Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

Title of the project activity	Loma Los Colorados Landfill Gas Project	
UNFCCC reference number of the project activity	0822	
Version number of the PDD applicable to this monitoring report	1.6, dated 24/06/2017	
Version number of this monitoring report	2.0	
Completion date of this monitoring report	06/05/2020	
Monitoring period number	Monitoring period #15	
Duration of this monitoring period	01/05/2019 to 31/03/2020	
Monitoring report number for this monitoring period	Not applicable.	
Project participants	KDM S.A. The Kansai Electric Power Co., Inc. Urbaser S.A. ALLCOT AG	
Host Party	Chile	
Applied methodologies and standardized baselines	ACM0001 - “Flaring or use of landfill gas” (version 15.0)	
Sectoral scopes	13 - Waste handling and disposal 1 - Energy industries (renewable - / non-renewable sources) (project’s electricity generation component)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	-	616,878 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	1,296,142 tCO_2e	

SECTION A. Description of project activity

A.1. General description of project activity

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The design for the CDM project activity “Loma Los Colorados Landfill Gas Project” encompasses collection of landfill gas (LFG) at the Loma los Colorados landfill; its destruction through combustion in high temperature enclosed flares and/or its utilization as gaseous fuel for electricity generation in two electricity generation facilities (the Central Loma Los Colorados 1 (CLLC-1) and the Central Loma Los Colorados 2 (CLLC-2) electricity generation facilities).

LFG is generated at the Loma Los Colorados landfill as a result of anaerobic decomposition of municipal solid waste (MSW) historically disposed at this landfill. LFG is rich in methane (CH_4), a powerful greenhouse gas (GHG). By combusting LFG, the operation of the project activity thus mitigates CH_4 that would otherwise be directly emitted into the atmosphere in the absence of the project activity (baseline scenario). By exporting net-generated electricity through the one of the regional electricity grid of Chile (SIC Grid), the project activity has also promoted carbon dioxide (CO_2) emission reductions (due to displacement of electricity (under amount equivalent to the amount of net-electricity generated by the project’s CLLC-1 and CLLC-2 electricity generation facilities) which would otherwise be generated by existing grid-connected power plants, including fossil-fuel fired power plants (and addition of new power generation units) within the SIC grid).

The project activity was initially built (as a LFG collection and destruction initiative) during the period encompassing year 2006. Its commissioning and starting of operations (under its initial design configuration – without utilization of LFG as fuel for electricity generation) are dated 26 and 27/02/2007 (internal verification), 17/03/2007 (system start-up and data registration), 11 and 12/06/2007 (internal audit) and 25/07/2007 (109 LFG collection wells under operational status). The so far occurred full and gradual/phased implementation and starting of operations of the CLLC-1 and CLLC-2 electricity generation infrastructures respectively are summarized as follows:

	Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CLLC-2 facility	Number of installed and operational GE Jenbacher J420 engine-generator sets (1.413 MW each)[1]	7	11	13	14	14	14	16	16	16	16
CLLC-1 facility	Number of installed and operational GE Waukesha APG-1000 engine generator sets (1.0 MW each)	2 (no additional engine-generators are expected to be installed as part of the CLLC-1 facility after the occurred installation of its 2 engine-generator sets occurred in year 2009)									

[1] As per the gradual/phased implementation time plan for the CLLC-2 electricity generation facility (which is summarized in the registered PDD), a 17th and an 18th engine-generator sets were forecasted to be installed in year 2018 and year 2019 respectively. Due to both procurement and commercial reasons (issues related to the purchase, payment and logistics of such additional engine-generator sets as well as operational issues with contractors hired for the installation and commissioning of additional engine-generator sets) and very unfavorable price for commercialization of electricity in the national electricity market of Chile in more recent years (i.e. very low spot market price for electricity generated by Independent Power Producers (IPPs)), the installation of the a 17th and an 18th engine-generator sets have not occurred and will not occur in year 2020 either. While the not yet occurred installation of the 17th and an 18th engine-generator sets of the CLLC-2 facility are currently expected/forecasted to happen in year 2021, it is still the intention of KDM Energia S.A. to have the both CLLC-1 and CLLC-2 electricity generation facilities reaching their previously forecasted total jointly combined installed capacity of 31.1 MW by the end of year 2026. It is important to note that, as per applicable CDM rules and requirements, the relative delay in so far occurred in the gradual/phased installation of identical GE Jenbacher J420 engine-generator sets for the CLLC-2 electricity generation facility DOES NOT represent a permanent change in the project design that would need to be addressed as per rules and procedures for addressing post-registration changes.

Besides of the so far occurred relative delays in the gradual/phased installation of identical GE Jenbacher J420 engine-generator sets for the CLLC-2 electricity generation facility, the project activity operated during the considered monitoring period under complete conformance with project design information and applicable monitoring requirements as made available in the latest and currently registered version of the PDD valid for 2nd 7-year crediting period of the project activity (PDD version 1.6, dated 24/06/2017, herein after termed "registered PDD"[2]). It is however also important to note that during the considered monitoring period, collected LFG was only combusted in the engine-generator sets of the CLLC-1 and CLLC-2 electricity generation facilities (while being utilized as gaseous fuel for electricity generation). As further explained in Section B.1., no collected LFG was destroyed through combustion in any one of the project's three high temperature enclosed flares during the considered monitoring period.

Non-occurrence during the considered monitoring period of combustion of collected LFG in any one of the project's high temperature enclosed flares is anyway under conformance with the project design as per the registered PDD since the project design is defined (in such latest version of the PDD) as follows:

> *"The objective of Loma Los Colorados Landfill Gas Project is to develop a landfill gas collection and utilization/destruction system. This involves investing in and operating a system for landfill gas (LFG) collection and electricity generation* ***and/or*** *flaring. Landfill gas flaring or its utilization for electricity generation involves methane combustion leading to greenhouse gas (GHG) emissions reductions."*

Emission Reductions (ER) achieved during the 15th monitoring period from 01/05/2019 to 31/03/2020 are reported as 616,878 tCO_2**e.**

A.2. Location of project activity

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The project activity is implemented at the Loma Los Colorados landfill. This landfill site is located in the administrative district ("Comuna") of Til-Til, 63.5 km North of Santiago through the Route 5. Til-Til is located near a village named Montenegro and it is located 578 meters above the sea level. According to the latest demographic census available (2012), Til-Til has a population of 16,558 inhabitants covering an area of 667.3 km^2.

The geographical coordinates of the project site (in decimal and in Degree, Minute, Second (DMS) formats) are as follows:

Format	Latitude	Longitude
Decimal	-32.9564	-70.8013
DMS	32° 57' 23.04" S	70° 48' 4.6794" W

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Chile (host)	KDM S.A	No

[2] The registered PDD (PDD version 1.6, dated 24/06/2017) includes previously approved permanent post-registration changes (PRCs). The revised version of the PDD was submitted as part of the verification assessment for the previous 12th monitoring period of the project activity and it was approved on 23/08/2017 (thus prior to the issuance of this Monitoring Report). Further details are made available in Section B.2.

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Japan	The Kansai Electric Power Co., Inc.	No
Spain	Urbaser S.A.	No
Switzerland	ALLCOT AG	No

A.4. References to applied methodologies and standardized baselines

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The project activity applies the following large-scale CDM baseline and monitoring methodology:

- ACM0001 - “Flaring or use of landfill gas” (version 15.0) (http://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO);

For the considered monitoring period, as also established in the registered PDD, the following methodological tools are also applied[3]:

- “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf).

  The application of this tool refers to the ex-post application of the latest version of the “Tool to calculate the emission factor for an electricity system” (version 04.0) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf)

- “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” (version 02) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf)

- “Project emissions from flaring” (version 02.0.0, EB 68) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v2.0.pdf);

- “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0, EB 61) (https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v2.0.0.pdf/history_view);

A.5. Crediting period type and duration

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2nd 7-year renewable crediting period from 17/03/2014 to 16/03/2021.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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During the considered monitoring period, the project activity encompassed the operation of the following installed equipment:

[3] The registered PDD also refers to the methodological tool “Emissions from solid waste disposal sites” (version 06.0.1). However, it is crucial to note that, as outlined in the registered PDD, applicable guidance of this methodological tool is only applied in the context of ex-ante estimation of emission reductions to be achieved by the project activity during the 2nd 7-year crediting period. This methodological tool is not applied for the ex-post determination of emission reductions achieved by the project activity.

- Two LFG condensate knock-out pot (KOP)[4]

Figure 1 - View of the installed project's knock-out pot (KOP)

- 4 LFG centrifugal blowers[5]

Figure 2 – View of the installed project's LFG centrifugal blowers

[4] *Design details for the condensate knock-out pot:*
The installed KOP unit has 60 inch diameter x 90 inch high (1.524 x 2.286 m) and it is supplied by OAH LFG Specialties L.L.C. It has 150# flanged 24-inch inlet (0.6096 m) and 18 inch (0.4572 m) outlet connections. The KOP has the following design characteristics:

- Internal coating of hi-build epoxy to resist acidic condensate
- External finish with rust resistant primer and industrial enamel color coat
- Stainless steel mist extraction pad with a 98% filtration efficiency of free liquids and solid particles of 20 microns or larger
- Removable lid to facilitate inspection and repair of coating if necessary
- Heavy duty gage glass liquid indicator
- Drain connection with manual ball valve and plug
- Liquid level switch for high condensate level alarm/shutdown

[5] *Design details of the LFG centrifugal blowers:* Each LFG centrifugal blower is powered by with 380 V, 3 phase, 50 Hz electricity required to power a 75 HP (56 kW) TEFC electrical motor. Each blower is of centrifugal type, spark proof, cast iron construction, cast aluminium impellers. The impellers, inlet & outlet heads, and blower casing are coated with resistant phenolic coating. Each blower delivers 3,000 SCFM (5,097 Nm^3/h) gas flow with 60 in. water column (14,944.92 Pa) inlet vacuum and 15 in. water column (3,736.23 Pa) discharge pressure.

Figure 3 - View of the specification plates available in each one pf the project's LFG blowers

- Automatic (normally-closed) shut-off valves for the flares (used for safety conditions)[6]

LFG flow measurement

During the considered monitoring period, monitoring of amount of methane combusted by the project activity in the engine-generator sets of CLLC-1 and CLLC-2 electricity generation facilities was performed on the basis of continuous measurements by a single thermal mass LFG flow meter (with company internal Id./ref. "F0"). This particular LFG flow meter is positioned along the project's main supply pipeline for collected LFG in way to be used for measuring the total flow of collected LFG sent to all the LFG utilization devices under operation during the considered monitoring period (i.e. engine-generator sets of the CLLC-1 and CLLC–2 electricity generation facilities)[7]. The LFG flow meter for which measurements were considered during the considered monitoring period is manufactured by Fluid Components International L.L.C. (FCI) and is of ST98 model.

The LFG flow meter from which measurements were considered provides LFG flow measurements in normalized cubic meters per hours (Nm^3/h). Thus, no additional monitoring of LFG temperature and LFG pressure are required.

LFG flow data measurements of collected LFG sent the project's LFG utilization devices under operation are electronically recorded and reported with an every 1 minute frequency. As per the operational procedure for the project activity, besides of the LFG flow meter in operation, an identical LFG flow meter unit is kept stored in the project site in order to be installed and used during calibration events of the utilized LFG flow meter[8].

[6] *Specification details for the automatic shut-off valves:* The valves are 12 in. bubble-tight carbon steel wafer type butterfly valves, which includes Teflon seat materials and stainless steel shafts and discs with a Bettis CB Series or equal pneumatic actuator and 3 way solenoid valve with a spring operated "fail safe" closing in case of a power failure. Each individual high temperature enclosed flare is equipped with a valve. While no LFG was sent to any of the project's high temperature enclosed flares during the considered monitoring period, such valves became under "closed" position/status during the whole underlying period.

[7] Box 1 includes details and the rationale for the non-operation (non-combustion of LFG) of the project's high temperature enclosed flares during the considered monitoring period.

[8] The utilized FCI ST98 LFG flow meters available in the project site are sent to the calibration/testing workshop of Fluid Components International L.L.C. (which is located in the United States) every 18-months in order to be tested and calibrated. This is in accordance to the calibration and testing requirements established by this equipment manufacturer for the FCI ST98 units. Further information about performed calibration events valid for the considered monitoring period are included in Section D.2.

Figure 4 - View of the project's installed
FCI ST 98 LFG flow meter with
company internal id./ref "F0"

- LFG pressure/vacuum transmitters & Variable frequency drives for the LFG blowers: 1 Yokogawa vacuum transmitter and 2 Yokogawa pressure transmitters are installed. The control panel for the high temperature enclosed flares receives signals from such transmitters and, based on the values of these signals, the variable frequency drivers are controlled. The variable frequency drivers controls the speed of the electric motors for the LFG blower by using signals of the LFG pressure/vacuum transmitter as input signal. LFG vacuum and pressure measurements are also electronically recorded.

- Continuous gas analyzer (to measure fraction of CH_4 in collected LFG): Fraction of CH_4 in collected LFG that was sent to the biogas utilization devices under operation during the considered monitoring period has been continuously measured by a Siemens Ultramat 23 gas analyzer. This gas analyzer continuously monitors the composition of collected LFG in terms of methane, oxygen, and carbon dioxide. As per the setting adjustments made in the gas analyzer, alarm signals are sent to the control panel for the high temperature enclosed flares whenever CH_4 content of collected LFG is out of the user-set range[9]. CH_4 content measurements performed$_2$ by the continuous gas analyser are electronically recorded and reported with every 1-minute frequency.

Figure 5 - View of the project's continuous CH_4/O_2 gas analyzer
(used to continuously measuring fraction of CH_4 in collected LFG)

[9] During the considered monitoring period, the gas analyzer unit was set in a way that alarm signals are sent whenever measurements are out of the following ranges:

- From 30% - 70% (for measurements of CH_4 content in collected LFG flow)
- From 0% - 100% (for measurements of CO_2 content in collected LFG flow)
- From 0% - 5% (for measurements of O_2 content in collected LFG flow)

The main reason for such settings that trigger alarm signals are safety and operational reasons.

- <u>Project data supervisory/controlling system (supervisory control and data acquisition system (SCADA)):</u> Win CC platform is used for control the operation of the project activity. Win CC solution is supplied by Siemens A.G. and it is customized to the project activity. A general view of the installed SCADA system during the present monitoring period is shown in the below:

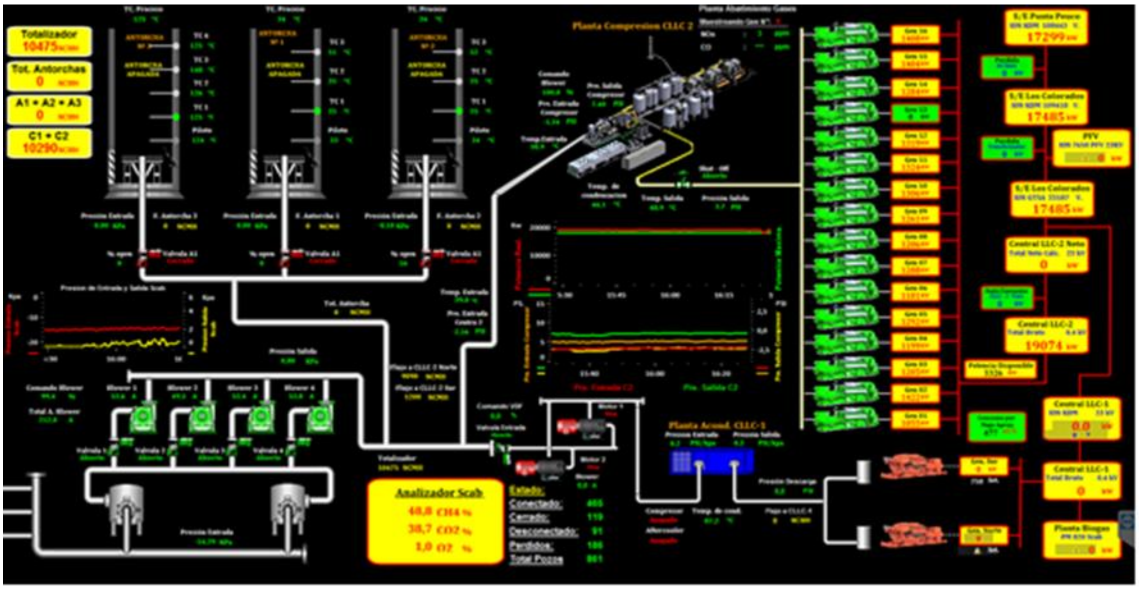

Figure 6 - View of the project's SCADA system screen for the project activity

The following paragraphs include general details about the project's electricity generation component.

<u>Central Loma Los Colorados-1 (CLLC-1) electricity generation facility</u>

- *<u>Power generation equipment:</u>* The CLLC-1 electricity generation facility comprises two identical engine-generator set units manufactured by GE Waukesha and of APG1000 model. Each GE Waukesha APG1000 engine-generator set has 1.0 MW of nameplate power generation capacity.

- *<u>LFG cooling station:</u>* All LFG sent to the CLLC-1 electricity generation facility passes through a LFG cooling station where temperature of LFG is reduced through the use of heat exchangers.

Figure 7 – View of one of the two engine-generator set GE Waukesha APG1000 that are installed as part of CLLC-1 electricity generation facility

- *Transmission of electricity generated at the CLLC-1 electricity generation facility:* During the considered monitoring period, all electricity generated by CLLC–1 electricity generation facility was exported to one of the regional electricity grid of Chile (SIC grid) through the same 110 kV voltage and 20 km length transmission line which was built for exporting electricity generated by the CLLC–2 electricity generation facility.

Central Loma Los Colorados-2 (CLLC-2) electricity generation facility

- *Power generation equipment*:
  While, as outlined in the PDD, the CLLC-2 electricity generation facility comprises the gradual/phased implementation of up to 22 engine-generator sets by year 2026, at the end of the considered monitoring period, the CLLC-2 electricity generation facility encompassed 16 GE Jenbacher J420 engine-generator sets (with nameplate installed capacity of 1.413 MW each)[10]. Both the 15th and the 16th engine-generator sets started continuously operating on 07/01/2017.

  The total nameplate installed capacity for the whole CLLC-2 was thus 22.6 MW at the end of the considered monitoring period. Due to procurement and commercial reasons (issues related to the purchase, payment and logistics of such additional engine-generator sets as well as well as operational issues with contractors hired for the installation and commissioning of additional engine-generator sets) as well as due to more recently perceived very unfavorable market conditions of the power market in Chile, the installation and commissioning of the 15th engine-generator sets for CLLC-2 facility occurred in year 2017 (prior to the considered monitoring period) with a relative delay of about 2 years. Also in year 2017, the 16th engine-generator set for the CLLC-2 was installed, commissioned and started to operate under conformance with the previously defined gradual/phased implementation plan for the whole CLLC-2 facility. As also indicated in Section A.1, the installation of the a 17th and an 18th engine-generator sets for the CLLC-2 facility have not occurred in year 2018 and year 2019 respectively as also previously defined in the gradual/phased implementation plan for the whole CLLC-2 facility. While the not yet occurred installation of the 17th and the 18th engine-generator sets of the CLLC-2 facility are currently expected/forecasted to happen in year 2021, it is still the intention of KDM Energia S.A. to have the both CLLC-1 and CLLC-2 electricity generation facilities reaching their previously forecasted total jointly combined installed capacity of 31.1 MW by the end of year 2026. It is important to note that, as also highlighted in Section A.1, as per applicable CDM rules and requirements, the relative delay in so far occurred in the gradual/phased installation of identical GE Jenbacher J420 engine-generator sets for the CLLC-2 electricity generation facility DOES

[10] As outlined in the registered PDD, the gradual/phased implementation schedule for the CLLC-2 electricity generation facility encompasses installation of identical GE Jenbacher J420 engine-generator sets under the following time plan:

Forecasted gradual/phased implementation of CLLC-2 electricity generation facility (as per the registered PDD):

End of Year	*2009 / 2010**	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*
Number of operational GE-Jenbacher J420 Units -	-	7	11	13	14	15	15	16	17	18	18	19	20	21	21	22	22
Total nameplate installed capacity (MW)	-	9.9	17.5	18.4	19.8	21.2	21.2	22.6	24.0	25.4	25.4	26.9	28.3	29.7	29.7	31.1	31.1

** - In the end of years 2009 and 2010 the project electricity generation component encompassed only the operation of the CLLC-1 electricity generation facility (with 2.0 MW of nameplate installed capacity).*

NOT represent a permanent change in the project design that would need to be addressed as per rules and procedures for addressing post-registration changes. the design of the project activity to be addressed as per applicable CDM rules and procedures for PRCs[11].

Exhaust gases from each one of the installed GE Jenbacher J420 engine-generator sets are evacuated through ducts equipped with a double filtration and emission abatement system (consisting of a catalytic oxidation filter (which reduces carbon monoxide emissions), and a selective catalytic reduction (SCR) type filter (which abates NO_x emissions)).

- *LFG cooling and filtering facility:*
  All engine-generator sets of the CLLC-2 electricity generation facility are fuelled by LFG through a LFG supply pipeline of maximum LFG supply technical capacity of up to 20,000 m^3/h.
  A complete LFG cooling and filtering facility is also available. The CLLC-2 facility's LFG cooling and filtering facility is designed to cool LFG and also to eliminate unwanted contaminants from the collected LFG (such as moisture and siloxanes). This LFG cooling and filtering facility is equipped with an efficient electric chiller and a siloxane removal system (of which have their electricity demand met by the CLLC-2 electricity generation facility). Whenever the operation of the CLLC-2 electricity generation facility is temporarily ceased (due to planned or unplanned interruptions), the operation of the LFG cooling and filtering infrastructure is also ceased.

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[11] Due to the so far occurred relative delays in the gradual/phased installation and starting of operations of identical GE Jenbacher J420 engine-generator sets for the CLLC-2 electricity generation facility; less electricity was potentially generated, thus negatively affecting the overall project's economic and financial attractiveness (when compared to assumption considered in the context of the previously demonstrated and assessed additionality of the project activity (under its revised design configuration)). While the whole project infrastructure (i.e. LFG collection infrastructure, LFG cooling and purifying infrastructure, high voltage power transformer, transmission lines, etc.) were previously conceived and were implemented by taking into account the previously forecasted gradual/phased implementation of the CLLC-2 electricity generation facility, all so far occurred delays in the gradual/phased installation and starting of operations of identical GE Jenbacher J420 engine-generator sets as part of this facility promotes negative adverse effects of its overall economic and financial attractiveness (loss of economy of scale). The very unfavorable price for commercialization of electricity in the national electricity market of Chile in more recent years (i.e. very low spot market price for electricity generated by Independent Power Producers (IPPs)) also represents a factor that promotes negative adverse effects of its overall economic and financial attractiveness of using collected LFG as gaseous fuel for generation of electricity.

The following quotations from the article "Is an energy revolution underway in Chile?" by *Maximiliano Proaño (dated 09 Jul 2018 and available online:* https://energytransition.org/2018/07/is-an-energy-revolution-underway-in-chile/) summarizes the very unfavorable price for commercialization of electricity generated by IPPs in Chile within the latest years:

> *"Chile's share of renewable energy has tripled in the past five years.*
> *(…)*
> *Five years ago, Chile generated only 5% of its electricity from renewable energy sources. This percentage has more than tripled in the last years, reaching 18% in May 2018. This excludes big hydro-electric plants over 20 megawatts.*
> *(…) energy auctions obtained a 75% lower price in 2017 than in 2013, at an average price of $32.5 MWh."*

Very low sale prices for generated electricity in Chile within the latest years (in the range of USD 32.5 per MWh) represents value per MWh of generated electricity which, in the particular case of the project activity, is even below the currently valid average operation and maintenance cost (O&M cost) per MWh of generated electricity typically applicable for an initiative promoting use of LFG as gaseous fuel for electricity (such as the project activity or a comparable initiative in Chile). For sake of further comparison, it is also relevant to note that in the context of the previously made demonstration and assessment of additionality of the project activity (more than 13 years ago), as outlined in previous version of the PDD valid for the currently expired 1st 7-year crediting of the project activity, conservative references to estimates for related average plant O&M cost of USD 23.1/MWh of generated electricity and electricity sale price of USD 50.0 per MWh were assumed at that (as values valid/applicable more than 13 years ago) in year 2006 (at the time of the initial project design conceptualization and when CDM was considered in context of the project's implementation decision making process).

- *Transmission of generated electricity:*

  All net electricity generated by the project's electricity generation infrastructure (CLLC-1 and CLLC-2 electricity generation facilities) is accounted as exported electricity by the Chilean electricity dispatch coordinating entity (Coordinador Eléctrico Nacional, former (CDEC-SIC[12]) on the basis of measurements performed by a dedicated meter and regularly recorded in monthly transfer balances of electricity for the power generation source registered at the CDEC-SIC as "*Loma los Colorados II*".

  Electricity generated by the project's electricity generation infrastructure is also used to meet the electricity demand of the project activity during the whole periods for which the project's electricity generation infrastructure is under full or partial operational status.

  It is important to note that, whenever the electricity generation facilities CLLC-1 and CLLC-2 are not under operation, the electricity demand of the whole project activity is met by imports of grid electricity measured by electricity meter M2 (since electricity is exported/imported trough the same line), as explained in further sections of the present monitoring report.
  Moreover, three captive off-grid electricity generators (fuelled by diesel) were used as a backup power source for the project activity whenever supply of grid electricity to the project activity was temporarily interrupted[13].

  Like in the case of the CLLC-1 electricity generation facility, each engine-generator set of the project's CLLC-2 electricity generation component are coupled to a power transformer that increases the voltage level of generated electricity from 400 V to 23 kV. From these power transformers, electricity generated by each engine-generator set is transmitted through an overhead power line leading collector that concentrates all the electricity generated in a main power sub-station.

  From the main power station, electricity is exported to the SIC electricity grid of Chile through a project dedicated 110 kV voltage and 20 km length transmission line. This transmission line, that starts at the Loma Los Colorados Landfill (at the sub-station named Sub-station Loma los Colorados (SELLC)), transmits electricity generated by the whole project's electricity generation infrastructure (CLLC-1 and CLLC-2 electricity generation facilities) by converting electricity from 23 kV to 110 kV in a main power transformer. The 20 km length power transmission line connects the project's electricity generation infrastructure to the Punta Peuco power substation, which is part of the Chilean SIC electricity grid.

- *Backup captive off-grid electricity generators (fuelled by diesel):*

  Whenever the project's electricity generation infrastructure is out of operation and supply of grid electricity to the project site is temporarily interrupted, the electricity demand of the project activity is temporarily met by electricity generated by two of the three backup electricity generators (fuelled by Diesel) installed as part of the project activity[14]. These backup electricity generators have nameplate electricity generation capacity of 276 kW and 352 kW.

[12] The "Coordinador Eléctrico Nacional, former Centro de Despacho Económico de Carga del Sistema Interconectado Central (CDEC-SIC) " is the national electricity dispatch coordinating entity in Chile. Besides of coordinating the dispatch of all grid connected power generation sources in Chile, this entity also has the role of

- Keeping safety of the service in electrical system
- Guarantee the most economical operation for the set of electrical system installations.
- Guarantee the right of easement over transmission systems established by concession.

Further details about the Coordinador Eléctrico Nacional are available online: https://www.coordinador.cl/

[13] More details on the utilization of the backup diesel generators are found further on this Monitoring Report.

[14] A 3rd backup captive off-grid electricity generation (fuelled by diesel) is kept at the SELLC sub-station. This backup electricity generator is only used as a backup system during power failures to the SELLC sub-station.

Moreover, an additional emergency backup captive off-grid electricity generator (fuelled by diesel and with internal reference “Diesel Backup Generator III”) with 80 kW of nameplate power is installed at the SELLC sub-station. This backup electricity generator is only used as a backup system during power failures to the SELLC sub-station.

The mains specifications of the backup captive off-grid electricity generators (fuelled by diesel) that were under operation on the project activity during the considered monitoring period:

Equipment id/tag	Manufacturer:	Model Number	Power (MW)
Diesel Backup Generator I	Atlas Copco (using a Volvo diesel generator)	QAS 325 Vd	0.276
Diesel Backup Generator II	Cummins	SDC - 400	0.352
Diesel Backup Generator III	Protelec	S 100 - 10	0.080

The figures below show the 3 backup captive off-grid electricity generators (fuelled by diesel) installed and operational as part of the project activity:

Figure 8 – View of the project’s captive off-grid electricity Generator “Diesel Backup Generator I”

Figure 9 – View of the project’s captive off-grid electricity Generator “Diesel Backup Generator II”

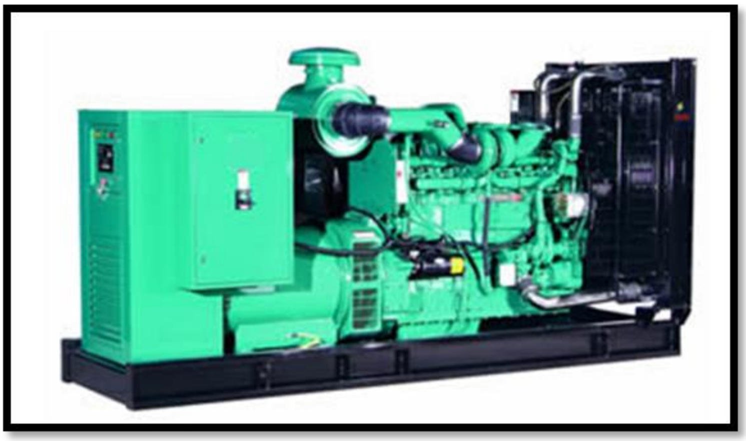

Figure 10 – View of the project's backup captive off-grid electricity generator "Diesel Backup Generator III"

The next figures show external and internal views of the project's CLLC-2 power plant at the Loma Los Colorados Landfill:

Figure 11 - External view of CLLC-2 electricity generation facility

Figure 12 - Internal view of CLLC-2 electricity generation facility

- Power sub-station Loma los Colorados (SELLC):
  This small power sub-station is located inside the area of the Loma Los Colorados landfill and this facility represents the starting point of the 20 km length 110 kV voltage transmission line connecting the project's electricity generation infrastructure to the Punta Peuco power sub-station. This power sub-station includes one of the project's backup captive off-grid electricity generator (fuelled by diesel) with internal reference "Diesel Backup Generator III") with 80 kW of nameplate installed capacity. This backup electricity generator is only used as a backup electricity supply system during power supply failure to the SELLC's control systems.

- Punta Peuco sub-station:
  This large power sub-station is located 20 km away from the project site (in the end of the project's 110 kV voltage transmission line) and it includes a power transformer and protection and control system for high voltage (which is equipped with switches, circuit breakers and transformers).

Figure 13 - Detail of the power transmission lines leaving the SELLC power sub-station (used to export net-generated electricity by CLLC-1 and CLLC-2 facilities)[15]

Note:
The project design also encompasses three enclosed high temperature flares supplied by LFG Specialities L.L.C. with the following specifications and operational conditions:

Flare 1 and Flare 2:

- Min. LFG flow: 850 Nm^3/h
- Max. LFG flow: 5,097 Nm^3/h
- Min. temperature of exhaust gas: 760 ^oC (in order to ensure acceptable combustion efficiency)
- Max. temperature of exhaust gas:1,093 ^oC (in order to ensure acceptable combustion efficiency

Flare 3:

- Min. LFG flow: 510 Nm^3/h
- Max. LFG flow: 5,097 Nm^3/h
- Min. temperature of exhaust gas: 760 ^oC (in order to ensure acceptable combustion efficiency)

[15] Under circumstances where the CLLC-1 and/or the CLLC-2 electricity generation facilities are both not under operational status, imports of the grid-sourced electricity is made through the SELLC power sub-station.

- Max. temperature of exhaust gas: 1,093 ^{o}C (in order to ensure acceptable combustion efficiency

As further explained below in Box 1, no collected LFG was sent to the project's flares for destruction during the considered monitoring period.

Under normal flare operational circumstances, LPG is used as a start-up fuel to ignite the high temperature enclosed flares whenever it is required (e.g. after maintenance/repair events, after temporary interruptions in grid electricity supply to the project activity, etc.). While no collected LFG was sent to the project's flares for destruction during the considered monitoring period, no consumption of LPG thus occurred within the considered monitoring period.

Box 1 - Operation of the project activity during the whole considered monitoring period with no excess of collected LFG being sent for destruction in the project's high temperature enclosed flares:

Since the implementation and commission of the CLLC-2 electricity generation facility in year 2011, the operational strategy for the project activity in terms of destination of collected LFG has been operationalized by prioritizing, as most as possible, the utilization of collected LFG as gaseous fuel for electricity generation in the installed power generation infrastructure (instead of, under the project scenario, destroying equivalent amount of collected LFG through flaring (like occurred in the scenario prior to the occurred implementation of CLLC-2 power plant within the 1st 7-year crediting period of the project activity)).

Due to such operational strategy envisaging promotion, as much as possible, of utilization of collected LFG as gaseous fuel for electricity generation in both CLLC-1 and CLLC-2 electricity generation facilities, if applicable/existent, only excess of collected LFG has been expected to be sent for destruction (under controlled and efficient conditions) in the installed 3 high temperature enclosed flares as part of the operation of the project activity.

As outlined in the registered PDD, the total combined nameplate installed capacity for the CLLC-2 has been gradually increased since its starting of operations in year 2011 (and, as established by the project design, the tota combined nameplate installed capacity of CLLC-2 plant is expected to further increase up to year 2026).

Due to different reasons, in the latest years of project operation (incl. the considered monitoring period), the project participant and project owner KDM S.A. has however faced severe difficulties for quantitatively increase collection of LFG (in a way that the still increasing demand for LFG of the project's electricity generation is met and, at the same time, to still have excess of collected LFG being made available for being destroyed in the installed project flares (i.e. set of flares total combined nameplate LFG flaring capacity of 15,091 Nm^3/h)).

While combustion of LFG in the project flares promotes no revenues (other than CDM revenues), one particular factor in the related difficulties faced in the latest years by KDM S.A. has been the aspect that any incremental and required investment on improvement of LFG collection infrastructure at the Loma Los Colorados landfill (e.g. increase of the number and/or quality of LFG collection wells beyond the number/specifications previously considered as part of the project design conceptualization (in order to allow excess of LFG to be combusted in the flares)) would indeed represent incremental capital expenditures (CAPEX) for which return of investment are very difficult to occur under the unfavourable market conditions for the commercialization of Certified Emission Reductions (CERs) within the latest years (low prices and low liquidity for CERs).

Furthermore, in the latest years a range of not previously expected day-to-day challenges in the operation of the project's LFG collection infrastructure (i.e. LFG collection wells and LFG pipeline network) have also limited and represented a barrier for desirable increases in the amount of LFG collected as part of the project activity.
In practical terms, these aspects are *inter alia* translated into a partial operation of the project activity infrastructure during the considered monitoring period. The project operation has thus been set/configured (i.e. definition and operationalization of LFG collection strategy in terms of setting of LFG suction pressure, management of individual LFG collection wells, etc.) in a way to ensure that LFG

consumption demand of the project's electricity generation infrastructure is always met as a priority and expected generation of electricity is thus always ensured (however with no excess of collected LFG being made available and sent for destruction in the project's flares).

Also as part of the setting/configuration of the operation of the project activity, the existent 3 safety shut-off valves located in the sections of project LFG pipeline prior to each one of the flares (1 valve per flare) were all temporarily manually selected under "closed" position on 10/03/2014 (prior to the starting of the considered monitoring period), thus temporarily interrupting any possibility of supply of collected LFG to the project's flares.

It is also relevant to note that during the whole considered monitoring period the status of such valves have been continuously electronically monitored, with recording of data being performed on every-minute basis.

As a result of the awareness of the temporary non-operation of the project flares prior to the starting of the considered monitoring period, the operationalization of the monitoring system for the project activity has also been temporarily flexibilized.

While the flare have been under non-operational status since 10/03/2014, the performance of selected monitoring activities that are uniquely applicable for the project flaring infrastructure were also temporarily interrupted (e.g. as one of the measures, the performance of regular (every 6-months) 3rd party measurements in the installed flares as part of required monitoring work for the parameter "Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t*" ($F_{CH4,EG,t}$) was temporarily ceased).

As the operator of the Loma los Colorados landfill, KDM S.A. does expect that as a result of on-going solid waste disposal activities in the landfill and upon also expected future improvements of the market conditions for CER commercialization and commercialization of electricity, quantitative increments in the LFG stream collected at the landfill may occur. Under such positive future scenario, it is expected that even with further increases in the nameplate installed capacity for the CLLC-2 facility (that will represent further increase in the LFG demand as fuel for the project's electricity generation infrastructure as a whole), there will exist excess of collected LFG to be combusted in the project's flares simultaneously with the operation of the project's electricity generation infrastructure. Under such circumstances, the project monitoring will again encompass monitoring for selected flaring related parameters.

In summary, KDM S.A. does expects the project's flares to be put under continuous operation again in the future. Due to that, the current situation in terms of flaring and monitoring as part of the operation of the project activity is regarded as temporary.

Note: It is crucial to note that due to its temporary nature, the above explained operation of the project activity during the whole considered monitoring period with no excess of collected LFG being sent for destruction in the project's high temperature enclosed flares does not represent a permanent change in the project design (that would be required to be addressed as per applicable CDM rules and procedures for addressing post-registration changes).

The above-explained occurred flexibilization of the operationalization of the monitoring system for the project activity is also regarded as temporary and does not negatively affect the overall integrity and accuracy of monitoring. Due to that, such flexibilization does not represent a post-registration change to the project activity either.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

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Not applicable for the considered and/or previous monitoring periods. There are no temporary deviations from the registered monitoring plan and/or applied CDM baseline and monitoring methodology and/or applicable methodological tools encompassed by the considered monitoring period and/or previously approved by the CDM-EB.

In fact, no temporary deviations from the registered monitoring plan and/or applied CDM baseline and monitoring methodology and/or applicable methodological tools were ever addressed in the context of previously performed and approved post-registration changes for the project activity (PRC-0822-001, PRC-0822-002 and PRC-0822-003/004/005).

B.2.2. Corrections

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Not applicable for the considered monitoring period. There are no Corrections (in information that do not affect the project design) encompassed by the considered monitoring period that are to be submitted with this Monitoring Report as part of the request for issuance (post-registration change – issuance track). Furthermore, there are no changes under this category that were previously approved by the CDM-EB (post-registration change – prior approval track) as being applicable specifically for the considered monitoring period either.

It is however relevant to note that Corrections (in information that do not affect the project design) were previously approved under PRC-0822-001, PRC-0822-002 and PRC-0822-003/004/005 as changes applicable/valid for monitoring period(s) prior to the considered monitoring period (thus not the context of the verification assessment for the considered monitoring period) as follows:

Ref. of PRC processes so far encompassed by the project activity	Approval date	Description of the post-registration change(s) under the category "*Corrections (in information that do not affect the project design)*"
PRC-0822-001	31/10/2012 (prior-approval track)	Corrections in information made available in the PDD (which does not affect the project design): • Previously existent minor typographical errors and mistakes of the initial registered version of the PDD in terms of general project description and application of applied baseline and monitoring methodologies (incl. grammar mistakes, errors in the calculation formulas, errors in references to measurement units, etc.). (PDD version valid for the currently expired 1st 7-year crediting period)
PRC-0822-002	05/04/2017 (prior-approval track)	Corrections (in information that do not affect the project design): • Missing monitoring details for the monitoring parameter "Maintenance events completed in year y as monitored by the project participants ($Maintenance_y$)" are added in Section B.7.3. • Figure 2 – "Schematic flow diagram: delineation of the project boundary for the project activity during the 2nd 7-year crediting period" is corrected in terms of the number of engine-generator sets for the project's CLLC-2 electricity generation facility and location of LFG flow meters • The formula for the determination of baseline emissions of methane ($BE_{CH4,y}$) in the context of ex-ante estimates of emission reductions to be achieved by the project activity is corrected in Section B.6.3.

		Related calculations of ex-ante estimates of emission reductions to be achieved by the project activity during the 2nd 7-year crediting period are also corrected in both Section B.6.3 and in a revised version of the emission reduction calculation spreadsheet (that is enclosed to the PDD). • Reporting in Section B.6.2 of the previously determined value for the ex-ante determined parameter "Historical amount of methane in the LFG which is captured and destroyed in the year prior to the implementation of the project activity (2006)" ($F_{CH4,BL,x-1}$) is corrected from 41,122 tCH_4/yr to 516.16 tCH_4/yr. • A clarification disclaimer referring to both the issuance of the environmental license for the CLLC-2 electricity generation facility + current compliance of the implementation and operation of the facility with all valid and applicable environmental requirements (as defined by the competent environmental authority in Chile) was added in Section D.2. • Minor previously existent typo mistakes were corrected in different sections of the PDD.
PRC-0822-003/004/005[16]	23/08/2017 (issuance track)	• Missing default value (applicable for generated electricity exported through the electricity grid the project activity is connected to) is added in details for the ex-ante determined (fixed) parameter "Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity" ($TDL_{grid,y}$) in Section B.6.2. Furthermore, while the previously selected 20% default value became applicable only for grid-sourced electricity imported by the project activity and is termed as $TDL_{grid,import,y}$, the added 3% missing default value is termed as $TDL_{grid,export,y}$. Texts in Sections B.6.1 and B.6.3 are adjusted accordingly. • Calculations of ex-ante estimates of emission reductions to be achieved by the project activity during the 2nd 7-year crediting period are corrected in both Section B.6.3 and in a revised version of the emission reduction calculation spreadsheet (that is enclosed to the PDD) by taking into account the missing 3% default value for the ex-ante determined (fixed) parameter $TDL_{grid,y}$ (value applicable for generated electricity exported through the electricity grid the project activity is connected to). • Details for the project participants of project activity are updated (as per the latest version of the completed Modalities of Communication (MoC) form for the project activity). • The estimated annual values for the monitoring parameter "Amount of electricity generated using LFG by the project activity in year y" ($EC_{BL,y}$) (applicable for years 2014 – 2021) are correctly reported in Section B.7.1.

B.2.3. Changes to the start date of the crediting period

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[16] The contents of PRC-0822-003, PRC-0822-004 and PRC-0822-005 are identical. Thus these PRCs are jointly referred as *"PRC-0822-003/004/005".*

Not applicable for the considered and/or previous monitoring periods. There are no changes to start date of the crediting period encompassed by the considered monitoring period and/or previously approved by the CDM-EB.

In fact, no change to start date of the crediting period was ever addressed in the context of previously performed and approved post-registration changes for the project activity (PRC-0822-001, PRC-0822-002 and PRC-0822-003/004/005).

B.2.4. Inclusion of monitoring plan

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Not applicable for the considered and/or previous monitoring periods. There is no inclusion of monitoring plan (and/or applicable methodological tools) encompassed by the considered monitoring period and/or previously approved by the CDM-EB as being applicable for the considered monitoring period.

In fact, no inclusion of monitoring plan was ever addressed in the context of previously performed and approved post-registration changes for the project activity (PRC-0822-001, PRC-0822-002 and PRC-0822-003/004/005).

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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Not applicable for the considered monitoring period. There are no permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied CDM baseline and monitoring methodology and/or applicable methodological tools encompassed by the considered monitoring period that are to be submitted with this Monitoring Report as part of the request for issuance (post-registration change – issuance track). Furthermore, there are no changes under this category that were previously approved by the CDM-EB (post-registration change – prior approval track) as being applicable specifically for the considered monitoring period either.

It is however relevant to note that permanent changes to the registered monitoring plan (revision of the monitoring plan) were previously approved under PRC-0822-001 and PRC-0822-002 as changes applicable/valid for monitoring period(s) prior to the considered monitoring period (thus not the context of the verification assessment for the considered monitoring period) as follows:

Ref. of PRC processes so far encompassed by the project activity	Approval date	Description of the post-registration change(s) under the category *“Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied CDM baseline and monitoring methodology and/or applicable methodological tools”*
PRC-0822-001	31/10/2012 (prior-approval track)	• More appropriate approaches and options for monitoring parameters associated with the determination of project emissions due to the consumption of electricity sourced from the grid and/or electricity sourced from a captive off-grid electricity generator (fuelled by diesel) by the project activity. • A more appropriate approach for monitoring parameters associated with the determination of project emissions due to the consumption of Liquefied Petroleum Gas (LPG) by the project activity

		• Incorporation in the monitoring plan of the option of performing measurements of CH_4 fraction in collected LFG by using a calibrated portable gas analyser (PDD version valid for the currently expired 1st 7-year crediting period)
PRC-0822-002	05/04/2017 (prior-approval track)	• Consideration/utilization of alternative monitoring approaches as per "Appendix - Additional data handling and monitoring guidance for determining the mass flow of methane in biogas" of the latest version of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) as follows: - Depending on operational conditions, monitoring approach as per Item 1. "*Data substitution for methane content or biogas flow*" may be applied (in case missing data are encountered in the course of determining the methane mass flow as part of the determination of $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$ along the 2nd 7-year crediting period). - Depending inter alia on availability of monitoring equipment, monitoring approach as per Item 2. *"Use of a single flow meter for multi-use of recovered biogas"* may be applied. • Inclusion of the monitoring details for the new/additional monitoring parameter "Operational status of biogas destruction devices" (Status of the biogas destruction device)" as required by the later version of the applied methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0).
PRC-0822-003/004/005	23/08/2017 (issuance track)	Not applicable. PRC-0822-003/004/005 do not include any permanent changes from the registered monitoring plan and/or monitoring methodology (revision of the monitoring plan from the registered PDD)

B.2.6. Changes to project design

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Not applicable for the considered monitoring period. There are no permanent changes to the design of the project activity encompassed by the considered monitoring period that are to be submitted with this Monitoring Report as part of the request for issuance (post-registration change – issuance track). Furthermore, there are no changes under this category that were previously approved by the CDM-EB (post-registration change – prior approval track) as being applicable specifically for the considered monitoring period either.

It is however relevant to note that permanent changes to the design of the project activity were previously approved under PRC-0822-001 (not in the context of the verification assessment for the considered monitoring period) as changes applicable/valid for monitoring period(s) prior to the considered monitoring period (thus not the context of the verification assessment for the considered monitoring period) as follows:

Ref. of PRC processes so far encompassed by the project activity	Approval date	Description of the post-registration change(s) under the category *“Permanent changes to the design of the project activity”*
PRC-0822-001	31/10/2012 (prior-approval track)	• Occurred and planned (yet to be fully implemented) gradual installation of electricity generation equipment fuelled by collected landfill gas (engine-generator sets) with higher energy conversion efficiency than as earlier assumed (thus resulting in higher installed capacity) • Occurred and yet to be fully implemented installation of electricity generation equipment under a revised timeline/schedule • Occurred installation of two additional backup captive off-grid electricity generators (fuelled by diesel) (PDD version valid for the currently expired 1st 7-year crediting period)
PRC-0822-002	05/04/2017 (prior-approval track)	Not applicable. PRC-0822-002 does not include any permanent changes to the design of the project activity.
PRC-0822-003/004/005	23/08/2017 (issuance track)	Not applicable. PRC-0822-003/004/005 do not include any permanent changes to the design of the project activity.

B.2.7. Changes specific to afforestation or reforestation project activity

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Not applicable.

SECTION C. Description of monitoring system

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Box 2 - Measurements of collected LFG supplied to a set of available/operational biogas destruction/utilization devices (i.e. engine-generator sets) performed by a single LFG flow meter during the considered monitoring period (under conformance with the alternative and simplified monitoring approach termed "Use of a single flow meter for multi-use of recovered biogas"):

During the considered monitoring period, measurements of collected LFG supplied to a set of available/operational biogas destruction/utilization devices (i.e. the engine-generator sets of the CLLC-1 and CLLC-2 electricity generation facilities) were performed by a single LFG flow meter (under conformance with the alternative and simplified monitoring approach termed in Section B.7.3 of the registered PDD as *"Use of a single flow meter for multi-use of recovered biogas*") and not by applying an individual LFG flow meter for each particular biogas destruction/utilization device[17].

By taking into account the applicable additional monitoring requirements valid/applicable specifically for the use of a single or reduced number of LFG flow meters (as established in the registered PDD), the following additional measures were considered for accounting of related emission reductions achieved by the project activity:

(i) It is ensured/demonstrated that within each section of the project's LFG supply pipeline that directs LFG towards each operational individual flare, there is an individual safety valve (that is installed/located within such pipeline section and prior to the underlying biogas destruction device) that automatically closes whenever the underlying biogas utilization device becomes under non-operational status. In the particular case of the considered monitoring period, as none of the flares operated during the period, such valves were thus kept closed during the whole underlying period. Moreover, the status of such valves ("*Open*" or "*Closed*") were continuously monitored during the whole period. Furthermore, for each individual flare, the status of the flame for each flare (Flame status "*on*" or flame status "*off*") was also confirmed as always corresponding to flame status "*off*"" (on the basis of continuous monitoring of the parameter "Flame detection of flare in the minute *m*" ($Flame_m$) by the use of UV flame detectors).

It is thus ensured/demonstrated that during the whole considered monitoring period, no collected LFG was able to be eventually directly emitted into (vented through) the atmosphere through a non-operational flare.

ii) It is ensured/demonstrated that the biogas utilization devices for which collected LFG is sent and measured by the single LFG flow meter (i.e. engine-generator sets) are all designed in such a manner that it is physically impossible for LFG passing through such devices without being combusted and being directly emitted into the atmosphere while the underlying engine-generator sets are under non-operational status. It is thus ensured/demonstrated that during the whole considered monitoring period, no collected LFG was able to be eventually directly emitted into (vented through) the atmosphere through a non-operational engine-generator set. For the considered monitoring period, such confirmations/demonstrations were done through the following approaches:

- Records electricity generated by the engine generator sets and records from the status of the both the flare(s) (by means of a flame detector(s) and the valves located prior to the flares within the project's LFG pipeline). In the particular case of the engine-generator sets, it is demonstrated that electricity generation (as the output from operation of such devices) corresponds to the flow of LFG actually consumed by the devices (in energy basis).

- For any time instants minute *m* where one or more biogas destruction/utilization devices connected downstream to the utilized single LFG flow meter (i.e. engine-generator set(s) and/or flare(s)) were under non-operational status), it is demonstrated that the set of remaining devices under operational status (i.e. engine-generator sets utilizing LFG as fuel for electricity generation in the particular case of the considered

[17] While the project's high temperature enclosed flares are termed in both the registered PDD and in this Monitoring Report as "*biogas destruction devices*", the engine-generator sets of the project's electricity generation infrastructure (CLLC-1 and CLLC-2 electricity generation facilities) are termed in both the registered PDD and in this Monitoring Report as "*biogas utilization devices*".

monitoring period) have the quantitative combined capacity to combust the amount of LFG flow that was sent to such devices during the underlying minute *m.*
Finally, it is also confirmed/demonstrated that measurement of methane content of collected LFG (monitoring parameter $v_{CH4,t,wb,j}$ or $v_{CH4,t,db,j}$) was conducted during the whole considered monitoring period by a CH_4 content gas analyser that has been located immediately downstream of the utilized LFG flow meter.

General description of the monitoring system (as per the project's operational and monitoring configuration valid for the considered monitoring period):

The schematic diagram below illustrates the applied monitoring system for the project activity during the considered monitoring period (as per the project's operational and monitoring configuration valid for the considered monitoring period):

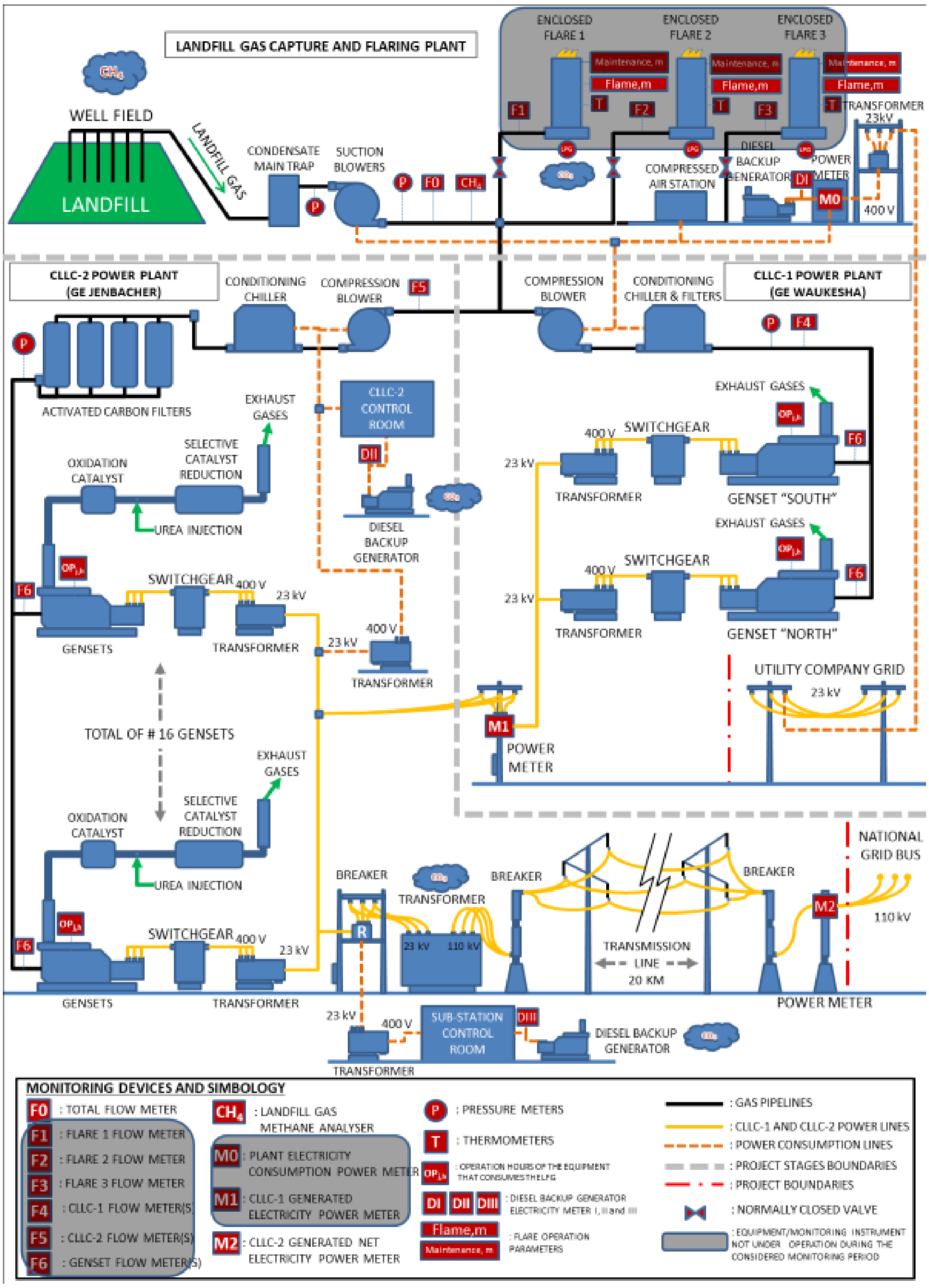

Figure 14 – Schematic diagram for the configuration of the project's monitoring system valid during the considered monitoring period

The figure above reflects the application of the alternative and simplified monitoring approach termed "*Use of a single flow meter for multi-use of recovered biogas*" as above explained in Box 2.

Gathering, recording and reporting of monitoring data:
During the considered monitoring period, signals for measurements of LFG flow (from the installed LFG flow meter with company internal Id./ref. "F0"), CH_4 fraction in collected LFG as well as other control parameters such as LFG pressure, LFG temperature, flame status of the non-operational flares and status of the shut off valves of such flares were received and processed by the project's programmable logical controller unit (PLC unit) and recorded by the project's supervisory and data acquisition system (SCADA) as data records.

The available project's SCADA system is based on the "WinCC" platform. "WinCC" platform is supplied by Siemens AG and it is customized for the project activity. Data records for the measurements described above are made available for each individual minute of the monitoring period. As per the project's monitoring system, every-minute data records for such measurements are exported and utilized as raw data in the emission reduction calculation spreadsheets.

Furthermore, the "WinCC" platform also receives data records from the bi-directional electricity meter that measures both the amount of net-electricity exported by the project activity and amount of grid-sourced electricity consumed by the project activity.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**OX_{top_layer}**
Unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline.
Source of data	The registered PDD refers to the default value as per the CDM baseline and monitoring methodology ACM0001 (version 15.0). The value is consistent with how oxidation is accounted for in the methodological tool "Emissions from solid waste disposal sites" (version 06.0.1).
Value(s) applied	0.1
Choice of data or measurement methods and procedures	Default value as per the applied CDM baseline and monitoring methodology ACM0001 "Flaring or use of landfill gas" (version 15.0)
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	**$F_{CH4,BL,x-1}$**
Unit	tCH_4/yr
Description	Historical amount of methane in the LFG which is captured and destroyed in the year prior to the implementation of the project activity (2006).
Source of data	Technical study developed by KDM S.A. related to year 2006.
Value(s) applied	516.16
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	**-**

Data/Parameter	**GWP_{CH4}**
Unit	tCO_2/tCH_4
Description	Global Warming Potential of CH_4
Source of data	The registered PDD refers to the "Global Warming Potential for Given Time Horizon" in table 2.14 of the errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, based on the effects of greenhouse gases over a 100-year time horizon. Available at: www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14 The applied value is also in accordance with the "Standard for application of the global warming potential to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol".
Value(s) applied	25
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	**-**

Data/Parameter	R_u
Unit	Pa.m^3/kmol.K
Description	Universal ideal gases constant
Source of data	The registered PDD refers to the default value as per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0).
Value(s) applied	8,314
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	**-**

Data/Parameter	MM_k
Unit	kg/kmol
Description	Molecular mass of gas *k*
Source of data	The registered PDD refers to the default value as per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0).
Value(s) applied	As outlined in the registered PDD, for considered gases *k* that are greenhouse gases (GHGs), the values in the table below are applied for MM_i. As per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”: “*The determination of the molecular mass of the gaseous stream ($MM_{t,db}$) requires measuring the volumetric fraction of all gases (k) in the considered gaseous stream. However as a simplification, only the volumetric fraction of gases k that are greenhouse gases and are considered in the emission reduction calculation in the underlying methodology must be monitored and the difference to 100% may be considered as pure nitrogen. The simplification is not acceptable if it is differently specified in the underlying methodology.*” ACM0001 (version 15.0) does not include any restriction to such simplification. Thus, only the volumetric fraction of gases that are greenhouse gases and are considered in related calculations (CH_4 in the particular case of the project activity) should be considered and the difference to 100% is just considered as pure nitrogen. Compound: Nitrogen; Structure: N_2; Molecular mass (kg/mol): 28.01
Choice of data or measurement methods and procedures	-

Purpose of data/parameter	Calculation of baseline emissions
Additional comments	**-**

Data/Parameter	**MM_i**
Unit	kg/kmol
Description	Molecular mass of greenhouse gas *i*
Source of data	The registered PDD refers to the default value as per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0).
Value(s) applied	As outlined in the registered PDD, the following value of molecular mass is applicable for CH_4 (the only GHG which is considered): Compound: Methane; Structure: CH_4; Molecular mass (kg/mol): 16.04
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	**-**

Compound	Structure	Molecular mass (kg/mol)
Methane	CH_4	16.04

Data/Parameter	**P_n**
Unit	Pa
Description	Total pressure at normal conditions
Source of data	The registered PDD refers to the default value as per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0).
Value(s) applied	101,325
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	In accordance with the registered PDD, since measurements of LFG flow are automatically converted and recorded in normalized cubic meters (by considering standard temperature and pressure (STP) conditions), the ex-ante determined parameters Temperature at normal conditions (T_n) and Total pressure at normal conditions (P_n) are not considered.

Data/Parameter	**MM_{H2O}**
Unit	kg/kmol
Description	Molecular mass of water
Source of data	The registered PDD refers to the default value as per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0).
Value(s) applied	18.0152
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	**-**

Data/Parameter	**T_n**
Unit	K
Description	Temperature at normal conditions
Source of data	The registered PDD refers to the default value as per the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (version 03.0).
Value(s) applied	273.15
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	In accordance with the registered PDD, since measurements of LFG flow are automatically converted and recorded in normalized cubic meters (by considering standard temperature and pressure (STP) conditions), the ex-ante determined parameters Temperature at normal conditions (T_n) and Total pressure at normal conditions (P_n) are not considered.

Data/Parameter	**$TDL_{grid,y}$**
Unit	Dimensionless
Description	Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity.
Source of data	The registered PDD refers to the applicable default as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01).
Value(s) applied	3% (for generated electricity exported through the electricity grid the project activity is connected to ($TDL_{grid,export,y}$)) 20% (for electricity imported by the project activity through the electricity grid the project activity is connected to ($TDL_{grid,import,y}$))
Choice of data or measurement methods and procedures	The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) defines, as alternative, default value of 20% for project consumption sources (applicable for determination of project emissions due to consumption of grid-sourced electricity by the project activity) and default value of 3% for baseline electricity consumption sources (applicable for the determination of baseline emissions for electricity generation by the project activity). The selection of these default values are under conformance with applicable guidance of ACM0001 (version 15.0). While transmission and distribution sources applicable for both grid-sourced electricity to be consumed by the project activity and for electricity generation by the project activity (equivalent to electricity consumption of baseline electricity consumption sources when applying the underlaying tool) do not fit under Scenario B and/or Scenario C (case II) of the such tool, the selected 20% value for $TDL_{grid,import,y}$ and 3% values for $TDL_{grid,export,y}$ are thus under conformance with applicable guidance of the tool. The selection of 20% value for $TDL_{grid,import,y}$ and 3% values for $TDL_{grid,export,y}$ meets applicable guidance for Scenarios A and C (cases I and III) of the Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) (whichever of these scenarios are applicable for the particular case of the project activity, where, as per the tool, in the case of doubts, case C.III should be identified as a conservative approach). It is relevant to note that as per the project design, the amount of electricity to be consumed by the project activity (project electricity consumption sources) to which scenario C of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) refers is smaller than the so-called electricity consumption of baseline electricity consumption sources ($EC_{BL,k,y}$) as per such tool (where $EC_{BL,k,y}$ in the tool is equivalent to the net amount of electricity generated using LFG in year y ($EG_{PJ,y}$) as defined by ACM0001 (version 15.0)). In summary, the project activity generates more electricity than it requires for its operation, with the largest amount of generated electricity being exported through the electricity grid the project activity is connected to. Under these particular conditions, also considering the 3% default value for electricity imported by the project activity (through the electricity grid the project activity is connected to) in thesis would represent an acceptable alternative. However, as a conservative approach, the generic 20% default value of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) applicable for project consumption sources is

	selected. This approach results in higher project emissions, thus reducing emission reductions to be achieved by the project activity accordingly.
Purpose of data/parameter	Calculation of both baseline emissions and project emissions (due to generation of electricity that is exported through the electricity grid and the consumption of grid-sourced electricity by the project activity).
Additional comments	-

Data/Parameter	w_{BM}
Unit	%
Description	Weighting of build margin emissions factor
Source of data	The registered PDD refers to the applicable default value as per the “Tool to calculate the emission factor for an electricity system” (version 4.0). The selected value is valid for the whole 2nd 7-year renewable crediting period.
Value(s) applied	0.75 (75%)
Choice of data or measurement methods and procedures	The applicable value valid for 2nd crediting period as per the “Tool to calculate the emission factor for an electricity system” (Version 4.0) is selected.
Purpose of data/parameter	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity).
Additional comments	-

Data/Parameter	w_{OM}
Unit	%
Description	Weighting of operating margin emissions factor
Source of data	The registered PDD refers to the applicable default value as per the “Tool to calculate the emission factor for an electricity system” (version 4.0). The selected value is valid for the whole 2nd 7-year renewable crediting period.
Value(s) applied	0.25 (25%)
Choice of data or measurement methods and procedures	The applicable value for the 2nd crediting period as per the “Tool to calculate the emission factor for an electricity system” (version 4.0) is selected.
Purpose of data/parameter	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity).
Additional comments	-

Data/Parameter	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	Build margin CO2 emission factor in year *y*
Source of data	As outlined in the registered PDD, data is ex-ante determined as per applicable guidance of the “Tool to calculate the emission factor for an electricity system” and value is valid for the whole 2nd 7-year crediting period. The adopted value was calculated with data provided by the CDEC-SIC grid.
Value(s) applied	0.7046
Choice of data or measurement methods and procedures	Data is determined as per applicable guidance of the “Tool to calculate the emission factor for an electricity system” valid for 2nd crediting period.
Purpose of data/parameter	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity) and baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project’s CLLC-1 and CLLC-2 electricity generation facilities which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the CDEC-SIC grid).
Additional comments	-

Data/Parameter	**$EF_{grid,OM,y}$**
Unit	tCO_2/MWh
Description	Operating margin CO2 emission factor in year *y*
Source of data	As outlined in the registered PDD, data is ex-ante determined as per applicable guidance of the “Tool to calculate the emission factor for an electricity system” and value is valid for the whole 2nd 7-year crediting period. The adopted value was calculated with data provided by the CDEC-SIC grid. As per the selected approach from the “Tool to calculate the emission factor for an electricity system”, $EF_{grid,OM,y} = EF_{grid,OM-adj,y}$.
Value(s) applied	0.7479
Choice of data or measurement methods and procedures	Data is determined as per applicable guidance of the “Tool to calculate the emission factor for an electricity system” valid for 2nd crediting period.
Purpose of data/parameter	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity) and baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project’s CLLC-1 and CLLC-2 electricity generation facilities which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the CDEC-SIC grid).
Additional comments	The adopted value of $EF_{grid,OM-adj,y}$ represents the average value for years 2010, 2011 and 2012.

<table>
<tr><td>Data/Parameter</td><td>$SPEC_{flare}$</td></tr>
<tr><td>Unit</td><td>°C (for temperature values)
Nm^3/h (for LFG flow values)
Number of days (for maintenance schedule interval values)</td></tr>
<tr><td>Description</td><td>Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval.</td></tr>
<tr><td>Source of data</td><td>The registered PDD refers to data as per the flare manufacturer. Data is used as a reference for later ex-post determination of values of flare efficiency ($\eta_{flare,m}$) for each individual high temperature enclosed flare in the context of determination of baseline emissions.</td></tr>
<tr><td>Value(s) applied</td><td>
<table>
<tr><th>$SPEC_{flare, Flare 1}$
$SPEC_{flare, Flare 2}$
$SPEC_{flare, Flare 3}$</th><th colspan="2">Min.</th><th>Max.</th></tr>
<tr><td rowspan="3">Operational LFG flow (for continuous operation):</td><td>Flare 1</td><td>850 Nm^3/h</td><td>5,097 Nm^3/h</td></tr>
<tr><td>Flare 2</td><td>850 Nm^3/h</td><td>5,097 Nm^3/h</td></tr>
<tr><td>Flare 3</td><td>510 Nm^3/h</td><td>5,097 Nm^3/h</td></tr>
<tr><td rowspan="3">Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high CH_4 destruction efficiency):</td><td>Flare 1</td><td>760 ^oC</td><td>1,093 ^oC</td></tr>
<tr><td>Flare 2</td><td>760 ^oC</td><td>1,093 ^oC</td></tr>
<tr><td>Flare 3</td><td>760 ^oC</td><td>1,093 ^oC</td></tr>
<tr><td rowspan="3">Required minimum frequency for inspection and maintenance service (incl. inspection in the conditions of the flare isolation ceramics revetment material):</td><td>Flare 1</td><td colspan="2" rowspan="3">Min. every year</td></tr>
<tr><td>Flare 2</td></tr>
<tr><td>Flare 3</td></tr>
<tr><td rowspan="3">Required/recommended minimum frequency for replacement of the flare isolation ceramics revetment material:</td><td>Flare 1</td><td colspan="2" rowspan="3">After 10 years of regular and appropriate operation</td></tr>
<tr><td>Flare 2</td></tr>
<tr><td>Flare 3</td></tr>
</table>
</td></tr>
<tr><td>Choice of data
or measurement methods
and procedures</td><td>As established by the methodological tool "Project emissions from flaring", the flare specifications and operational + maintenance requirements (as set/recommended by the equipment manufacturer) are documented and considered for the ex-ante determination of applicable values for the parameter $SPEC_{flare}$. During the 2nd 7-year crediting period, ex-ante selected data will be compared against monitored data related to the operation of the flare, including:
a) Minimum and maximum monitoring records for data regarding inlet LFG flow rate,
(b) Minimum and maximum monitoring records for data of temperature in the exhaust gas of each individual high temperature enclosed flare; and</td></tr>
</table>

	(c) Duration in days of time periods between maintenance events for each individual high temperature enclosed flare.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	All flare specification and operation details/requirements are based on information provided by the equipment manufacturer. It is crucial to note that, as further explained in Section B.1., no collected LFG was destroyed through combustion in anyone of the project's three high temperature enclosed flares during the considered monitoring period.

Data/Parameter	$\mathbf{PP_{CP,Diesel\text{-}generator}}$
Unit	MW
Description	Rated capacity of the installed captive backup electricity generators fuelled by diesel
Source of data	Nameplate capacity of the installed captive generator as per manufacturer's specifications or catalogue references
Value(s) applied	The specifications of the installed captive backup electricity generators (fuelled by diesel) are shown in the table below: (see table below) Thus, the Rated capacity of the installed captive backup electricity generators fuelled by diesel is considered as 0.708 MW for the 2[nd] crediting period.
Choice of data or measurement methods and procedures	Specifications of the installed captive backup electricity generators.
Purpose of data/parameter	Calculation of project emissions (due to the consumption of electricity sourced by captive off-grid electricity generators by the project activity).
Additional comments	-

Equipment id/tag	Manufacturer:	Model Number	Power (MW)
Diesel Backup Generator I	Atlas Copco (using a Volvo diesel generator)	QAS 325 Vd	0.276
Diesel Backup Generator II	Cummins	SDC - 400	0.352
Diesel Backup Generator III	Protelec	S 100 - 10	0.080

Data/Parameter	$TDL_{captive,y}$
Unit	-
Description	Average technical transmission and distribution losses for electricity sourced by the captive electricity generator
Source of data	Applicable default as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01).
Value(s) applied	0
Choice of data or measurement methods and procedures	Data is determined as per applicable guidance of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01).
Purpose of data/parameter	Calculation of project emissions (due to the consumption of electricity sourced by captive off-grid electricity generator by the project activity).
Additional comments	The ex-ante determined default value for $TDL_{captive,y}$ will only be used in case alternative approach 1 or approach 2 is used for the determination of Project emissions due to the consumption of electricity sourced by backup captive off-grid electricity generators (fuelled by Diesel) ($PE_{EC,captive,y}$).

Data/Parameter	$EF_{EL,captive,y}$
Unit	tCO_2/MWh
Description	CO_2 emission factor for electricity sourced by the captive off-grid electricity generators
Source of data	Applicable default as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01) (in case the *Alternative approach 2* is selected (by following option B2 of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”).
Value(s) applied	1.3
Choice of data or measurement methods and procedures	Data is determined as per applicable guidance of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01).
Purpose of data/parameter	Calculation of project emissions (due to the consumption of electricity sourced by captive off-grid electricity generator by the project activity).
Additional comments	The ex-ante determined default value for $EF_{EL,captive,y}$ will only be used in case alternative approach 1 or approach 2 is used for the determination of Project emissions due to the consumption of electricity sourced by backup captive off-grid electricity generators (fuelled by Diesel) ($PE_{EC,captive,y}$).

Ex-ante determined parameters not used in the context of ex-post determination and calculation of emission reductions achieved by the project activity:

The following ex-ante determined parameters (that are also included in the registered PDD) are not used for the purpose of ex-post determination of baseline emissions and project emissions achieved by the project activity during the considered monitoring period:

- Efficiency of the LFG capture system that will be installed in the project activity (η_{PJ})
- Default value for model correction factor to account for model uncertainties ($\varphi_{default}$)
- Oxidation factor (reflecting the amount of methane from the considered SWDS that is oxidized in the soil (or other material covering the waste)) (OX)
- Fraction of methane in the SWDS gas (volume fraction) (F)
- Fraction of degradable organic carbon (DOC) in MSW that decomposes in the considered SWDS ($DOC_{f,default}$)
- Methane correction factor ($MCF_{default}$)
- Fraction of degradable organic carbon in the waste type j (weight fraction) (DOC_j)
- Decay rate for the waste type *j* (k_j)
- Weight fraction of the waste type *j* (W_j)

As also outlined in the registered PDD, data for the above-listed parameters are used only in the context of ex-ante estimation of annual accumulated values for the “Amount of methane in the LFG which is destroyed or utilized by the project activity” ($F_{CH4,PJ,y}$) (in the context of ex-ante estimation of emission reductions to be achieved by the project activity during the 2nd 7-year renewable crediting period). Due to that, details for the above-listed parameters are not included in this Section as they are not relevant in the context of determination of emission reductions achieved by the project activity during the considered monitoring period. Relevant details for such not hereby reported parameters are included in Section B.6.2 of the registered PDD.

D.2. Data and parameters monitored

Data/Parameter	**Management of SWDS**
Unit	Dimensionless
Description	Management of the SWDS
Measured/calculated/ default	As per the adopted monitoring procedure for the project activity, management of the Loma los Colorados landfill is yearly compared against the previously conceived original construction and operational design for the underlying landfill in order to confirm that its overall management and operation (including relevant aspects related to waste disposal/ landfilling practice) were not deliberately modified with the unique aim to intentionally quantitatively increase generation of methane at the landfill. By performing a comparative checking annually, it is monitored whether any practice aiming to increase methane generation in the landfill has occurred or promoted. As required by ACM0001 (version 15.0), any change in the management of the Loma los Colorados landfill after the implementation of the project activity should be justified by referring to applicable technical or regulatory specifications.
Source of data	For the considered monitoring period, a technical evaluation was initially performed by the independent 3rd party engineering company Emerge Ingenieria Ltda. In January 2019 The findings for the performed evaluations are reported in a declaration document issued by such company that is dated 03/01/2019. As per the applicable monitoring procedure, two sequential technical evaluations valid for the considered monitoring period were performed also by the independent 3rd party engineering company Emerge Ingenieria Ltda. The findings for such performed evaluations are reported in declaration documents issued by such company and are dated 06/05/2019 and 06/04/2020. The final evaluation covers the period from 17/03/2007 (date when the project was registered as a CDM project activity) to 06/04/2020 (issuance date of the declaration document for the performed evaluation). As part of the performed annual technical evaluation, the current configuration and operational conditions of the Loma Los Colorados landfill were compared against the previously conceived design and operational conditions of the landfill prior of the occurred implementation of the project activity on the basis of different sources and assessments including inter alia: - The original design documents of the landfill (as described in the documentation required for all phases of the environmental licensing and operational permitting for the Loma Los Colorados landfill); - Applicable local or national regulations.

Value(s) of monitored parameter	As outlined in the issued internal technical evaluation/declarations dated 03/01/2019, 06/05/2019 and 06/04/2020 the previously conceived original design of the Loma Los Colorados landfill (dated prior to the implementation of the project activity) is confirmed not to being deliberately modified during the whole period from 17/03/2007 to 06/04/2020. Furthermore, no modification in the previously conceived original design of the Loma Los Colorados landfill has occurred or was promoted during the considered monitoring period from 01/05/2019 to 31/03/2020. The issued technical reports confirm that no practice to increase methane generation at the Loma Los Colorados landfill have occurred or have been promoted (when compared to management and MSW landfilling practices prior to implementation of the project activity). Aspects, conditions and circumstances related to management of the landfill (e.g. waste disposal, waste covering, waste compacting, management of leachate, draining of rainwater, etc.) were not changed with an aim to increase methane generation on site. It is relevant to note that MSW management business (collection and disposal of MSW) in Chile (and in most of the developing countries) has its own economics, dynamics, politics and related regulations. That makes MSW disposal activity for the Loma Los Colorados landfill and other similar landfills in Chile completely independent from the CDM mechanism and/or revenues of commercialization of CERs generated by project based destruction of methane in landfills. Currently, there is still no climate change of waste management policy in Chile which would provide an incentive or a mandate to have MSW being disposed in landfills with better/improved LFG collection / destruction systems (such as the project's LFG collection and destruction system currently implemented at the Loma Los Colorados landfill).
Monitoring equipment	Not applicable. No measuring equipment is used for monitoring management of the Loma Los Colorados landfill.
Measuring/reading/recording frequency	Annual checking is performed.
Calculation method (if applicable)	Not applicable.
QA/QC procedures	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. (private entity) in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	As required by ACM0001 (version 15.0), any change in the management of the landfill after the implementation of the project activity will be justified by referring to technical or regulatory specifications and impacts of such changes in the determination of baseline emissions should in this case be taken into account appropriately. Such monitoring requirement will be used for the determination/confirmation of baseline emissions and/or confirmation of the project's implementation as described in the registered PDD (in terms of operation and management conditions of the landfill from which LFG is combusted).

<table>
<tr><td>Data/Parameter</td><td>$V_{t,wb}$</td></tr>
<tr><td>Unit</td><td>m^3 wet gas/h</td></tr>
<tr><td>Description</td><td>Volumetric flow of LFG stream in time interval t on a wet basis</td></tr>
<tr><td>Measured/calculated/ default</td><td>Continuously measured by an installed LFG flow meter.</td></tr>
<tr><td>Source of data</td><td>Continuous measurements performed by the installed LFG flow meter are recorded in the project’s acquisition system with an every-minute frequency.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>The emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report) include all records of measurement data of LFG flow sent to the project’s biogas destruction/utilization devices under operational status under the considered monitoring period (i.e. engine-generator sets of the electricity generation infrastructure). Measurement data is recorded and reported with an every-minute frequency.</td></tr>
<tr><td>Monitoring equipment</td><td>Specifications and calibration details for the LFG flow meter utilized during the considered monitoring period:

- LFG flow meter internal id no./reference: F0

- Manufacturer: FCI Fluid Components International LLC

- Model: ST98 Thermal Mass Flow meter

- Accuracy: ±1%

- Serial number of installed/operational instrument: 663496

Details about performed calibration events valid for the considered monitoring period:

<table>
<tr><th colspan="2">Calibration Certificate</th><th rowspan="2">Calibration Date</th><th rowspan="2">Validity of the calibration event</th><th rowspan="2">Customer Order Number</th></tr>
<tr><th>Serial Number (S/N)</th><th>Calibration by</th></tr>
<tr><td>663496</td><td>FCI Fluid Components International LLC</td><td>17/12/2018</td><td>16/06/2020</td><td>C093554</td></tr>
</table>

Calibration frequency and maintenance requirements: Every 18 months. The calibration frequency adopted for the installed/operatiomal instruments is as per the recommendations of equipment/instrument manufacturer. The registered PDD and ACM0001 (version 15.0) methodology do not specify any frequency for the calibration of the LFG flow meter.</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuous measurements are recorded and reported with an every-minute frequency.</td></tr>
<tr><td>Calculation method (if applicable)</td><td>Not applicable.</td></tr>
<tr><td>QA/QC procedures</td><td>Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of their manufacturer.</td></tr>
</table>

	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The design of the LFG flow meter instruments used during the considered monitoring period ensure that measurement data is automatically converted and recorded in normal cubic meters per hour (Nm^3/h). Due to that, as further explained in Section D.1, measurements of LFG pressure and LFG temperature are not required for determining values of the calculation parameter $V_{t,wb,n}$ in the context of calculation of achieved emission reductions. Reported values of $V_{t,wb}$ are thus equivalent to values of $V_{t,wb,n}$ and are thus directly used for the determination of the amount of methane in the LFG destroyed by the project activity ($F_{CH4,PJ,y}$) as per Option C of the applicable methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (measurements of volume flow in a wet basis) (as outlined in the emission reduction calculation spreadsheets enclosed to this Monitoring Report). As further explained above in Section C (Box 2), during the considered monitoring period, measurements of collected LFG supplied to a set of available/operational biogas destruction/utilization devices (i.e. engine-generator sets) were performed by a single LFG flow meters (under conformance with the alternative and simplified monitoring approach termed in Section B.7.3 of the latest version of the registered PDD as *"Use of a single flow meter for multi-use of recovered biogas*").

Data/Parameter	$\mathbf{v_{CH4,t,wb}}$
Unit	m^3 CH_4/m^3 wet gas
Description	Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis
Measured/calculated/ default	Continuously measured by continuous CH_4/O_2 content gas analyzer.
Source of data	Measured as part of the operation of the project activity by applying appropriate monitoring instruments (CH_4 content gas analyser) (with continuous measurements being electronically recorded).
Value(s) of monitored parameter	The emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report) include measurement data for $v_{CH4,t,wb}$ that are recorded and reported with an every-minute frequency.

Monitoring equipment	*Continuous CH_4/O_2 content gas analyzer unit:* One CH_4/O_2 content gas analyzer unit was utilized for measuring CH_4 content of collected LFG during the whole monitoring period. The specifications of the CH_4/O_2 content gas analyzer unit are as follows: - Manufacturer: Siemens AG - Model: Ultramat 23 - Serial Number: N1-W2-678 - Accuracy: ±1% - Calibration events valid for the considered monitoring period: <table><tr><th>Equipment/instrument Serial Number</th><th>Calibration event date</th><th>Validity of the calibration event</th><th>Calibrated by</th></tr><tr><td rowspan="2">N1-W2-678</td><td>30/05/2018</td><td>29/05/2019</td><td>Aguapur Vapor SpA</td></tr><tr><td>13/05/2019</td><td>12/05/2020</td><td>Aguapur Vapor SpA</td></tr></table> Calibration events valid for the considered monitoring period were performed by using certified span gas cylinders with a known CH_4 composition. Certified span gases utilized for performing the calibration events valid for the considered monitoring period: - Gas cylinders with a calibration mixture of 50.00 cmol/mol of CH_4, 38.00 cmol/mol of CO_2 and 12.00 cmol/mol of N_2 cylinder n° P51020A, certificate number MVP238, supplied by Linde Industrial Gases. - Calibration frequency and/or maintenance requirements: Calibration is to be performed yearly (as established by the internal calibration procedure which is in accordance with calibration frequency recommendation from the equipment manufacturer). No calibration frequency requirements are specified in the monitoring plan of the registered PDD or AM0001 (version 15.0).
Measuring/reading/recording frequency	Continuously measurements are recorded/reported every minute.
Calculation method (if applicable)	Not applicable.
QA/QC procedures	Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of their manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	It is also confirmed/demonstrated that measurement of methane content of collected LFG (monitoring parameter $v_{CH4,t,wb,j}$) was conducted during the whole considered monitoring period by a CH_4 content gas analyser that has been located immediately downstream of the utilized LFG flow meter.

Data/Parameter	**Status of biogas destruction device**
Unit	-
Description	Operational status of biogas destruction devices[18]
Measured/calculated/ default	Continuously measured.
Source of data	Records of operation of each individual engine-generator set of the project's electricity generation infrastructure (CLLC-1 and CLLC-2 electricity generation facilities). The electronic control system for each engine-generator set of the project's electricity generation infrastructure continuously monitor operational status of the set (engine-generator set under operation "on" or not under operation "off"). Records confirming the non-operational status for the 3 installed high temperature enclosed flares are also considered. Continuous monitoring of the signal of the UV flame detectors installed in each one of the flares were continuously monitored during the considered monitoring period. Related monitoring details are included under details for the monitoring parameter "Flame detection of flare in the minute *m*" ($Flame_m$).
Value(s) of monitored parameter	<u>*Engine-generator sets for the CLLC-1 and CLLC-2 electricity generation facilities:*</u> Records for every-minute operational status of each engine-generator set (under operation ("on") = 1 or not under operation ("off") = 0) are made available in the emission reduction calculation spreadsheets that are enclosed to this Monitoring Report. While the operational status for each individual engine-generator set consuming LFG is independently monitored, the monitoring parameter "Status of biogas destruction device" is thus recorded and reported on the basis of the following sub-parameters: *CLLC-1 power plant:* - $Status_{genset-north}$: Operational status of the engine-generator north - $Status_{genset-south}$: Operational status of the engine-generator south *CLLC-2 power plant:* - $Status_{genset-1}$: Operational status of the engine-generator 1 - $Status_{genset-2}$: Operational status of the engine-generator 2 - $Status_{genset-3}$: Operational status of the engine-generator 3 - $Status_{genset-4}$: Operational status of the engine-generator 4 - $Status_{genset-5}$: Operational status of the engine-generator 5 - $Status_{genset-6}$: Operational status of the engine-generator 6 - $Status_{genset-7}$: Operational status of the engine-generator 7 - $Status_{genset-8}$: Operational status of the engine-generator 8 $Status_{genset-9}$: Operational status of the engine-generator 9

[18] As established by the applied methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0), the monitoring parameter "Status of biogas destruction device" is applicable for both the project's high temperature enclosed flares (termed in both the registered PDD and in this Monitoring Report as "*biogas destruction devices*") and for the engine-generator sets of the project's electricity generation infrastructure (termed in both the registered PDD and in this Monitoring Report as "*biogas utilization devices*"). Thus, despite of its name/description, monitoring details for this particular monitoring parameter includes both the terms "*biogas destruction device(s)*" and "*biogas utilization device(s)*" for sake of completeness and transparency and are thus applicable for both types of devices.

	- $Status_{genset-10}$: Operational status of the engine-generator 10 - $Status_{genset-11}$: Operational status of the engine-generator 11 $Status_{genset-12}$: Operational status of the engine-generator 12 - $Status_{genset-13}$: Operational status of the engine-generator 13 - $Status_{genset-14}$: Operational status of the engine-generator 14 - $Status_{genset-15}$: Operational status of the engine-generator 15 - $Status_{genset-16}$: Operational status of the engine-generator 16 *High temperature enclosed flares:* Continuous monitoring of the signal of the UV flame detectors installed in each one of the flares were continuously monitored during the considered monitoring period. Related monitoring details are included under details for the monitoring parameter "Flame detection of flare in the minute *m*" ($Flame_m$). Although none of the installed three high temperature enclosed flares combusted LFG during the considered monitoring period, for sake of completeness and appropriateness of monitoring, the signal from the flame detector in each one of the flares have been continuously monitored despite of the non-operational status of the flares during the considered monitoring period.
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency	Values are recorded/reported every minute.
Calculation method (if applicable)	Not applicable.
QA/QC procedures	Monitoring equipment/instruments are calibrated and/or maintained as per instrument specifications and/or recommendations of manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation of baseline emissions.
Additional comments	-

Data/Parameter	**$EC_{PJ,grid,y}$**
Unit	MWh
Description	Amount of grid electricity consumed by the project activity during the year *y*
Measured/calculated/ default	Continuously measured by a bi-directional electricity meter.
Source of data	Measured as part of the operation of the project activity by applying appropriate electricity meter.
Value(s) of monitored parameter	14.950

<table>
<tr><td>Monitoring equipment</td><td><u>Specifications of the installed/utilized electricity meter:</u>

- Manufacturer: Schneider Electric

- Model: ION 8600 (bi-directional meter)

- Serial Number: PT-1011A447-01

- Class: ±0.2

- Accuracy: ±0.2%

Calibration events valid for the considered monitoring period:

<table>
<tr><th>Serial Number:</th><th>Calibration certificate number:</th><th>Calibration date:</th><th>Validity of the calibration event</th><th>Calibrated by:</th></tr>
<tr><td>PT-1011A447-01</td><td>KDM20181200001</td><td>20/12/2018</td><td>19/12/2020</td><td>CAM Chile S.A.</td></tr>
</table>

Calibration frequency and/or maintenance requirements:
According to the equipment’s supplier, Schneider electric, the electricity meters are to be calibrated every 2 years.</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Accumulated values for continuous measurements of grid-sourced electricity consumption are recorded once a day.</td></tr>
<tr><td>Calculation method
(if applicable)</td><td>Not applicable.</td></tr>
<tr><td>QA/QC procedures</td><td>Amount of imported grid-sourced electricity measured by the installed bi-directional electricity meter was crosschecked with the monthly CDEC SIC report.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity).</td></tr>
<tr><td>Additional comments</td><td>-</td></tr>
</table>

Data/Parameter	**$EC_{BL,y}$**
Unit	MWh
Description	Amount of electricity generated using LFG by the project activity in year *y*
Measured/calculated/ default	Measured as part of the operation of the project activity by applying appropriate bi-directional electricity meter.
Source of data	During the considered monitoring period, collected LFG was used as fuel for electricity generation in the project’s electricity generation infrastructure. Monitoring of $EC_{BL,y}$ was thus performed on the basis of measurements of exported electricity which was generated by both power plants ($EC_{BL,y,CLLC-1+2}$) .
Value(s) of monitored	114,050.399

parameter	
Monitoring equipment	While monitoring for the parameter $EC_{BL,y}$ is performed on the basis of electricity export measurements performed by the same instrument for which measurements of imports of grid-sourced electricity are made as part of monitoring of the parameter "Amount of grid electricity consumed by the project activity during the year y" ($EC_{PJ,grid,y}$), specifications of the installed electricity meter are presented above in the table with details for the monitoring parameter $EC_{PJ,grid,y}$.
Measuring/reading/recording frequency	Continuous measurements performed by installed electricity meter are recorded/reported every hour.
Calculation method (if applicable)	Not applicable.
QA/QC procedures	Amount of electricity exported measured by the installed bi-directional electricity meter was crosschecked with the monthly CDEC SIC report.
Purpose of data/parameter	Calculation of baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project's CLLC-1 and CLLC-2 electricity generation facilities which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the CDEC SIC grid).
Additional comments	-

Data/Parameter	**$Op_{j,h}$**
Unit	-
Description	Operation of the equipment that consumes LFG (engine-generator sets of the CLLC-1 and CLLC-2 electricity generation facilities).
Measured/calculated/ default	For each equipment unit *j* using the LFG monitor that the plant is operating in hour h by the monitoring any one or more of the following three parameters: (a) Temperature. Determine the location for temperature measurements and minimum operational temperature based on manufacturer's specifications of the burning equipment. Document and justify the location and minimum threshold in the registered PDD; (b) Flame. Flame detection system is used to ensure that the equipment is in operation; (c) Products generated. Monitor the generation of steam for the case of boilers and air-heaters and glass for the case of glass melting furnaces. This option is not applicable to brick kilns. $Op_{j,h}$=0 when: (a) One of more temperature measurements are missing or below the minimum threshold in hour h (instantaneous measurements are made at least every minute); (b) Flame is not detected continuously in hour h (instantaneous measurements are made at least every minute); (c) No products are generated in the hour h. Otherwise, $Op_{j,h}$=1
Source of data	The electronic control system for each engine-generator set of the project's electricity generation component continuously monitor operational status of the set (engine-generator set under operation "on" or not under operation "off").

Value(s) of monitored parameter	Records for every-minute operational status of the set (engine-generator set under operation (“on”) = 1 or not under operation (“off”) = 0) are made available in the emission reduction calculation spreadsheets. While the operational status for each individual engine-generator set consuming LFG is independently monitored, the monitoring parameter $Op_{j,h}$ is recorded and reported on the basis of the following sub-parameters: *CLLC-1 power plant:* - $Op_{genset\text{-}north,h,y}$: Operation of the engine-generator north - $Op_{genset\text{-}south,h,y}$: Operation of the engine-generator south *CLLC-2 power plant:* - $Op_{genset\text{-}1,h,y}$: Operation of the engine-generator 1 - $Op_{genset\text{-}2,h,y}$: Operation of the engine-generator 2 - $Op_{genset\text{-}3,h,y}$: Operation of the engine-generator 3 - $Op_{genset\text{-}4,h,y}$: Operation of the engine-generator 4 - $Op_{genset\text{-}5,h,y}$: Operation of the engine-generator 5 - $Op_{genset\text{-}6,h,y}$: Operation of the engine-generator 6 - $Op_{genset\text{-}7,h,y}$: Operation of the engine-generator 7 - $Op_{genset\text{-}8,h,y}$: Operation of the engine-generator 8 - $Op_{genset\text{-}9,h,y}$: Operation of the engine-generator 9 - $Op_{genset\text{-}10,h,y}$: Operation of the engine-generator 10 - $Op_{genset\text{-}11,h,y}$: Operation of the engine-generator 11 - $Op_{genset\text{-}12,h,y}$: Operation of the engine-generator 12 - $Op_{genset\text{-}13,h,y}$: Operation of the engine-generator 13 - $Op_{genset\text{-}14,h,y}$: Operation of the engine-generator 14 - $Op_{genset\text{-}15,h,y}$: Operation of the engine-generator 15 - $Op_{genset\text{-}16,h,y}$: Operation of the engine-generator 16
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency	Values are reported on a minute basis.
Calculation method (if applicable)	Not applicable.
QA/QC procedures	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. in accordance with detailed working instructions that are included in the company’s quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project’s CLLC-1 and CLLC-2 electricity generation facilities which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the CDEC SIC grid).
Additional comments	-

Data/Parameter	**$Flame_m$**
Unit	Flame status "*on*" or flame status "*off*"
Description	Flame detection of flare in the minute *m*
Measured/calculated/ default	Continuously measured by Ultra violet (UV) flame detectors (one UV flame detector for each installed high temperature enclosed flare).
Source of data	For each one of the installed flares, whenever flame is detected in the flare, flame status "*on*" or "1" value is attributed. Whenever no flame is detected in the flare, flame status "*off*" or "0" is attributed.
Value(s) of monitored parameter	Values for each one of the installed 3 high temperature enclosed flares are reported in the emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report). Measurement data is recorded and reported with an every-minute frequency. While measurements are performed by 3 UV flame detectors (one UV flame detector installed in each individual installed flare), the monitoring parameter $Flame_m$ is thus measured, recorded and reported on the basis of the following sub-parameters: - $Flame_{m,flare-1}$: Flame detection in Flare 1 - $Flame_{m,flare-2}$: Flame detection in Flare 2 - $Flame_{m,flare-3}$: Flame detection in Flare 3
Monitoring equipment	Measurements are performed by 3 appropriate ~~ultra violet~~ultraviolet (UV) flame detectors (one for each high temperature enclosed flare) of the same model. The main specifications of the installed flame detectors are as follows: - Manufacturer: Honeywell Analytics Ltd. - Model: C7035A 1031 - Serial Number: No Serial Number is indicated in the instrument
Measuring/reading/recording frequency	Continuously measurements are recorded/reported every minute.
Calculation method (if applicable)	Not applicable
QA/QC procedures	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Although none of the installed three high temperature enclosed flares combusted LFG during the considered monitoring period, for sake of completeness and appropriateness of monitoring, the signal from the flame detector in each one of the flares have been continuously monitored despite of the non-operational status of the flares during the considered monitoring period. The sections of the LFG supply pipeline prior to the flares are equipped with automatic (normally-closed) shut-off valves. During the whole monitoring period, such values were under closed position and the status of such valves have been continuously monitored, with recording of data being

	performed on every-minute basis.

Data/Parameter	$\mathbf{EC_{PJ,captive,y}}$
Unit	MWh
Description	Quantity of electricity generated in captive diesel backup generator during the year *y*
Measured/calculated/ default	Measured as part of the operation of the project activity by applying appropriate electricity meter(s).
Source of data	Measured as part of the operation of the project activity by applying appropriate electricity meters.
Value(s) of monitored parameter	Quantity of electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,1}$): 12.527 MWh Quantity of electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,2}$): 6.183 MWh Quantity of electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,3}$): 0 MWh

Monitoring equipment

Specifications of the electricity meter utilized for measuring electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,1}$):

- Manufacturer: Schneider Electric
- Model: PM820MG
- Serial Number: 26207716
- Class: ±0.5
- Accuracy: ±0.5%

Calibration events valid for the considered monitoring period:

Serial Number:	Calibration certificate number:	Calibration date:	Validity of the calibration event	Calibrated by:
26207716	KDM20190100001	03/01/2019	02/01/2021	CAM Chile S.A

Calibration frequency and/or maintenance requirements: 2 years

Specifications of the electricity meter utilized for measuring electricity generated by the Diesel Backup Generator II ($EC_{PJ,captive,y,2}$):

- Manufacturer: Schneider Electric
- Model: PM820MG
- Serial Number: 26204495
- Class: ±0.5
- Accuracy: ±0.5%

Calibration events valid for the considered monitoring period:

Serial Number:	Calibration certificate number:	Calibration date:	Validity of the calibration event	Calibrated by:
26204495	KDM20190100003	03/01/2019	02/01/2021	CAM Chile S.A

Calibration frequency and/or maintenance requirements: 2 years

Specifications of the electricity meter utilized for measuring electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,3}$):

- Manufacturer: Schneider Electric
- Model: PM820MG
- Serial Number: 26205401
- Class: ±0.5
- Accuracy: ±0.5%

Calibration events valid for the considered monitoring period:

	<table><tr><th>Serial Number:</th><th>Calibration certificate number:</th><th>Calibration date:</th><th>Validity of the calibration event</th><th>Calibrated by:</th></tr><tr><td>26205401</td><td>KDM20181200004</td><td>27/12/2018</td><td>26/12/2020</td><td>CAM Chile S.A</td></tr></table> Calibration frequency and/or maintenance requirements: 2 years
Measuring/reading/recording frequency	Continuous measurements performed by installed electricity meters are recorded/reported every hour.
Calculation method (if applicable)	Not applicable.
QA/QC procedures	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at KDM S.A. in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data/parameter	Calculation of project emissions.
Additional comments	-

The following monitoring parameters (which are also included in the monitoring plan of the registered PDD) were not monitored as the methodological options for which they are applicable were not selected as the monitoring or calculation approaches for the determination of baseline emissions and/or project emissions achieved by the project activity during the considered monitoring period:

- Volumetric flow of LFG stream in time interval t on a dry basis ($V_{t,db,j}$)
- Volumetric fraction of CH_4 in the collected LFG in time interval t on a dry basis ($v_{CH4,t,db,j}$)
- Mass flow of the LFG stream in time interval t on dry basis ($M_{t,db,j}$)
- Temperature of the LFG stream in time interval *t* (T_t)
- Pressure of the LFG stream in time interval *t* (P_t)
- Quantity of fuel Diesel combusted by the captive off-grid electricity generator ($FC_{Diesel,y}$)
- Net calorific value of the fuel Diesel in year *y* ($NCV_{Diesel,y}$)
- CO_2 emission factor of fuel Diesel in year *y* ($EF_{CO2,Diesel,y}$)
- Quantity of electricity generated in captive diesel backup generator during the year *y* ($EG_{Diesel\text{-}Generator,y}$)

The following monitoring parameters (which are also included in the monitoring plan of the registered PDD) were not monitored as no collected LFG was sent for combustion in any of the three installed high temperature enclosed flare during the considered monitoring period:

- Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* ($F_{CH4,EG,t}$)
- Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$)
- Maintenance events completed in year *y* as monitored by the project participants ($Maintenance_y$)
- Quantity of LPG consumed by the project activity in year *y* ($FC_{LPG,y}$)
- Net calorific value of the fuel LPG ($NCV_{LPG,y}$)
- CO_2 emission factor of fuel LPG in year *y* ($EF_{CO2,LPG,y}$)

- Saturation pressure of H_2O at temperature T_t in time interval *t* ($p_{H2O,t,Sat}$)

D.3. Implementation of sampling plan

>>

Not applicable.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>

Baseline emissions (BE_y) are determined (in tCO_2e) as follows:

$$BE_y = BE_{CH4,y} + BE_{EC,y}$$

Where:

$BE_{CH4,y}$ Baseline emissions of methane from the SWDS[19].

$BE_{EC,y}$ Baseline emissions associated with electricity generation in year *y* (in tCO_2e/yr).

Determination of baseline emissions associated with electricity generation ($BE_{EC,y}$)

Baseline emissions associated with electricity generation ($BE_{EC,y}$) is determined as follows:

$$BE_{EC,y} = EC_{BL,y} * EF_{EL,grid,y} * (1 + TDL_{grid,y})$$

Where:

$EC_{BL,y}$ Net amount of electricity generated using LFG in year y (in MWh). Total net electricity generated by the project activity (using collected LFG as gaseous fuel) for the considered monitoring period are reported as 114,050.399 MWh. Related monitoring details for the monitoring parameter $EC_{BL,y}$ are included in Section D.2.

$EF_{EL,grid,y}$ Emission factor for grid sourced electricity in year *y* (in tCO_2/MWh). $EF_{EL,grid,y}$ is determined as the combined margin emission factor ($EF_{grid,CM,y}$) that is calculated as the weighted average of the operating margin and build margin emission factors. To weight these two factors, the default values applicable to both for the 2^{nd} crediting period are applied. The combined margin emission factor is thus obtained as follows:

$$EF_{EL,grid,y} = EF_{grid,CM,y} = w_{OM} * EF_{grid,OM,y} + w_{BM} * EF_{grid,BM,y}$$

Where:

w_{OM} Weighting of operating margin emissions factor. The value for w_{OM} is ex-ante selected as 0.25%. Further details about

[19] SWDS = Solid Waste Disposal Site. For the case of the project activity, the SWDS is the Loma los Colorados landfill.

the ex-ante selected parameter w_{OM} are included in Section D.1 and in the registered PDD.

w_{BM} Weighting of operating margin emissions factor. The value for w_{BM} is ex-ante selected as 0.75%. Further details about the ex-ante selected parameter w_{BM} are included in Section D.1 and in the registered PDD.

$EF_{grid,OM,y}$ Operating margin CO_2 emission factor in year *y*. The value for $EF_{grid,OM,y}$ is ex-ante determined as 0.7479 tCO_2/MWh. Further details about the ex-ante determined parameter $EF_{grid,OM,y}$ are included in Section D.1 and in the registered PDD.

$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year *y*. The value for $EF_{grid,BM,y}$ is ex-ante determined as 0.7046 tCO_2/MWh. Further details about the ex-ante determined parameter $EF_{grid,BM,y}$ are included in Section D.1 and in the registered PDD.

For the considered monitoring period, $EF_{EL,grid,y}$ is thus calculated as 0.7154 tCO_2/MWh.

$TDL_{grid,y}$ Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity. For the particular case of determination of $BE_{EC,y}$, $TDL_{,grid,y}$ is ex-ante determined as being 3% ($TDL_{grid,export,y}$).

Baseline emissions associated with electricity generation in year *y* ($BE_{EC,y}$) for the considered monitoring period are calculated and reported as 84,039 tCO_2e. All related calculation are presented in emission reduction calculation spreadsheets that are enclosed to this Monitoring Report.

Determination of baseline emissions of methane from the SWDS ($BE_{CH4,y}$):

Baseline emissions of methane from the SWDS ($BE_{CH4,y}$) are determined as follows:

$BE_{CH4,y}$ Baseline emissions of methane from the SWDS. As established by both ACM0001 (version 15.0) and the registered PDD, the determination of $BE_{CH4,y}$ is based on the amount of methane that is actually captured and combusted (through destruction of collected LFG in the flares and/or through utilization of collected LFG as gaseous fuel for electricity generation by the project activity. As also established by both ACM0001 (version 15.0) and the registered PDD, the amount of methane that, in the absence of the project activity (baseline scenario), would be otherwise captured and destroyed in the landfill (by the pre-project previously existent conventional LFG destruction system) is also taken into account. In addition, the effect of methane oxidation (that, as per ACM0001 (version 15.0) is assumed as existing in the baseline and not in the project scenario) is also taken into account. $BE_{CH4,y}$ is thus determined as follows:

$$BE_{CH4,y} = ((1 – OX_{top\_layer}) * F_{CH4,PJ,y} – F_{CH4,BL,y}) * GWP_{CH4}$$

Where:

OX_{top_layer} Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline scenario. The value for OX_{top_layer} is ex-ante determined as 10%. Further details about the selection of the value for OX_{top_layer} is included in Section D.1 and in the registered PDD.

$GWP_{CH4,y}$ Global warming potential of CH_4. The value for GWP_{CH4} is ex-ante determined as 25. Further details about the selection of the value for GWP_{CH4} is included in Section D.1 and in the registered PDD.

$F_{CH4,BL,y}$ Amount of methane in the LFG that would be flared in the baseline scenario (absence of project activity). As outlined in Section B.6.1 of the registered PDD, $F_{CH4,BL,y}$ is calculated as follows:

$$F_{CH4,BL,y} = F_{CH4,hist,y} = F_{CH4,BL,x-1} / F_{CH4,x-1} * F_{CH4,PJ,y}$$

Where:

$F_{CH4,hist,y}$ Historical amount of methane in the LFG which is captured and destroyed (in t CH_4/yr).

$F_{CH4,BL,x-1}$ Historical amount of methane in the LFG which is captured and destroyed in the year prior to the implementation of the project activity. The value for $F_{CH4,BL,x-1}$ is ex-ante selected as 516.16 tCH_4/yr. Further details about the selection of the value for $F_{CH4,BL,x-1}$ is included in Section D.1 and in the registered PDD.

$F_{CH,x-1}$ Amount of methane in the LFG generated in the SWDS in the year prior to the implementation of the project activity. The value for $F_{CH4,BL,x-1}$ is ex-ante determined as 41,292.46 t CH_4/yr (year 2006). Further details about the selection of the value for $F_{CH4,BL,x-1} = F_{CH4,BL,2006}$ is included in the emission reduction calculation that is enclosed to the registered PDD.

$F_{CH4,PJ,capt,y}$ Amount of methane collected by the project activity. In the particular case of the project activity and for the considered monitoring period, $F_{CH4,PJ,capt,y}$ is determined as follows:

$$F_{CH4,PJ,capt,y} = F_{CH4,sent,flare,y} + F_{CH4,EL,y}$$

Where:

$F_{CH4,EL,y}$ Amount of methane in the LFG which is used for electricity generation in year y (in tCH_4/yr). Details for the determination of every-minute values for $F_{CH4,EL,y}$ are presented below (under "*Determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$*").

$F_{CH4,sent\_flare,y}$ Amount of methane in the LFG which is sent to the flare. While no collected LFG was sent to the flares during the

considered monitoring period, $F_{CH4,sent\_flare,y}$ is thus considered as null.

For the considered monitoring period, the accumulated value for $F_{CH4,BL,y}$ is calculated and reported as 302 tCH_4. All related calculation are presented in the emission reduction calculation spreadsheets that are enclosed to the Monitoring Report.

$F_{CH4,PJ,y}$ Amount of methane in the LFG which is flared and/or used in the project activity. In the particular case of the project activity, $F_{CH4,PJ,y}$ is determined as follows:

$$F_{CH4,PJ,y} = F_{CH4,flared,y} + F_{CH4,EL,y}$$

Where:

$F_{CH4,EL,y}$ Amount of methane in the LFG which is used for electricity generation in year *y* (in tCH_4/yr). Details for the determination of every-minute values for $F_{CH4,EL,y}$ are presented below (under "*Determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$"*).

$F_{CH4,flared,y}$ Amount of methane in the LFG flared by the project activity (in tCH_4) during the whole monitoring period. While no collected LFG was sent to the flares during the considered monitoring period, $F_{CH4,flared,y}$ is thus considered as null.

Determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$:
For the considered monitoring period, Option C of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (where the gaseous stream the tool shall be applied to is the stream of collected LFG that is sent to the electricity generation infrastructure)[20] is the selected option for determination of values $F_{CH4,EL,y}$.

By following calculation option C (that is one of the applicable calculation methods the registered PDD refers to), the mass flow of greenhouse gas i ($F_{i,t}$) (i = CH_4) sent to the project's electricity generation infrastructure is determined as follows:

$$F_{CH4,EL,y} = V_{t,wb,n} * v_{CH4,t,wb} * \rho_{CH4,n}$$

Where:

$V_{t,wb,n}$ Volumetric flow of the gaseous stream (LFG) sent to the electricity generation infrastructure in time interval *t* on a wet basis at normal conditions. While in the particular case of the project activity, during the considered monitoring period,

[20] It is relevant to note that the registered PDD states the following regarding the calculation approach for values of $F_{CH4,EL,y}$: "Applicable guidance of the Methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) will be applied to determine $F_{CH4,EL,y}$ by using Option 2: *Simplified calculation without measurement of the moisture content*, and one of the options A, C or D. The selection of the determination option will depend on project conditions and equipment to be installed. Furthermore, monitoring approach as per Item *2.* "*Use of a single flow meter for multi-use of recovered biogas"* from "*Appendix. - Additional data handling and monitoring guidance for determining the mass flow of methane in biogas*" of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) is also applied.

volumetric flow of the gaseous stream (LFG) is already measured in Nm³ wet gas/h (normal conditions), the following assumption is valid:

$V_{t,wb,n}$ is equivalent to $V_{t,wb}$

Where:

$V_{t,wb}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a wet basis.

$v_{CH4,t,wb}$ Volumetric fraction of CH_4 in the gaseous stream in time interval *t* on a wet basis. Further monitoring details about the monitoring parameter $v_{CH4,t,wb}$ are included above and in Section D.2.

$\rho_{CH4,n}$ Density of CH_4 in the gaseous stream (LFG) at normal conditions. For the considered monitoring period, value of $\rho_{CH4,n}$ (in kg of CH_4 / m^3 of CH_4) is calculated and reported in the emission reduction calculation spreadsheets valid for the considered monitoring period (and enclosed to this Monitoring Report) as follows:

$\rho_{CH4,n} = (P_n * MM_i) / (R_u * T_n)$

Where:

P_n Absolute pressure at normal conditions. P_n is ex-ante determined as 101,325 Pa. Further details about the ex-ante determined parameter P_n are included in Section D.1 and in the registered PDD.

T_n Temperature at normal conditions. T_n is ex-ante determined as 273.15 Kelvin. Further details about the ex-ante determined parameter T_n are included in Section D.1 and in the registered PDD.

MM_i Molecular mass of greenhouse gas *i* (*i* = CH_4). MM_i (*i* = CH_4) is ex-ante determined as 16.04 kg/mol. Further details about the ex-ante determined parameter MM_i (*i* = CH_4) are presented in Section D.1 and in the registered PDD.

R_u Universal ideal gases constant. R_u is ex-ante determined as 8,314 $Pa.m^3$ /kmol.K. Further details about the ex-ante determined parameter R_u are presented in Section D.1 and in the registered PDD.

$\rho_{CH4,n}$ is calculated as 0.7156650 $kgCH_4$ / m^3CH_4 as reported in the emission reduction calculation spreadsheets valid for the considered monitoring period.

During the entire monitoring period, measurements of collected LFG supplied to a set of available/operational biogas destruction/utilization devices (i.e. engine-generator sets) were performed by a single LFG flow meters (under conformance with the alternative and simplified monitoring approach termed in Section B.7.3 of the latest version of the registered PDD as *"Use of a single flow meter for multi-use of recovered biogas*").
Applicable additional monitoring requirements valid/applicable specifically for the use of a single or reduced number of LFG flow meters as established in the registered PDD were considered in the context of the determination of $F_{CH4,EL,y}$ as follows:

(i) It is ensured/demonstrated that within each section of the project's LFG supply pipeline that directs LFG towards each operational individual flare, there is an individual safety valve installed/located within such pipeline section and prior to the underlying biogas destruction device that automatically closes whenever the underlying biogas utilization device becomes under non-operational status. In the particular case of the considered monitoring period, such valves were kept closed during the whole period. Moreover, the status of such valves ("*Open*" or "*Closed*") were monitored during the whole period. Furthermore, for each individual flare, the status of the flare's flame (Flame status "*on*" or flame status "*off*") was also confirmed to always corresponding to flame status "*off*"" (on the basis of continuous monitoring of the parameter "Flame detection of flare in the minute *m*" ($Flame_m$) by the use of UV flame detectors).

(ii) It is ensured/demonstrated that the biogas utilization devices for which sent of collected LFG was measured by the single LFG flow meters (i.e. engine-generator sets) are all designed in such a manner that it is physically impossible for LFG passing through and being directly emitted into the atmosphere while the underlying engine-generator sets are under non-operational status. It is thus ensured/demonstrated that during the whole considered monitoring period, no collected LFG was able to be eventually directly emitted into (vented through) the atmosphere through a non-operational engine-generator set.

For the considered monitoring period, such confirmations/demonstrations were done through the following approaches:

- Records of electricity generated by the engine generator sets and records from the status of the both the flare(s) (by means of a flame detector(s) and the valves located prior to the flares within the project's LFG pipeline). In the particular case of the engine-generator sets, it is demonstrated that electricity generation (as the output from operation of such devices) corresponds to the flow of LFG actually consumed by the devices (in energy basis).

- For any time instants minute *m* where one or more biogas destruction/utilization devices connected downstream to the utilized single LFG flow meter (i.e. engine-generator set(s) and/or flare(s)) were under non-operational status, it is demonstrated that the set of remaining devices under operational status (i.e. engine-generator sets utilizing LFG as fuel for electricity generation in the particular case of the considered monitoring period) have the quantitative capacity to combust the amount of LFG flow that was sent to the underlying devices during the underlying minute *m.*

- Finally, it is also confirmed/demonstrated that measurement of methane content of collected LFG (monitoring parameter $v_{CH4,t,wb}$) was conducted during the whole considered monitoring period by a CH_4 content gas analyser that has been located immediately downstream of the utilized LFG flow meter.

For the considered monitoring period, the accumulated value for $F_{CH4,PJ,y}$ = $F_{CH4,EL,y}$ is calculated as 24,019 tCH_4.

For the considered monitoring period, baseline emissions of methane from the SWDS ($BE_{CH4,y}$) are calculated as 532,878 tCO_2e.

The summarized emission reduction calculation spreadsheet (that is enclosed to this Monitoring Report) summarizes the determination of $BE_y = BE_{CH4,y} + BE_{EC,y}$ for the considered monitoring period.

E.2. Calculation of project emissions or actual net removals

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As outlined in the registered PDD, the operation of the project activity still requires consumption of grid-sourced electricity and electricity sourced by the installed backup off-grid electricity generator fuelled by Diesel. As also established in the registered PDD, project emissions due to consumption of these energy carriers are determined by following the applicable guidance of the “Tool to calculated baseline, project and/or leakage emissions from electricity consumption“ and “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion”.

Project emissions (PE_y) for the considered monitoring period are determined (in tCO_2e) as follows:

$$PE_y = PE_{EC,grid,y} + PE_{EC,captive,y}$$

Where:

$PE_{EC,grid,y}$ Project emissions due to the consumption of grid electricity due to the project activity in year *y* (in tCO_2/year)

$PE_{EC,captive,y}$ Project emissions from consumption of electricity generated by a captive off-grid electricity generator fuelled by fossil fuel (diesel) in year *y* (in tCO_2/yr)

Project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$):

Project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$) are calculated as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01) as follows:

$$PE_{EC,grid,y} = EC_{PJ,grid,y} * EF_{EL,grid,y} * (1 + TDL_{grid,y})$$

Where:

$TDL_{grid,y}$ Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity. For the particular case of determination of $PE_{EC,grid,y}$, $TDL_{grid,y}$ is ex-ante selected as 20% ($TDL_{grid,import,y}$). Further details about the ex-ante determined parameter $TDL_{grid,y}$ are included in Section D.1 and in the registered PDD.

$EC_{PJ,grid,y}$ Quantity of grid sourced electricity consumed by the project activity in year *y* (in MWh). Total accumulated amount of grid-sourced electricity consumption during the considered monitoring period is reported as 14.950 MWh.

Additional monitoring details about the monitoring parameter $EC_{PJ,grid,y}$ are included in Section D.2.

$EF_{EL,grid,y}$ Emission factor for grid sourced electricity in year *y* (in tCO_2/MWh). $EF_{EL,grid,y}$ is determined as the combined margin emission factor ($EF_{grid,CM,y}$) that is calculated as

the weighted average of the operating margin and build margin emission factors. To weight these two factors, the default values applicable to both for the 2nd crediting period are applied. The combined margin emission factor is thus obtained as follows:

$$EF_{grid,CM,y} = w_{OM} * EF_{grid,OM,y} + w_{BM} * EF_{grid,BM,y}$$

Where:

w_{OM} Weighting of operating margin emissions factor. The value of w_{OM} is ex-ante selected as 0.25%. Further details about the ex-ante selected parameter w_{OM} are included in Section D.1 and in the registered PDD.

w_{BM} Weighting of operating margin emissions factor. The value of w_{BM} is ex-ante selected as 0.75%. Further details about the ex-ante selected parameter w_{BM} are included in Section D.1 and in the registered PDD.

$EF_{grid,OM,y}$ Operating margin CO_2 emission factor in year *y*. The value of $EF_{grid,OM,y}$ is ex-ante selected as 0.7479 tCO_2/MWh. Further details about the ex-ante selected parameter $EF_{grid,OM,y}$ are included in Section D.1 and in the registered PDD.

$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year *y*. The value of $EF_{grid,OM,y}$ is ex-ante selected as 0.7046 tCO_2/MWh. Further details about the ex-ante selected parameter $EF_{grid,BM,y}$ are included in Section D.1 and in the registered PDD.

For the considered monitoring period, project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$) are calculated as follows:

$PE_{EC,grid,y}$ = 14.950 MWh * (0.25 * 0.7479 tCO_2/MWh + 0.75 * 0.7046 tCO_2/MWh) * (1 + 0.2) = 13 tCO_2 (rounded value)

The summarized emission reduction calculation spreadsheet (that is enclosed to this Monitoring Report) includes all calculations related to the determination of $PE_{EC,grid,y}$ for the considered monitoring period.

Project emissions from consumption of electricity generated by the captive off-grid electricity generators fuelled by fossil fuel (diesel) in year y (in tCO_2/yr):

Project emissions from the consumption of electricity generated by the installed three diesel backup generators during the considered monitoring period are calculated as follows:

$$PE_{EC,captive,y,n} = EC_{captive,y,n} * EF_{EL,captive,y} * (1 + TDL_{captive,y})$$

Where:

n Diesel Backup Generator number (for the considered monitoring period, *n* = 1, 2 and 3)

$EC_{PJ,captive,y,n}$ Amount of electricity sourced by the captive electricity generator (fuelled by Diesel) in question and consumed by the project activity. For the considered monitoring period, total accumulated amount of electricity sourced by the captive backup diesel

generators 1, 2 and 3 are reported as 12.527 MWh ($EC_{PJ,captive,y,1}$), 6.183 ($EC_{PJ,captive,y,2}$) and 0 MWh ($EC_{PJ,captive,y,3}$) respectively.

$EF_{EL,captive,y}$ CO_2 emission factor for electricity sourced by the captive off-grid electricity generators (tCO_2/MWh). By following Option B2 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", the value for $EF_{EL,captive,y}$ is ex-ante determined as 1.3 tCO_2/MWh. Further details about the ex-ante selected parameter $EF_{EL,captive,y}$ are included in Section D.1 and in the registered PDD.

$TDL_{captive,y}$ Average technical transmission and distribution losses for electricity sourced by the captive electricity generator. In accordance with the applicable provisions of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", as a simplification, the value of $TDL_{captive,y}$ is ex-ante determined as zero (fixed value along the whole crediting period). Further details about the ex-ante selected parameter $TDL_{captive,y}$ are included in Section D.1 and in the registered PDD.

Thus, project emissions due to consumption of electricity generated by the installed backup captive off-grid electricity generators (fuelled by diesel) (Diesel Backup Generator I and Diesel Backup Generator III) during the considered monitoring period are calculated as follows:

$PE_{EC,captive,y,1} = 12.527 * 1.3 * (1 + 0) = 17\ tCO_2$ (rounded value)

$PE_{EC,captive,y,1} = 6.183 * 1.3 * (1 + 0) = 9\ tCO_2$ (rounded value)

$PE_{EC,captive,y,3} = 0 * 1.3 * (1 + 0) = 0\ tCO_2$ (rounded value)

Thus, project emissions due to the consumption of electricity sourced by the backup captive off-grid electricity generators (fuelled by diesel) are calculated as:

$PE_{EC,captive,y} = PE_{EC,captive,y,1} + PE_{EC,captive,y,2} + PE_{EC,captive,y,3} = 17 + 9 + 0 = 26\ tCO_2$

Total project emissions (PE_y) for the considered monitoring period are calculated as 39 tCO_2 (rounded value).

E.3. Calculation of leakage emissions

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Not applicable.

E.4. Calculation of emission reductions or net anthropogenic removals

Emission reductions achieved by the project activity during the considered monitoring period are determined as the difference between baseline emissions (BE_y) and project emissions (PE_y) determined for such period. Calculations of baseline emissions (BE_y) are presented in Section E.1. Calculations of project emissions (PE_y) are presented in Section E.2. As summarized in the table below, during the monitoring period from 01/05/2019 to 31/03/2020, achieved emission reductions are calculated and reported as follows:

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	616,917	39	-	-	616,878	616,878

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
616,878	1,296,142

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

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The 1,296,142 tCO_2e value is calculated as the sum of the share of the estimated total emission reductions for the fraction of the considered monitoring period within year 2019 (emission reductions to be achieved during the 245-day length period from 01/05/2019 to 31/12/2019 (calculated as 1,397,300 tCO_2e * 245 / 365 = 937,914)) + the share of the estimated total emission reductions for the fraction of the considered monitoring period within year 2020 (emission reductions to be achieved during the 91-day length period from 01/01/2020 to 31/03/2020 (calculated as 1,436,849 tCO_2e * 91 / 365 = 358,228))

E.6. Remarks on increase in achieved emission reductions

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Emission reductions achieved by the project activity during the considered monitoring period are about ~52% lower than calculated value of ex-ante estimation of emission reductions as per the registered version of the registered PDD that valid for the considered monitoring period from 01/05/2019 to 31/03/2020. The following aspects justify and explain the relative difference between such calculated value for ex-ante estimation of emission reductions as per the registered PDD (calculated as applicable for the considered monitoring period) and emission reductions actually achieved by the project activity during the underlying monitoring period:

Aspects/conditions which represent a decrease factor of reported emission reductions for the considered monitoring period when compared against the *ex-ante* estimation of emission reduction for the same period in the registered PDD:

1) *Uncertainties associated with the application of First Order Decay (FOD) multi-phased model for estimating the emission reductions in the registered PDD:*
   As outlined in the registered PDD, like other similar CDM project activities encompassing LFG collection and destruction/utilization, the amount of methane to be generated by decomposition of MSW disposed at the Loma los Colorados landfill and collected by the project activity was previously derived by applying the First Order Decay (FOD) model as per the methodological tool "Emission from Solid Waste Disposal Sites" (version 06.0.1) (in the context of the previously performed determination of ex-ante estimated emission reductions to be achieved during the 2nd 7-year renewable crediting period).
   By taking in account all potential uncertainties associated with the application of such multi-phased decay model vis-à-vis the operational conditions of the project activity, it is reasonable to assume that, in the particular case of the project activity and its operation during the considered monitoring period, the application of this model somehow

overestimated the amount of LFG to be actually generated, collected and destroyed/utilized by the project activity.

In this particular context, it is crucial to note that, while the registered PDD assumes a LFG collection efficiency of 92.80% (ex-ante determined parameter "Efficiency of the LFG capture system that will be installed in the project activity" (η_{PJ})) in the context of the ex-ante estimates of emission reductions to be achieved by the project activity along its 2nd 7-year crediting period, during the considered monitoring period the project activity had limited performance in terms of LFG collection (as outlined in Box 1), thus negatively affecting the overall collection efficiency for LFG generated in the site as part of the operation of the project activity during the considered period.

Lower collection of LFG as part of the project activity represented along the considered monitoring period no destruction of LFG through flaring and reduced utilization of collected LFG as gaseous fuel for electricity generation (when compared to ex-ante estimates of emission reductions outlined in the registered PDD).

All these particular aspects represent negative impacts over emission reductions achieved during the period (when compared to estimates in the registered PDD).

2) *Reduced performance of the project's LFG collection infrastructure and postponing of performance of required improvement of related existing infrastructure (with no collected LFG being sent to the project's flares for destruction):*

   As further explained in Box 1 in Section B.1, operational difficulties/challenges in the project's LFG collection infrastructure have been faced in the latest years by KDM S.A. Performance of incremental and required investment on improvement of LFG collection infrastructure at the Loma Los Colorados landfill (e.g. increase of the number and/or quality of LFG collection wells, including related repair/overhauling work) in order to allow excess of LFG to be combusted in the flares were postponed. While such investment would represent incremental capital expenditures (CAPEX) for which return of investment are very difficult to occur under the unfavourable market conditions for the commercialization of Certified Emission Reductions (CERs) within the latest years (low prices and low liquidity for CERs), postponing of the incurrence of such CAPEX negatively affected the overall performance of the project activity in terms of collection of LFG.

   Furthermore, a range of not previously expected day-to-day challenges in the operation of the project's LFG collection infrastructure (i.e. LFG collection wells and LFG pipeline network) have also limited previously expected increase in the amount of LFG collected as part of the project activity (as per ex-ante estimates of emission reductions in the registered PDD). Under such circumstances of relative limitation in the amount of collected LFG, none of the project's high temperature enclosed flare operated during the considered monitoring period. This situation represents a decrease factor of reported emission reductions for the considered monitoring period when compared against the *ex-ante* estimation of emission reduction for the same period in the registered PDD.

E.7. Remarks on scale of small-scale project activity

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Not applicable.

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Document information

Version	Date	Description
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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