




**Validation report form for post-registration changes for
CDM project activities
(Version 03.0)**

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

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	<ul style="list-style-type: none"> Title: KDHC Daegu Biomass Cogeneration Project Reference number: 5153
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	<ul style="list-style-type: none"> Version 1.2
Completion date of the validation report	<ul style="list-style-type: none"> 14/05/2021
Type(s) of PRCs	<input type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ¹ <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan <input checked="" type="checkbox"/> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents <input checked="" type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	<ul style="list-style-type: none"> Version 17.1
Project participants	<ul style="list-style-type: none"> Korea District Heating Corporation(KDHC)
Host Party	<ul style="list-style-type: none"> Republic of Korea
Applied methodologies and standardized baselines	<ul style="list-style-type: none"> Applied methodology: AMS-I.C. (Version18) : Thermal energy production with or without electricity No standardized baseline(s) applicable
Mandatory sectoral scopes	<ul style="list-style-type: none"> Sectoral scope: 1- Energy industries (renewable/non-renewable sources)

¹ 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).

Conditional sectoral scopes, if applicable	<ul style="list-style-type: none"> • No conditional sectoral scope(s) linked to the applied methodology
Name and UNFCCC reference number of the DOE	<ul style="list-style-type: none"> • Name: Korean Foundation for Quality (KFQ) • Reference number: E-0025
Name, position and signature of the approver of the validation report	<p>Yu Shim JEONG</p>  <p>Managing Director of Energy-Climate Change Assessment Division</p>

SECTION A. Executive summary

Korean Foundation for Quality (hereinafter KFQ) has performed periodic verification of the CDM project “KDHC Daegu Biomass Cogeneration Project”, in the Republic of Korea, UNFCCC Registration Ref. No. 5153 in the period 31/08/2017 to 31/12/2020. The project activity is developed by Korea District Heating Corporation (KDHC) in the Republic of Korea.

The project activity is to install a new cogeneration power plant, which generation heat and electricity with the use of woody biomass as energy sources. The project activity has installed the cogeneration system which consists of boiler and steam turbine (Electrical power generation: 3MW and District Heating (DH) capability: 14.5 Gcal/h).

There was a post-registration change (hereinafter, 'PRC'), permanent changes to the registered monitoring plan and changes to the project design identified in the course of verification for this monitoring period. The request for approval of permanent change is submitted via the issuance track with the discretion of the project participant (hereinafter, PP) as per the CDM project standard for project activities.

Validation process

The validation process includes desk review of PRC and other supporting documents. Further, onsite assessments and interviews with those involved in project management and operations are conducted. Draft validation report is prepared by summarizing desk review and on-site inspection findings (i.e. Raising CARs, CLs, and FARs). Upon successful closing of the CARs and CLs raised (if any), the final PRC validation report for the PRC is prepared. The final report then undergoes a technical review and final approval according to KFQ's internal quality assurance procedures.

The information provided by the PP was assessed by review of the detailed project documentation as well as interviews with staffs of the PP according to the VVS (Version 02.0). This has enabled the validation team to assess and determine that the permanent change from the registered monitoring plan and changes to the project design is in compliance with CDM PS (Version 02.0) and relevant guidance provided by the Board.

General description of the project activity and summary of Post-registration change

Project Title	KDHC Daegu Biomass Cogeneration Project
UNFCCC Registration Number	5153
Project Participant	Korea District Heating Corporation (KDHC)
Baseline and monitoring methodology	AMS-I. C. (Version 18)
Location of the project	Address: 895, Daecheon-dong, Dalseo-gu, Daegu Metropolitan city, Republic of Korea GPS coordination: Latitude 35.8311°E, Longitude 128.4896°N
Date of registration	14/09/2011
PDD	Resisted PDD: Version 16 of 03/12/2018 Updated PDD: Version 17.1 of 14/05/2021
Validation	Validation report of 01/08/2011 by TUV
Crediting period	14/09/2011 to 13/09/2021
Monitoring period of this verification	31/08/2017 to 31/12/2020 (1,219 days)
Summary of PRC	<p>➤ Permanent changes to the registered monitoring plan</p> <p>The woodchip storage site was closed on 30/08/2017 and woodchips transported directly between project site and biomass supply site. Thus monitoring parameters were excluded from the calculation of the emission reduction as</p>

below.

- EG_{storage,y}: imported electricity in the woodchip storage site
- FF_{storage,y}: consumed diesel of heavy equipment in the storage site

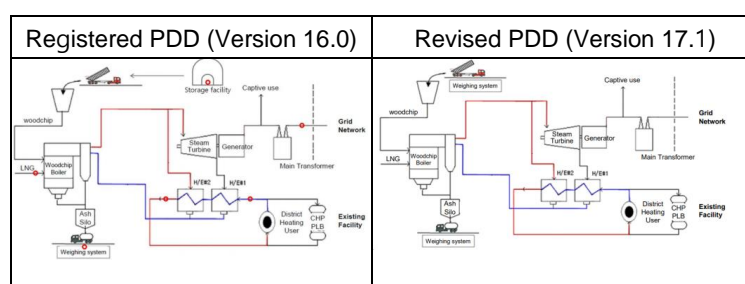
And measurement methods and procedures are changed as follows:

- TL_{woodchip,y}:
“(Calculated at the storage site and the CHP site. The lower value is applied)” is excluded.
- MAD_{woodchip}: “the distance between project site and Geoje via the storage site(175km) is applied” is changed as “the distance between project site and Geoje (165km) is applied”

➤ Changes to the project design

The woodchip storage site was closed on 30/08/2017. Thus, the project design has been changed as below.

- Project boundary : the woodchip storage site is excluded



During this monitoring period (31/08/2017~31/12/2020), there was a post-registration change identified and details of it are as below:

1) Permanent changes to the registered monitoring plan

a) Monitoring parameters regarding the woodchip storage site are excluded

- EG_{storage,y}: imported electricity in the woodchip storage site
- FF_{storage,y}: consumed diesel of heavy equipment in the storage site

b) Measurement methods and procedures are changed

- TL_{woodchip,y}: “(Calculated at the storage site and the CHP site. The lower value is applied)” is excluded.
- MAD_{woodchip}: “the distance between project site and Geoje via the storage site(175km) is applied” is changed as “the distance between project site and Geoje (165km) is applied” due to closure of the woodchip storage site.

2) Change to the project design

a) The woodchip storage site is excluded from the project boundary

Conclusion

As a result of our assessment, the changes described in the revised PDD (Version 17.1 dated 14/05/2021) ensure that PRC are in accordance with the applied methodology and the changes to the project activity comply with the requirements established in the CDM Project Standard (version 02.0). As per para. 246~248 of CDM PS for PA (Version 02.0), the PP decided to submit request for approval of PRC with the request for issuance of CERs for this monitoring period.

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Last name	First name	Affiliation	Involvement in
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					(e.g. name of central or other office of DOE or outsourced entity)	Desk/document review	On-site inspection	Interviews	Validation findings
1	Team Leader(*)	IR	JANG	Pyung Hee	KFQ	√	√	√	√
2	Verifier	IR	PARK	Su Hyun	KFQ	√	-	-	√
3	Verifier	IR	CHO	Hyun Cheol	KFQ	√	-	-	√
4	Verifier (Trainee)	-	OH	Jae Ryong	KFQ	√	√	√	√

(*) means a personnel with technical expertise in technical area 1.1.

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	LEE	Mi Jeong	KFQ
2.	Approver	IR	JEONG	Yu Shim	KFQ

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

SECTION C. Means of validation

C.1. Desk/document review

KFQ's validation is based on the revised monitoring plan and 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 and 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

On-site inspection related to this validation of the permanent change from the registered monitoring plan and changes to the project design was performed during the site visit on 19/03/2021. During the on-site assessment, the personnel were interviewed or assisted the validation team. Even though the woodchip storage site was already closed, the validation team visited the site and confirmed the woodchip storage site was demolished and restored the land by the PP.

The main activity performed on-site are summarized in the table below

Duration of on-site inspection: 19/03/2021				
No.	Activity performed on-site	Site location	Date	Team member

1	Confirm the implementation and operation of the project	Biomass cogeneration facility	19/03/2021	Pyung Hee JANG Jae Ryoing OH
2	Review the data flow for generating, aggregating and reporting the monitoring parameters	Biomass cogeneration facility	19/03/2021	Pyung Hee JANG Jae Ryoing OH
3	Confirm the correct implementation of procedures for operations and data collection	Biomass cogeneration facility	19/03/2021	Pyung Hee JANG Jae Ryoing OH
4	Cross-check the information provided in the PRC documentation with other sources	Biomass cogeneration facility	19/03/2021	Pyung Hee JANG Jae Ryoing OH

C.3. Interviews

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

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	LEE	Hae Gab	Head Office of KDHC	19/03/2021	General support for CDM project activities (Revision of monitoring plan and reporting impact of design change etc.)	Pyung Hee JANG Jae Ryong OH
2	SEO	Myeong Gwee	Head Office of KDHC	19/03/2021		Pyung Hee JANG Jae Ryong OH
3	LEE	Seong Heon	Daegu Office of KDHC	19/03/2021	Implementation and operation of the plant	Pyung Hee JANG Jae Ryong OH

C.4. Sampling approach

Not applicable to this PRC.

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

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	0	0	0
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	0	0	0
Corrections	0	0	0
Changes to the start date of the crediting period	0	0	0
Inclusion of a monitoring plan	0	0	0
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents	0	1	0
Changes to the project design	0	0	0
Changes specific to afforestation and reforestation project activities	0	0	0
Others (please specify)	0	0	0
Total	0	1	0

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	Comparing the PDD with the latest PDD template form (CDM-PDD-FORM) as well as "Instructions for completing this form" provided by CDM EB listed in UNFCCC website.
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Findings	<p>Regarding to this PRC, the PP submitted revised PDD which is used latest PDD form (Version 11.0) and update version of registered PDD reflecting permanent changes to the registered monitoring plan and changes to the project design in the registered PDD (Version 16.0 dated 03/12/2018). All PRC has been included in the revised PDD (Version 17.1 dated 14/05/2021) and the PP has provided the revised PDD in both clean and track version. Both registered and revised PDD were reviewed for the consistency of the information and the validation team can confirm that the information transferred to the latest version of the PDD form is materially the same as that in the registered PDD besides those changes are assessed under this report.</p> <p>Thus, the validation team confirms that the revised PDD completed by the PP is compliance with the latest PDD form (Version 11.0) and instruction therein available at UNFCCC website and conforms to the requirement of paragraph 296 to 310 of VVS version 02.0</p>
Conclusion	The validation team confirm that revised PDD is compliance with the latest form and instruction therein. Furthermore, it is confirm that information transferred to the later version of the PDD form is materially the same as that in the registered PDD.

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

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

D.3. Corrections

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

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

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

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

Means of validation	The proposed permanent change to the registered monitoring plan is assessed by the validation team as per para. 296 ~299 of VVS version 02.0. KFQ reviewed the revised PDD, registered PDD, applied methodology, and the supporting documents referenced in the findings row below.
Findings	<p>Firstly, as per the registered PDD (Version 16, 03/12/2018), the woodchip storage site had been existed. The PP decided closure of woodchip storage site on 19/06/2017 due to consideration of fire hazard of the woodchip storage site and expiration of the lease contract for woodchip storage site. Thus, woodchip storage site was closed and the effective date of this change is on 31/08/2017.</p> <p>Moreover, we reviewed followings as evidences regarding closure of woodchip storage site.</p> <ul style="list-style-type: none"> the decision document, "Woodchip storage site closure and site restoration plan report" on 19/06/2017 Building demolition contract by Dae Yong Construction Co., Ltd. on 25/07/2017 Confirmation letter for electricity supply suspension' from KEPCO (issued

on 29/08/2017)

- Confirmation letter for land restoration completion by two entities' witness check' on 30/08/2017
- Demolition and site reversion result report by KDHC on 27/11/2017

According to the monitoring plan change as the above, monitoring parameters regarding woodchip storage site have been removed and revised a description as follow.

1) Monitoring parameters excluded in the project emission

- a) Quantity of diesel used for operating heavy equipments in the storage site ($FF_{storage, diesel, y}$)

This parameter is used for the calculation of the project emission from diesel fuel based heavy equipment for filtering and mixing process of piled woodchip in the woodchip storage site. The PP monitored a quantity of diesel supplied and cross-checked with bill from fuel suppliers. However, the woodchip storage site was closed on 30/08/2017 and the PP excepted this parameter from the monitoring plan. Thus, the calculation of the project emission through combustion of fossil fuel has been revised as follow.

Item	Calculation formula
Registered PDD	$PE_{y,comb} = FF_{start-up,y,k} \times NCV_k \times EF_k + FF_{storage,y,k} \times NCV_k \times EF_k$
Revised PDD	$PE_{y,comb} = FF_{start-up,y,k} \times NCV_k \times EF_k$

- a) Electricity imported from the national grid used in the woodchip storage site ($EG_{storage,y}$)

This parameter is used for the calculation of the project emission from the auxiliary electricity use in the woodchip storage site. Watt-hour meter was located at the woodchip storage site and data of $EG_{storage,y}$ was monitored from the watt-hour meter. Due to closure of the woodchip storage site on 30/08/2017, this parameter is excepted in the monitoring plan. Thus, the PP have changed the monitoring plan as follow.

Item	Calculation formula
Registered PDD	$PE_{y,power} = EG_{captive,y} \times EF_{grid,CM,y} \times (1 + TDL_y) + EG_{storage,y} \times EF_{grid,CM,y} \times (1 + TDL_y)$
Revised PDD	$PE_{y,power} = EG_{captive,y} \times EF_{grid,CM,y} \times (1 + TDL_y)$

2) Monitoring measurement methods and procedures changed

- a) Average biomass load of trucks ($TL_{woodchip,y}$)

This parameter is used for the calculation of the leakage emission from transportation of biomass as the below.

$$LE_{TB,y} = \frac{Q_{woodchip,y}}{TL_{woodchip,y}} \times MAD_{woodchip} \times \frac{NCV_{diesel} \times EF_{diesel}}{FE_{woodchip,truck}} \times CF_{thermal}$$

$TL_{woodchip,y}$ is applied the lower value between the average woodchip loads of the trucks delivering woodchips from original sources to the storage site and the average woodchip loads of the trucks delivering woodchips from the woodchip storage site to the CHP site. However, the woodchip storage site was closed and the woodchip is directly delivered to the CHP site. Thus, $TL_{woodchip,y}$ can be calculated at the CHP site only. So the PP has modified the monitoring measurement methods and procedures in the monitoring plan as the below.

Item	Monitoring measurement methods and procedures
Registered PDD	Determined by averaging the weights of biomass each truck carries to project site. (Calculated at the storage site and the CHP site. The lower value is applied)

	<table border="1"> <tr> <td>Revised PDD</td><td>Determined by averaging the weights of biomass each truck carries to project site.</td></tr> </table> <p>b) Maximum round-trip distance between project site and biomass supply site ($MAD_{woodchip}$)</p> <p>This parameter is used for the calculation of the leakage emission from transpotation of biomass as the below.</p> $LE_{TB,y} = \frac{Q_{woodchip,y}}{TL_{woodchip,y}} \times MAD_{woodchip} \times \frac{NCV_{diesel} \times EF_{diesel}}{FE_{woodchip,truck}} \times CF_{thermal}$ <p>The validation team found that monitoring measurement methods and procedures of $MAD_{woodchip}$ is applied the distance between project site and Geoje via the storage site (175km). However, the woodchip storage site was closed on 30/07/2017 (Refer to Appendix 4/Table 2/CAR ID 01). Regarding this CAR, the PP applied the revised monitoring plan. According to the revised monitoring plan, maximum round-trip distance between project site and biomass supply site (Geoje) is applied 165km. If the average distance between the project site and a biomass supply site is more than 165 km, average distance shall be calculated and applied. The validation team checked the transportation distance between the project site and the biomass supply sites using Google Maps and found the applied distance correct.</p> <p>Thus, $MAD_{woodchip}$ can be monitored excepting via the storage site. Thus, the PP has modified the monitoring measurement methods and procedures in the monitoring plan as the below.</p> <table border="1"> <tr> <th>Item</th><th>Monitoring measurement methods and procedures</th></tr> <tr> <td>Registered PDD</td><td>the distance between project site and Geoje via the storage site(175km) is applied</td></tr> <tr> <td>Revised PDD</td><td>the distance between project site and Geoje (165km) is applied</td></tr> </table> <p>The validation team reviewed relevant documents as well as site inspection and also, we checked the fomular for the project emission calculation as $PE_{y,comb}$, $PE_{y,power}$ and leakage emission calculation as $LE_{TB,y}$. All calculation fomular is complied with the applied methodology, AMS-I.C (Version 18.0). Moreover, the validation team checked the level of the accuracy for the calculation fomular of the revised PDD and found the accuracy level of the relevant parameters is same as the registered PDD. Thus we confirmed the permanet changes of the project activity do not reduce the level of accuracy of the monitoring compared with the registered PDD.</p>	Revised PDD	Determined by averaging the weights of biomass each truck carries to project site.	Item	Monitoring measurement methods and procedures	Registered PDD	the distance between project site and Geoje via the storage site(175km) is applied	Revised PDD	the distance between project site and Geoje (165km) is applied
Revised PDD	Determined by averaging the weights of biomass each truck carries to project site.								
Item	Monitoring measurement methods and procedures								
Registered PDD	the distance between project site and Geoje via the storage site(175km) is applied								
Revised PDD	the distance between project site and Geoje (165km) is applied								
Conclusion	<p>The raised CAR (ID 01) has been completely resolved.</p> <p>Based on the above mentioned findings, the validation team confirmed that the proposed permanent changes do not reduce the level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan. Also this permanent change are not likely to lead to a reduction in the accuracy of the calculation of emission reductions</p> <p>The permanent changes complied with the relevant requirements related to the permanent changes to the registered monitoring plan in the PS (Version 02.0). As per para.246~248 and Appendix. Indicative list of post-registration changes that may be suitable for approval under the issuance track of CDM PS for PA (Version 02.0), the PP decided to submit request for approval of PRC with the request for issuance of CERs for this monitoring period. And the validation team confirm that the changes above have no material impact on the applicability of the applied methodologies or the accuracy and completeness of the monitoring.</p>								

D.7. Changes to the project design

Means of validation	The proposed changes to the project design is assessed by the validation team as per para. 300 ~310 of VVS version 02.0. KFQ reviewed the revised PDD,
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Findings	<p>registered PDD, applied methodology, and the supporting documents referenced in the findings row below as well as site inspection.</p> <p>The project activity commissioned on 30 November 2010, after then the construction plan report of the woodchip storage site was reported in March 2011 and the project activity was registered on 14 September 2011. Construction of the woodchip storage site was completed on 9 December 2011. In the first verification stage, the post-registration change which includes the woodchip storage site in the project boundary had been approved and the PDD had been revised (version 15/27 June 2014 (Refer to PRC-5153-001)). Under the operation of the project activity, the PP had considered a fire hazard of the woodchip storage site. Thus the PP decided closure of woodchip storage site on 19/06/2017 and the woodchip storage site was closed from 31/08/2017. Accordingly the woodchip storage site was closed, and project boundary and monitoring plan has also changed.</p> <div> </div> <p>The validation team reviewed relevant evidences as follows and confirmed all documents are consistent with the actual project activities through document review as well as site-inspection.</p> <ul style="list-style-type: none"> Decision document, "Woodchip storage site closure and site restoration plan report" on 19/06/2017 Buliding demolition contract by Dae Yong Construction Co., Ltd. on 25/07/2017 Confirmation letter for electricity supply suspension' from KEPCO (issued on 29/08/2017) Confirmation letter for land restoration completion by two entities' witness check' on 30/08/2017 Demolition and site reversion result report by KDHC on 27/11/2017) <p><u>Para 309 (c) An assessment regarding whether the changes would adversely affect the conclusions of the validation report of the registered PDD with regard to:</u></p> <p>Moreover, the validation team assessed the impact of change to the project design and confirmed the changes to the project design of the project activity do not adversely impact any of the following.</p> <p><u>(i) The applicability and the applied standardized baselines and the other applied methodological regulatory documents with which the project activity has been registered</u></p> <p>The validation team reviewed requirement in AMS-I.C (Version 18.0) applied by the project activity and found that there is no applicable requirement that affected by the above mentioned changes. In addition, this project doesn't applied any standardized baseline that have to be updated or switched to. This is confirmation that these changes don't cause any affect to applied methodology or any standardized baseline.</p> <p><u>(ii) The project boundary and any associated leakages due to the changes</u></p> <p>The validation team checked the project boundary and any associated leakages due to the changes and found the PP indicated the project boundardy including the biomass cogeneration system, measuring instrument, electricity grid and district</p>
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heating network. Also, CO₂ is the only included GHG in the project boundary. Thus, the validation team confirmed the the project boundary and any associated leakages based on the changes to design of the project activity are correctly applied in the revised PDD according AMS-I.C (Version 18.0) and the changes do not adversely affect to the Conclusion of the validation report of the registered PDD.

(iii) The compliance of the monitoring plan with the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents

The validation team reviewed above mentioned changes against description provided in registered monitoring plan and found that some part of the monitoring plan has been revised due to the changes to project design (Refer to Section D.6 of this report details) and the revised parameters of the monitoring plan is complied with the methodology. Thus we confirmed the revised momitoring plan do not cause any affect to the conclusion of compyng with the applied methodology.

(iv) The level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan

The validation team reviewed the changes regarding closure of the woodchip storage site and taken account of any risk that related to level of accuracy provided in registered monitoring plan. It's found that above mentioned changes don't cause any effect to level of accuracy as required by registered monitoring plan. Also this permanent change is not likely to lead to a reduction in the accuracy of the calculation of emission reductions. Thus, it has no impact on the leve of accuracy of the momitoring (Refer to Section D.6 of this report details).

(v) The additionality of the project activity

As per the registered PDD and final validation report (Revisio No. 9, 01/08/2011) of this project activity, additionality of this project activity was demonstrated through investment barrier "Tool for the demonstration and assessment of additionality". As above mentioned changes may affect the investment cost, the validation team checked the investment cost used at the validation for registration and found that demolition costruction cost of the woodchip storage site is added as KRW 281.210 million (without VAT) due to the changes to project design. The investment cost is not included the woodchip contruction cost and O&M cost of the woodchip storage site is also not considered in the investment analysis for the registration. As the result of test for investment analysis considering demolition construction cost, the project activity is still economically unattractive. The validation team reviewed building demolition contract, demolition and site reversion result report by KDHC as well as testig of the investment analysis sheet. The result of the investment analysis for the registration is 4.81% of IRR and -1.44 billion Won of NPV which is not included a construction cost and O&M cost of the woodchip storage site. Considering demolition costruction cost of the woodchip storage site (KRW 281.210 million (without VAT)), IRR is dropped to 4.72% and NPV is also more negative as - 1.549 billion Won.

Based on the above, combined with document review and on-site physical inspection and test result, the validation team could confirmed that the result of the investment analysis is more unattractive than the registered PDD. Moreover, the closure of the woodchip storage site is not impact the capacity of the project activity, so, this change would not adversely affect initial result of additionality.

(vi) The scale of the project activity

The project activity belongs to the small-scale project type (Type I for this project activity). The validation team found that the installed capacities of electrical power generation and heat production were unchanged as 3 MW and 14.5 Gcal/h respectively on every year from 2017 to 2020. And we checked that the total installed energy generation capacity is correctly calculated as 25.864 MW thermal with appropriate conversion factors. Therefore, the validation team concluded that the total energy generation capacity of the installed equipment does not exceed the limit of 45 MW thermal. More over, changes to the project design is only excluding

	of the woodchip storage site which relevant parameters are $EG_{\text{storage},y}$ (electricity imported), $FF_{\text{storage,diesel},y}$ (quantity of diesel used), $TL_{\text{woodchip},y}$ (average biomass load of trucks) and MAD_{woodchip} (maximum round-trip distance between project site and biomass supply site) and is not affected the capacity of any main equipment of cogeneration system (boiler, steam turbine, DH system, woodchip & ash handling system etc.) Thus, the changes of the project design of the project activity will not impact the scale of the project activity.
Conclusion	<p>The validation team confirms that the actual changes comply with all the relevant requirements in the CDM PS (Version 02.0).</p> <p>The validation team confirms that the relevant description of the revised PDD reflects accurately actual project information.</p> <p>The revised PDD complies with all the requirements of the applied methodologies and the other applied methodological regulatory documents.</p> <p>It is confirmed that actual changes to the project design of a registered CDM project activity do not adversely affect the conclusions of the validation of the registered PDD with regard to:</p> <ul style="list-style-type: none"> (a) The applicability and application of the applied methodologies and the other applied methodological regulatory documents with which the project activity has been registered; (b) The project boundary and any associated leakages due to the changes; (c) The compliance of the monitoring plan with the applied methodologies and the other methodological regulatory documents; (d) The level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan; (e) The additionality of the registered CDM project activity; (f) The scale of the registered CDM project activity <p>It is confirmed that actual changes to the project design of a registered CDM project activity do not adversely impact any of the following requirement in CDM PS (Version 02.0).</p> <ul style="list-style-type: none"> (a) The applicability and the applied standardized baselines and the other applied methodological regulatory documents with which the project activity has been registered; (b) The additionality of the project activity (c) The scale of the project activity

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

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

SECTION E. Internal quality control

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According to KFQ's Procedure for deciding whether to proceed 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

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Korean Foundation for Quality (KFQ) has performed a validation for post registration changes of 'KDHC Daegu Biomass Cogeneration Project (UNFCCC Registration Ref. No. 5153)'. The post registration changes have been validated in line with all relevant UNFCCC requirements for the

CDM. The validation is based on the information available to DOE and the engagement conditions.

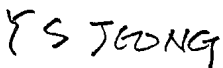
The validation is based on the revised PDD (Version 17.1), applied methodology (AMS-I. C. Version 18.0) and the information made available to us. The validation team conducted the validation in accordance with VVS (Version 02.0) and the review of the revised PDD, relevant supporting documents, and the subsequent follow-up interviews have been conducted to determine the post-registrations change of the project activity meet all relevant UNFCCC requirements for the CDM.

The validation team confirms the the permanent changes to the registered monitoring plan comply with the relevant requirements in the PS (Version 02.0) and the changes to the project design would adversely affect the conclusion of the validation report of the registered PDD. The emission reductions will not be over-estimated compared to the actual emission reductions as as result of the PRC. The request for approval of PRC is submitted under this issuance track according to the choice of the PP.

As a result of our assessment, KFQ confirms that the PRC complies with the relevant requirements related to the PRC from the registered monitoring plan and project design in the CDM Project Standard for project activities (Version 02.0).

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

Signed on behalf of the Korean Foundation for Quality

Signature : 

Name : Yu Shim JEONG, Managing Director of Energy·Climate Change
Assessment Division

Date : 14 May 2021

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CHP	Combined Heat and Power
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 _{2e}	Carbon dioxide equivalent
DCS	Distributed Control System
DOE	Designated Operational Entity
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KDHC	Korea District Heating Corporation
KEMCO	Korea Energy Management Corporation
KEPCO	Korea Electric Power Corporation
KFQ	Korean Foundation for Quality
KIMS	Korea Institute of Materials Science Annexed to Korea Institute of Machinery & Materials
KIOC	KDHC Integrated Operation Center
KPX	Korea Power Exchange
KTR	Korea Testing & Research Institute
MoC	Modalities of communication
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
PP	Project participant
PS	Clean Development Mechanism Project Standard
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



CERTIFICATE OF COMPETENCE

Name: Pyung-Hee JANG

Qualification:

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

Scopes of Expertise:

Technical Area (TA)

- 1.1 Thermal energy generation
- 1.2 Renewables

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 29 March 2019.

Sustainability Management Institute

Mi Jung LEE



CERTIFICATE OF COMPETENCE

Name: Su Hyun PARK

Qualification:

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

Scopes of Expertise:

Technical Area (TA)

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

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

Sustainability Management Institute
Mi Jung LEE



CERTIFICATE OF COMPETENCE

Name: Hyun Cheol CHO

Qualification:

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

Scopes of Expertise:

Technical Area (TA)

3.1 Energy demand

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 18 May 2020.

Energy·Climate Change Assessment Division
Nam Hoon KIM



CERTIFICATE OF COMPETENCE

Name: Mi Jung LEE

Qualification:

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

Scopes of Expertise:

Technical Area (TA)

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

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

Sustainability Management Institute
Yu Shim JEONG

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Project participant	Monitoring report:	Ver. 1.0 (15/02/2021) Ver. 2.0 (21/04/2021) Ver. 2.1 (14/05/2021)	Project participant
2	Project participant	Registered PDD Revised PDD	Ver.16 (03/12/2018) Ver.17 (04/02/2021) Ver.17.1(14/05/2021)	Others Project participant
3	Project participant	ER calculation sheet_PDD ver.17.1	14/05/2021	Project participant
4	Project participant	Test of Investment analysis sheet	14/05/2021	Project participant
5	TUV SUD	Validation report	Rev.07 (01/08/2011)	Others
6	KFQ KTR KFQ	Verification reports - 1 st monitoring period - 2 nd monitoring period - 3 rd monitoring period	Ver. 2.0 (16/12/2016) Ver. 3.0 (25/01/2019) Ver. 1.1 (10/04/2020)	Others
7	KFQ	Validation report (Post-registration changes): 'KDHC Daegu Biomass Cogeneration Project' (Ref. No.: PRC-5153-001)	14/07/2014	Others
8	KTR	Validation report (Post-registration changes): 'KDHC Daegu Biomass Cogeneration Project' (Ref. No.: PRC-5153-002)	25/01/2019	Others
9	Project participant	Woodchip storage site closure and site restoration plan report	19/06/2017	Project participant
10	Project participant	Buliding demolition contract by Dae Yong Construction Co., Ltd.	25/07/2017 (original version) 25/08/2021 (fee revision)	Project participant
11	KEPCO	Confirmation letter for electricity supply suspension' from KEPCO	29/08/2017	Project participant
12	Project participant	Confirmation letter for land restoration completion by two entities' witness check	30/08/2017	Project participant
13	Project participant	Demolition and site reversion result report by KDHC	27/11/2017	Project participant
14	CDM Executive Board	Methodology AMS-I.C. "Thermal energy production with or without electricity" (Version 18.0) Tool - "Tool to calculate emission factor for an electricity system" (version 02.0) Tool - "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01.0) CDM validation and verification standard for project activities (Version 02.0) CDM project standard for project activities (Version 02.0) CDM project cycle procedure for	From 17/09/2010 From 16/10/2009 From 16/05/2008 From 29/11/2018 From 29/11/2018 From 29/11/2018	

		project activities (Version 02.0) activities (Version 03.0)		
		Proejct design document form (Version 11.0)	From 31/05/2019	

Appendix 3. Clarification requests, corrective action requests and forward action requests

Table 1. CLs from this validation

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

Table 2. CARs from this validation

CAR ID	01	Section no.	D.6	Date:	07/05/2021
Description of CAR					
Monitoring measurement methods and procedures of MAD _{woodchip} in the monitoring plan is not consistent with the actual monitoring of the project activity.					
-Monitoring Plan: "the distance between project site and Geoje via the storage site(175km) is applied"					
-Actual monitoring: No -via the storage site (closed on 30/08/2017)					
Project participant response				Date:	14/05/2021
The PP revised the PDD (Version 17.1) and description of monitoring measurement methods and procedure has been changed as "the distance between project site and Geoje (165km) is applied"					
Documentation provided by project participant					
· PDD (Version 17.1)					
DOE assessment				Date:	14/05/2021
The validation team checked the distance between the project site and Geoje through Google map and found it is correctly applied. Thus, the validation team reviewed relevant documents as well as site inspection and also, we checked the formular for the leakage emission calculation as LE _{PB,y} . All calculation formular is complied with the applied methodology, AMS-I.C (Version 18.0). Moreover, the validation team checked the level of the accuracy for the calculation formular of the revised PDD and found the accuracy level of the relevant parameters is same as the registered PDD. Thus, we confirmed the permenet changes of the project activity do not reduce the level of accuracy of the monitoring plan compaired with the registered PDD.					

Table 3. FARs from this validation

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

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);• Make editorial improvements.
02.0	31 October 2017	Revision to align with the requirements in 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: Registration Keywords: post-registration change, project activities, validation report		