



**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

Title and UNFCCC reference number of the project activity	<ul style="list-style-type: none"> Title: Mokpo Landfill Gas Recovery Project for Electricity Generation Reference number: 2834
Scale of the project activity	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
Version number of the verification and certification report	Version 1.3
Completion date of the verification and certification report	23/07/2020
Monitoring period number and duration of this monitoring period	<ul style="list-style-type: none"> Monitoring period number : 10th Duration : 01/01/2019 – 17/02/2020
Version number of the monitoring report to which this report applies	Version 3.0
Crediting period of the project activity corresponding to this monitoring period	From 18/02/2010 to 17/02/2020
Project participants	<ul style="list-style-type: none"> Hanwha Corporation (Republic of Korea) Hanwha Corporation (Switzerland)
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.D (Version 13), AMS-III.G (Version 06.0) No standardized baseline(s) applicable
Mandatory sectoral scopes	<ul style="list-style-type: none"> Sectoral scope: 1-Energy Industry 13-Waste handling and disposal
Conditional sectoral scopes, if applicable	<ul style="list-style-type: none"> No conditional sectoral scope(s) linked to the applied methodology
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	<ul style="list-style-type: none"> Amount estimated in PDD for 2019~2020 : 30,453 tCO₂e (413days) (Section E.8.5 for the detailed calculations)
Certified amount of GHG emission reductions or GHG removals for this monitoring period	50,053 tCO ₂ e
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 verification and certification report	<p>YU SHIM JEONG</p> <p><i>Y S JEONG</i></p> <p>Managing Director of Energy·Climate Change Assessment institute</p>

SECTION A. Executive summary

Korean Foundation for Quality (KFQ) has performed periodic verification of the CDM project 'Mokpo Landfill Gas Recovery Project for Electricity Generation' in Republic of Korea. UNFCCC Registration Ref. No. of this project activity is 2834 and duration of this 10th monitoring period is 01/01/2019 ~ 17/02/2020. This report contains the findings from the verification and a certification statement for the certified emission reductions.

Verification objective

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

The objective of this verification was to verify and certify emission reductions reported for the 'Mokpo Landfill Gas Recovery Project for Electricity Generation' for the period from 01/01/2019 to 17/02/2020 in accordance with paragraph 62 of CDM modalities and procedures.

Verification scope

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place.
- The monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of CERs and verifiable and in accordance with applicable CDM requirements.
- The monitoring plan complies with the monitoring methodology and the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology including applicable tools and compliance with any guidance provided by the Board regarding deviations from the provisions of a registered plan and/or methodology.
- Data is recorded and stored as per the monitoring methodology AMS-I.D (Version 13), AMS-III.G (Version 06) and the calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

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

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

Verification process

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

The verification process includes desk review of the MR published (and any updated versions, if available), emission reduction calculation spreadsheets and other supporting documents and data. Further, onsite assessments and interviews with those involved in project management and operations are conducted. This is followed by preparation of draft verification report summarizing

desk review and on-site assessment findings (i.e. CARs, CLs, and FARs). Upon successful closing of the CARs and CLs raised (if any), the draft verification report is prepared. The draft verification report reviewed by a technical reviewer according to KFQ's internal quality assurance procedures. If no further findings are raised the final verification report is prepared and reviewed once again.

The data presented in the MR were assessed by review of the detailed project documentation and production records, as well as by interviews with personnel at Hanwha Corporation and observation of collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results, as well as to verify the correct application of the approved monitoring methodology. Furthermore, this has enabled the verification team to assess and determine that the implementation and operation of the project activity as well as the steps taken to report emission reductions in compliance with the CDM criteria and relevant guidance provided by the Board.

In addition, all parameters, as required (and as applicable) by the monitoring methodology AMS-I.D (Version 13) and AMS-III.G (Version 06) as well as the monitoring plan and the management system were assessed during the site visit.

Description of the project activity

Title of project activity	Mokpo Landfill Gas Recovery Project for Electricity Generation
UNFCCC Reference Number	2834
Project Parties	Republic of Korea (Host) Switzerland
Project Participants	Hanwha Corporation (Republic of Korea) Hanwha Corporation (Switzerland)
Baseline and monitoring methodology	AMS-I.D: Grid connected renewable electricity generation (Version 13) AMS-III.G: Landfill methane recovery (Version 06)
Location of the project activity	Address Daeyang-dong, Mokpo City, Jeollanam-do, Republic of Korea GPS Coordinates: Longitude: 126.4096 °E / Latitude: 34.8328°N
Registration Date	18/02/2010
Crediting Period	18/02/2010 to 17/02/2020
Period verified in this verification	01/01/2019 to 17/02/2020

Mokpo Landfill Gas Recovery Project for Electricity Generation is developed by Hanwha Corporation in the Republic of Korea. Mokpo Landfill was constructed in 1995 as a municipal solid waste (MSW) landfill and total area of it is 290,490 m².

The purpose of this project is to collect and utilize CH₄ (as a renewable energy) for electricity generating at the landfill site. Two generators are installed with a total capacity of 2.123 MW (1.065MW and 1.058MW) and the generating electricity from the project is exporting to a Grid.

The physical components including the equipment for collecting LFG, generating electricity, measuring LFG, generated electricity and emission reduction calculation were confirmed as per the PDD (Version 6.0, 12/06/2017).

Conclusion

KFQ has performed the verification of the emission reductions reported for the project activity 'Mokpo Landfill Gas Recovery Project for Electricity Generation' in the republic of Korea (UNFCCC Registration Ref. No. 2834) for the period from 01/01/2019 to 17/02/2020.

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. All relevant records of data from the monitoring system and daily operational record have been examined and verified for the reporting period.

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

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

The implementation of the project resulted in 50,053 tCO₂e of emission reductions during the period from 01/01/2019 to 17/02/2020. which is within the fixed crediting period from 18/02/2010 to 17/02/2020. In our opinion, the GHG emission reductions reported for the project in the MR (Version 3.0) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-I.D (Version 13), AMS-III.G (Version 06) and the monitoring plan contained in the registered PDD (Version 6.0, 12/06/2017).

KFQ is able to certify that the emission reductions from the 'Mokpo Landfill Gas Recovery Project for Electricity Generation' in Republic of Korea during the period from 01/01/2019 to 17/02/2020 amount to 50,053 tCO₂e.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader(*)	IR	KANG	Yeong Gyeong	KFQ	√	√	√	√
2.	Verifier	IR	LEE	Ji Yu	KFQ	√	√	√	√

(*) means a personnel with technical expertise in technical area 13.1.

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	PARK	Su Hyun	KFQ
2.	Approver	IR	JEONG	Yu Shim	KFQ

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

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	<i>Number of Monitoring parameters</i>	L	<i>Methodology and tool require a rather low number of monitoring parameter.</i>	<i>In response of that risk, the KFQ verification team included two verifiers in total and visited on-site in order to cover/review all monitoring parameters in a complete and detailed manner.</i>
2.	<i>Error rate in Monitoring report</i>	L	<i>Expert organization is involved in compilation of MR as well as calculation.</i>	<i>In response of that risk, the KFQ verification team focused on systematic consistency and error checks.</i>
3.	<i>Familiarity with Monitoring system</i>	L	<i>This is 10th monitoring period, expert organization is involved in the periodic inspection of monitoring equipment</i>	<i>In response to that risk, the KFQ verification team checked the existence of any and all monitoring instruments as well as their valid calibration, independently from the fact that the PP would be familiar with the monitoring system.</i>
4.	<i>QA/QC</i>	L	<i>Stable QA/QC system has been implemented.</i>	<i>In response to that risk, the KFQ verification team focused on periodic calibration and QA/QC activities performed as well as on plausibility check in order to ensure data quality.</i>
5.	<i>Data flow</i>	M	<i>Transmitted to the spreadsheet automatically</i>	<i>In response to that risk, the KFQ verification team checked the safeguard measures for raw data and crosschecked raw data with the MS Excel spreadsheets on a random sampling basis, in an extent to ensure the functioning of the transferring system.</i>
6.	<i>Recalculation</i>	M	<i>Calculation is performed in excel spreadsheet applying formulae. However, recalculation is done manually.</i>	<i>In response to that risk, the KFQ verification team firstly checked on the existence of omissions of events for recalculations and secondly reviewed all recalculations in detail.</i>

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

C.2. Consideration of materiality in conducting the verification

Two of the detected findings has influenced on the amount of emission reductions, but occurred in isolation and is immaterial. As the findings could be considered as simple error, not systematic reoccurring error, the verification team decided that no additional audit procedures need to be conducted in order to reach a reasonable level of assurance and that the claimed emission

reductions in the MR are free from material error, omission or misstatement. Accordingly, verification and sampling plan were not revised.

SECTION D. Means of verification

D.1. Desk/document review

KFQ's verification is based on the monitoring documentation provided by the PP especially the MR (Version 01.0 dated 17/04/2020, published on 22/04/2020) and the ER calculation spreadsheets. Furthermore, the registered PDD and validation report were reviewed as well as the monitoring plan, previous verification reports, the applied baseline and monitoring methodology and any other information and references relevant to the project activity's emission reductions (e.g. IPCC reports, etc.). A complete list of all documents reviewed is shown in Appendix 3 of this verification report. KFQ's verification process takes into consideration all the CDM Rules and Guidance applicable to the project activity, e.g. CDM Validation and Verification Standard for Project Activities, CDM Project Standard, CDM Project Cycle Procedure, Checklist for requests for post-registration changes to project activities and Checklist for requests for issuance for project activities and relevant decisions, clarifications and guidance from the CMP and the CDM EB.

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

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

D.2. On-site inspection

Detailed verification of all data contained in the MR was performed during the site visit at project site on 19/05/2020. During the site visit, the personnel were interviewed or assisted the verification team. During the on-site assessment, KFQ has applied standard auditing techniques to assess the quality of information provided. The following aspects of the CDM project activity have been confirmed:

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

Further, the following activities were performed:

- A cross-check between information provided in the MR and data from other sources such as plant log books, inventories, purchase records or similar data sources;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the monitoring plan and AMS-I.D (Version 13) and AMS-III.G (Version 06):
- A review of calculations and assumptions made in determining the GHG data and emission reductions; and
- An identification that quality control and quality assurance procedures are in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

Duration of on-site inspection: 19/05/2020				
No.	Activity performed on-site	Site location	Date	Team member
1.	Confirmation of the correct & complete implementation and operation of the Project Activity and check of all physical features as described in the PDD are in place.	Mokpo	19/05/2020	Yeong Gyeong KANG Ji Yu LEE
2.	Review of the complete data flow from data generation, aggregation, recording, calculation to reporting of the monitoring parameters.	Mokpo	19/05/2020	Yeong Gyeong KANG Ji Yu LEE
3.	Confirmation of the complete & correct implementation of procedures for the operation and data collection.	Mokpo	19/05/2020	Yeong Gyeong KANG Ji Yu LEE
4.	Verification of the information provided in the MR and documentation with other sources	Mokpo	19/05/2020	Yeong Gyeong KANG Ji Yu LEE
5.	Check of the monitoring equipment against the PDD, the monitoring plan as well as the approved methodology, including check of calibration & maintenance, etc. in relation to that equipment.	Mokpo	19/05/2020	Yeong Gyeong KANG Ji Yu LEE
6.	Identification whether suitable QA/QC procedures are in place in order to prevent errors or to enable the corrections of errors and omissions in the reported parameters.	Mokpo	19/05/2020	Yeong Gyeong KANG Ji Yu LEE

D.3. Interviews

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

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	LEE	Kun Hong	Hanwha Corporation	19/05/2020	General support, Facilities, instruments and analysis, QA/QC, calculation	Yeong Gyeong KANG Ji Yu LEE
2	CHOI	Jin Young				
3	KIM	Yae Won	Roen Consulting Co., Ltd.		QA/QC, Calculation, Reporting and general support	
4	LEE	Yu Jeong				
5	NOH	Sul Ji				

D.4. Sampling approach

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

Since automatic transferred system to the spreadsheet is in place, crosscheck for data in spreadsheet against raw data were done based on random sampling after confirming safeguard measure for raw data in DCS and server and transferring system.

Sampling plan when the verification team planned for verification needed not to be revised as no omissions in the detection process of events related to emission reductions were found.

Whereas recalculations for all events, the locations, calibrations of all measurement instruments and intervals (Measuring frequency, Reading frequency and Recording frequency) were assessed. All data recorded manually were also verified.

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	0	0	0
Compliance of the project implementation and operation with the registered PDD	1	1	0
Post-registration changes	0	0	0
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	0	0	0
Compliance of monitoring activities with the registered monitoring plan	1	2	0
Compliance with the calibration frequency requirements for measuring instruments	0	0	0
Assessment of data and calculation of emission reductions or net removals	1	0	0
Assessment of reported sustainable development co-benefits	0	0	0
Global stakeholder consultation	0	0	0
Others (please specify)	0	0	0
Total	3	3	0

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

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

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

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

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

3CLs and 3CARs were raised for this monitoring period, which were closed successfully after PP have submitted MR Version 3.0.

SECTION E. Verification findings

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

Means of verification	KFQ has checked the MR provided by the PP against the latest MR form in order to determine, whether the MR is in compliance with it.
Findings	It was found that there are no deviations between the MR and the latest monitoring report form (Version 07.0)
Conclusion	The verification team concludes that the MR (Version 1.0 and Version 3.0) is in compliance with the latest monitoring report form (Version 07.0) and the instructions therein.

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

During the validation the validating DOE might have raised issues that could not be closed or resolved during the validation stage. For this purpose, FARs might have been raised. Likewise FARs might have been raised in the course of previous verifications.

In the course of this verification the latest version of the PDD and the previous verification reports, where applicable, have been checked in order to identify any remaining forward action requests.

For the current monitoring period the following applies:

- i) Open issues from validation
 - There were no open issues which have been addressed in the latest version of the validation report.
- ii) Open issues from previous verifications
 - There were no open issues which have been addressed in the previous verification reports.

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

Means of verification	<p><u>Physical project implementation</u> During the on-site visit, the KFQ verification team visually inspected the installations of the project activity as well as instrumentations necessary for the monitoring of the emission reductions and checked, whether all physical features of the CDM Project activity, including the data collection systems and storage, have been implemented in accordance with the registered PDD (Version 6.0 dated 12/06/2017). Also, the KFQ verification team reviewed the documentation in respect of start-up and operation of the systems, monitoring instrument specifications including containing details such as instrument history and measuring ranges.</p> <p><u>Project operation</u> The verification team checked raw data of LFG flow rate and methane fraction recorded in every 8~10 seconds, records daily/weekly/monthly electricity export, monthly bills of electricity import, maintenance & calibration history, and event log files. In addition to this, verification team interviewed relevant plant staff to check actual operation especially events occurred such as maintenance and error in monitoring system as indicated in the MR to understand operational status during this monitoring period.</p> <p><u>Management system and quality control and quality assurance</u> The operation procedures and QA/QC procedures and respective reports have been reviewed and crosschecked by the KFQ verification team. Furthermore, the latest organizational arrangements were checked by means of interviews with relevant staff from Hanwha Corporation.</p> <p><u>Consecutive monitoring period</u> The verification team checked monitoring period of previous verifications through interviews with staff from Hanwha Corporation as well as history of requests for issuance provided by UNFCCC website to confirm consecutive monitoring periods</p>
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	<p>of this project activity.</p> <p><u>Limit of the type of small-scale project activities</u></p> <p>The verification team assessed whether the registered small-scale CDM project activity remains within the limit of the type of small-scale project activity by document review and on-site inspection related to installed capacity, if any, for the monitoring period.</p>
Findings	<p><u>Physical project implementation</u></p> <p>The purpose of this project activity is to collect and utilize LFG for electricity generation with 1.065 MW and 1.058 MW generator respectively at the landfill site. As this landfill site is still reclamation, management of LFG collecting system is required to collect LFG efficiently and to maintain optimum condition to capture methane. Therefore, re-location of existing wellhead/well and adding new wellhead/vertical well is very natural to operate landfill site from the point of view of verification team's expertise. However, in this monitoring period, there was no change in location and number of existing wellhead/well and no additional wellhead/well compare to the last verification and the registered PDD. Through site-visit and review of relevant document, verification team could not identify any changes were occurred during this monitoring period against the registered PDD.</p> <p><u>Project operation</u></p> <p>Operation of the monitoring system & data collection system were operational during the monitoring period - the maintenance/calibration periods of the monitoring instruments performed during the monitoring period and as described in the MR are complete, respective re-calculation of emission reductions during times of observations (if applicable) were done correctly in the project spreadsheets and in accordance with the registered PDD and the applied methodology.</p> <p>During this monitoring period, there was no noticeable/specific event. However, there were several operational events such as maintenance of generators and errors in the monitoring system. In such cases, flow rate and methane concentration data were not monitored and/or recorded so emission reduction for certain period was not claimed or used the values from the daily work log. To check events during this monitoring period especially that related to ER calculation, verification team reviewed daily work log to identify number of events, type of event, reason of event occurrence and timeslot of each events. After this, to check exact start and end time of each event, verification team crosscheck it with daily raw data which show methane fraction of measured LFG at an interval of 8~10 seconds. Additionally, to prevent any omission of events that shall be considered in ER calculation, verification team also checked observation record reported by site operator hourly in daily work log. Finally all of events identified through above mentioned process were cross-checked against the event listed in monitoring report and ER calculation spreadsheet.</p> <p>However verification team found that reason of operational events on 22/02/2019, 25/11/2019, 04/02/2020~07/02/2020 described in MR (Version 1.0) (table in section B.1) does not consistently reflect the actual event identified from event log files and interview with field staffs. <u>(Refer to Appendix 4/Table 2/CL ID 01)</u> PP revised the monitoring report to be consistently classified for operational events according to actual operate active. Verification team checked above mentioned operational events during this monitoring period against internal record such as daily raw data and event log files. Based on those evidence and interview with plant manager during on-site assessment, verification team confirmed that description provided in MR (Version 3.0) is correct and it is classified according to the "Operational manual-Mokpo LFG power plant (Version 27)".</p> <p>In conclusion, verification team confirmed that all the events to be considered in ER calculation spreadsheet especially excluding data are well reflected in ER calculation spreadsheet without any omission.</p> <p>The monitoring system and data collection system were fairly operated during this monitoring period.</p>

	<p><u>Management system and Quality assurance</u></p> <p>KFQ found that the project is operated and monitored by Hanwha Corporation, supported for checking & reporting of data under the CDM activity has been contracted to Roen Consulting Co., Ltd. The procedures & responsibilities are described in the MR and are considered and applied in full. With respect to quality control and quality assurance, the KFQ verification team found that the monitoring systems are designed as an automatic process, so the involvement of the personnel during normal operation is minimized. In case of any deficiency, appropriate procedures are in place.</p> <p>KFQ found that the quality assurance and quality control procedures in terms of equipment operation, maintenance, calibration as well as data reporting are covered by project operator's management system and found to be valid during the whole monitoring period. Hanwha Corporation covers all CDM activities in the internal, external audit and management reviews.</p> <p><u>Consecutive monitoring period</u></p> <p>This is the 10th monitoring period since registration of this project activity. Previous monitoring reports were already published on the UNFCCC CDM website in a consecutive manner and completed verification of their respective monitoring periods. Thus, the verification team of this monitoring period confirms monitoring periods of this project have been consecutive.</p> <p><u>Limit of the type of small-scale project activities</u></p> <p>As per the Project Standard (Version 02.0) para. 268(a), PP has to demonstrate that the scale of the activities belonging to the small-scale project type (Type I and Type III for this project activity) remained under the limit of that type every year during the crediting period. However, description related to above was omitted in MR (Version 1.0) (<u>Refer to Appendix 4/Table 3/CAR ID 01</u>). To response this CAR, PP revised MR (Version 3.0) to explain that the scale of the project activity belonging to the Type I and Type III remained under the limit of the type during this monitoring period. The verification team checked installed capacities of the generation system by document review and on-site inspection and found that the installed capacities of electrical power generation were unchanged as 2.123 MW from 2019 to 2020. And verification team also checked that the estimated GHG emission reductions for this monitoring period (413 days) is 50,053 tCO₂e thus the emission reductions achieved during this monitoring period are not exceeding 60 ktCO₂e per year in any year of the crediting period. Therefore, the verification team concluded that the total energy generation capacity of the installed equipment and the estimated GHG emission reductions do not exceed the limit of 15 MW and 60 ktCO₂e respectively during the years of monitoring period thus the verification team did not conduct any further assessment referred to in para.378 of VVS (Version 02.0).</p>
Conclusion	<p>The raised CL (ID 01) and CAR (ID 01) have been completely resolved.</p> <p>KFQ confirms that the project has been implemented according to the description in the registered PDD.</p> <p>The verification team specifically confirms that</p> <ul style="list-style-type: none"> • All physical features of the proposed CDM project activity including data collection systems and storage are in place and in accordance with the registered PDD; and • All other relevant information provided in the MR is fully in accordance with respective information stated in the registered PDD; and • The information on project operation, the management system and quality assurance are complete, correct and in accordance with the registered PDD; and • The management system and quality assurance and related procedures have implemented as described in the MR and in accordance with the registered PDD. • The monitoring periods of this project have been consecutive. • The registered project activity remains with the limit of the type I and III of small-scale project activities defined in the CDM Project Standard.

E.4. Post-registration changes**E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹**

There were no temporary deviations applied to this monitoring period.

E.4.2. Corrections

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

However, there was correction during 7th verification as below and it was approved on 07/09/2017 (PRC-2834-002):

- Each engine type installed at the project site due to typo in the registered PDD.

Please kindly refer to registered PDD (Version 6.0, 12/06/2017) for above corrections.

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

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

E.4.4. Inclusion of a monitoring plan

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

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

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

However, there was correction during 4th verification as below and it was approved on 06/03/2014 (PRC-2834-001):

- Addition of new watt hour meter to measure exported electricity for second generator as per national regulation, 'Act on the promotion of the development, use and diffusion of new and renewable energy.'

Please kindly refer to registered PDD (Version 6.0, 12/06/2017) for above corrections.

E.4.6. Changes to the project design

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

However, there was correction during 7th verification as below and it was approved on 07/09/2017 (PRC-2834-002):

- Changes in the number of facilities of collecting system (vertical well, well head and j-trap) due to maintenance.

Please kindly refer to registered PDD (Version 6.0, 12/06/2017) for above corrections.

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

N/A

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).

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

Means of verification	The KFQ verification team reviewed the monitoring plan contained in the registered PDD against the approved methodology, AMS-I.D (Version 13) and AMS-III.G (Version 06), 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 04)' and 'Tool to calculate the emission factor for an electricity system (Version 01.1)' which is applied by the project activity.
Findings	The KFQ verification team found that there are no incompliance between the applicable monitoring plan, the applied methodology AMS-I.D (Version 13) and AMS-III.G (Version 06), 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 04)' and 'Tool to calculate the emission factor for an electricity system (Version 01.1)'. Furthermore, it was found that there are no standardized baselines applied in the project activity.
Conclusion	KFQ confirms that the monitoring plan is in accordance with the approved methodology, AMS-I.D (Version 13) and AMS-III.G (Version 06), 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 04)' and 'Tool to calculate the emission factor for an electricity system (Version 01.1)' applied by the project activity (no standardized baselines are used in the project activity).

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

General statement on data and parameters

Means of verification	The means of verification in relation to the different parts (Information flow and data collection system and monitoring parameters) are stated in detail in the section & tables further below.
Findings	The findings in relation to the different parts (Information flow and data collection system and monitoring parameters) are stated in detail in the section & tables further below.
Conclusion	<p>KFQ confirms that the monitoring is complete and has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. The monitoring plan has been properly implemented and is followed by the PP.</p> <p>KFQ confirms that all parameters stated in the monitoring plan have been monitored, including project emission parameters, baseline emission parameters (leakage is not applicable) and management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan.</p> <p>KFQ confirms that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools and the relevant guidance provided by the CDM EB. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that monitoring results are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that QA/QC procedures have been applied in accordance with the monitoring plan.</p> <p>KFQ confirms that the MR lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided in the MR (The information flow for each parameter is further verified in the following sections).</p> <p>KFQ confirms that the monitoring methodologies and sustaining records are sufficient to enable verification of emission reductions.</p>

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

Means of verification	Data and parameters fixed ex-ante as listed in the MR have been crosschecked & reviewed – as applicable – against the monitoring plan in the registered PDD as well as against the applied methodology (AMS-I.D (Version 13) and AMS-III.G (Version 06)) and other relevant CDM related documentation.
Findings	<i>Data & Parameters fixed ex-ante and COMMONLY relevant for the project activity:</i>

	Data/parameter (description, unit)	Source of data	Value(s) applied	KFQ Findings
	EF _{OM} : Operation Margin Emission Factor - Unit: ton CO ₂ e/MWh - The generation-weighted average CO ₂ emission per electricity unit generated by the existing grid-connected power plants	PDD (Version 06) - it was originally adopted from the 'Statistics of Electric Power in Republic of Korea'.	0.6817	Crosscheck of the value with the revised PDD & Monitoring plan and the applied methodology
	EF _{BM} : Build Margin Emission Factor - Unit: ton CO ₂ e/MWh - The generation-weighted average CO ₂ emission per electricity unit generated by the additionally constructed power plants	PDD (Version 06) - it was originally adopted from the 'Statistics of Electric Power in Republic of Korea'.	0.3933	Crosscheck of the value with the revised PDD & Monitoring plan and the applied methodology
	CEF _{electricity} : CO ₂ emission intensity of the electricity displaced - Unit: ton CO ₂ e/MWh - The weighted average of EF _{OM} and EF _{BM}	PDD (Version 06) - it was originally adopted from the 'Statistics of Electric Power in Republic of Korea'.	0.5375	Crosscheck of the value with the revised PDD & Monitoring plan and the applied methodology
A complete set of data covering the monitoring period has been provided to KFQ and been reviewed during verification.				
Conclusion	KFQ confirms that all data and parameters fixed ex ante such as EF _{OM} , EF _{BM} : CEF _{electricity} are explicitly mentioned in the MR and have been correctly and consistently applied. All values are in compliance with relevant documentation such as the PDD & monitoring plan as well as the applied methodology, applied tools and other CDM related documentation, where applicable.			

E.6.2. Data and parameters monitored

Information flow & data collection system

Means of verification	<p>The KFQ verification team assessed the information flow and data collection system and by means of physical inspection of all major components of the information flow & data collection system as well as related documentation. Interviews with relevant staff were held in order to experience the system in action. Furthermore, the verification of the information flow (where applicable) for all monitoring parameters was successfully done by means of following documents and cross checks:</p> <p><i>Data generation and aggregation:</i></p> <ul style="list-style-type: none"> • Calibration records and certificates • Certificate of analysis of the standard test gas for analyzer calibration • Intervals (measuring frequency, reading frequency, recording frequency) of instruments for each instrument are also verified through display panel on-site and DCS generated <p><i>Aggregation to recording:</i></p>
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	<ul style="list-style-type: none"> • Daily and monthly exported electricity generation (From KPX website) • Monthly bills of electricity imported (From KEPCO) • Data cross check between values from monitoring meters and values in control room & data cross check between data server and daily work log. <p><i>Calculation and reporting:</i></p> <ul style="list-style-type: none"> • Crosscheck of implemented calculations in Excel sheets against the PDD formulae • Data cross check between monthly report generated by PP and Excel Sheets
Findings	<p>As stated in the MR and verified by the KFQ verification team, common data flow systems are used in the project activity for the following parameters:</p> <ul style="list-style-type: none"> • Amount of landfill gas combusted in power plant ($LFG_{\text{electricity},y}$) • Methane fraction in LFG ($W_{CH_4,y}$) • Total amount of exported electricity out of the project ($EL_{EXP,PJT,Y}$) • Total amount of imported electricity to meet project requirement ($EL_{IMP,PJT,Y}$) <p>For the amount of landfill gas combusted in the power plants, there are 3 flow meters.</p> <ul style="list-style-type: none"> • Main flow meter to measure total flow rate: Fa • Flow meter for generator 1: Fb • Flow meter for generator 2: Fc <p>Each flow meter sends signals continuously to the data server and the accumulated data are registered in electronic file continuously. As the type of flow meter is thermal mass flow meter, reading flow rate is automatically converting to normalized cubic meters.</p> <p>While the flow data is transferring to the server, data lag is occasionally occurring. In this case, spot data is not transmitting from the flow meter to the data server, thus flow data is not recording. However as there is a main meter to measure total flow, PP could read/measure total flow rate during certain time period of data lag as it measures accumulated flow rate.</p> <p>In case of methane fraction in LFG, gas analyzer sends signals continuously to the data server (centralized monitoring system) and it records in the data server with the same recording frequency of the LFG flow. As explained as above data lag is also occasionally occurring. In that case, PP takes conservative approach to adopt CH_4 concentration with a lower value comparing with measured data and previous one of it in every recording time. Furthermore, in case of CH_4 concentration data was not transferred to the data server due to data server malfunction or maintenance of monitoring system, PP manually records the CH_4 concentration data every hour according to the emergency procedure in operating manual. Lastly, for the electricity, amount of exported electricity is measuring by watt-hour meters connected to KPX and imported electricity is measuring by watt-hour meter controlled by KEPCO.</p> <p>It was found by the KFQ verification team, that the information flow & data collection system are fully functional and were so during the whole verification period covered under this verification. Respective documents and results were made available to KFQ for verification.</p>
Conclusion	<p>The KFQ verification team confirms that the information flow & data collection system meets the requirements of the registered PDD and its monitoring plan as per the applied and approved methodology, AMS-I.D (Version 13) and AMS-III.G (Version 06), 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 04)' and 'Tool to calculate the emission factor for an electricity system (Version 01.1)'. Intervals (measuring frequency, reading frequency and recording frequency) are applied in accordance with the applied methodology, the above mentioned tools and the monitoring plan.</p>

Assessment on data/parameters

Data/Parameter	F
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Data Unit	Not applied
Description	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data used	Written information from the operator of the solid waste disposal site and/or site visits at the solid waste disposal site
Value(s)	0
Means of verification	The verification team checked whether there were changes in the landfill management plan of the site and facilities for LFG treatment against registered PDD through waste management status data published by Ministry of Environment and physical site inspection.
Findings	The verification team confirms that there were no changes for LFG management and any fraction of methane captured and flared, combusted or use in another manner during this monitoring period. Thus, value for this factor is zero during this monitoring period
Conclusion	Through the interview plant operator and PP as well as physical site inspection, verification could confirm that there were no changes in LFG management manner during this monitoring period thus it is correct and reasonable to treat F as '0'.

Data/Parameter	GWP_{CH4}
Data Unit	tCO _{2e} /tCH ₄
Description	Global Warming Potential (GWP) of methane, valid for the relevant commitment period
Source of data used	Decisions under UNFCCC and the Kyoto Protocol
Value(s)	25 (to be applied for the second commitment period of the Kyoto Protocol)
Means of verification	Verification team crosschecked GWP of CH ₄ used in emission reduction calculation with it in the 'Application of the global warming potentials to clean development mechanism project activities and programme of activities for the second commitment period of the Kyoto Protocol.
Findings	No findings
Conclusion	KFQ confirms that PP applied 25 for GWP of CH ₄ in emission reduction calculation for this monitoring period correctly.

Data/Parameter	LFG_{electricity, y}					
Data Unit	Nm ³ /y					
Description	Amount of landfill gas combusted in power plant					
Source of data used	Gas flow meters					
Value(s)	Data	Measured LFG _{electricity, y} (Nm ³)				Applied LFG _{electricity, y} (Nm ³) in ER calculation spreadsheet
		F _b	F _c	F _a	F _b + F _c	
	01/01/2019 ~ 18/01/2019	126,267.900	10,117.400	138,692.500	136,385.300	136,385.300
	19/01/2019 ~ 18/02/2019	246,478.600	4,924.700	265,050.000	251,403.300	251,403.300
	19/02/2019 ~ 18/03/2019	211,585.100	16,575.400	230,936.400	228,160.500	228,160.500
	19/03/2019 ~ 18/04/2019	238,521.800	29,177.000	265,618.000	267,698.800	267,698.800
	19/04/2019 ~ 18/05/2019	370,573.200	0.000	370,270.700	370,573.200	370,573.200
	19/05/2019 ~ 18/06/2019	321,858.400	43,094.700	361,360.500	364,953.100	364,953.100
	19/06/2019 ~ 18/07/2019	355,086.000	14,329.000	368,916.400	369,415.000	369,415.000
	19/07/2019 ~ 18/08/2019	352,759.300	31,764.000	384,346.300	384,523.300	384,523.300
	19/08/2019 ~ 18/09/2019	387,978.600	0.000	382,830.500	387,978.600	387,978.600
	19/09/2019 ~ 18/10/2019	372,225.100	0.000	372,742.100	372,225.100	372,225.100
	19/10/2019 ~	393,773.800	10,909.600	396,359.600	404,683.400	404,683.400

	18/11/2019					
	19/11/2019 ~ 18/12/2019	389,586.200	123.700	390,634.100	389,709.900	389,709.900
	19/12/2019 ~ 18/01/2020	370,225.800	0.000	370,604.400	370,225.800	370,225.800
	19/01/2020 ~ 17/02/2020	395,316.200	0.000	389,648.900	395,316.200	395,316.200
	01/01/2019 ~ 17/02/2020	4,532,236.000	161,015.500	4,688,010.400	4,693,251.500	4,693,251.500
Means of verification	<p>The verification team checked whether the monitoring activities in relation to this parameter comply with the monitoring plan by physically inspecting the applied measuring device and related equipment for data generation, aggregation, recording and reporting procedures. Furthermore, the KFQ verification team performed data crosscheck between daily raw data downloaded from the server and the spreadsheet for emission reduction calculation.</p> <p>All results have been verified against the requirements out of monitoring plan and the applied methodology.</p> <p>Procedures and records on calibration, maintenance and QA/QC activities have been reviewed and checked against the requirements out of the monitoring plan and the applied methodology.</p>					
Findings	<p>Each flow meter (Fa: main meter, Fb: for 1st generator, Fc: 2nd generator) is reading flow rate (as the type of flow meter is thermal mass flow meter, reading flow rate is automatically converting to normalized cubic meters) every 8~10 seconds on average and sends signals continuously to the data server. And this data is recording in electronic file continuously.</p> <p>While the flow data is transferring to the server, certain data may not be transmitted to the data server from the flow meter due to data recording lag thus flow data could not be recorded. In this case PP read total flow during this time period and it is possible because the figure read by flow meter is accumulated flow data.</p> <p>During this monitoring period, data recording lag was occurred (e.g. 17/07/2019~24/07/2019). Verification team checked data lag period and reviewed whether manually recorded data is correctly applied in the baseline emission calculation through work log according to operational manual.</p> <p>Daily data of 'Fb + Fc' and 'Fa' are also compared. The differences between these two reading data could not be exceeding maximum error range (1,728 Nm³/day: theoretical calculation with each flow meter's accuracy) according to internal QA/QC procedures. Verification team checked two reading data ('Fb + Fc' and 'Fa') described as above and checked whether they are not exceeding maximum error range.</p> <p>To be conservative, if measured value between two reading data is out of the range, the smaller value was applied according to internal QA/QC procedures. The PP described that there was no event conservatively calibrated in MR (Version 1.0), however, the verification team found that difference of two reading data is out of range on 18/01/2020 in ER spreadsheet. (Refer to Appendix 4/Table 2/CL ID 02)</p> <p>PP explained that basically Fb+Fc values are used, and to be conservative, if the measured value between two values (Fb+Fc, Fa) is out of the range, the smaller value was applied. In this monitoring period, on January 18, 2020, there was no need to be conservatively calibrate even though the error range of Fa and Fb+Fc values exceeded 1,728Nm³/day because it applies Fb+Fc values, the smaller than Fa. Accordingly, PP revised MR (Version 3.0) to including above explanation.</p> <p>On 18/01/2020, the verification team confirmed that difference value between Fb+Fc and Fa is over 1,728 Nm³/day however, the smaller value was applied in calculation emission reduction in conservative manner so that it is not necessary to additional adjustment. Also, the verification team confirmed that MR (Version 3.0) is appropriately revised.</p> <p>Also, the verification team checked the daily work log, the operating manual, ER calculation spreadsheet, raw data sheet and confirmed that all data applied to BE calculation are consistent and correct as per the registered PDD.</p>					

Conclusion	<p>The raised CL (ID 02) has been completely resolved.</p> <p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools and the relevant guidance provided by the CDM EB. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan and the applied methodology.</p>
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Data/Parameter	W_{CH₄,y}
Data Unit	%
Description	Methane fraction in LFG
Source of data used	Methane analyzer
Value(s)	55.825
Means of verification	<p>The measured methane fraction is monitoring automatically and continuously by gas analyzer.</p> <p>The verification team checked whether the monitoring activities in relation to this parameter comply with the monitoring plan by physically inspecting the applied measuring device and related equipment for data generation, aggregation, recording and reporting. Furthermore, the KFQ verification team performed data crosscheck between daily raw data downloaded from the server and the spreadsheet for emission reduction calculation.</p> <p>All results have been verified against the requirements out of monitoring plan and the applied methodology.</p> <p>Procedures and records on calibration, maintenance and QA/QC activities have been reviewed and checked against the requirements out of the monitoring plan and the applied methodology.</p>
Findings	<p>In case of methane fraction in LFG, gas analyzer sends signals continuously to the data server (centralized monitoring system) and it records in the data server with the same recording frequency of the LFG flow.</p> <p>While transferring reading data from monitoring meter to the data server, data recording lag is occasionally occurred. In that case, PP takes conservative approach to adopt CH₄ concentration with a lower value comparing with measured data and previous one of it in every recording time. Verification team reviewed daily raw data (Mokpo LFG plant ERP data) to confirm whether this approach is conservative and applied correct value in baseline emission calculation.</p> <p>In case of CH₄ concentration data was not transferred to the data server due to data server malfunction or maintenance of monitoring system, PP manually records the CH₄ concentration data every hour according to the emergency procedure in operating manual. Thus, verification team reviewed CH₄ concentration recorded hourly for such events to confirm methane analyzer functioned properly at that time through daily work log.</p> <p>Entire events related to the description above are well in Section B (See Table B-1 Operation events history), of the MR (Version 2.0) and verification team checked it through daily raw data (Mokpo LFG plant ERP data), daily work log. Also verification team checked that methane fraction in LFG is calculated as weighted average CH₄ concentration based on confirmed raw data to calculate baseline.</p> <p>However, the verification team found several issued in calculation of LFG flow rate as below.</p> <p>i) When the generator for the project was not operated in case of equipment maintenance or error in monitoring system or when the generator shifts to other</p>

	<p>generator the flow rate, the PP applied measured flow data as '0' due to measurement error. Through site-visit, verification team checked that each event of abnormal operation occurred on 17/01/2019, 31/01/2019, 21/02/2019, 22/02/2019, 06/04/2019, 30/05/2019, 03/06/2019, 04/08/2019 and 25/11/2019 and whether flow rates have been to be applied as '0' to exclude it in baseline emission calculation as per above. But verification team found that LFG flow rate was not applied as '0' in ER calculation spreadsheet (Version 1.0) on above events. In another case, the verification team found that the flow rate has been to be applied as '0' at 00:00~01:00 of 22/03/2019 in ER calculation spreadsheet, however, the time (00:00~01:00) was not classified to operational event in MR (Version 1.0).</p> <p>ii) Start or end time of some operational events in MR (Version 1.0) is inconsistent with raw data sheets and there were missed operational events compared with raw data sheets.</p> <p>[Correction of time]</p> <ul style="list-style-type: none"> - On 25/04/2019, start time of event 10:16 → 10:19 - On 08/07/2019, start time of event 10:40 → 08:39 - On 17/07/2019, end time of 1st event 10:20 → 10:59 - On 25/11/2019, start time of event 14:38 → 14:21 <p>[Omission] 10/03/2019, 18/04/2019</p> <p><u>(Refer to Appendix 4/Table 2/CAR ID 02)</u></p> <p>For the CAR ID 02 mentioned above, it is corrected as below by PP:</p> <p>i) Applied LFG flow rates from raw data for the event time period on 17/01/2019, 31/01/2019, 21/02/2019, 22/02/2019, 06/04/2019, 30/05/2019, 03/06/2019, 04/08/2019 and 25/11/2019 are revised to '0' in ER calculation spreadsheet (Version 3.0) and daily raw data. Also, LFG flow rate at 00:00~01:00 is revised to correct value according to daily raw data in ER calculation spreadsheet (Version 3.0).</p> <p>ii) PP revised some operational event time on 25/04/2019, 30/05/2019, 17/07/2019 and 25/11/2019 and added operational events on 10/03/2019, 18/04/2019 and 08/07/2019 in MR (Version 3.0). Also, PP revised spreadsheet of daily raw data on relevant above events.</p> <p>After the PP have submitted the MR (Version 3.0), ER calculation spreadsheet (Version 3.0) and revised spreadsheet of daily raw data, verification team confirmed that flow rates in dates with issue are revised in ER calculation spreadsheet as per revised raw data. The verification team checked the daily work log, the operating manual, ER calculation spreadsheet and raw data sheet and confirmed that all data applied to BE calculation are consistent and correct as per the registered PDD.</p>
Conclusion	<p>The raised CAR (ID 01) has been completely resolved.</p> <p>Methane fraction in LFG is measuring by methane analyzer continuously and it is sending to the data server. The measured data is recording in electronic file continuously at 8~10 seconds interval.</p> <p>Verification team re-checked daily log sheet with ER calculation spreadsheet and could confirmed that 55.825 % is correctly calculated $W_{CH_4,y}$ for this monitoring period.</p> <p>KFQ verification team confirmed that 55.825 % is correctly calculated based on reliable raw data and applied in the baseline emission calculation and calculation process was checked.</p> <p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools and the relevant guidance provided by the CDM EB. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in</p>

	accordance with the monitoring plan and the applied methodology.			
Data/Parameter	EL_{EXP,PJT,Y}			
Data Unit	MWh			
Description	Total amount of exported electricity out of the project			
Source of data used	Watt-hour meter			
Value(s)	Data	Wa	Wc	Total EL_{EXP} (MWh)
	01/01/2019 ~ 18/01/2019	141.687	12.717	154.404
	19/01/2019 ~ 18/02/2019	264.141	6.080	270.221
	19/02/2019 ~ 18/03/2019	222.156	17.454	239.610
	19/03/2019 ~ 18/04/2019	240.067	29.905	269.972
	19/04/2019 ~ 18/05/2019	466.966	0.000	466.966
	19/05/2019 ~ 18/06/2019	420.629	54.111	474.740
	19/06/2019 ~ 18/07/2019	459.183	18.498	477.681
	19/07/2019 ~ 18/08/2019	456.904	37.293	494.197
	19/08/2019 ~ 18/09/2019	501.212	0.000	501.212
	19/09/2019 ~ 18/10/2019	483.998	0.000	483.998
	19/10/2019 ~ 18/11/2019	492.060	14.452	506.512
	19/11/2019 ~ 18/12/2019	485.637	0.000	485.637
	19/12/2019 ~ 18/01/2020	475.952	0.000	475.952
	19/01/2020 ~ 17/02/2020	477.204	0.000	477.204
	01/01/2019 ~ 17/02/2020	5,587.797	190.510	5,778.307
Means of verification	<p>The total amount of exported electricity out of project is measured automatically by certified 2 watt-hour meters and measured figures are automatically transferring to the KPX.</p> <p>The verification team checked whether the monitoring activities in relation to this parameter comply with the monitoring plan by physical inspecting to see measuring device and related equipment for data generation, aggregation, recording and reporting. Furthermore, the KFQ verification team performed data crosscheck between the meter readings against monthly sales receipts provided by KPX.</p> <p>All results have been verified against the requirements out of monitoring plan and the applied methodology.</p> <p>Procedures and records on calibration, maintenance and QA/QC activities have been reviewed and checked against the requirements out of the monitoring plan and the applied methodology.</p>			
Findings	<p>There are two Watt-hour meters, W_a and W_c, as described in the registered PDD. W_a measures generated electricity from 1st and 2nd generators, and W_c measures electricity generated by 2nd generator.</p> <p>Amount of electricity exported is automatically monitored by these two meters connected to KPX. Verification team checked meter reading (monthly data: it is aggregated data from daily and weekly reading) by these meters against monthly sales receipts provided by KPX. The amount of power transmitted by each generator is measured in each watt-hour meter. Therefore, the sum of each electricity in EL_{EXP,PJT,Y} is not calculated in duplicate.</p>			
Conclusion	<p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools and the relevant guidance provided by the CDM EB. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan and the applied methodology.</p>			

Data/Parameter	EL_{IMP,PJT,Y}
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Data Unit	MWh		
Description	Total amount of imported electricity to meet project requirement		
Source of data used	Watt-hour meter		
Value(s)	Data	Measured EL_{IMP} (MWh)	
	01/01/2019 ~ 18/01/2019	0.672	
	19/01/2019 ~ 18/02/2019	0.264	
	19/02/2019 ~ 18/03/2019	0.480	
	19/03/2019 ~ 18/04/2019	0.408	
	19/04/2019 ~ 18/05/2019	0.048	
	19/05/2019 ~ 18/06/2019	0.264	
	19/06/2019 ~ 18/07/2019	0.216	
	19/07/2019 ~ 18/08/2019	0.168	
	19/08/2019 ~ 18/09/2019	0.120	
	19/09/2019 ~ 18/10/2019	0.168	
	19/10/2019 ~ 18/11/2019	0.048	
	19/11/2019 ~ 18/12/2019	0.288	
	19/12/2019 ~ 18/01/2020	1.320	
	19/01/2020 ~ 17/02/2020	0.168	
	01/01/2019 ~ 17/02/2020	4.632	
Means of verification	<p>The total amount of imported electricity from outside of the project site is measured automatically by a certified watt-hour meter.</p> <p>The verification team checked whether the monitoring activities in relation to this parameter comply with the monitoring plan by physical inspecting to see measuring device and related equipment for data generation, aggregation, recording and reporting. Furthermore, the KFQ verification team performed data crosscheck between the amounts of imported electricity in the monitoring report against monthly bills provided by KEPCO.</p> <p>All results have been verified against the requirements out of monitoring plan and the applied methodology.</p> <p>Procedures and records on calibration, maintenance and QA/QC activities have been reviewed and checked against the requirements out of the monitoring plan and the applied methodology.</p>		
Findings	<p>The amount of imported electricity is measured automatically by certified watt-hour meter (W_b) and monthly bills of imported electricity are issued by KEPCO.</p> <p>The verification team checked the monthly bills from KEPCO on total amount of electricity imported from the grid to the project activity during this monitoring period against the values provided in the monitoring report.</p> <p>In order to determine the amount of daily imported electricity for the period 19/02/2019 to 18/03/2019, the amount of imported electricity of March(19/02/2019~18/03/2019) from the monthly bill should be divided into 28 days but it was incorrectly applied on a basis of 29 days. <u>(Refer to Appendix 4/Table 2/CAR ID 03)</u></p> <p>PP revised formula for daily EL_{imp} on 19/02/2019~18/03/2019 from 29 to 28 in 'Emission Reduction' sheet of ER calculation spreadsheet.</p> <p>Verification team checked correct revision of formulas and confirmed that these errors in formula for daily EL_{imp} don't affect emission reduction due to applied EL_{imp} for ER calculation is monthly value and retrieved from other spread sheet (i.e. 'EL_{imp}' sheet in ER calculation spreadsheet).</p>		
Conclusion	<p>The raised CAR (ID 02) has been completely resolved.</p> <p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it.</p> <p>KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as</p>		

	methodological tools and the relevant guidance provided by the CDM EB. Details on calibration are given in section E.7 below. KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan and the applied methodology.
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E.6.3. Implementation of sampling plan

Means of verification	N/A
Findings	N/A
Conclusion	N/A

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

General statement

Means of verification	The means of verification in relation to the specific instruments are stated in detail in the tables further below.
Findings	The findings in relation to the specific instruments are stated in detail in the tables further below.
Conclusion	KFQ confirms that the calibration of the measuring equipment has been conducted as per the applied methodology and the monitoring plan. KFQ confirms that there has not been any calibration delay for any instrument affecting the verification period and thus, there is no error to be applied on any monitored parameters.

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

Data/Parameter	LFG_{electricity, y}			
Data Unit	Nm ³ /y			
Description	Amount of landfill gas combusted in power plant			
TAG Number/Serial Number	· F _a (Main flow meter): GR-1906043 (used from 08/07/2019) · F _b (Flow meter for 1 st generator): GR-1906044 (used from 08/07/2019) · F _c (Flow meter for 2 nd generator): GR-170320 (used from 20/03/2017)			
Type	Thermal mass flow meter			
Accuracy level	+/- 0.5 % of F.S for F _a , F _b and F _c			
Calibration entity	Golden Rules Co., Ltd. for F _a , F _b and F _c			
Calibration frequency	1 year for F _a , F _b and 3 years for F _c			
Previous calibration (if applicable)		F _a (Main flow meter)	F _b (Flow meter for 1 st generator)	F _c (Flow meter for 2 nd generator)
	Serial No.	GR-1906043	GR-1906044	GR-170320
	Date	02/09/2016	02/09/2016	N/A
	Validity	01/09/2019	01/09/2019	(Latest calibration is valid for whole monitoring period)
Latest calibration		F _a (Main flow meter)	F _b (Flow meter for 1 st generator)	F _c (Flow meter for 2 nd generator)
	Date	03/07/2019	03/07/2019	20/03/2017
	Validity	02/07/2020	02/07/2020	19/03/2020
Applied period of max. permissible error (when applicable)	N/A (No calibration delay)			
Means of verification	The KFQ verification team has visually checked the physical existence of the instrument. The KFQ verification team has checked the calibration records & instrument history against the calibration requirements as per the applied			

	methodology, the monitoring plan as well as the available instrument specifications including manufacturer recommended frequencies.
Findings	<p>It was found that the instrument, as stated in the MR (F_a: Main flow meter, F_b: Flow meter for 1st generator and F_c: Flow meter for 2nd generator), physically exists and could be identified by the TAG Number and the serial number.</p> <p>It was also found that it has been regularly calibrated with a frequency shorter than one described in the registered PDD. Due to replacement of meters (F_a, F_b), it has been changed their calibration frequency in registered PDD (3 years) into 1 years as per new certificate of guarantee.</p> <p>No delay of calibration has been observed. It was found, that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.</p>
Conclusion	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan and the applied methodology.

Data/Parameter	W _{CH4,y}		
Data Unit	%		
Description	Methane fraction in LFG		
TAG Number/Serial Number	A8M7282T		
Type	Infrared gas analyzer		
Accuracy level	· Linearity: 1% of F.S · Repeatability: 0.5% of F.S		
Calibration entity	National Metrology Institute		
Calibration frequency	3 years		
Previous calibration (if applicable)	N/A (Latest calibration is valid for whole monitoring period)		
Latest calibration	Date	26/03/2018	
	Validity	25/03/2021	
Applied period of max. permissible error (when applicable)	N/A (no calibration delay)		
Means of verification	The KFQ verification team has visually checked the physical existence of the gas analyzer at the project site. The KFQ verification team also has checked the calibration records & instrument history against the calibration requirements as per the applied methodology, the monitoring plan as well as the available instrument specifications including manufacturer recommended frequencies.		
Findings	It was found that the instrument, as stated in the MR physically exists and could be identified by the TAG Number and the serial number. It was also found that it has been calibrated regularly according to the calibration frequency described in the registered PDD. No delay of calibration has been observed in this monitoring period. It was found that the instrument was working within the specified error ranges as per available, suitable certificates.		
Conclusion	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements in VVS and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan and the applied methodology. KFQ confirms that the error has been applied in a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed GHG emission reductions or net anthropogenic GHG removals; and for all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.		

Data/Parameter	EL_{EXP, PJT, y}		
Data Unit	MWh		
Description	Total amount of exported electricity out of the project		
TAG Number/Serial Number	· W _a (Measuring exported electricity by 1 st and 2 nd generator): 95246742 · W _c (Measuring exported electricity by 2 nd generator): 50339836		

Type	Watt-hour meter		
Accuracy level	0.5s		
Calibration entity	Korea Testing Certification (KTC)		
Calibration frequency	At least once in 2 years		
Previous calibration (if applicable)	Wa, Wc : N/A (Latest calibration is valid for whole monitoring period)		
Latest calibration		Wa	Wc
	Date	07/08/2018~09/08/2018	07/08/2018~09/08/2018
	Validity	06/08/2020	06/08/2020
Applied period of max. permissible error (when applicable)	N/A (No calibration delay)		
Means of verification	The KFQ verification team has visually checked the physical existence of 2 Watt-hour meters at the project site. The KFQ verification team also has checked the calibration records & instrument history against the calibration requirements as per the applied methodology, the monitoring plan as well as the available instrument specifications including manufacturer recommended frequencies.		
Findings	It was found that the instrument, as stated in the MR physically exists and could be identified by the TAG Number and the serial number. It was also found that it has been calibrated regularly according to the calibration frequency described in the registered PDD. No delay of calibration has been observed. It was found, that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.		
Conclusion	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan and the applied methodology.		

Data/Parameter	EL _{IMP,PJT,y}	
Data Unit	MWh	
Description	Total amount of imported electricity to meet project requirement	
TAG Number/Serial Number	24142000332	
Type	Watt-hour meter	
Accuracy level	0.5s	
Calibration entity	Korea Testing Certification (KTC)	
Calibration frequency	Once in 2 years	
Previous calibration (if applicable)	N/A (Latest calibration is valid for whole monitoring period)	
Latest calibration	S/N	24142000332
	Date	07/08/2018~09/08/2018
	Validity	06/08/2020
Applied period of max. permissible error (when applicable)	N/A (No calibration delay)	
Means of verification	The KFQ verification team has visually checked the physical existence of the Watt-hour meter at the project site. The KFQ verification team also has checked the calibration records & instrument history against the calibration requirements as per the applied methodology, the monitoring plan as well as the available instrument specifications including manufacturer recommended frequencies.	
Findings	It was found that the instrument, as stated in the MR physically exists and could be identified by the TAG Number and the serial number. It was also found that it has been calibrated regularly according to the calibration frequency described in the registered PDD. No delay of calibration has been observed. It was found, that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.	
Conclusion	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan and the applied	

methodology.

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**

Means of verification	<p>KFQ has reviewed all data, parameters and calculations with respect to calculation of the baseline GHG emissions and checked them against the requirements out of the applied methodology (AMS-I.D Version 13 and AMS-III.G Version 06), the registered PDD (Version 6.0 dated on 12/06/2017) as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations.</p> <p>Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PP have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available, such as but not limited to production log sheets, meters available in the operators control room or on-site, etc.</p>																												
Findings	<p>The baseline GHG emissions have been found to be 50,053.267 tCO₂e for the verification period. It was found that a complete set of data covering the monitoring period has been provided by the PP. Activity levels and non-activity parameters have been monitored in accordance with the monitoring plan, as applicable.</p> <p>The calculation was found to be correct as well as carried out in accordance with the formulae and methods described in the monitoring methodology (AMS-I.D Version 13 and AMS-III.G Version 06) and the registered PDD (Version 6.0 dated on 12/06/2017).</p> <p>It was found that all emission factors, GWPs and default values and reference values, as applicable, have been correctly justified, are explicitly mentioned in the MR and have been correctly applied. It was found that no assumptions are used that have any relevant influence on reported emission reductions.</p> <p>It was found that the spreadsheets, including corresponding re-calculations of data during events as described in the MR, were made available completely by the PP and that all formulae have been correctly implemented and are accessible and traceable. Any recalculations are in line with the procedure in the registered PDD and have been checked and found to be correct and conservative. Safeguarding procedures in accordance to the monitoring plan have been applied in a conservative way. Rounding of digits, where applicable, has been applied both correctly and conservatively.</p> <p>All necessary documentation is collected, referenced and aggregated and is easily accessible in spreadsheets and daily reports in electronic format. Measurements are performed by calibrated equipment, and key data could be cross-checked via other sources (if applicable), such as raw data generated in the DCS, production log sheets and meters available in the operators control room or on-site. Further details on cross-checks for each parameter and the information flow are given in sections E.6.2 above.</p> <p>A detailed assessment of all relevant parameters for the verification period is given in E.6.1 and E.6.2 above.</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Formula</th><th>Value</th></tr> </thead> <tbody> <tr> <td>BE_y</td><td>$= (MD_y - MD_{reg,y}) + EL_{EXP,PJT,y} \times CEF$</td><td>50,056.230 tCO₂e</td></tr> <tr> <td>MD_y</td><td>$= LFG_{electricity,y} \times W_{CH4,y} \times D_{CH4,y} \times GWP_{CH4}$</td><td>46,950.399 tCO₂e</td></tr> <tr> <td>MD_{reg,y}</td><td></td><td>0</td></tr> <tr> <td>EL_{EXP,PJT,y}</td><td></td><td>5,778.307 MWh</td></tr> <tr> <td>CEF</td><td></td><td>0.5375 tCO₂/MWh</td></tr> <tr> <td>LFG_{electricity,y}</td><td></td><td>4,693,251.5 Nm³</td></tr> <tr> <td>W_{CH4,y}</td><td></td><td>55.825 %</td></tr> <tr> <td>D_{CH4,y}</td><td></td><td>0.0007168 t/Nm³</td></tr> </tbody> </table>		Parameter	Formula	Value	BE _y	$= (MD_y - MD_{reg,y}) + EL_{EXP,PJT,y} \times CEF$	50,056.230 tCO ₂ e	MD _y	$= LFG_{electricity,y} \times W_{CH4,y} \times D_{CH4,y} \times GWP_{CH4}$	46,950.399 tCO ₂ e	MD _{reg,y}		0	EL _{EXP,PJT,y}		5,778.307 MWh	CEF		0.5375 tCO ₂ /MWh	LFG _{electricity,y}		4,693,251.5 Nm ³	W _{CH4,y}		55.825 %	D _{CH4,y}		0.0007168 t/Nm ³
Parameter	Formula	Value																											
BE _y	$= (MD_y - MD_{reg,y}) + EL_{EXP,PJT,y} \times CEF$	50,056.230 tCO ₂ e																											
MD _y	$= LFG_{electricity,y} \times W_{CH4,y} \times D_{CH4,y} \times GWP_{CH4}$	46,950.399 tCO ₂ e																											
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EL _{EXP,PJT,y}		5,778.307 MWh																											
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LFG _{electricity,y}		4,693,251.5 Nm ³																											
W _{CH4,y}		55.825 %																											
D _{CH4,y}		0.0007168 t/Nm ³																											

	GWP _{CH4}	25
Conclusion	<p>KFQ confirms that all required data for calculation of the baseline GHG emissions were available for the whole verification period.</p> <p>KFQ confirms that suitable cross-checking of data was possible and has been performed as described.</p> <p>KFQ confirms that the PP has followed appropriate methods and formulae for calculating baseline GHG emissions have been followed.</p> <p>KFQ confirms that any emission factors, GWPs and default values and reference values – as applicable – that were applied in the calculation have been justified and correctly applied. No assumptions were used.</p> <p>KFQ confirms that the calculation of the baseline GHG emissions for the covered monitoring period is fully complete and based on suitable and verifiable evidence.</p> <p>KFQ confirms that the error has been applied in a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed GHG emission reductions or net anthropogenic GHG removals; and for all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.</p>	

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

Means of verification	<p>KFQ has reviewed all data, parameters and calculations with respect to calculation of the project GHG emissions and checked them against the requirements out of the applied methodology (AMS-I.D Version 13 and AMS-III.G Version 06), the registered PDD (Version 6.0 dated on 12/06/2017) as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations.</p> <p>Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PP have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable – any information with other sources available, such as but not limited to production log sheets, meters available in the operators control room or on-site, etc.</p>
Findings	<p>The project GHG emissions have been found to be 2.490 tCO₂e for the verification period. It was found that a complete set of data covering the monitoring period has been provided by the PP. Activity levels and non-activity parameters have been monitored in accordance with the monitoring plan, as applicable.</p> <p>The calculation was found to be correct as well as carried out in accordance with the formulae and methods described in the monitoring methodology (AMS-I.D version 13, AMS-III.G version 06) and the PDD (Version 6.0 dated 12/06/2017), as well as relevant tools applied.</p> <p>It was found that all emission factors, GWPs and default values and reference values, as applicable, have been correctly justified, are explicitly mentioned in the MR and have been correctly applied. It was found that no assumptions are used that have any relevant influence on reported emission reductions.</p> <p>It was found that the spreadsheets, including corresponding re-calculations of data during events as described in the MR, were made available completely by the PP and that all formulae have been correctly implemented and are accessible and traceable. Any recalculations are in line with the procedure in the registered PDD and have been checked and found to be correct and conservative. Safeguarding procedures in accordance to the monitoring plan have been applied in a conservative way. Rounding of digits, where applicable, has been applied both correctly and conservatively.</p> <p>All necessary documentation is collected, referenced and aggregated and is easily accessible in spreadsheets and daily reports in electronic format. Measurements are performed by calibrated equipment, and key data could be cross-checked via other sources (if applicable), such as raw data generated in the DCS, production log sheets and meters available in the operators control room or on-site. Further details on cross-checks for each parameter and the information flow are given in</p>

	sections E.6.2 above.		
	A detailed assessment of all relevant parameters for the verification period is given in E.6.1 and E.6.2 above.		
	Parameter	Formula	Value
	PE _y	= EL _{IMP,PJT,y} x CEF	2.490 tCO ₂ e
	EL _{IMP,PJT,y}		4.632 MWh
Conclusion	CEF		0.5375 tCO ₂ /MWh
	<p>KFQ confirms that all required data for calculation of the project GHG emissions were available for the whole verification period.</p> <p>KFQ confirms that suitable cross-checking of data was possible and has been performed as described.</p> <p>KFQ confirms that the PP has followed appropriate methods and formulae for calculating project GHG emissions have been followed.</p> <p>KFQ confirms that any emission factors, GWPs and default values and reference values – as applicable – that were applied in the calculation have been justified and correctly applied. No assumptions were used.</p> <p>KFQ confirms that the calculation of the project GHG emissions for the covered monitoring period is fully complete and based on suitable and verifiable evidence.</p>		

E.8.3. Calculation of leakage GHG emissions

Means of verification	KFQ has checked, whether leakage emissions (if any) were determined by the PP in accordance with the applied methodology and the PDD.
Findings	KFQ has found that the approach applied by the PP that leakage emissions need not to be considered (i.e. being considered zero, consequently) is in accordance to the applied methodology AMS-I.D Version 13 and AMS-III.G Version 06.
Conclusion	KFQ confirms that the PP approach with regard to leakage GHG emissions is correct and that no leakage GHG emissions need to be considered in the project activity based on the applied methodology.

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

Means of verification	<p>KFQ has reviewed all data, parameters and calculations with respect to calculation of the GHG emission reductions and checked them against the requirements out of the applied methodology (AMS-I.D Version 13 and AMS-III.G Version 06), and the PDD (Version 6.0 dated 12/06/2017), as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations.</p> <p>Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PP have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available, such as but not limited to production log sheets, meters available in the operators control room or on-site, etc.</p> <p>Means of verification in respect of baseline GHG emissions, project GHG emissions and leakage GHG emissions that form the basis for calculation of the GHG emission reductions, are stated in detail in sections E.8.1., E.8.2. and E.8.3. above.</p>
Findings	<p>The GHG emission reductions have been found to be 50,053 tCO₂e for the verification period. It was found that the first day on which CERs are being claimed in this verification period has been correctly specified by the PP, being 01/01/2019.</p> <p>It was found that a complete set of data covering the monitoring period has been provided by the PP. Activity levels and non-activity parameters have been monitored in accordance with the monitoring plan, as applicable.</p> <p>The calculation was found to be correct as well as carried out in accordance with the formulae and methods described in the monitoring methodology (AMS-I.D Version 13 and AMS-III.G Version 06) and the PDD (Version 6.0 dated 12/06/2017), as well as relevant tools applied.</p> <p>It was found that all emission factors, GWPs and default values and reference</p>

	<p>values, as applicable, have been correctly justified, are explicitly mentioned in the MR and have been correctly applied. It was found that no assumptions are used that have any relevant influence on reported emission reductions.</p> <p>It was found that the spreadsheets, including corresponding re-calculations of data during events as described in the MR, were made available completely by the PP and that all formulae have been correctly implemented and are accessible and traceable. Any recalculations including delayed calibration are in line with the procedure in the registered PDD and have been checked and found to be correct and conservative. Safeguarding procedures in accordance to the monitoring plan have been applied in a conservative way. Rounding of digits, where applicable, has been applied both correctly and conservatively.</p> <p>All necessary documentation is collected, referenced and aggregated and is easily accessible in spreadsheets and daily reports in electronic format. Measurements are performed by calibrated equipment, and key data could be cross-checked via other sources (if applicable), such as raw data generated in the DCS, production log sheets and meters available in the operators control room or on-site. Further details on cross-checks for each parameter and the information flow are given in sections E.6.2 above.</p> <p>A detailed assessment of all relevant parameters for the verification period is given in E.6.1 and E.6.2 above. Findings in respect of baseline GHG emissions, project GHG emissions and leakage GHG emissions, that form the basis for calculation of the GHG emission reductions, are stated in detail in sections E.8.1., E.8.2. and E.8.3. above.</p>
Conclusion	<p>KFQ confirms that all required data for the calculation of GHG emission reductions were available for the whole verification period and no data were missing due to any non-monitoring of activity levels or non-activity parameters.</p> <p>KFQ confirms that suitable cross-checking of data was possible and has been performed as described.</p> <p>KFQ confirms that the PP has followed appropriate methods and formulae for calculating GHG emission reductions have been followed.</p> <p>KFQ confirms that any emission factors, GWPs and default values and reference values – as applicable – that were applied in the calculation have been justified and correctly applied. No assumptions were used.</p> <p>KFQ confirms that the calculation of the GHG emissions for the covered monitoring period is fully complete and based on suitable and verifiable evidence.</p> <p>KFQ confirms that the first day in which CERs are being claimed in the verification period is 01/01/2019, i.e. later than 31/12/2012. No pro-rata approach is applicable.</p> <p>KFQ finally confirms that the amount of emission reductions claimed by the PP for the verification period from 01/01/2019 to 17/02/2020, amounting to 50,053 tCO₂e, is correctly determined and calculated.</p>

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

Means of verification	KFQ compared the ex-ante estimation of emission reductions in the registered PDD with the emission reductions reported by the PP in the MR.
Findings	<p>KFQ found that the ex-ante estimation of emission reductions in the registered PDD (11,214 tCO₂e) had been calculated for 5-month as per initial set crediting period (01/06/2009 - 31/05/2019). If this value converts into 12-month, estimated in emission reductions for 2019 is calculated 26,914 tCO₂e. Also, this monitoring period is 413days including 48 days in 2020, therefore, the ex-ante estimation of emission reductions of 2020 (3,539 tCO₂e) is proportionally calculated by multiplying the estimation of 2019 with the corresponding days in 2020. Thus, emission reductions for this monitoring period, from 01/01/2019 to 17/02/2020 in the PDD were estimated as 30,453 tCO₂e (value rounded down). However, the actual emission reductions reported by the PP during the same period were 50,053 tCO₂e and is thus higher than the value estimated in the PDD.</p> <p>It was found that the PP has correctly described the situation in the MR as well.</p>
Conclusion	<p>KFQ confirms that the reported emission reductions in the MR (Version 3.0) are higher than estimated in the PDD.</p> <p>KFQ confirms that the emission reductions claimed by the PP are reasonable.</p>

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

Means of verification	As per the specific instructions of the CDM-VCR-FORM, in this section it is to be explained how the cause of any increase in the actual GHG emission reductions in this monitoring period were assessed in accordance with the applicable verification requirements in the VVS. As there is actual increase of actual GHG emission reductions (refer to E.8.5), the cause of the increase was investigated by PP and KFQ has checked the respective explanation offered by the PP in the monitoring period.
Findings	<p>The reported emission reductions in the monitoring report during 10th monitoring period (50,053 tCO₂e) is approximately 64.4 % higher than the estimation in the PDD (30,453 tCO₂e). However, PP have insufficiently described the reason for the increase in MR (Version 1.0). (Refer to Appendix 4/Table 2/CL ID 03)</p> <p>After the PP have submitted the MR (Version 3.0), PP explained reasons of emission reductions increasing based on as below.</p> <ul style="list-style-type: none"> · <u>Updated value of GWP_{CH4}</u> <ul style="list-style-type: none"> : According to the decision made at COP 17, new GWP for methane, 25 from 21 is applied for this monitoring period. PP explained that the emission reductions increased to 64.4 % during this monitoring period compared to the expected emission reductions that are on the registered PDD. Applying the GWP and CH₄ concentration given in PDD to the emission reductions that since the increase in the GWP, emission reduction had about 17.7 % increase in this monitoring period (When the previous GWP, CH₄ is applied, total reduction is 42,541 tCO₂e) · <u>Applied conservative data to estimate annual emission reduction in the PDD</u> <ul style="list-style-type: none"> : While estimate annual emission reduction in the PDD, methane emission potential of a solid waste disposal site (BE_{CH4,SWDS,y}) was used in baseline emission calculation. Thus expected amount of LFG may differ from actual LFG generated at the project site. For this monitoring period average flow rate was 8.65 m³/min in MR (Version 3.0) whereas it was 6.47 m³/min in registered PDD. · <u>Concentration of methane</u> <ul style="list-style-type: none"> : W_{CH4} for this monitoring period is 55.825 % whereas 50 % was applied to estimate annual emission reduction in the PDD. (When the 50% CH₄ concentration is applied, total reduction is 45,154 tCO₂e). · <u>Seasonal effect</u> <ul style="list-style-type: none"> : Decay rate for the waste is change with precipitation and temperature, and it increases when precipitation and temperature are high. The PDD estimate was based on 30-year average climate data for the Mokpo landfill but the precipitation and temperature in 2019 increased compared to the based temperature. In this monitoring period, there were lots of torrential rain and abnormally high temperatures with humidity especially in summer. · <u>Change in the location of LFG collection well</u> <ul style="list-style-type: none"> : The change in the location of LFG collection wells caused increasing the amount of LFG collected. <p>Therefore, PP explained that reported emission reduction in monitoring report is higher than the ex-ante estimation in the PDD in accordance with above.</p> <p>PP have submitted the MR (Version 3.0). By reviewing PP's explanation, the verification team concluded that the main causes of the increase that is different from that stated in the registered PDD is reasonable and comprehensively reflect the actual situation stated in the MR (Version 3.0). Also, the verification team confirmed that there was no change the number of LFG collection wells and change in design in comparison with registered PDD. Therefore, KFQ considers emission reductions claimed in the monitoring period are reasonable.</p>
Conclusion	<p>The raised CL (ID 03) has been completely resolved.</p> <p>KFQ confirms that the cause of increase in the actual GHG emissions reductions were well justified during the verification period.</p> <p>KFQ confirms that the emission reductions claimed by the PP are reasonable.</p>

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

Means of verification	The GHG emission reductions reported in the MR are 50,053 tCO ₂ e. As described in detail in Section E of this report, all relevant aspects of the project activity have been assessed in order to determine, whether the claimed emission reductions by the PP are correctly determined, reasonable and fairly stated and based on verifiable evidence and in accordance with the applied methodology and the registered PDD as well as applicable tools.
Findings	It was found that the project activity is implemented and operated according to the registered PDD and the monitoring of any and all data and parameters as well as calculation of baseline GHG emissions, project GHG emissions and GHG emission reductions is complete conducted in accordance with the registered PDD, the applied methodology.
Conclusion	KFQ arrived at the conclusion that the GHG emission reductions reported in the MR and claimed by the PP are correctly determined with 50,053 tCO ₂ e for the covered verification period between 01/01/2019 to 17/02/2020. This implies, that 100% of the reported GHG emission reduction in this verification period has been achieved in a period after the end of 31/12/2012, i.e. the first commitment period is untouched by this verification period.

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

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

E.10. Global stakeholder consultation

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

SECTION F. Internal quality control

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

SECTION G. Verification opinion

Through the verification of the MR of the CDM project activity 'Mokpo Landfill Gas Recovery Project for Electricity Generation' in accordance with VVS (Version 02.0), KFQ could confirm that:

- The project activity has been implemented and operated as per the registered PDD (Version 6.0, dated 12/06/2017),
- The installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately,
- The monitoring plan is as per the applied methodology,
- The monitoring plan in MR is as per the monitoring plan in the registered PDD,
- The monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, and approved methodology including applicable tool(s) and generated GHG emission reductions data,
- The GHG emission reductions in the MR (Version 3.0) are calculated without material misstatements.

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

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

Title of project activity	Mokpo Landfill Gas Recovery Project for Electricity Generation
UNFCCC Reference Number	2834
Date of registration	18/02/2010
Registered PDD	12/06/2017 (Version 6.0)
Methodology applied	AMS-I.D (Version 13) AMS-III.G (Version 06)
Final version of MR	3.0 (dated 10/07/2020)
Crediting period	18/02/2010 to 17/02/2020
Monitoring period	01/01/2019 to 17/02/2020
Total GHG emission Reductions Verified	Baseline emissions: 50,056.230 tonnes CO _{2e} Project emissions: 2.490 tonnes CO _{2e} Leakage: 0 tonnes CO _{2e} Emission reductions: <u>50,053.740 tonnes CO_{2e}</u>
ER Claim	<u>50,053 tonnes CO_{2e}</u>

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

SECTION H. Certification statement

Korean Foundation for Quality has performed the periodic verification of the emission reductions that have been reported for the CDM project activity: 'Mokpo Landfill Gas Recovery Project for Electricity Generation' (UNFCCC Registration Ref. No. 2834) for the period 01/01/2019 to 17/02/2020.

The PP is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is KFQ's responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

KFQ conducted the verification on the basis of the monitoring methodology AMS-I.D (Version 13) and AMS-III.G (Version 06), the registered PDD of 12/06/2017 (Version 6.0), the validation report (dated 17/02/2010) and the MR (Version 3.0) dated 10/07/2020. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

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

In our opinion the GHG emissions reductions of the 'Mokpo Landfill Gas Recovery Project for Electricity Generation' (UNFCCC Registration Ref. No. 2834) for the period from 01/01/2019 to 17/02/2020 are fairly stated in the MR (Version 3.0).

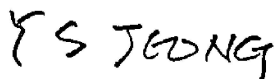
The data generation, aggregation, recording, calculation and reporting of GHG emission reductions were conducted correctly on the basis of the approved baseline and monitoring methodology AMS-

I.D (Version 13) and AMS-III.G (Version 06), and the monitoring plan contained in the registered PDD.

Hence, KFQ is able to certify that the emission reductions from the 'Mokpo Landfill Gas Recovery Project for Electricity Generation' during the period from 01/01/2019 to 17/02/2020 are 50,053 tCO₂e.

Signed on behalf of the Korean Foundation for Quality

Signature :

Handwritten signature in black ink, reading "YS JEONG".

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

Date : 23 July 2020

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Approved Small Scale Methodology
BE	Baseline Emissions
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
DCS	Distributive Control System
DOE	Designated Operational Entity
EB	Executive Board
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KEPCO	Korea Electric Power Corporation
KFQ	Korean Foundation for Quality
KPX	Korea Power Exchange
LFG	Landfill Gas
MR	Monitoring Report
PDD	Project Design Document
PP	Project participant
PS	Clean Development Mechanism Project Standard
QA/QC	Quality Assurance and Quality Control
SWDS	Solid Waste Disposal Site
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 : Yeonggyeong KANG

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
- 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 02 January 2019

Sustainability Management Institute
Mi Jung LEE



CERTIFICATE OF COMPETENCE

Name: Ji Yu LEE

Qualification:

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

Scopes of Expertise:

Technical Area (TA)

1.2 Renewables

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 15 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



Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Project participants	Monitoring report :	Version 1.0 17/04/2020 Version 3.0 10/07/2020	Project Participant
2	Project participants	ER calculation spreadsheet :	Version 1.0 15/05/2020 Version 3.0 10/07/2020	Project Participant
3	Project participants	CDM Project Design Document : Mokpo Landfill Gas Recovery Project for Electricity Generation: - Version 06	12/06/2017 https://cdm.unfccc.int/filestore/X/O/P/XOP0WGEHASYC5FMDZ7IQJLK8UN2R96/Revised%20PDD_Project%202834_version%2006_clean%20version.pdf?t=emR8cHVpbng5fDA0ym9DByqChar5GcB3iGt8	UNFCCC Website Project Participant
4	Korean Foundation for Quality (KFQ)	PRC validation report PRC-2834-001 PRC-2834-002	https://cdm.unfccc.int/PRCContainer/searchFinalized?ref=&proj_ref=2834&track=&types_op=or&status=	Others
5	Environmental Management Corporation (EMC)	Validation report for 'Mokpo Landfill Gas Recovery Project for Electricity Generation' (Report No. 08-001, Revision No. 08 dated as 17 February 2010)	http://cdm.unfccc.int/Projects/DB/emc1249265030.9/view	Others
6	Korean Foundation for Quality (KFQ)	9 th verification/certification report for 'Mokpo Landfill Gas Recovery Project for Electricity Generation (Version 2.2)	https://cdm.unfccc.int/filestore/L/K/T/LKTZ6GMBY07UN514VR8OF39DEHC2S/verification%20report.pdf?t=dHp8cWJkcmFifDC-VR_2S5ALPNS7SPHBPiOI	Others
7	Data server	Spreadsheet of daily raw data (raw data sheet) downloaded from the data server: flow rate, methane fraction	from 01/01/2019 to 17/02/2020	Project Participant
8	Data server/Hanwha Corporation	Event log files and daily work log recorded manually	from 01/01/2019 to 17/02/2020	Project Participant
9	Hanwha Corporation	Monthly report of waste volume in Mokpo Landfill site	from 01/01/2019 to 17/02/2020	Project Participant
10	Hanwha Corporation	Operating manual –Mokpo LFG Power Plant (Version 27)	01/01/2019	Project Participant
11	Hanwha Corporation/KPX	Daily, weekly, monthly record for electricity export and sales receipt of it	from 01/01/2019 to 17/02/2020	Project Participant
12	KEPCO	Monthly bill for electricity imported	from 01/01/2019 to 17/02/2020	Project Participant
13	Golden Rules Co., Ltd./ National Metrology Institute/Korea Testing Certification/Korea	Calibration report: - $F_a/F_b/F_c$ - gas analyzer - Watt-hour meter (W_a/W_c) - Watt-hour meter (W_b)	from 01/01/2019 to 17/02/2020	Project Participant

	Testing Certification			
14	Hanwha Corporation	Internal audit records External audit records Management review reports	06/03/2020	Hanwha Corporation
15	CDM Executive Board	Standards, Procedure & Checklists · Clean Development Mechanism Validation and Verification Standard, version 02.0 · Clean Development Mechanism Project Standard, version 02.0 · Sampling and surveys for CDM project activity and programme of activities, version 07 · Clean Development Mechanism Project Cycle Procedure, version 02.0 · Standard for application of the global warming potentials to clean development mechanism project activities and programme of activities for the second commitment period of the Kyoto Protocol, version 01.0 · Guideline on the application of materiality in verifications, version 02.0 · Request for issuance and post registration changes: Completeness Checklist, version 03.0 · Monitoring report form, version 06.0 · Verification and certification report form for CDM project activities, version 03.0 · AMS-I.D: Grid connected renewable electricity generation (Version 13) · AMS-III.G: Landfill methane recovery (Version 06)	29/11/2018 29/11/2018 04/05/2017 29/11/2018 13/09/2012 20/02/2015 27/03/2015 07/06/2017 31/05/2019 All published under: http://cdm.unfccc.int/Reference/index.html 28/05/2010 https://cdm.unfccc.int/filestore/C/D/M/CDMWF_AM_PHPV5WESACMBTJ2YY54GAJYSIEI3HD/AMS_I.D_rev_ver13.pdf?t=UW98cHQ5d25fDChE3ONP1GX80C19vvoeb8X 14/03/2008 https://cdm.unfccc.int/filestore/C/D/M/CDMWF_AM_341FT628YO0PX9D2BW9IDMHSTPY139/EB38_rep_an12_AMS_III.G_ver06.pdf?t=NHF8cHQ5d290fDC-deSr1IN0H85z6v0bWdSp	Others

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

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

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				

Table 2. CL from this verification

CL ID	01	Section no.	E.3	Date: 19/05/2020
Description of CL				
Verification team found that reason of operational events on 22/02/2019, 25/11/2019, 04/02/2020~07/02/2020 described in MR (Version 1.0) (table in section B.1) does not consistently reflect the actual event identified from event log files and interview with field staffs.				
Project participant response				Date: 10/07/2020
PP revised the monitoring report to be consistently classified for operational events according to actual operate active as below:				
Date	original		revised	
	Duration	Operation events	Duration	Operation events
22/02/2019	7:59-10:58	Generator shift from 2 nd generator to 1 st generator	07:59-12:33	Generator shift from 2 nd generator to 1 st generator
	10:58-12:33			
25/11/2019	8:52-10:44	Maintenance of facilities - Replace engine oil	08:52-10:44	Maintenance of facilities - Replace engine oil
			10:58-11:02	Error of equipment
	10:58-14:7	Generator shift from 1 st generator to 2 nd generator	11:04-11:07	Generator shift from 1 st generator to 2 nd generator
			11:18-11:26	
	14:38-17:43	Generator shift from 2 nd generator to 1 st generator	11:38-14:07	Generator shift from 2 nd generator to 1 st generator
			14:21-17:43	
04/02/2020	9:37-9:52	Black-out	09:37-09:52	Black-out
	11:0-23:59		11:00-23:59	Monitoring system error
05/02/2020	0:0-23:59	Black-out	00:00-23:59	Monitoring system error
06/02/2020	0:0-23:59	Black-out	00:00-23:59	Monitoring system error
07/02/2020	0:0-16:0	Black-out	00:00-23:59	Monitoring system error
Documentation provided by project participant				
MR (Version 3.0)				
DOE assessment				Date: 11/07/2020
Verification team checked above mentioned operational events during this monitoring period against internal record such as daily raw data and event log files. Based on those evidence and interview with plant manager during on-site assessment, verification team confirmed that description provided in MR (Version 3.0) is correct and it is classified according to the "Operational manual-Mokpo LFG power plant (version 27)".				

CL ID	02	Section no.	E.6.2	Date: 19/05/2020
Description of CL				
To be conservative, if measured value between two reading data is out of the range (i.e. the maximum error range 1,728 Nm ³ /day), the smaller value was applied according to internal QA/QC procedures. The PP described that there was no event conservatively calibrated in MR (Version 1.0), however, the verification team found that difference of two reading data is out of range at 18/01/2020 in ER spreadsheet. PP have insufficiently described on related above in MR (Version 1.0).				
Project participant response				Date: 10/07/2020
PP explained that basically Fb+Fc values are used, and to be conservative, if the measured value between two values is out of the range, the smaller value was applied. In this monitoring period, on January 18, 2020, there was no need to be conservatively calibrate even though the error range of Fa and Fb+Fc values exceeded 1,728Nm ³ /day because it applies Fb+Fc values, the smaller than Fa. Accordingly, PP revised MR (Version 3.0) to including above explanation.				
Documentation provided by project participant				
MR (Version 3.0)				
DOE assessment				Date: 11/07/2020
On 18/01/2020, the verification team confirmed that difference value between Fb+Fc and Fa is over 1,728 Nm ³ /day however, the smaller value was applied in calculation emission reduction in conservative manner so that it is not necessary to additional adjustment. Also, the verification team confirmed that MR (Version 3.0) is appropriately revised.				

CL ID	03	Section no.	E.8.6	Date: 19/05/2020								
Description of CL												
The reported emission reductions in the monitoring report during 10th monitoring period (50,053 tCO ₂ e) is approximately 64.4 % higher than the estimation in the PDD (30,453 tCO ₂ e). However, PP have insufficiently described the reason for the increase in MR (Version 1.0).												
Project participant response				Date: 10/07/2020								
PP have submitted the MR (Version 3.0), PP explained reasons of emission reductions increasing based on as below:												
<p>i) PP explained that the emission reductions increased to 64.4 % during this monitoring period compared to the expected emission reductions that are on the registered PDD. Applying the GWP and CH₄ concentration given in PDD to the emission reductions that since the increase in the GWP, emission reduction had about 17.6 % increase in this monitoring period (When the previous GWP, CH₄ is applied, total reduction is 42,539 tCO₂e).</p> <p>W_{CH₄} for this monitoring period is 55.825 % whereas 50 % was applied to estimate annual emission reduction in the PDD. (When the 50% CH₄ concentration is applied, total reduction is 45,151 tCO₂e).</p> <p>ii) PP explained that the LFG flow was estimated to be 2.70 m³/min (on the registered CDM-PDD in 2019, based 5-month) and value converted into 12-month was estimated to be 6.47 m³/min. However, the actual average flow was 8.64 m³/min during the monitoring period. In other words, there was 33.5 % of the difference between the theoretical and the actual values. When the 50 % CH₄ concentration and 21 GWP were applied, the LFGy per minute is 11.48 m³/min and the difference with theoretical and the actual values are 77.4 %.</p>												
Content	Year	LFG_y (m³/min)	=	BE_{CH₄,SWDS,y}	/	GWP	/	D_{CH₄}	/	W_{CH₄,y}	/	MIN_{year}
PDD	2019 (151days)	2.7	=	9,741	/	21	/	0.0007168	/	0.5	/	480,000
	2019 (365days)	6.47	=	23,378	/	21	/	0.0007168	/	0.5	/	480,000
	2019-2020 (413days)	6.47	=	26,453	/	21	/	0.0007168	/	0.5	/	543,123
MR	2019 (365days)	8.50	=	40,797	/	25	/	0.0007168	/	0.55	/	480,000
	2019-2020 (413days)	8.64	=	46,947	/	25	/	0.0007168	/	0.55	/	543,123
<p>iii) PP explained that seasonal effect as below</p> <p>: Decay rate for the waste is change with precipitation and temperature, and it increases when precipitation and temperature are high. The PDD estimate was based on 30-year average climate data for the Mokpo</p>												

landfill but the precipitation and temperature in 2019 increased compared to the based temperature. In this monitoring period, there were lots of torrential rain and abnormally high temperatures with humidity especially in summer.

iv) PP explained that change in the location of LFG collection well caused increasing the amount of LFG collected.

Therefore, PP have submitted the MR (Version 3.0) and explained that reported emission reduction in monitoring report is higher than the ex-ante estimation in the PDD in accordance with above.

Documentation provided by project participant

MR (Version 3.0)

DOE assessment

Date: 11/07/2020

By reviewing PP's explanation, the verification team concluded that the main causes of the increase that is different from that stated in the registered PDD is reasonable and comprehensively reflect the actual situation stated in the MR (Version 3.0). Also, the verification team confirmed that there was no change the number of LFG collection wells and change in design in comparison with registered PDD. Therefore, KFQ considers emission reductions claimed in the monitoring period are reasonable.

Table 3. CAR from this verification

CAR ID	01	Section no.	E.3	Date: 19/05/2020
Description of CAR				
As per the Project Standard (Version 02.0) para. 268(a), PP has to demonstrate that the scale of the activities belonging to the small-scale project type (Type I and Type III for this project activity) remained under the limit of that type every year during the crediting period. However, description related to above was omitted in MR (Version 1.0).				
Project participant response				Date: 10/07/2020
To response this CAR, PP revised MR (Version 3.0) to explain that the scale of the project activity belonging to the Type I and Type III remained under the limit of the type during this monitoring period.				
Documentation provided by project participant				
MR (Version 3.0)				
DOE assessment				Date: 11/07/2020
The verification team checked installed capacities of the generation system by document review and on-site inspection and found that the installed capacities of electrical power generation were unchanged as 2.123 MW from 2019 to 2020. And verification team also checked that the estimated GHG emission reductions for this monitoring period (413 days) is 50,053 tCO ₂ e thus the emission reductions achieved during this monitoring period are not exceeding 60 ktCO ₂ e per year in any year of the crediting period. Therefore, the verification team concluded that the total energy generation capacity of the installed equipment and the estimated GHG emission reductions do not exceed the limit of 15 MW and 60 ktCO ₂ e respectively during the years of monitoring period thus the verification team did not conduct any further assessment referred to in para.378 of VVS (Version 02.0).				

CAR ID	02	Section no.	E.6.2	Date: 19/05/2020
Description of CAR				
The verification team found several issued in calculation of LFG flow rate as below.				
i) When the generator for the project was not operated in case of equipment maintenance or error in monitoring system or when the generator shifts to other generator the flow rate, the PP applied measured flow data as '0' due to measurement error. Through site-visit, verification team checked that each event of abnormal operation occurred on 17/01/2019, 31/01/2019, 21/02/2019, 22/02/2019, 06/04/2019, 30/05/2019, 03/06/2019, 04/08/2019 and 25/11/2019 and whether flow rates have been to be applied as '0' to exclude it in baseline emission calculation as per above. But verification team found that LFG flow rate was not applied as '0' in ER calculation spreadsheet (Version 1.0) on above events. In another case, the verification team found that the flow rate has been to be applied as '0' at 00:00~01:00 of 22/03/2019 in ER calculation spreadsheet, however, the time (00:00~01:00) was not classified to operational event in MR (Version 1.0).				
ii) Start or end time of some operational events in MR (Version 1.0) is inconsistent with raw data sheets and there were missed operational events compared with raw data sheets.				
[Correction of time]				
- On 25/04/2019, start time of event 10:16 → 10:19				
- On 08/07/2019, start time of event 10:40 → 08:39				
- On 17/07/2019, end time of 1 st event 10:20 → 10:59				
- On 25/11/2019, start time of event 14:38 → 14:21				

[Omission]	
- 10/03/2019, 18/04/2019	
Project participant response	Date: 10/07/2020
For the CAR ID 02 mentioned above, it is corrected as below by PP: i) Applied LFG flow rates from raw data for the event time period on 17/01/2019, 31/01/2019, 21/02/2019, 22/02/2019, 06/04/2019, 30/05/2019, 03/06/2019, 04/08/2019 and 25/11/2019 are revised to '0' in ER calculation spreadsheet and daily raw data. Also, LFG flow rate at 00:00~01:00 is revised to correct value according to daily raw data in ER calculation spreadsheet. ii) PP revised some operational event time on 25/04/2019, 30/05/2019, 17/07/2019 and 25/11/2019 and added operational events on 10/03/2019, 18/04/2019 and 08/07/2019 in MR (Version 3.0) Also, PP revised spreadsheet of daily raw data on relevant above events.	
Documentation provided by project participant	
MR (Version 3.0) ER calculation spreadsheet (Version 3.0) Revised relevant spreadsheet of daily raw data	
DOE assessment	Date: 11/07/2020
After the PP have submitted the MR (Version 3.0), ER calculation spreadsheet (Version 3.0) and revised spreadsheet of daily raw data, verification team confirmed that flow rates in dates with issue are revised in ER calculation spreadsheet as per revised raw data. The verification team checked the daily work log, the operating manual, ER calculation spreadsheet and raw data sheet and confirmed that all data applied to BE calculation are consistent and correct as per the registered PDD.	

CAR ID	03	Section no.	E.6.2	Date: 19/05/2020
Description of CAR				
In order to determine the amount of daily imported electricity for the period 19/02/2019 to 18/03/2019, the amount of imported electricity of March(19/02/2019~18/03/2019) from the monthly bill should be divided into 28 days but it was incorrectly applied on a basis of 29 days.				
Project participant response				Date: 10/07/2020
PP revised formula for daily EL_{imp} on 19/02/2019~18/03/2019 from 29 to 28 in 'Emission Reduction' sheet of ER calculation spreadsheet.				
Documentation provided by project participant				
ER calculation spreadsheet (Version 3.0)				
DOE assessment				Date: 11/07/2020
Verification team checked correct revision of formulas and confirmed that these errors in formula for daily EL_{imp} are not affected emission reduction due to applied EL_{imp} for ER calculation is monthly value and retrieved from other spread sheet (i.e. ' EL_{imp} ' sheet in ER calculation spreadsheet).				

Table 4. FAR from this verification

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				