation from the monitoring plan and methodology is appropriate under existing situation, and the emission reductions will not be over-estimated compared to actual emission reductions as a result of the deviation. It is also confirmed that the deviation complies with the relevant requirements related to the temporary deviation from the registered monitoring plan and applied methodology in the 'CDM project standard for project activity (ver.01.0)'.

The temporary deviation is in lie with Appendix of CDM Project Standard (ver.01.) hence request for approval of the temporary deviation is submitted under this issuance track.

- For the permanent changes to the registered monitoring plan

: According to the methodology applied (AMS I.D version 13) in the registered PDD, EG_y , is only monitoring parameter to measure electricity supplied to the Grid by the Project. Thus only electricity meter of measuring electricity supplied to the Grid is mentioned in the registered PDD and allowable error of this meter was determined as $\pm 0.5\%$ as per 'Act on operation of electricity market' controlled by KPX, Korea Power Exchange. However, net electricity supplied to the Grid by the project (Electricity supplied to the Grid by the project activity – Electricity imported to the project activity) shall be considered in emission reduction calculation thus PP installs electricity meter to measure electricity imported to each plant (Gosan and Pangyo) from KEPCO but those electricity meters were not mentioned in the registered PDD.

In case of electricity meter for measuring electricity imported to the project activity from KEPCO, allowable error of electricity meter is determined by 'Rules and Rates for Electricity Service' issued by KEPCO. According to this, the allowable error of electricity meter to measure electricity imported from KEPCO must be within $\pm 2.0\%$.

To provide clear information on monitoring parameters especially allowable error of electricity meter to measure electricity imported from KEPCO, PP revised registered PDD to reflect allowable error of it. It does not affect the applicability of applied methodology AMS-I.D. version 13. The changes are correctly reported in the revised PDD (version 05 dated 14/09/2017).

As per Appendix of PS, request for approval of this permanent change to the registered monitoring plan is submitted along with the request for issuance of this monitoring period.

Conclusion

As a result of our assessment, KFQ confirms that the changes described in the revised PDD (ver.05.0) ensure accurate reflection of actual project information and temporary deviation as well as permanent changes to the registered monitoring plan also complies with the relevant requirements related to temporary deviation from the registered monitoring plan in the 'CDM project standard for project activities (ver.01.0)'.

Hence KFQ recommends for approval of corrections to project information, temporary deviation from the registered monitoring plan and permanent changes to the registered monitoring plan during the deviation period (Pangyo: 01/06/2010~31/12/2010, 01/01/2011~30/05/2011, 01/07/2011~31/08/2011) of project activity 'K-water 0.96MW bundled small-scale hydroelectric power plants project'.

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader	IR	LEE	Mi Jung	KFQ	√	√	√	√
2.	Verifier	IR	JANG	Pyung Hee	KFQ	√	√	√	√

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	PARK	Sang Yeon	KFQ
2.	Approver	IR	YEOM	Soon Hong	KFQ

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

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

KFQ's validation is based on the 'Corrections to project information' and 'revised monitoring plan' as well as other supporting documents provided by the PP. Those were reviewed as initial step of the validation process as for the post registration changes. Also, over the whole validation period, validation team reviewed the applied baseline and monitoring methodology and any other information/references relevant to the post registration changes. A complete list of all documents reviewed is shown in Appendix 3 of this validation report. KFQ's validation process takes into consideration all the CDM Rules and Guidance applicable to the project activity, e.g. Clean Development Mechanism Validation and Verification Standard, Clean Development Mechanism Project Standard, Clean Development Mechanism Project Cycle Procedure, and relevant decisions, clarifications and guidance from the CMP and the CDM EB.

C.2. On-site inspection

Detailed validation of 'Corrections to project information', 'Temporary deviation from the registered monitoring plan' and 'Permanent changes to the registered monitoring plan' was performed during the site visit on 18/07/2017. During the on-site assessment, the personnel were interviewed or assisted the validation team.

The main topics of the discussion are summarized in the table below.

Duration of on-site inspection: 18/07/2017				
No.	Activity performed on-site	Site location	Date	Team member
1.	Confirmation of information to the project activity and the correct & complete implementation	Gosan	18/07/2017	Pyung Hee JANG
		Pangyo	18/07/2017	Mi Jung LEE
2	Review the data low for generating, aggregating and reporting the monitoring parameters	Same as above	Same as above	Same as above
3	Confirm the correct implementation of procedures for operations and data collection	Same as above	Same as above	Same as above
4	Cross-check the information provided in the PDD and temporary deviation documentation with other sources	Same as above	Same as above	Same as above

C.3. Interviews

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

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

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
I. Gosan						
1	JO	Jeong Hong	Korea Water Resources Corporation(K-water)	18/07/2017	General support, QA/QC	Pyung Hee JANG
2	KIM	Yong Jik	Korea Water Resources Corporation(K-water)	18/07/2017	Plant operation and maintenance	Pyung Hee JANG
II. Pangyo						
1	KIM	Deog Je	Korea Water Resources Corporation(K-water)	18/07/2017	General support, QA/QC	Mi Jung LEE
2	OH	Ho Young	Korea Water Resources Corporation(K-water)	18/07/2017	Plant operation and maintenance	Mi Jung LEE

C.4. Clarification requests, corrective action requests and forward action requests raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	0	0	0
Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline	1	n/a	n/a
Corrections	0	0	0
Changes to the start date of the crediting period	n/a	n/a	n/a
Inclusion of a monitoring plan to a registered project activity	n/a	n/a	n/a
Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline	n/a	n/a	n/a
Changes to the project design of a registered project activity	n/a	n/a	n/a
Types of changes specific to afforestation and reforestation project activities	n/a	n/a	n/a
Total	1	0	0

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

Means of validation	Compliance with PDD form is validated by the document review, review of PDD template and instruction for completing PDD form, review of registered PDD (ver. 03.2) and review of revised PDD (ver. 05).
Findings	The change to the project information of the registered project activity has been observed during document review and on-site visit. The project participant has provided a revised PDD (ver. 05) inclusive of all post registration changes. The project participants used the latest version of the PDD form for the revised PDD. The PP has provided the PDD in VVS track in clean and track change version and same has been checked and found to be correct.
Conclusion	The validation team has reviewed the revised PDD and it is observed that the revised PDD is completed by using the latest form, Project Design Document form (version 10.1). By means of checking updated PDD with the latest applicable and available PDD template form, the validation team can confirm that the information transferred to the later version of the PDD form is materially the same as that in the registered PDD and those changes are assessed under this report.

D.2. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

The reason for deviation	<p><u>The reason for deviation</u></p> <p>'The electricity supplied to the grid by the project activity (EGy)' shall be monthly recorded as per the monitoring plan in the registered PDD. Accordingly, 'the quantity of electricity consumed by the plant from the grid' (hereinafter referred to as 'electricity consumption') shall be monthly recorded. However, it is found that the monthly recording of the electricity consumption for the Pangyo have been missed for 14 months (01/06/2010~31/12/2010, 01/01/2011~30/05/2011 and 01/07/2011~31/08/2011) and only the gross electricity consumption were recorded on 31/12/2010, 30/05/2011, 30/06/2011 and 31/08/2011.</p> <p>Therefore, it is decided to proceed a temporary deviation for 'the electricity consumption' during the data missing period under the issuance track as per CDM project standard (ver. 01.0).</p> <p><u>The applied sites & applied period for the temporary deviation</u></p> <p>The project is a bundled two small-scale hydroelectric power plants – Gosan and Pangyo.</p> <p>The temporary deviation is only applicable to Pangyo and the temporary deviation periods are as below:</p> <ul style="list-style-type: none"> • 01/06/2010~31/12/2010 • 01/01/2011~30/05/2011 • 01/07/2011~31/08/2011 <p><u>The application of conservative assumption or discount factors</u></p> <p>The 'electricity consumption' is measured through an integrating electricity meter and the gross electricity consumption was recorded on 31/12/2010, 30/05/2011, 30/06/2011 and 31/08/2011.</p> <p>Accordingly, the PP sought a conservative approach with regard to the application of the electricity consumption during the deviation period by comparing two options to determine the missed electricity consumption of Pangyo as below:</p> <ul style="list-style-type: none"> • Option A) <u>Estimating from the daily average data which actually measured</u> ; Deviation data were calculated using the daily average data which actually measured during the monitoring period • Option B) <u>Adding extra factor of 2% to the recorded gross electricity consumption</u> ; Deviation data were calculated by adding the extra factor of 2% (maximum permissible error of the meter) to the recorded gross electricity consumed
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The missed electricity consumption was calculated by applying two options and the detailed data are described as below:

Option		Pangyo		
		01/06/2010~ 31/12/2010	01/01/2011~ 30/05/2011	01/07/2011~ 31/08/2011
A	① Gross electricity consumption which monthly recorded during the monitoring period	2,843.0 kWh	2,843.0 kWh	2,843.0 kWh
		※ Above mentioned gross electricity consumption for each period is actual monthly gross electricity consumption recorded during 01/09/2011~31/12/2011 (122 days).		
	② Daily average electricity consumption	23.3 kWh (①/122 days)	23.3 kWh (①/122 days)	23.3 kWh (①/122 days)
	③ Estimation of electricity consumption during data missing period	4,986.9 kWh (②*214 days)	3,495.5 kWh (②*150 days)	1,444.8 kWh (②*62 days)
B	④ Gross electricity consumption during data missing period	2,092.8 kWh	10,279.2 kWh	1,545.6 kWh
	⑤ Estimation of electricity consumption by applying max. permissible error	2,134.7 kWh (④*1.02)	10,484.8 kWh (④*1.02)	1,576.5 kWh (④*1.02)
Selected value		4,986.9 kWh	10,484.8 kWh	1,576.5 kWh

The PP compared the two options mentioned above, and proposed the application of the highest values as electricity consumption during the temporary deviation period in a conservative manner.

Means of validation

The KFQ validation team checked, whether this explanation for the reason for deviation is reliable through review of relevant documents and interviews with project participant.

Findings

As indicated above, the PP monitored the electricity consumption by integrating electricity meter, however, did not record the electricity consumption monthly during the temporary deviation period (14 months: 01/06/2010~31/12/2010, 01/01/2011~30/05/2011 and 01/07/2011~31/08/2011). Consequently, it was identified that monitoring of electricity generation is not implemented as per the monitoring plan of the registered PDD. The proposed deviation from the registered monitoring plan does not require a revision of monitoring plan since the deviation is temporary non-compliance. In addition, the temporary deviation is in line with Appendix of Project Standard (ver. 01.0) hence request for approval of the temporary deviation is submitted under this issuance track.

The PP has checked and recorded the accumulated electricity consumption of Pangyo on prior to this monitoring period (22/12/2009). And the gross electricity consumption was only recorded on 31/12/2010, 30/05/2011, 30/06/2011 and 31/08/2011 respectively. Even the gross electricity consumption was recorded on above mentioned date, the monitoring frequency of electricity consumption was not met as per the monitoring plan of the registered PDD.

The deviation has impact on baseline emissions and it is likely to lead to a reduction in the accuracy of the calculation of emission reductions. Therefore, the PP proposed two alternative monitoring arrangements (option A & B mentioned above). The PP compared the two options, and applied the highest values as electricity

	<p>consumption during the temporary deviation period in a conservative manner.</p> <p>The validation team checked the data presented by the PP through each plant's job-sheet as well as photo evidences of electricity meters, on-site assessment and interviews with relevant staff at K-water. The validation team confirms the application of the highest values between two options is conservative, and consequently the emission reductions will not be over-estimated compared to actual emission reductions as a result of the temporary deviation.</p> <p>However, as mentioned as above electricity consumption during 01/06/2010 ~ 31/12/2010 for Pangyo is 2,092.8 kWh and it was checked through the recording of gross electricity consumption measured on 31/12/2010, but start date of this measurement couldn't be checked (Please refer to CL 01). After the PP submitted evidence with regard to start date of measurement of electricity consumption, the CL 01 is successfully closed.</p>
Conclusion	<p>Regarding to the CL 01, PP submitted 'Inspection report of transmission and substation facilities completion' of Pangyo issued on 22 December 2009. According to this document, even there is no record of accumulated electricity measured on 30/05/2010 the validation team could confirm accumulated electricity consumption measured on 31/12/2010 is including electricity consumption before start date of this monitoring period (01/06/2010). Thus, validation team confirmed that gross electricity consumption during 01/06/2010 ~ 31/12/2010 is conservative as it is calculated as project emission.</p> <p>Regardless of it, the validation team checked the data presented by the PP through each plant's job-sheet as well as photo evidences of electricity meters, on-site assessment and interviews with relevant staff at K-water. The validation team confirms the application of the highest values between two options is conservative, and consequently the emission reductions will not be over-estimated compared to actual emission reductions as a result of the temporary deviation.</p> <p>The validation team confirms the alternative measure for temporary deviation from the monitoring plan is appropriate under existing situation, and the emission reductions will not be over-estimated compared to actual emission reductions as a result of the deviation.</p> <p>It is also confirmed that the deviation complies with the relevant requirements related to the temporary deviation from the registered monitoring plan and applied methodology in the 'CDM project standard for project activities (ver. 01.0)'</p>

D.3. Corrections

Means of validation	Corrections to the project information have been validated by document review, on-site inspection and review of registered and revised PDD.		
Findings	There is no change on the installed capacity of generators for the project activity. However, there are typographical errors identified with regard to specifications on wheel for Pangyo and geo coordination of Gosan in the registered PDD.		
	The validation team has checked out information of wheel and geo coordination through nameplates and specifications of the equipment as well as on-site assessment and GPS map services. And it is confirmed that the PP has corrected the information according to the actual installation, and the corrected information is as below;		
		Description in registered PDD (v.3.2)	Revised PDD (v.5.0)
	The Gosan small-scale hydroelectric power plant		
	Latitude	N35°50'57"	N35°49'47"
	Longitude	E128°33'9"	E128°41'42"
	The Pangyo small-scale hydroelectric power plant		

CDM Project Form

	Wheel	Type	Horizontal shaft Kaplan Tubular	Horizontal shaft Kaplan Tubular (No change)							
		Output power	222 KW	292 KW							
		Rotation	1,800 RPM	1,885 RPM							
		Efficiency	80%	80% (No change)							
		Unit	2	2(No change)							
	<p>The estimated ER in the registered PDD was calculated based on the capacity of generator and annual operating hours of the generator. There was no change on the installed capacity of generator at Pangyo, and the PP only corrected typographical errors with regard to specifications on wheel in the revised PDD. Therefore, the corrections to the project information mentioned above affect neither the estimated ER in the registered PDD nor the design of the project activity. Accordingly, request for approval of the corrections is submitted under the issuance track since the corrections are in line with Appendix of CDM Project Standard (ver. 01).</p> <p>Moreover, below information is added in the course of preparing a revised PDD using the valid version of the applicable PDD form. The details of added information and assessment opinions are as below:</p>										
	<table><tr><th>No.</th><th>Added information in the revised PDD</th><th>DOE Assessment</th></tr><tr><td>1</td><td><u>A.2. Location of project activity</u> Inclusion of detailed address (i.e. street no.)</td><td>The information is added and it was confirmed through the on-site assessment and GPS map services.</td></tr><tr><td>2</td><td><u>A.4. Parties and project participants</u> ➤ Inclusion of Annex I parties (Switzerland)</td><td>The information is added and it was confirmed through MoC Annex 2 approved by UNFCCC and interview with the PP.</td></tr></table>			No.	Added information in the revised PDD	DOE Assessment	1	<u>A.2. Location of project activity</u> Inclusion of detailed address (i.e. street no.)	The information is added and it was confirmed through the on-site assessment and GPS map services.	2	<u>A.4. Parties and project participants</u> ➤ Inclusion of Annex I parties (Switzerland)
No.	Added information in the revised PDD	DOE Assessment									
1	<u>A.2. Location of project activity</u> Inclusion of detailed address (i.e. street no.)	The information is added and it was confirmed through the on-site assessment and GPS map services.									
2	<u>A.4. Parties and project participants</u> ➤ Inclusion of Annex I parties (Switzerland)	The information is added and it was confirmed through MoC Annex 2 approved by UNFCCC and interview with the PP.									
Conclusion	<p>The validation team confirms the PP has corrected the information on wheel for Pangyo, geo coordination for Gosan and allowable error of electricity meter for measuring imported electricity from KEPCO according to the actual installation in the revised PDD (ver. 05.0), and the changes do not affect the design of the project activity.</p> <p>The validation team confirms that the corrected information reflects actual project information in line with para. 288 of VVS (ver. 01.0).</p>										

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

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.5. Inclusion of a monitoring plan to a registered project activity

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.6. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	The proposed change to the project design is verified by the validation team as per para.296~299 of VVS version 01.0.
Findings	According to the methodology applied (AMS I.D version 13) in the registered PDD, EG _y is only monitoring parameter to measure electricity supplied to the Grid by the Project. Thus only electricity meter of measuring electricity supplied to the Grid is

mentioned in the registered PDD and allowable error of this meter was determined as $\pm 0.5\%$ as per 'Act on operation of electricity market' controlled by KPX, Korea Power Exchange. However, net electricity supplied to the Grid by the project (Electricity supplied to the Grid by the project activity – Electricity imported to the project activity) shall be considered in emission reduction calculation thus PP installs electricity meter to measure electricity imported to each plant (Gosan and Pangyo) from KEPCO but those electricity meters were not mentioned in the registered PDD.

In case of electricity meter for measuring electricity imported to the project activity from KEPCO, allowable error of electricity meter is determined by 'Rules and Rates for Electricity Service' issued by KEPCO. According to this, the allowable error of electricity meter to measure electricity imported from KEPCO must be within $\pm 2.0\%$.

Item	Allowable error for the meters	
	Registered PDD (v.3.2)	Revised PDD (v.5.0)
EG _y	$\pm 0.5\%$	<ul style="list-style-type: none"> Electricity meter for electricity exported to the Grid: $\pm 0.5\%$. Electricity meter for electricity imported from the Grid: $\pm 2.0\%$.

To provide clear information on monitoring parameters especially allowable error of electricity meter to measure electricity imported from KEPCO, PP revised registered PDD to reflect allowable error of it. It does not affect the applicability of applied methodology AMS-I.D. version 13. Further to this, for ensuring the claimed emission reduction was not overestimated and this permanent change does not reduce the accuracy level of emission reduction, the validation team checked the changes in emission reduction under conservative assumption of maximum differences of allowable error between $\pm 0.5\%$ (same level of allowable error as electricity meter for electricity exported to the Grid) and $\pm 2.0\%$ (allowable error of installed electricity meter for electricity imported from the Grid). And it is identified that there is only change below two decimal places of calculated emission reduction thus it is unlikely to alter integer value.

The changes are correctly reported in the revised PDD (version 05 dated 14/09/2017).

As per Appendix of PS, request for approval of this permanent change to the registered monitoring plan is submitted along with the request for issuance of this monitoring period.

Conclusion

The validation team confirms the below:

- PP has submitted the revised PDD in the latest format.
- The changes are correctly applied in the revised PDD.
- As per Appendix of project standard, version 01.0, the reported changes does not require prior approval.
- The change in the monitoring plan does not impact the applicability of the methodology.
- The claimed emission reduction will not be overestimated.

Hence, the post registration change reported in the revised PDD fulfils the requirement of section 8.3.4 of Project standard, version 01.0.

The validation team accepts the permanent changes from the registered monitoring plan reported in the revised PDD.

D.7. Changes to the project design of a registered project activity

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.8. Types of changes specific to afforestation and reforestation project activities

Means of validation	N/A
Findings	N/A
Conclusion	N/A

SECTION E. Internal quality control

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

SECTION F. Validation opinion

Korean Foundation for Quality (KFQ) has performed a validation for post registration changes of "K-water 0.96MW bundle small-scale hydroelectric power plants project" (UNFCCC Registration Ref. No. 2901)". During the validation, 'corrections to project information', 'temporary deviation from registered monitoring plan' and 'permanent changes to the registered monitoring plan' have been validated in line with all relevant UNFCCC requirements for the CDM.

The validation is based on the registered PDD (ver. 03.2), revised PDD (ver. 05) and the information made available to us. The review of the registered PDD (ver. 03.2), revised PDD (ver. 05), relevant supporting documents, and the subsequent follow-up interviews have been conducted to determine the post-registration changes of the project activity meet all relevant UNFCCC requirements for the CDM.

The validation team confirms i) PP has corrected the information of the project according to the actual installation in the revised PDD (ver. 05) and ii) alternative measure for the temporary deviation from the monitoring plan and methodology iii) permanent changes to the registered monitoring plan is appropriate under existing situation, and the emission reductions will not be over-estimated compared to actual emission reductions as a result of the temporary deviation and permanent changes to the registered monitoring plan.

The correction to the project information, temporary deviation and permanent changes to the registered monitoring plan is in line with Appendix of CDM Project Standard (ver. 01) hence request for approval of the corrections and temporary deviation is submitted under this issuance track.

As a result of our assessment, KFQ confirms the corrected information in the revised PDD (ver. 05) reflects actual project information and the temporary deviation of registered monitoring plan and permanent changes to the registered monitoring plan complies with the relevant requirements and applied methodology in the CDM Project Standard for project activities (ver. 01.0).

Therefore, KFQ recommends for approval of the post registration changes as justified above.

Signed on behalf of the Korean Foundation for Quality

Signature: 

Name : Soon Hong YEOM, Managing Director

Date : 19 September 2017

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Approved small scale methodology
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification Request
CMP	COP/MOP Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DOE	Designated Operational Entity
FAR	Forward Action Request
EB	Executive Board
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KFQ	Korean Foundation for Quality
KPX	Korea Power Exchange
KEPCO	Korea Electric Power Corporation
MoV	Means of verification
MP	Monitoring Plan
PDD	Project Design Document
PP	Project participant
PS	Clean Development Mechanism Project Standard
QMS	Quality Management System
EMS	Environment 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: 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
- 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 13 June 2017.

Sustainability Management Institute
Yu Shim JEONG



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: Sang Yeon 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
- 3.1 Energy demand
- 5.2 Caprolactam, nitric and 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 31 March 2016

Sustainability Management Institute
Yu Shim JEONG

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Project participants	Monitoring report version 01.0	20/06/2017	Project participant
2	Project participants	Emission reduction calculation (spread sheet) version 1	16/06/2017	Project participant
3	Project participant	CDM Project Design Document : · Version 03.2	19/06/2009 http://cdm.unfccc.int/filestorage/U/0/T/U0TGJLA6WQ4ZNE57B8KR_OCS1H92DP3/PDD_Eng%28ver.03.2%29%5B1%5D?t=SVR8b3VodmpwfDBr7b0H2NrhR58Uip1vydmx	Others
		· Version 05.0	14/09/2017	Project participant
4	KEMCO	CDM Validation Report: · Report No. AT201-200819 (Rev. 03)	05/08/2009 http://cdm.unfccc.int/Projects/DB/KEMCO1249968222.57/view	Others
5	Project participant	MoC Annex 2	24/05/2012	Others
6	Project participant	Jobsheet & photo evidences of electricity consumption recorded (electricity meter for internal consumption) (For Pangyo)	01/06/2010~ 31/12/2011	Project participant
7	Project participants	Alternative measure for temporary deviations from registered monitoring plan	31/07/2017	Project participant
8	GUGLER HYOSUNG Co., Ltd. , Ltd.	Equipment specifications · Pangyo	10/01/2009	Project participant
9	KEPCO	Rules and Rates for Electric Service	www.kepc.co.kr 28/08/2017	Project participant
10	Project participant	Inspection report of transmission and substation facilities completion' of Pangyo	22/12/2009	Project participant
11	Project participant	CDM monitoring manual	29/12/2011	Project participant
12	LSIS	Calibration certificates for Pangyo · SN:0887933 (for imported from the Grid)	01/07/2009	Project participant
13	KFQ	ISO 9001 Certificate & ISO 14001 Certificate	03/11/2008 17/10/2011	Project participant
14	CDM Executive Board	Methodology: AMS.I.D. ver.13.0 (Grid connected renewable electricity generation)	http://cdm.unfccc.int/filestorage/C/D/M/CDM_WF_AM_PHPV5WESACMBTJ2YY54GAJY	Others

CDM-PRCV-FORM

			SIEI3HD/AMS_I.D_rev ver13.pdf?t=TUF8b3 VodnF1fDBGQ8POqv W8JU6Phl8uPe-	
15	CDM Executive Board	CDM Forms <ul style="list-style-type: none"> • Project Design Document form (Ver. 10.1) • Monitoring report form (Ver. 06.0) • Validation report form for post registration changes for CDM project activities (Ver. 01.0) 	https://cdm.unfccc.int/ Reference/PDDs_For ms/index.html	Others
16	CDM Executive Board	CDM Standards <ul style="list-style-type: none"> • CDM project standard for project activities (Ver. 01.0) • CDM validation and verification standard for project activities (Ver. 01.0) 	https://cdm.unfccc.int/ Reference/Standards/i ndex.html	Others
17	CDM Executive Board	CDM Procedure <ul style="list-style-type: none"> • CDM project cycle procedure for project activities (Ver. 01.0) 	https://cdm.unfccc.int/ Reference/Procedures /index.html	Others

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

Table 1. CL from this validation

CL ID	01	Section no.	D.2	Date:	18/07/2017
Description of CL					
Electricity consumption during 01/06/2010 ~ 31/12/2010 for Pangyo is 2,092.8 kWh and it was checked through the recording of gross electricity consumption measured on 31/12/2010 but start date of this measurement couldn't be checked. Please clarify that above mentioned electricity consumption is for the period from 01/06/2010 to 31/12/2010.					
Project participant response					Date: 31/07/2017
Submitted evidence to show start date of measurement of electricity consumption					
Documentation provided by project participant					
- Inspection report of transmission and substation facilities completion' of Pangyo issued on 22 December 2009					
DOE assessment					Date: 04/08/2017
PP submitted 'Inspection report of transmission and substation facilities completion' of Pangyo issued on 22 December 2009. According to this document, even there is no record of accumulated electricity measured on 30/05/2010 the validation team could confirm accumulated electricity consumption measured on 31/12/2010 is including electricity consumption before start date of this monitoring period (01/06/2010). Thus, validation team confirmed that gross electricity consumption during 01/06/2010 ~ 31/12/2010 is conservative as it is calculated as project emission.					

Table 2. CAR from this validation

CAR ID	-	Section no.	-	Date:	-
Description of CAR					
n/a					
Project participant response					Date: -
n/a					
Documentation provided by project participant					
n/a					
DOE assessment					Date: -
n/a					

Table 3. FAR from this validation

FAR ID	-	Section no.	-	Date:	-
Description of FAR					
n/a					
Project participant response					Date: -
n/a					
Documentation provided by project participant					
n/a					
DOE assessment					Date: -
n/a					