Monitoring report form for CDM project activity
(Version 07.0)

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

MONITORING REPORT		
Title of the project activity	Kayseri Molu Landfill Gas to Electricity Project, Turkey	
UNFCCC reference number of the project activity	GS1061	
Version number of the PDD applicable to this monitoring report	8	
Version number of this monitoring report	12	
Completion date of this monitoring report	27/12/2021	
Monitoring period number	Period 2	
Duration of this monitoring period	01/04/2014 – 31/12/2016	
Monitoring report number for this monitoring period		
Project participants	Her Enerji ve Çevre Teknolojileri Sanayi Ticaret A.Ş.	
Host Party	Turkey (Host Country)	
Applied methodologies and standardized baselines	ACM0001 Version 13	
Sectoral scopes	13 (Waste Handling and Disposal)	
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
	-	493,769 tCO2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	172,746 tCO2e (01/04/2014- 31/12/2016)	

SECTION A. Description of project activity

A.1. General description of project activity

Her Enerji ve Çevre Teknolojileri Sanayi Ticaret A.Ş. (Her Enerji) invested into a biogas power plant to generate electricity and feed it into the Turkish grid. The biogas power project was built close to Molu village of Koca Sinan district in the province of Kayseri in Turkey. The project aims at avoiding greenhouse gas (GHG) emissions from existing landfill area by collecting biogas to generate electricity. Thus, in addition to the direct avoidance of GHG emissions, further indirect emission reductions are achieved through the CO2-neutral replacement of fossil fuels used for power generation.

The Gold Standard organization sets a framework – following the schemes defined by the Kyoto-Protocol for the international trading of emission reductions – for the generation and trading of certificates attesting emission reductions achieved by a project. The Gold Standard VER approach is applicable in countries that are not subject to a GHG emission target defined in the Kyoto-Protocol. Construction work for project started at the end of June 2011. The activity includes installation of landfill gas extraction system, an enclosed flare as well as three biogas driven gensets for electricity production with capacity of 1560 kWe, 1305 kWe and 1357 kWe each. The total licenced installed capacity of the project is 4.222 MWe. The entire net electricity production during this Monitoring Period is 100,551 MWh. The electricity produced by project activity results in a total emission reduction of 493,769 tonnes of CO2e during this Monitoring Period. The extraction system shall include a network of vertical gas extraction wells, de-watering units and gas transport pipelines connected to a main collector system. The gas will be driven to gas engine and the flare via an aspiration system.

The landfill gas to electricity project consists of:
1- Pipelines that collect landfill gas from landfill with help of Booster.
2- Booster system that pull LFG
3- Blower that blow the LFG to the gas Engines
4- Gas engines that burn the LFG to produce electricity
5- Enclosed flare system that burns the extra gas that is not burnt in the Engines.

The working principles of the landfill gas are as follow. The LFG which is caused by organic content of the landfill collected by pipelines connected to the booster system. The gas which is collected by booster also blew to the engine to be burnt down. If there is failure of the engines the collected gas directed to the flare system. In the system there is no need for auxiliary fuels for the start-up of the engines, because there is no need. The LFG can be burnt directly.

A.2. Location of project activity

The project is situated within the borders of Kayseri city, Koca Sinan district. Kayseri landfill area is located 4 km from the nearest residential area, Molu Village. The landfill area serves approximately 912,000 people. Project coordinates are given below;

	Coordinates
Latitude	38^{o} 47' 40.2" N
Longitude	35^{o} 18' 18.6" E

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A (host Party) Turkey	Private entity: Her Enerji ve Çevre Teknolojileri Sanayi Ticaret A.Ş.	No

A.4. References to applied methodologies and standardized baselines

ACM0001 Version 13: 'Flaring or use of landfill gas[1]

[1] See, http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

Used tools:
Methodological tool: “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 05.0.0)
Methodological tool: “Emissions from solid waste disposal sites” (version 6.0.0)
Methodological tool: “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” version (01)
Methodological tool “Project emission from flaring” Version 02.0.0;
Methodological tool: “Tool to calculate the emission factor for an electricity system” (version 02.2.1)
Methodological tool: “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0.0)
Methodological tool. “Tool to calculate project or leakage CO emissions from fossil fuel combustion” (Version 02)

A.5. Crediting period type and duration

The proposed project activity adopts a fixed crediting period, i.e. 10 years (01/12/2011-30/11/2021).

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project installation is completed according to the description in the PDD and completely operational. The project consists of only one site. The activity includes installation of landfill gas extraction system, an enclosed flare as well as three biogas driven gensets for electricity production with capacity of 1,560 kWe, 1,305 kWe and 1,357 kWe each. The total licenced installed capacity of the project is 4.222 MWe. The extraction system include a network of vertical gas extraction wells, de-watering units and gas transport pipelines connected to a main collector system. The gas is driven to gas engine and the flare via an aspiration system. The Molu Landfill Project reduces methane gas generated at the Molu landfill by combusting the collected gas in an engine to generate electricity.

By the implementation of the project, a gas extraction and control system was implemented. The control activities include periodic adjustment of the gas wells by means of measuring equipment - gas flow, methane content and oxygen content are very important parameters (landfill gas may form an explosive mixture when it combines with air in certain proportions; methane is explosive between its LEL of 5% by volume and its UEL4 of 15% by volume).

The gas extraction plant is equipped with aspirators that create a suction vacuum in the system necessary for LFG extraction (aspiration system). Landfill gas is used for electricity generation and excess gas will be flared in a high temperature flare (800-1200°C, retention time 0.3 s). An emergency genset is available for start-up of the biogas engine. The produced energy is fed into the national grid. There is also an emergency diesel genset in the plant which was only used during construction period. The Standby power of the diesel generator is 101 kVA, / Continuous power 82 kVA.
As opposed to First Monitoring Period, during this Monitoring Period two boosters were employed. In the first 10 months of 2014, only Booster-1 was in operation. Since the 10th month of 2014, Booster-2 has been activated also and both boosters have worked together until the end of 2016. Booster 1 has been deactivated from time to time depending on the gas potential in the field. However, Booster -2 worked continuously during this period. During this Monitoring Period there has been no failures about the engines or flare.

The most important milestones are included in the following table:

Table 1 : Milestones

Date (DD/MM/YYYY)	Activity
27/09/2010	Contract with the Municipality
04/03/2011	Date of Board Decision on Carbon income

08/02/2011	First Proposal Request from VER Consultants
29/04/2011	Turnkey agreement with İltekno which is date of decision making
05/05/2011	Signature with FutureCamp Turkey for VER Development
01/07/2011	Starting Construction Activities with Roads and Site Preparation
01/08/2011	Issuance of the License
14/10/2011	The date of contract with the DOE
24/10/2011	Operation date for first gas engine
21/11/2011	Date of Submission of Initial PDD to DOE
19/07/2012	Operation date for second gas engine
05/07/2013	Operation date for third gas engine
31/03/2014	End date of the first monitoring period
31/12/2016	End date of the second monitoring period

Moreover, the Project is in commercial operation in line with the description in the registered PDD. There are no significant overhaul times, downtimes of equipment, exchange of equipment that could have an impact on the applicability of the UNFCCC tools and methodologies that have been Used.

B.2. Post-registration changes

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

There is no revision in the monitoring plan of the project.

B.2.2. Corrections

In the registered PDD it is explained that “the extraction system shall include a network of vertical gas extraction wells, de-watering units and gas transport pipelines connected to a main collector system. The gas will be driven to gas engine and the flare via an aspiration system”. The term of aspiration system is used instead of booster system mistakenly. This is corrected in section A.1 of MR.

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

The proposed Kayseri Molu Landfill gas to electricity project started to operate one month before its planned date that is why the start date of crediting period has been changed from 01/01/2012 to 01/12/2011 as mentioned in the PDD.

B.2.4. Inclusion of monitoring plan

None

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

The invoices for purchase of diesel cannot be reached, that is why the consumption amount of diesel is used for calculation of emission from diesel consumption.

B.2.6. Changes to project design

There is no change in the project design. As opposed to first Monitoring Period extra flow meters have been employed for Booster 2. Till October 2014, only Booster 1 was in operation. Booster 1 has three flow meters that measures the LFG that goes to flare (with the serial number ABF1701F), to engines (with the serial number of ABF1699F), and also the total flow (with the serial number ABF0859F). After October 2014, Booster 2 has also been added to the system that has one flow

meter to measure total LFG flow that goes to the engines (with the serial number of AEJ2006F). These deviations do not compromise the applicability of the methodologies and tools that are used for registration.

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

N/A.

SECTION C. Description of monitoring system

The monitoring methodology is based on direct measurement of the amount of landfill gas captured and destroyed at the flare platform(s) and the electricity generating unit(s) to determine the quantities as shown in Figure 1. The monitoring plan provides for continuous measurement of the quantity and quality of LFG flared. The main variables that need to be determined are the quantity of Volumetric flow of the gaseous stream in the hour h on a wet basis ($V_{t,wb}$) and the quantity of methane used to generate electricity ($LFG_{electricity,y}$). The methodology also measures the energy generated by use of LFG ($EC_{BL,y,}$).

From the monitoring methodology, it could be seen that there are the following main variables to be measured:

Table 2: Summary of Monitoring Plan

#	Parameter	Description
1	$V_{t,wb}$	Volumetric flow of the gaseous stream in the hour *h* on a wet basis (Nm^3)
2	$F_{CH4,sent\ flare,y}$	Amount of methane in LFG which is sent to the flare in year y
3	$F_{CH4,EL,y}$	Amount of methane in LFG which is sent to the genset for electricity generation in year y
4	$V_{CH4,\ t,wb}$	Volumetric flow of CH4 in time interval on a wet basis (Nm^3)
5	T	Temperature of the landfill gas
6	P	Pressure of the gaseous stream in the hour *h*
7	w_{CH4}	Methane fraction in the landfill gas
8	$EC_{BL,y}$	Net electricity delivered to the grid

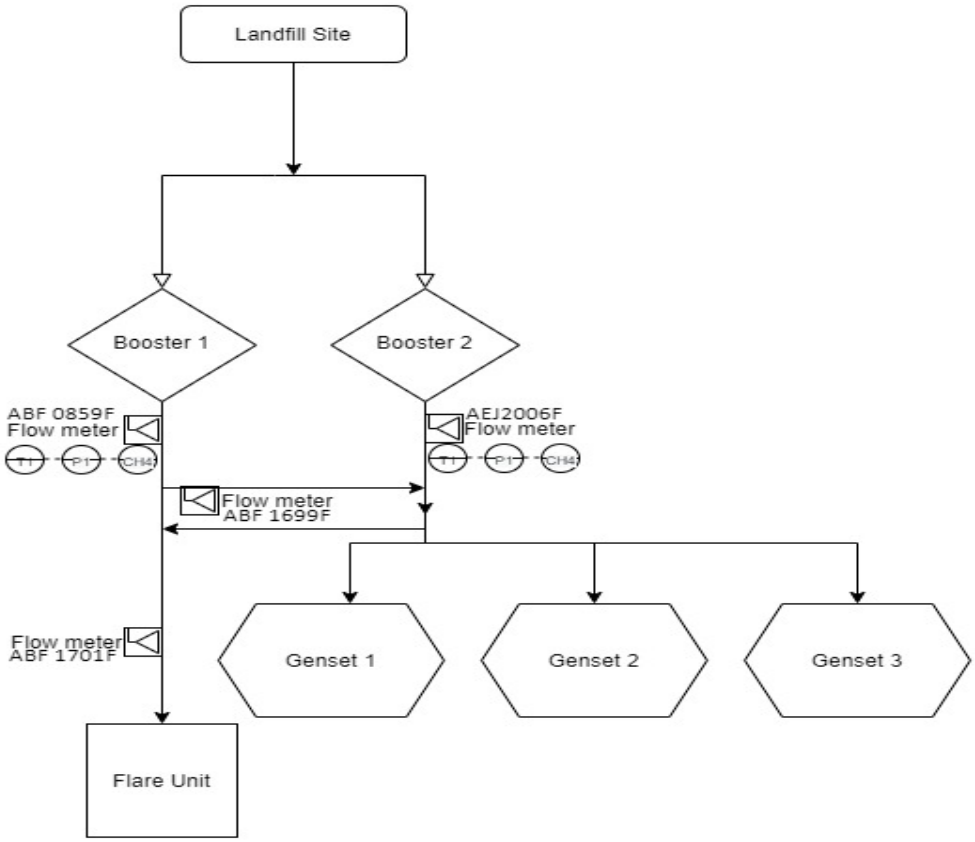

Figure 1: Monitoring Schema

Till October 2014, only Booster 1 was in operation. Booster 1 has three flow meters that measures the LFG that goes to flare (with the serial number ABF1701F), to engines (with the serial number of ABF1699F), and also the total flow (with the serial number ABF0859F). After October 2014, Booster 2 has also been added to the system that has one flow meter to measure total LFG flow that goes to the engines (with the serial number of AEJ2006F).

Other than the fixed gas flow and pressure measurement equipment present in boosters, portable flow meters, pressure meters, and gas analysers were employed to ensure a more reliable monitoring of the process. Whenever there seems to be a problem in one of the fixed measurement equipment, portable devices are employed to measure the relevant parameter.

Mass flow of methane in the residual gaseous is determined by calculation. Amount of landfill gas combusted in generators is determined by calculations. Methane fraction in the total gas is depicted by Gas Analyser (with a serial number 80024000-2428). Project Emissions from flaring are calculated. Temperature in the exhaust gas of the enclosed flare is depicted by Thermocouple.

Table 3: The Table of measurement devices is provided below:

FIXED GAS FLOW AND PRESSURE MEASUREMENT EQUIPMENT IN BOOSTER						
	MODEL	**MANUFACTURER**	**SERIAL NO.**	**ACCURACY**	**CALIBRATION FREQUENCY**	**DATE of CALIBRATION**
Thermocouple	K TYPE	Isocontrolli	2012OF000652	Not Declared	1-2 years	01/08/2011
Gas Analyser 1	SSM-6000-LT (2011)	PRONOVA	80024000-1598	2%-3% OF FULL SCALE (DEPENDING OF GAS	10 years	01/08/2011

				CALIBRATION QUALITY)		
Gas Analyser 2	SSM-6000-LT (2014)	PRONOVA	80024000-2428	2%-3% OF FULL SCALE (DEPENDING OF GAS CALIBRATION QUALITY)	10 years	22/07/2014
Flow meters Booster 1	ORIFICE PLATE - DCMD200016CS 2011	TECNOVA HT	**Engine:** ABF 1699F; **Flare+Engine:** ABF 0859F; **Flare:** ABF 1701F	2%-3% OF FULL SCALE	10 years	21/12/2012
Flow meter Booster 2	2014	TECNOVA HT	AEJ2006F	2%-3% OF FULL SCALE	10 years	26/09/2014
Pressure meter 1	FCX-FKP – FKGT01V5AMCYY AA1YY 2011	FUJI ELECTRIC	D6500B-3/84447450	0,065% OF FULL SCALE	10 years	01/08/2011
Pressure meter 2	FKCT22V5AKCYY AA2YY 2014	FUJI ELECTRIC	KEMA 08ATEX0120 X	0,065% OF FULL SCALE	10 years	04/09/2014
Diesel Generator	1006TG1A	TEKSAN	TJ101PR5A	50Hz	10 years	24/01/2011

The Project's net amount of electricity supplied to the grid is determined by the primary and secondary electricity measurement devices by EPİAŞ. There are two electricity meters as main and backup. The details of the meters are shown in the following. Since the calibration of the meters is valid for ten years, there was no calibration conducted during this Monitoring Period. Moreover, Project Owner has no control over the electricity meters, which means that they can't perform any change on electricity meters. Sole control over the electricity meters is on KCETAS Electricity Distribution Company. The meters are annually controlled for accuracy and sealed by the KCETAS Electricity Distribution Company. KCETAS is responsible for monitoring and ensuring that the measurement devices satisfy the requirements. KCETAS is also responsible for the calibration of the measurement devices. In case of any detected problem (e.g. failure of one of the measurement devices, inconsistency between the readings of the primary and the back-up meter etc.), the plant manager in the name of the Project owner is responsible for coordinating the necessary maintenance and calibration procedure with the KCETAS.

	Model	**Serial Nr**	**Accuracy class**	**Calibration Frequency**	**First Detection date**
Main Electricity Meter	Elster 1500	447413	IEC-EN 60687 0.5 class	10 years	06.12.2011
Back Up Electricity Meter	Elster 1500	447412	IEC-EN 60687 0.5 class	10 years	06.12.2011

Responsibilities for the data processing and management lie with Her Enerji. Therefore, they established a VER team. This team is responsible for monitoring all data required to estimate emission reductions. Life Enerji also assists VER Team with regards to the monitoring aspects of the project. Plant manager has main responsibility to collect and archive the data. The data is monitored and recorded by qualified technicians according to the monitoring plan. All the technicians receive proper training to ensure that they understand their specific tasks and handling of equipment. The records are double checked by the General Manager of the Proposed Project who is responsible

for accuracy and frequency of the measurements. In the below Figure management structure can be seen.

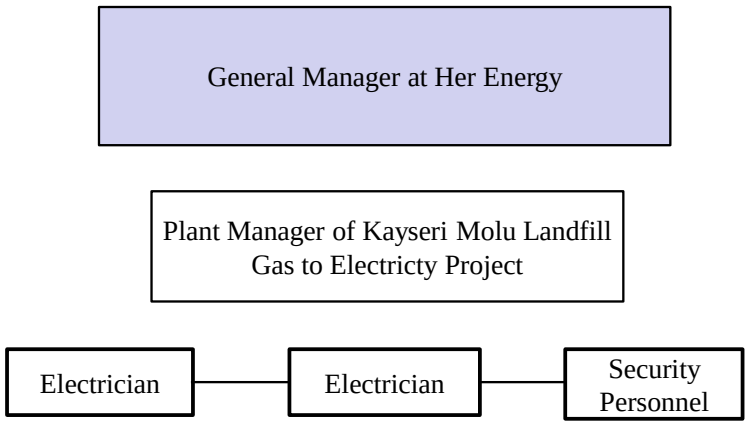

Figure 2: Organizational chart

The power generation data are stored by EPIAS. The website of EPIAS (https://www.epias.com.tr/uzlastirma/aylik-uzlastirma-bildirimsureci/) accessible by the Project owner with their unique user ID and password. Once accessed, the Project owners are able to retrieve electricity generation and consumption data. The same data is used by the Project owner for invoicing purposes. The electricity generation data are reported on a monthly basis.

C.1 Data Processing and Archiving

C.1.1. Data Processing and collection

The monitoring equipment and other equipment of the plant are connected to a Programmable Logic Controller (PLC), which collects all the monitoring data and sends them to the SCADA system so that the operator can read main parameters in real time. The PLC archives reading values in a database which is accessible through the SCADA interface. Monitored data can be read and downloaded with the SCADA system for reporting purposes. Moreover, these electronic records are backed-up in a separate computer. The main source for landfill gas data is the Project activity's PLC-SCADA system. The system automatically reads measurement devices and records data on hard drives. The PLC system records meter readings at pre-determined intervals, as specified in the CDM monitoring manual. These data is used to calculate the total emission reductions.

1) Flow measurements

Gas flow is measured by flow meters, including the flow into the flare, generators and the total flow. These parameters are required to be normalized at 0°C and 1 atm, using actual gas temperature and pressure data to be measured with temperature and pressure transmitters. These in-built transmitters are integrated in each of the flow meters and equipped with a flow computer so that the values sent to the SCADA system are already been normalized (converted to normal cubic meters). Therefore, temperature and pressure data at each flow meter do not need to be separately monitored. Methane content in the gas is measured by a gas analyser that is connected to the PLC-SCADA system.

Calibration: The flow sensors are calibrated according to specified temperature, pressure and composition of the gas as per the manufacturer's recommendation. The equipment selected will allow dynamic compensation for these parameters, normalized to standard temperature, pressure, and gas composition. There will be a periodic verification according to the requirement of equipment specifications.

2) Gas Quality and efficiency of the flare

Methane destruction is determined by an enclosed flare unit that has an inbuilt flame detection unit. The project emissions from flaring and emission reductions from the destruction of LFG have been monitored at this point. The readings have been taken and recorded internally by compatible and proper measurement devices automatically with high data quality. The measured parameters are automatically converted to dry- basis and normal conditions by the PLC system. The instruments monitor parameters continuously. The emissions are calculated using the methodological tool "Project emissions from flaring" (v. 02.0.0), which is the newest version of the tool at the time of the preparation date of this monitoring report.

Concentration of methane and oxygen in the landfill gas stream and the exhaust gas of the flare are the parameters that are essential for calculation of emission reductions, as well as the safe and efficient operation of the system.
Concentration of methane and oxygen in the landfill gas stream are controlled by a common sample line installed in the main collection system piping and measured continuously by two separate analysers to measure methane, oxygen and carbondioxide each. Although compensation for temperature and pressure is not required for the methane and oxygen sensors, the sensors are designed to operate within specified temperature and pressure conditions.
Concentration of methane and oxygen in the exhaust gas stream are monitored by a common sample line installed in the upper section of the flare.

Calibration: Analysers are periodically calibrated according to the manufacturers and regulation on "Metering and Testing of Metering Systems'[2] of Ministry of Science, Industry and Technology recommendation. Calibration equipment will provide an accuracy of +/- 1% by volume.

3) Electricity Generation:
The electricity generation data is stored by PMUM, the financial settlement centre of TEIAS (the national grid operator). The website of PMUM (http://dgpys.teias.gov.tr/dgpys) is accessible by the Project owner with their ID used for control and checks and for invoicing purposes. The electricity generation data is reported on a monthly basis. The procedure involves the following tasks:

- Accessing the website of PMUM (http://dgpys.teias.gov.tr/dgpys),
- Obtaining the electricity generation and consumption reports
- Store the data in electronic version in the computer of Her Enerji on the site
- Issue invoices to TEİAŞ based on the data published in PMUM.

C.1.2. A Backup Unit for Systematic Storage

i. Electricity Generation:
There are two measurement devices; a primary measurement device and a secondary (i.e. back-up or check-meter) measurement device for quality assurance, to be used if the primary meter fails. Both the primary and back-up measurement devices measure and store the aggregate total electricity import and export for the whole Project in real-time. The electricity meters are under responsibility of TEIAS and they are located in the sub-station which is also belong to TEIAS.

The invoices are kept by the Project owner as hardcopies. Furthermore, the PMUM system stores the reports electronically, which is accessible to the Project owner whenever necessary. After the monthly reports are obtained from PMUM, data are aggregated using a separate spreadsheet. The monthly generation and consumption data are entered to the spreadsheet, which calculates the emission reductions during the monitoring period.

[2] See, http://www.sanayi.gov.tr/download/osgm/olcu_aletleri_muayene_yonetmelik.zip (page 2)

ii. Methane Destruction:
Data Storage: The electronic monitoring system (PLC) will periodically archive the readings data. Written documents (e.g. equipment replacement protocols, accident logs, maintenance records, back-ups etc.) will be kept safely. Electronically backup of the data will be conducted on a daily basis. A hard copy backup of all relevant data will be printed out monthly. Calibration records for all instrumentation will be constantly collected and archived. All data and records required for verification are kept for two years after the end of the project crediting period or the last issuance of VERs, whichever is later.

C.1.3 Calibration Procedures:

The calibration of the monitoring equipment was carried out according to the information provided in the GS-VER PDD. The GS-VER PDD mainly includes the following obligation for the calibration of the appropriate meters:

Maintenance and calibration of measurement devices: All measurement devices will be purchased and maintained as specified in the CDM monitoring manual according to manufacturer specifications. All measurement devices that are used in monitoring will be subject to a quality control procedure that will include regular maintenance and calibration in agreement with legal and/or manufacturer requirements. According to the relevant regulation, "The Turkish Electricity Market Regulation Agency (EPDK) sets rules on the accuracy of electricity meters that are used by power plants feeding into the grid. The rules are part of the EPDK regulation 25056 from 22 March 2003[3]. The table in Article 11 of the regulation specifies the use of electricity meters of the accuracy class 0.5S for power plants between 10 MW and 100 MW and refers to compliance with International Electro technical Commission's norm EN 60687. TEIAS, whose employees visit the plant for the meter readings monthly, is in charge of ensuring the adherence to these rules. Calibration and maintenance procedures follow the requirements."

If any equipment has a malfunction or breakdown, corrective actions are carried out in a timely manner to minimize the risk of emissions that are not intended. To ensure data quality, operational staff will be trained appropriately so that they can effectively take actions in such cases. The plant operator periodically inspects the plant to check visually if there are any obvious problems. In case of any findings, these are documented.

In case of an organizational change within the Project owner, a qualified person will be assigned for carrying out and management of the monitoring and verification procedures. In case of fire, earthquake or another similar emergency situation, the data that are stored by the Project owner as back-up will be used, whereby conservativeness will be maintained with specific procedures. For extraordinary events where such back-up data are not available, the amount of landfill gas consumed will be calculated by using the power generation figures and engines' full load electrical efficiencies, by using conservative values and other assumptions to maintain conservativeness, as necessary. Regarding the project emissions from flaring, data recording and aggregation and procedures for extraordinary events are the same as described above (i.e. the methane destruction component).

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

Data/Parameter	Wx
Unit	Ton
Description	Quantity of MSW land filled during 1996~2012

[3] http://www.epdk.gov.tr/documents/elektrik/mevzuat/teblig/elektrik/sayaclar_hakkinda/Elk_Tblg_Sayaclar.doc, page 3.

Source of data	Landfill gas power generation report of Kayseri Molu Landfill gas project
Value(s) applied	See section B.6.3 of PDD and Molu Calculation sheet
Choice of data or measurement methods and procedures	The data is provided in the report of landfill gas power generation report and this data is used to for calculation of energy generation. The date of waste is also confirmed by representative of waste department in Municipality.
Purpose of data/parameter	
Additional comments	

Data/Parameter	GWP_{CH4}
Unit	tCO_2e/tCH_4
Description	Global warming potential of CH4
Source of data	IPCC
Value(s) applied	25 tCO_2e/tCH_4 for the first commitment period, and 25 tCO_2e/tCH_4 for the second commitment period of Kyoto Protocol. Shall be updated according to any future COP/MOP decisions
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	D_{CH4}
Unit	tCH_4/ m^3tCH_4
Description	Methane Density
Source of data	
Value(s) applied	At standard temperature and pressure (0 degree Celsius and 1,013 bar) the density of methane is 0.0007168 tCH_4/ m^3tCH_4
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	**Φ**
Unit	-
Description	Default value for the model correction factor to account for model uncertainties
Source of data	“Methodological Tool: Emissions from solid waste disposal sites” (Version 06.0.0)

Value(s) applied	0.75 For baseline emissions: refer to Table 3 of PDD to identify the appropriate factor based on the application of the tool (A or B) and the climate where the SWDS is located

Default values for the model correction factor	**Humid/wet conditions**	**Dry conditions**
Application A	**0.75**	**0.75**
Application B	**0.85**	**0.80**

Choice of data or measurement methods and procedures	Oonk et el. (1994) have validated several landfill gas models based on 17 realized landfill gas projects. The mean relative error of multi-phase models was assessed to be 18%. Given the uncertainties associated with the model and in order to estimate emission reductions in a conservative manner, a discount of 10% is applied to the model results.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**OX**
Unit	-
Description	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 3.2.
Value(s) applied	0.1
Choice of data or measurement methods and procedures	As the landfill was covered by soil, the default value for oxidation could be applied.
Purpose of data/parameter	-
Additional comments	-

Data/Parameter	**F**
Unit	-
Description	Fraction of methane in the SWDS gas (volume fraction)
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste,
Value(s) applied	0.5
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	**DOC_f**
Unit	Weight fraction
Description	Default value for the fraction of degradable organic carbon (DOC) in MSW that decomposes in the SWDS.

Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste,
Value(s) applied	0.5
Choice of data or measurement methods and procedures	Based on the methodological tool "Emissions from solid waste disposal sites" version 06.0.0", this factor reflects the fact that some degradable organic carbon degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0.5 is recommended by IPCC.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**MCF**
Unit	-
Description	Methane correction factor
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 3.1
Value(s) applied	0.8
Choice of data or measurement methods and procedures	The methane correction factor (MCF) accounts for the fact that unmanaged SWDS produce less methane from a given amount of waste than managed SWDS, because a larger fraction of waste decomposes aerobically in the top layers of unmanaged SWDS. Based on the "Tool: Emissions from solid waste disposal sites", IPPC default value for **unmanaged solid waste disposal sites.** This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of greater than or equal to 5 meters.[4]
Purpose of data/parameter	
Additional comments	

Data/Parameter	**DOC_j**
Unit	-
Description	Fraction of degradable organic carbon (by weight) in the waste type j
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Tables 2.4 and 2.5.
Value(s) applied	

Waste type j	DOC_j (% wet waste)	DOC_j (% dry waste)
Wood and wood products	43	50
Pulp, paper and cardboard (other than sludge)	40	44
Food, food waste, beverages and tobacco (other than sludge)	15	38
Textiles	24	30
Garden, yard and park waste	20	49
Glass, plastic, metal, other inert waste	0	0

[4] Landfill gas power generation report of Kayseri Molu Landfill.

Choice of data or measurement methods and procedures	MAP/PET<1 for province of Kayseri, thus **dry** values are used in accordance to "the tool Emissions from solid waste disposal sites" version 6.0.0 and 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Tables 2.4 and 2.5.
Purpose of data/parameter	
Additional comments	0.40 (kitchen waste), 0.03 (paper & carton), 0.08 (textiles), 0.03 (wood), 0.10 (garden/fruits), 0.36 (glass, plastic, metal, other inert waste)[5]

Data/Parameter	**k_j**
Unit	-
Description	Decay rate for the waste type j
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 3.3.
Value(s) applied	0.04 (paper & carton), 0.04 (textiles), 0.02 (wood), 0.05 (garden & park wastes), 0.06 (food)

Waste type j		**Boreal and Temperate (MAT ≤ 20 ºC)**		**Tropical (MAT ≥ 20 ºC)**	
		Dry MAP/PET < 1)	Wet (MAP/PET > 1)	Dry (MAP < 1000 mm)	Wet MAP > 1000)
Slowly Degrading	Pulp, paper, cardboard (other than sludge, textiles)	0.04	0.06	0.045	0.07
Slowly Degrading	Wood, wood products and straw	0.02	0.03	0.025	0.035
Moderately Degrading	Other (non-food) organic putrescible garden and park waste	0.05	0.10	0.065	0.17
Rapidly Degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06	0.185	0.085	0.40

[5] Kayseri-Ergebnisbericht-Deponie und Gasprognos.page: 18.

Choice of data or measurement methods and procedures	For Kayseri region: Medium Average temperature MAT [°C]: 10.5 Medium Average Precipitation MAP [mm/y]: 393 Potential Evapotraspiration PET [mm/y]:438 Thus, MAP/PET<1 Source for MAP : http://www.mgm.gov.tr/veridegerlendirme/yillik-toplam-yagis-verileri.aspx?m=KAYSERI#sfB Source for PET: http://www.mgm.gov.tr/veridegerlendirme/acik-yuzey-buharlasma.aspx
Purpose of data/parameter	
Additional comments	

Data/Parameter	η_{PJ}
Unit	Dimensionless
Description	Efficiency of the LFG capture system that will be installed in the project activity
Source of data	The methodology ACM0001 Version 13.
Value(s) applied	50%
Choice of data or measurement methods and procedures	While there are different values in regards of efficiency of LFG capture system due to difference in disposal sites. The default value of 50% is applied fort he Project.
Purpose of data/parameter	
Additional comments	

Data/Parameter	fy
Unit	-
Description	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y
Source of data	Methodology ACM0001 Version 13
Value(s) applied	0
Choice of data or measurement methods and procedures	N.a
Purpose of data/parameter	
Additional comments	According Methodology ACM0001 Version 13, “0” is applied.

Data/Parameter	**Gross electricity generation**
Unit	**MWh**
Description	Gross Electricity supplied to the grid by relevant sources (2008-2010)
Source of data	Turkish Electricity Transmission Company (TEIAS), Annual Development of Turkey’s Gross Electricity Generation of Primary Energy Resources (1975-2010) TEIAS, see: https://webapi.teias.gov.tr/file/cfd34f31-0bfd-4a06-8346-efb33285e44c?download
Value(s) applied	See table 11 of PDD

Choice of data or measurement methods and procedures	TEIAS is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**Net electricity generation**
Unit	**MWh**
Description	Net electricity fed into the grid. Used for the calculation of the net/gross relation (Including Import and Export figures)
Source of data	Turkish Electricity Transmission Company (TEIAS), Annual Development of Electricity Generation-Consumption and Losses in Turkey (1984-2010) TEIAS, https://webapi.teias.gov.tr/file/cfd34f31-0bfd-4a06-8346-efb33285e44c?download
Value(s) applied	See table 11 of PDD
Choice of data or measurement methods and procedures	This data is used to find relation between the gross and net electricity delivered to the grid by fossil fuel fired power plants (Table 12). Import and Export data is used to find total net electricity fed into the grid in the years of 2008, 2009 and 2010 (table 12) TEIAS is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**HVi,y**
Unit	Mass or volume unit
Description	Heating Values of fuels consumed for electricity generation in the years of 2007, 2008, 2009 and 2010
Source of data	Heating Values Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, TEİAŞ. See: https://webapi.teias.gov.tr/file/780b9f4b-7e97-4e64-a264-20669a820b79?download
Value(s) applied	See table 21 of PDD
Choice of data or measurement methods and procedures	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey. There is no national NVC data in Turkey. However, TEİAŞ announces Heating values of fuels. This data is used to calculate annual NCVs for each fuel type.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**$FC_{i,y}$**
Unit	Mass or volume unit

Description	Fuels consumed for electricity generation in the years of 2008, 2009 and 2010
Source of data	Annual Development of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, TEİAŞ. See: https://webapi.teias.gov.tr/file/69279fb3-a945-4066-a772-26d6a9ee15f9?download
Value(s) applied	See table 22 of PDD
Choice of data or measurement methods and procedures	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**$NCV_{i,y}$**
Unit	TJ/kton, TJ/million m^3
Description	Net Calorific Value of fuel types in the years of 2008, 2009 and 2010
Source of data	Calculated by using HVi,y to FCi,y as Net Calorific Values of fuel types are not directly available in Turkey.
Value(s) applied	See table 23 of PDD
Choice of data or measurement methods and procedures	TEİAŞ is the national electricity transmission company, which makes available the official data of power plants in Turkey. Calculation of NCVs from national $HV_{i,y}$ and $FC_{i,y}$ data, Table 22 and **Table 23**, is preferred to default IPCC data as these are more reliable.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**Sample Group for BM emission factor**
Unit	Name of the plants, MW capacities, fuel types, annual electricity generations and dates of commissioning.
Description	Most recent power plants which compromise 20% of total generation

Source of data	Annual Development of Fuels Consumed in Thermal Power Plants in Turkey by the Electric Utilities, TEIAS: For plants in 2006: http://www.epdk.gov.tr/documents/10157/70d5f8ce-9da8-44c4-bef8-84b7505dccc3 (page 76 and 77 for installed power of new plants, page 67-75 for generation amounts. For capacity additions, interpolation method is used for generation amounts) For plants in 2007: www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf (page 121 and 122 for installed power of new plants, page 111-120 for generation amounts. For capacity additions, interpolation method is used for generation amounts) For plants in 2008: http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf (page 95 for plants and pages 82-94 for generation amounts. For capacity additions, interpolation method is used for generation amounts) For Plants in 2009: http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf (page 98-100 for plants and pages 85-97 for generation amounts. For capacity additions, interpolation method is used for generation amounts) For Plants in 2010: http://www.epdk.org.tr/documents/10157/8edb1470-7667-4ce1-8ce5-21d1ce4e4761 (Page 101-106 for 2010 Plants and Pages 88-101 for Fuel Types and Generation Amounts)
Value(s) applied	See table 25 of PDD
Choice of data or measurement methods and procedures	TEIAS is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of data/parameter	
Additional comments	

Data/Parameter	**EF_i**
Unit	tCO_2/GJ
Description	Emission factor for fuel type *i*
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the IPCC Guidelines on National GHG Inventories. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value(s) applied	See table 24 of PDD

Choice of data or measurement methods and procedures	No plant specific and national emission factor data is available in Turkey. So, IPCC default data is used. For Fuel Oil Power Plants: 'Gas/Diesel Oil' data is used for conservativeness. For Coal Power Plants: In the 205th page of official document given in the link below, it is stated that Çolakoğlu and İçdaş utilizes 'Taşkömürü' (Hardcoal). And at the Table-2 in page 157 of the same document, Taşkömürü is dived in two groups: Bituminous and Antharcite. Since Sub-Bituminous Coal is under Brown Coal in the same table and since Other Bituminous Coal has lower EF than Anthracite in 1.4 of IPCC Guidelines, EF for 'Other Bituminous Coal' is used. See: http://www.dpt.gov.tr/DocObjects/Icerik/4225/Enerji_Hammaddeleri_(Linyit_Taskömuru-Jeotermal)
Purpose of data/parameter	
Additional comments	

Data/Parameter	$\eta_{i,y}$
Unit	-
Description	Average energy conversion efficiency of power unit m in year y
Source of data	TEİAŞ and Annex I of the "Tool to calculate the emission factor for an electricity system"
Value(s) applied	See Table 16 of PDD
Choice of data or measurement methods and procedures	For Lignite and Coal power plants, plants specific values are applied. There are two lignite power plant in Sample Group. These are Çan and Elbistan PPs. For efficiency factor of Çan PP is taken form presentation of Mr. Sefer Bütün (General Manager of EUAS, state production company), which is 'Thermal Power Plants and Environment'. This presentation is submitted to DOE. In the page 18 of the presentation, it is stated that for pulverized lignite power plants the highest achieved electrical efficiency rate is 38%. So this rate is applied also for Elbistan-B PP. Weighted average of these efficiency rates, which turns to be 38.63% is used for lignite power plants. For coal power plants, the highest efficiency rate for 'fluidized bed' technology which is 41.5% for PFBS is applied as coal PPs in the sample group (Çolakoğlu (Capacity Increment) and Çan Gr I-II) are utilizing fluidized bed type technology. For reference see: http://www.mimag-samko.com.tr/akiskan_yatakli_kazanlar.pdf (last paragraph of page 6) For Natural Gas and Oil plants efficiencies, default value given in the tool is applied: http://cdm.unfccc.int/methodologies/Tools/EB35_repan12_Tool_grid_emission.pdf
Purpose of data/parameter	
Additional comments	

Data/Parameter	R_u
Unit	$Pa.m^3/kmol.K$
Description	Universal ideal gas constant
Source of data	Methodological Tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 02.0.0

Value(s) applied	8,314
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	MM_{CH4}
Unit	kg/kmol
Description	Molecular mass of greenhouse gas (CH4)
Source of data	Methodological Tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” Version 02.0.0
Value(s) applied	16.04
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	P_n
Unit	Pa
Description	Total pressure at normal conditions
Source of data	Methodological Tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” Version 02.0.0
Value(s) applied	101,325 Pa
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	T_n
Unit	K
Description	Temperature at normal conditions
Source of data	Methodological Tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” Version 02.0.0
Value(s) applied	273.15 K
Choice of data or measurement methods and procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	$EF_{grid,CM,y}$.
Unit	tCO_2/MWh

Description	Combined Margin Emission factor for Turkish electricity grid
Source of data	Registered PDD
Value(s) applied	0.5313 tCO2/MWh
Choice of data or measurement methods and procedures	Calculation of baseline emission
Purpose of data/parameter	
Additional comments	

In addition the following constants - as provided in the "Tool to determine project emissions from flaring gases containing methane" (EB 28, Meeting report Annex 13, page 11/12) - are used in the equations 5-19.

Table 4: Constants and default values used in equations to determine project emissions from flaring gases

Parameter	Unit	Description	Value
MM_{CH4}	kg/kmol	Molecular mass of methane	16.04
MM_{CO}	kg/kmol	Molecular mass of carbon monoxide	28.01
MM_{CO2}	kg/kmol	Molecular mass of carbon dioxide	44.01
MM_{O2}	kg/kmol	Molecular mass of oxygen	32.00
MM_{H2}	kg/kmol	Molecular mass of hydrogen	2.02
MM_{N2}	kg/kmol	Molecular mass of nitrogen	28.02
AM_c	kg/kmol (g/mol)	Atomic mass of carbon	12.00
AM_H	kg/kmol (g/mol)	Atomic mass of hydrogen	1.01
AM_O	kg/kmol (g/mol)	Atomic mass of oxygen	16.00
AM_N	kg/kmol (g/mol)	Atomic mass of nitrogen	14.01
P_n	Pa	Atmospheric pressure at normal conditions	101,325
Ru	Pa m3/kmol K	Universal ideal gas constant	8,314
Tn	K	Temperature at normal conditions	273.15
MF_{O2}	Dimensionless	O_2 volumetric fraction of air	0.21
MV_n	m^3/kmol	Volume of one mole of any ideal gas at normal temperature and pressure	22.414
$\rho_{CH4,n}$	kg/m^3	Density of methane gas at normal conditions	0.716

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	Management of SWDS
Unit	-
Description	Management of SWDS
Measured/calculated/ default	Project participants will refer to the original design of the landfill to ensure that any practice to increase methane generation have been occurring prior to the implementation of the project activity.
Source of data	One of the following sources can be used: •Original design of the landfill; •Technical specifications for the management of the SWDS; •Local or national regulations
Value(s) of monitored parameter	There has been no changes to the design of the landfill. However, as a rule, peak gas production in landfills usually occurs from 5 to 7 years after the waste is buried.

Monitoring equipment	Visual inspection
Measuring/reading/recording frequency	Once each verification
Calculation method (if applicable)	-
QA/QC procedures	-
Purpose of data/parameter	Calculation of baseline emission
Additional comments	-

Data/Parameter	**$F_{CH4,sent\ flare,y}$**
Unit	t_{CH4} /y
Description	Amount of methane in LFG which is sent to the flare in year y
Measured/calculated/ default	Measured and calculated
Source of data	Calculated based on the flow of LFG and the concentration of methane in the LFG that will be sent to the flare(s)
Value(s) of monitored parameter	For 2014: 28.993 tons For 2015: 40.514 tons For 2016: 10.251 tons Total for the Monitoring Period: 79.757 tons
Monitoring equipment	Measured by a flow meter and a gas analyzer. Data to be aggregated monthly and yearly

Fıxed Gas Flow And Pressure Measurement Equıpment In Booster

	Model	Manufactu rer	Serıal No.	Accuracy	Calıbrat ıon Freque ncy	Date Of Calıbratı on
Flow Meter	ORIFICE PLATE - DCMD200016CS 2011	TECNOVA HT	ABF 1701F	%0.1	10 years	21/12/2012

Measuring/reading/recording frequency	Continuously
Calculation method (if applicable)	
QA/QC procedures	Flow meter is subject to regular (in accordance to the manufacturer) maintenance and testing to ensure accuracy. The accuracy class: +-0.1
Purpose of data/parameter	Calculation of Project emission
Additional comments	

Data/Parameter	**$F_{CH4,EL,y}$**
Unit	t_{CH4} /y
Description	Amount of methane in LFG which is sent to the gas engine in year y
Measured/calculated/ default	Measured and calculated
Source of data	Calculated based on the flow of LFG and the concentration of methane in the LFG that will be sent to the genset
Value(s) of monitored parameter	For 2014: 5,460.34 tons For 2015: 7,598.15 tons For 2016: 6,601.54 tons Total for the Monitoring Period: 19,660.03 tons

<table>
<tr><td>Monitoring equipment</td><td>Measured by a flow meter and a gas analyzer. Data to be aggregated monthly and yearly
<table>
<tr><th colspan="7">FIXED GAS FLOW AND PRESSURE MEASUREMENT EQUIPMENT IN BOOSTER</th></tr>
<tr><th></th><th>MODEL</th><th>MANUFACTURER</th><th>SERIAL NO.</th><th>ACCURACY</th><th>CALIBRATION FREQUENCY</th><th>DATE of CALIBRATION</th></tr>
<tr><td>Flow Meter</td><td>ORIFICE PLATE - DCMD200016CS 2011</td><td>TECNOVA HT</td><td>ABF 1699F</td><td>%0.1</td><td>10 years</td><td>21/12/2012</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuously</td></tr>
<tr><td>Calculation method (if applicable)</td><td></td></tr>
<tr><td>QA/QC procedures</td><td>Flow meter is subject to regular (in accordance to the manufacturer) maintenance and testing to ensure accuracy.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of Project emission reduction</td></tr>
<tr><td>Additional comments</td><td>Amount of methane in LFG which is sent to the flare in year y</td></tr>
</table>

<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 the gaseous stream in the hour h on a wet basis</td></tr>
<tr><td>Measured/calculated/ default</td><td>Measured</td></tr>
<tr><td>Source of data</td><td>PLC (Measured based on the flow of LFG)</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>For 2014: 15,016,481.89 Nm^3
For 2015: 21,218,524.89 Nm^3
For 2016: 18,897,199.28Nm^3
Total for the Monitoring Period: 55,132,206.06 Nm^3</td></tr>
<tr><td>Monitoring equipment</td><td>Measured by a flow meter. Data will be aggregated monthly and yearly. Volumetric flow measurement should always refer to the actual pressure and temperature.
<table>
<tr><th colspan="7">FIXED GAS FLOW AND PRESSURE MEASUREMENT EQUIPMENT IN BOOSTER</th></tr>
<tr><th></th><th>MODEL</th><th>MANUFACTURER</th><th>SERIAL NO.</th><th>ACCURACY</th><th>CALIBRATION FREQUENCY</th><th>DATE of CALIBRATION</th></tr>
<tr><td>Flow Meter</td><td>ORIFICE PLATE - DCMD200016CS 2011</td><td>TECNOVA HT</td><td>ABF 0859F</td><td>%0.1</td><td>10 years</td><td>21/12/2012</td></tr>
<tr><td>Flow meter Booster 2</td><td>2014</td><td>TECNOVA HT</td><td>AEJ2006F</td><td>%0.1</td><td>10 years</td><td>26/09/2014</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuous. The measurement interval will be equal to or more than one sampling each hour. (average value in a time interval not greater than an hour will be used in the calculations of emission reductions) Measured by a flow meter, which is a turbine system, with a special internal shell for biogas, completed with a volume checker and a fiscal converter of frequency. Meter will provide a minimum accuracy of +/- 1% by volume.</td></tr>
<tr><td>Calculation method (if applicable)</td><td></td></tr>
<tr><td>QA/QC procedures</td><td>Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer’s specifications</td></tr>
</table>

Purpose of data/parameter	Calculation of Project emission reduction
Additional comments	Temperature and pressure are automatically measured and LFG volumes are expressed in normalised cubic meters

Data/Parameter	$V_{CH4, wb,t,}$
Unit	m^3 CH4/ m^3 wet gas
Description	Volumetric flow of CH4 in time interval on a wet basis
Measured/calculated/ default	Measured
Source of data	PLC (Measured based on the flow of LFG)
Value(s) of monitored parameter	For 2014: 51.23% For 2015: 50.12% For 2016: 49.04% Average for the Monitoring Period: 50.13 %
Monitoring equipment	Continuous gas analyzer operating in dry-basis. Volumetric flow measurement refers to the actual pressure and temperature. Data will be aggregated monthly and yearly.
Measuring/reading/recording frequency	Continuous. The measurement interval will be equal to or more than one sampling each hour (average value in a time interval not greater than an hour will be used in the calculations of emission reductions) Measured by a flow meter, which is a turbine system, with a special internal shell for biogas, completed with a volume checker and a fiscal converter of frequency. Meter will provide a minimum accuracy of +/- 1% by volume.
Calculation method (if applicable)	
QA/QC procedures	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications
Purpose of data/parameter	Calculation of Project emission reduction
Additional comments	Temperature and pressure are automatically measured, and LFG volumes are expressed in normalized cubic meters. Gas analysers provide values every 10 minutes so that the value given here (50.13%) is just an average value of the methane concentrations every 10 minutes. Please see Column F of Baseline Emissions Methane sheet and Column C of Emission Reductions sheet from ER workbook.

Data/Parameter	T_t
Unit	K
Description	Temperature of the landfill gas
Measured/calculated/ default	Measured
Source of data	PLC (Thermometer)
Value(s) of monitored parameter	
Monitoring equipment	Continuous temperature analyzer operating in dry-basis.
Measuring/reading/recording frequency	Continuous. The measurement interval will be equal to or more than one sampling each hour (average value in a time interval not greater than an hour will be used in the calculations of emission reductions) All the data will be aggregated hourly, daily, monthly and yearly.
Calculation method (if applicable)	

QA/QC procedures	The device is subject to regular maintenance and testing regime to ensure accuracy. They will be periodically calibrated according to the manufacturer's recommendation by project participants. Accuracy +/- 0,065%
Purpose of data/parameter	Calculation of Project emission reduction
Additional comments	

Data/Parameter	**Pt**
Unit	Pa or mbar
Description	Pressure of the gaseous stream in the hour *h*
Measured/calculated/ default	Measured
Source of data	Manometer
Value(s) of monitored parameter	127.42 mbar
Monitoring equipment	Continuous on dry-basis. Instruments with recordable electronic signal (analogical or digital) are required. Examples include pressure transducers, etc. Manometer (Pressure gauge)

FIXED GAS FLOW AND PRESSURE MEASUREMENT EQUIPMENT IN BOOSTER

	MODEL	MANUFACTURER	SERIAL NO.	ACCURACY	CALIBRATION FREQUENCY	DATE of CALIBRATION
Pressure meter 1	FCX-FKP – FKGT01V5AMCYYAA1YY 2011	FUJI ELECTRIC	D6500B-3/84447450	0,065% OF FULL SCALE	10 years	01/08/ 2011
Pressure meter 2	FKCT22V5AKCYYAA2YY 2014	FUJI ELECTRIC	KEMA 08ATEX0120 X	0,065% OF FULL SCALE	10 years	04/09/ 2014

Measuring/reading/recording frequency	Continuous.
Calculation method (if applicable)	
QA/QC procedures	The device is subject to regular maintenance and testing regime to ensure accuracy. They will be periodically calibrated according to the manufacturer's recommendation by project participants. The range 0-250.
Purpose of data/parameter	Calculation of Project emission reduction
Additional comments	

Data/Parameter	**$TDL_{k,y}$**
Unit	
Description	Average technical transmission and distribution losses for providing electricity to source k in year y
Measured/calculated/ default	Default value per "Tool to calculate baseline, project and or leakage emission from electricity consumption" version 01.
Source of data	Use recent, accurate and reliable data available within the host country;
Value(s) of monitored parameter	0

Monitoring equipment	na
Measuring/reading/recording frequency	na
Calculation method (if applicable)	
QA/QC procedures	
Purpose of data/parameter	Calculation of Project emission reduction
Additional comments	

Data/Parameter	**$PE_{flare,y}$**
Unit	tCO_2e
Description	Project emissions from flaring of the residual gas stream in year y
Measured/calculated/ default	Calculated
Source of data	Calculated as per the "Tool to determine project emissions from flaring gases containing methane" (EB 28, Report Annex 13)
Value(s) of monitored parameter	For 2014: 725 tCO_2e For 2015: 1,013 tCO_2e For 2016: 257 tCO_2e Average for the Monitoring Period: 1,995 tCO_2e
Monitoring equipment	N/A
Measuring/reading/recording frequency	N/A
Calculation method (if applicable)	Calculated as per the "Tool to determine project emissions from flaring gases containing methane" (EB 28, Report Annex 13)
QA/QC procedures	NA
Purpose of data/parameter	Calculation of Project emission reduction
Additional comments	

Data/Parameter	**$FC_{i,j,y}$**
Unit	t/year
Description	Quantity of diesel combusted for auxiliary purposes
Measured/calculated/ default	Measured and Calculated
Source of data	Working hour of genset and perhour fuel consumption
Value(s) of monitored parameter	For 2014: 0.5150 tons For 2015: 0.6581 tons For 2016: 0.1298 tons Total for the Monitoring Period: 1.3029 tons
Monitoring equipment	**DIESEL GENERATOR** **MODEL** / **MANUFACTURER** / **SERIAL NO.** / **POWER RATING** / **CALIBRATION FREQUENCY** / **DATE of CALIBRATION** 1006TG1A / TEKSAN / TJ101PR5A / 50Hz / 10 years / 24/01/2011
Measuring/reading/recording frequency	Fuel consumption is calculated using a working hour of genset and per hour consumption of diesel Measuring frequency is done per monitoring period.
Calculation method (if applicable)	Fuel consumption is calculated using a mass balance approach based on the quantity of fuel purchased and the difference in the quantity held in stock.

QA/QC procedures	Cross-check with operation hours of the emergency genset.
Purpose of data/parameter	Calculation of Project emissions
Additional comments	Fuel usage for auxiliary combustion, only. Related project emissions are expected to remain below 0,1% of total emission reduction.

Data/Parameter	w_{CH4}
Unit	m^3CH4/m^3LFG
Description	Methane fraction in the landfill gas
Measured/calculated/ default	Measured
Source of data	PLC (gas analyzer)
Value(s) of monitored parameter	For 2014: 51.23% For 2015: 50.12% For 2016: 49.04% Average for the Monitoring Period: 50.13 %
Monitoring equipment	The gas analysing system is a modular construction and designed for stationary operation for measuring directly the fraction of methane in the landfill gas. The gas analyser provides three analogue signals, CH4, CO2 and O2. The values are measured continuously. The proportion of the data to be monitored is 100%.
Measuring/reading/recording frequency	Continuously.
Calculation method (if applicable)	
QA/QC procedures	The gas analyser will be subject to a regular maintenance and testing regime to ensure accuracy. The gas analyser will be calibrated according to manufacturer's specifications. Accuracy +/- 0,065%
Purpose of data/parameter	Calculation of Project emission reduction

FIXED GAS FLOW AND PRESSURE MEASUREMENT EQUIPMENT IN BOOSTER

	MODEL	MANUFACTURER	SERIAL NO.	ACCURACY	CALIBRATION FREQUENCY	DATE of CALIBRATION
Gas Analyser 1	SSM-6000-LT (2011)	PRONOVA	80024000-1598	2%-3% OF FULL SCALE (DEPENDING OF GAS CALIBRATION QUALITY)	10 years	01/08/ 2011
Gas Analyser 2	SSM-6000-LT (2014)	PRONOVA	80024000-2428	2%-3% OF FULL SCALE (DEPENDING OF GAS CALIBRATION QUALITY)	10 years	22/07/ 2014

Additional comments	Methane fraction of the landfill gas and LFG flow has to be measured on the same basis (either wet or dry). Gas analysers provide values every 10 minutes so that the value given here (50.13%) is just an average value of the methane concentrations every 10 minutes. Please see Column F of Baseline Emissions Methane sheet and Column C of Emission Reductions sheet from ER workbook.

Data/Parameter	**T_{flare} /$T_{EG,m}$**
Unit	°C
Description	Temperature in the exhaust gas of the enclosed flare in minute m
Measured/calculated/ default	Measured
Source of data	PLC (Thermocouple)
Value(s) of monitored parameter	500
Monitoring equipment	Thermocouple. Measure the temperature of the exhaust gas in the flare by an appropriate temperature measurement equipment. Measurements outside the operational temperature specified by the manufacturer may indicate that the flare is not functioning correctly and may require maintenance. Flare manufacturers must provide suitable monitoring ports for the monitoring of the temperature of the flare. These would normally be expected to be in the middle third of the flare. Where more than one temperature port is fitted to the flare, the flare manufacturer must provide written instructions detailing the conditions under which each location shall be used and the port most suitable for monitoring the operation of the flare according to manufacturer's specifications for temperature
Measuring/reading/recording frequency	Once per minute
Calculation method (if applicable)	
QA/QC procedures	Thermocouples should be replaced and periodically calibrated according to the manufacturer's recommendation
Purpose of data/parameter	Calculation of Project emission
Additional comments	The average exhaust gas temperature during the monitoring period is 500°C for the data that are used for calculations of emission reduction from flaring. Exhaust gas temperatures below and above the flare efficiency range are discarded from calculations. Unexpected changes such as a sudden increase/drop in temperature can occur for different reasons. These events should be noted in the site records along with any corrective action that was implemented to correct the issue. Monitoring of this parameter is applicable in case of enclosed flares.

FIXED GAS FLOW AND PRESSURE MEASUREMENT EQUIPMENT IN BOOSTER

	MODEL	MANUFACTURER	SERIAL NO.	ACCURACY	CALIBRATION FREQUENCY	DATE of CALIBRATION
Thermo couple	K TYPE	Isocontrolli	2012OF000652	Not Declared	1-2years	01.08.2011

Data/Parameter	**$EC_{BL,y}$**
Unit	MWh
Description	Net electricity delivered to the grid
Measured/calculated/ default	Measured

<table>
<tr><td>Source of data</td><td>The data from the Electricity Meters are the basis for the settlement notification of PMUM. Data are gathered electronically from the meters by TEIAS and stored in secured website of PMUM, which is accessible to project developer with a private password. For monitoring, the monthly settlement notification of PMUM shall be used as source of data.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>For year 2014: 25,726.910 MWh
For year 2015: 37,945.810 MWh
For year 2016: 36,878.430 MWh
Total for Monitoring Period: 100,551.150 MWh</td></tr>
<tr><td>Monitoring equipment</td><td>Electricity meters
<table>
<tr><th></th><th>Model</th><th>Serial Nr</th><th>Accuracy class</th><th>Calibration Frequency</th><th>First Detection date</th></tr>
<tr><td>Main Electricity Meter</td><td>Elster 1500</td><td>447413</td><td>IEC-EN 60687 0.5 class</td><td>10 years</td><td>06.12.2011</td></tr>
<tr><td>Back Up Electricity Meter</td><td>Elster 1500</td><td>447412</td><td>IEC-EN 60687 0.5 class</td><td>10 years</td><td>06.12.2011</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuously</td></tr>
<tr><td>Calculation method (if applicable)</td><td></td></tr>
<tr><td>QA/QC procedures</td><td>According to the Article 2 of the 'Communiqué Regarding the Meters to be used in the Electricity Market '[6] (Communiqué): 'The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained "Type and System Approval" certificate from the Ministry of Trade and Industry.' Therefore, Ministry of Science, Industry and Technology (Ministry) is responsible from control and calibration of the meters.

Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems'[7] (Regulation) of Ministry states that: ' b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.' Therefore periodic calibration of the meters will be done every 10 years.

Also according to Article 67 (page 20) of this regulation, the calibration shall be done in calibration stations which have been tested and approved by Ministry of Trade and Industry. Article 10-d) of Communiqué requires the meters shall be three phase four wire and Article 64 of Regulation clearly states how calibration shall be performed for this kind of meters.

According to Article 3 of System Usage Agreement[8] done by Her Enerji and TEIAS; other than periodic tests, if a party alleges the meters are not working appropriately tests of the meters will be done by presence of both parties. If, after controls, it is seen that the meter is not working appropriately, the measurements of reserve meters are taken into account beginning from date both meters are reading the same (page 3, 2-c)

As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of Project emission reductions</td></tr>
</table>

[6] See, http://www.epdk.org.tr/english/regulations/electric/meters.doc, (page 6)
[7] See, http://www.sanayi.gov.tr/download/osgm/olcu_aletleri_muayene_yonetmelik.zip (page 2)
[8] See, http://www.teias.gov.tr/sistemkullanim1.doc , (page 3, 2-b)

Additional comments	

Data/Parameter	**NCV i,y**
Unit	GJ/t
Description	Net calorific value of diesel combusted for auxiliary purposes
Measured/calculated/ default	Default
Source of data	IPPC default value at the upper limit of the uncertainty at a 95 % confidence interval as provided in Table 1.2. of chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines
Value(s) of monitored parameter	43.3 GJ/t (IPCC)
Monitoring equipment	
Measuring/reading/recording frequency	continuously measured and monthly recorded
Calculation method (if applicable)	
QA/QC procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	**EF $_{CO2,i,y}$**
Unit	t CO_2/GJ
Description	CO_2 emission factor of diesel in year y
Measured/calculated/ default	Default
Source of data	IPPC default value at the upper limit of the uncertainty at a 95 % confidence interval as provided in Table 1.4. of chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines.
Value(s) of monitored parameter	0.0748 t/GJ (IPCC)
Monitoring equipment	
Measuring/reading/recording frequency	
Calculation method (if applicable)	
QA/QC procedures	
Purpose of data/parameter	
Additional comments	

Data/Parameter	**Opj,h**
Unit	h
Description	Operation of the equipment that consumes the LFG
Measured/calculated/ default	Measured
Source of data	PLC of the system
Value(s) of monitored parameter	72,360 hours

<table>
<tr><td>Monitoring equipment</td><td>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:
· 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 PDD; · Flame. Flame detection system is used to ensure that the equipment is in operation; · 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. Opj,h = 0 when: · One of more temperature measurements are missing or below the minimum threshold in hour h (instantaneous measurements are made at least every minute); · Flame is not detected continuously in hour h (instantaneous measurements are made at least every minute); · No products are generated in the hour h Otherwise Opj,h = 1
<table>
<tr><td></td><td>Genset1 (hr)</td><td>Genset2 (hr)</td><td>Genset3 (hr)</td></tr>
<tr><td>01.04.2014</td><td>29,376</td><td>14,904</td><td>6,480</td></tr>
<tr><td>31.12.2016</td><td>53,496</td><td>39,024</td><td>30,600</td></tr>
<tr><td>Operation Hour</td><td>24,120</td><td>24,120</td><td>24,120</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Measured continuously in real-time and recorded every 10 minutes.</td></tr>
<tr><td>Calculation method
(if applicable)</td><td>The Project is considered to be operating when the total power generation of the engines is higher than 0 kW.</td></tr>
<tr><td>QA/QC procedures</td><td>The PLC provides data on engines' supplied amount of power (kW). Operational hours are calculated based on engine operation (i.e. at least of one of the engines generates power</td></tr>
<tr><td>Purpose of data/parameter</td><td></td></tr>
<tr><td>Additional comments</td><td>This is monitored to ensure methane destruction is claimed for methane used in electricity plant when it is operational.</td></tr>
</table>

Data/Parameter	**$EC_{PJ,y}$**
Unit	MWh/yr
Description	Quantity of electricity consumed by the project electricity consumption source j in year y
Measured/calculated/ default	Measured
Source of data	The data from the Electricity Meters are the basis for the settlement notification of PMUM. Data are gathered electronically from the meters by TEIAS and stored in secured website of PMUM, which is accessible to project developer with a private password. For monitoring, the monthly settlement notification of PMUM shall be used as source of data.
Value(s) of monitored parameter	For year 2014: 300 MWh For year 2015: 510 MWh For year 2016: 870 MWh Total for Monitoring Period: 1,680 MWh

<table>
<tr><td>Monitoring equipment</td><td>• Regarding the electricity meters: two meters will be placed (one main and one reserve). at the TEIAS substation. These meters are sealed by TEIAS and intervention by project proponent is not possible. The fact that two meters are installed in a redundant manner keeps the uncertainty level of the only parameter for baseline calculation low. High data quality of this parameter is not only in the interest of the emission reduction monitoring, but paramount for the business relation between the plant operator and the electricity buyer.
• Measured hourly and readings monthly: Monthly settlement notifications of PMUM consist hourly electricity production and withdrawn from the grid
• Since the meters are reading electricity supplied to the system and withdrawn from the system separately, the net electricity amount supplied to the grid will be calculated by electricity supplied minus electricity withdrawn which will be taken from monthly settlement notifications. Thus with this procedure is monitored sufficient and no extra Monitoring has to be implemented. The above described measurement method follows Article 81 of the official regulation “Electricity Market Balancing And Settlement Regulation”
<table>
<tr><th></th><th>Model</th><th>Serial Nr</th><th>Accuracy class</th><th>Calibration Frequency</th><th>First Detection date</th></tr>
<tr><td>Main Electricity Meter</td><td>Elster 1500</td><td>447413</td><td>IEC-EN 60687 0.5 class</td><td>10 years</td><td>06.12.2011</td></tr>
<tr><td>Back Up Electricity Meter</td><td>Elster 1500</td><td>447412</td><td>IEC-EN 60687 0.5 class</td><td>10 years</td><td>06.12.2011</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuously</td></tr>
<tr><td>Calculation method (if applicable)</td><td></td></tr>
<tr><td>QA/QC procedures</td><td>According to the Article 2 of the 'Communiqué Regarding the Meters to be used in the Electricity Market ' 25 (Communiqué): ‘The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained “Type and System Approval” certificate from the Ministry of Trade and Industry.’ Therefore, Ministry of Science, Industry and Technology (Ministry) is responsible from control and calibration of the meters. Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems'26 (Regulation) of Ministry states that: ‘ b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done every 10 years.’ Therefore periodic calibration of the meters will be done every 10 years. Also according to Article 67 (page 20) of this regulation, the calibration shall be done in calibration stations which have been tested and approved by Ministry of Trade and Industry. Article 10-d) of Communiqué requires the meters shall be three phase four wire and Article 64 of Regulation clearly states how calibration shall be performed for this kind of meters. According to Article 3 of System Usage Agreement27 done by Her Enerji and TEIAS; other than periodic tests, if a party alleges the meters are not working appropriately tests of the meters will be done by presence of both parties. If, after controls, it is seen that the meter is not working appropriately, the measurements of reserve meters are taken into account beginning from date both meters are reading the same (page 3, 2-c) As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan.</td></tr>
<tr><td>Purpose of data/parameter</td><td></td></tr>
<tr><td>Additional comments</td><td></td></tr>
</table>

D.3. Implementation of sampling plan

N/A

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

Baseline emissions are calculated as per the consolidated Methodology ACM0001 version 13 and determined according to equation 1 and comprise the following sources:
(A) Methane emissions from the SWDS in the absence of the project activity;
(B) Electricity generation using fossil fuels or supplied by the grid in the absence of the project activity;

$$BE_y = BE_{CH4,y} + BE_{EC,y} \quad \textbf{(1)}$$

where

BE_y	Baseline emissions in year y (t CO_2e)
$BE_{CH4,y}$	Baseline emissions of methane from the SWDS in year *y* (t CO_2e/yr)
$BE_{EC,y}$	Baseline emissions associated with electricity generation in year *y* (t CO_2e/yr)

For example for the year 2014, from the ER Excel spreadsheet Emission Reductions section, we can see that $BE_{CH4,2014}$ = 122,857 t CO_2e and $BE_{EC,2014}$ = 13,668 t CO_2e;

For the year 2015, from the ER Excel spreadsheet Emission Reductions section, we can see that $BE_{CH4,2015}$ = 170,958 t CO_{2e} and $BE_{EC,2015}$ = 20,160 tCO_{2e};
For the year 2016, from the ER Excel spreadsheet Emission Reductions section, we can see that $BE_{CH4,2016}$ = 148,534 tCO_2e and $BE_{EC,2016}$ = 19,593 tCO_2e;

E.1. 1 Electricity Production Component:

The total emission reductions from electricity production can be calculated with the results of the below described equations. The emission reduction is equal to the baseline emissions minus project emissions and leakage emissions. Leakage emissions in this project are considered to be negligible. The general equation is as follows:

$$ER_y = BE_y - PE_y - L_y \quad \textbf{(2)}$$

Where:

ER_y	Emission reduction
$BE_{EC,y}$	Baseline emissions
PE_y	Project emissions
L_y	Leakage
y	Refers to a given period

According to the methodological tool “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 01) baseline emission for electricity generation is calculated by multiplying the amount of electricity generated using LFG with carbon emission factor of the electricity source, which is the Turkish national grid.

Option A1 of the tool is applied, thus Methodological tool: "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 05.0.0) was used to calculate emission factor. Thus, $FE_{EL,k,,y}$,is equal to $EF_{grid,CM,y}$.For simplicity $TDL_{k,y}$ is assumed to be equal to zero.

$$BE_{EC,y} = \sum_{k} EC_{BL,k,y} x EF_{EL,k,y} x \left(1 + TDL_{k,y}\right) \quad \textbf{(3)}$$

Where:

$BE_{EC,y}$	Baseline emissions for electricity generation in year y (tCO2/yr)
$EC_{BL,k,y}$	Quantity of electricity that would be generated using LFG in year y (MWh/yr)
$FE_{EL,k,,y}$	Emission factor for electricity generation for source k in year y (tCO2/MWh)
$TDL_{k,y}$	Average technical transmission and distribution losses for providing electricity to source k in year y
K	Sources of electricity consumption in the baseline

Emission factor for electricity generation for source k in year y (tCO2/MWh)	**0.5313**

Table 5: Baseline emissions for electricity generation sample calculation table

	Quantity of electricity that is generated using LFG in year y	**Electricity Consumption by project Activity**	**NET Quantity of electricity that is generated using LFG in year y**	**Baseline emissions for electricity generation in year y**
	kWh	**kWh**	**kWh**	**(tCO2/yr)**
2014_04	2,797,010.0000	120.0000	2,796,890.0000	1,485.9877
2014_05	3,083,490.0000	20.0000	3,083,470.0000	1,638.2476
2014_06	3,101,320.0000	10.0000	3,101,310.0000	1,647.7260
2014_07	3,081,320.0000	10.0000	3,081,310.0000	1,637.1000
2014_08	2,826,740.0000	10.0000	2,826,730.0000	1,501.8416
2014_09	2,619,110.0000	0.0000	2,619,110.0000	1,391.5331
2014_10	2,479,440.0000	50.0000	2,479,390.0000	1,317.2999
2014_11	2,646,590.0000	40.0000	2,646,550.0000	1,406.1120
2014_12	3,092,190.0000	40.0000	3,092,150.0000	1,642.8593
2014	**25,727,210.0000**	**300.0000**	**25,726,910.0000**	**13,668**
2015_01	3,118,860.0000	50.0000	3,118,810.0000	1,657.0238
2015_02	2,751,920.0000	110.0000	2,751,810.0000	1,462.0367
2015_03	3,529,330.0000	20.0000	3,529,310.0000	1,875.1224
2015_04	3,560,260.0000	50.0000	3,560,210.0000	1,891.5396
2015_05	3,566,500.0000	0.0000	3,566,500.0000	1,894.8815

2015_06	2,952,750.0000	10.0000	2,952,740.0000	1,568.7908
2015_07	3,080,560.0000	30.0000	3,080,530.0000	1,636.6856
2015_08	3,045,610.0000	50.0000	3,045,560.0000	1,618.1060
2015_09	3,026,880.0000	60.0000	3,026,820.0000	1,608.1495
2015_10	3,202,870.0000	70.0000	3,202,800.0000	1,701.6476
2015_11	3,262,270.0000	0.0000	3,262,270.0000	1,733.2441
2015_12	2,848,510.0000	60.0000	2,848,450.0000	1,513.3815
2015	**37,946,320.0000**	**510.0000**	**37,945,810.0000**	**20,160**
2016_01	3,050,880.0000	220.0000	3,050,660.0000	1,620.8157
2016_02	2,987,130.0000	40.0000	2,987,090.0000	1,587.0409
2016_03	3,477,940.0000	50.0000	3,477,890.0000	1,847.8030
2016_04	3,502,210.0000	20.0000	3,502,190.0000	1,860.7135
2016_05	3,406,540.0000	50.0000	3,406,490.0000	1,809.8681
2016_06	3,126,640.0000	80.0000	3,126,560.0000	1,661.1413
2016_07	3,057,820.0000	50.0000	3,057,770.0000	1,624.5932
2016_08	2,998,960.0000	70.0000	2,998,890.0000	1,593.3103
2016_09	2,860,890.0000	70.0000	2,860,820.0000	1,519.9537
2016_10	2,984,030.0000	120.0000	2,983,910.0000	1,585.3514
2016_11	2,790,200.0000	40.0000	2,790,160.0000	1,482.4120
2016_12	2,636,060.0000	60.0000	2,636,000.0000	1,400.5068
2016	**36,879,300.0000**	**870.0000**	**36,878,430.0000**	**19,593**
Total	**100,552,830.0000**	**1,680.0000**	**100,551,150.0000**	**53,421**

E.1.2. Methane Destruction Component:

Baseline emissions of methane from the SWDS are determined as follows, based on the amount of methane that is captured under the project activity and the amount that would be captured and destroyed in the baseline (such as due to regulations). In addition, the effect of methane oxidation that is present in the baseline and absent in the project is taken into account:

$$BE_{CH4,y} = (1 - OX_{top-layer})(F_{CH4,PJ,y} - F_{CH4,BL,y})GWP_{CH4} \quad \textbf{(4)}$$

Where:

$BE_{CH4,y}$	Baseline emissions of LFG from the SWDS in year *y* (t CO2e/yr)
$OX_{top-layer}$	Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)
$F_{CH4,PJ,Y}$	Amount of methane in the LFG which is flared and/or used in the project activity in year *y* (t CH4/yr)
$F_{CH4,BL,y}$	Amount of methane in the LFG that would be flared in the baseline in year *y* (t CH4/yr) *(it is assumed to be zero)*
GWP_{CH4}	Global warming potential of CH4 (t CO2e/t CH4)

For example, for the year 2014, as we can see from the ER Excel spreadsheet;

$BE_{CH4,2014} = (1 - 0.1)*(5,460.34 - 0)* 25 = 122,857\ tCO_2e$

For the year 2015, as we can see from the ER Excel spreadsheet;

$BE_{CH4,\ 2015}$ = (1 – 0.1)*(7,598.15– 0)* 25 = 170,958 tCO_2e

For the year 2016, as we can see from the ER Excel spreadsheet;

$BE_{CH4,\ 2016}$ = (1 – 0.1)*(6,601.54 – 0)* 25 = 148,534 tCO_2e

During the crediting period, $\mathbf{F_{CH4,\ PJ,y}}$ is determined as the sum of the quantities of methane flared and used in power plant(s), boiler(s), air heater(s), kiln(s) and natural gas distribution network, as follows based on the UNFCCC Methodology ACM0001 Version 13: ' Flaring or use of landfill gas[9]:

$$F_{CH4,PJ,y} = F_{CH4\ flared,y} + F_{CH4,EL,y} + F_{CH4,HG,y} + F_{CH4,NG,y} \quad \textbf{(5)}$$

Where:

$F_{CH4,PJ,y}$: Amount of methane in the LFG which is flared and/or used in the project activity in year *y* (t CH4/yr)

$F_{CH4,flared,y}$ Amount of methane in the LFG which is destroyed by flaring in year *y* (t CH4/yr)

$F_{CH4,EL,y}$ Amount of methane in the LFG which is used for electricity generation in year *y* (t CH4/yr)

$F_{CH4,HG,y}$ Amount of methane in the LFG which is used for heat generation in year *y* (t CH4/yr)

$F_{CH4,NG,y}$ Amount of methane in the LFG which is sent to the natural gas distribution network in year *y* (t CH4/yr)

The amount of methane that is destroyed/ combusted in project scenario during year y is determined by monitoring the quantity of methane actually flared and by monitoring the gas used to generate electricity, and the total quantity of methane captured. There is neither methane used for generation of thermal energy (HG) nor sent to the pipeline for feeding to the natural gas (NG) distribution network or flared.

Thus, $F_{CH4,\ PJ,\ y}$ will be calculated as follow. Calculation is done in excel sheet 'emission reduction' column F:

$$F_{CH4,PJ,y} = F_{CH4\ flared,y} + F_{CH4,EL,y} \quad \textbf{(6)}$$

While flare efficiency could not be confirmed for each minutes, the efficiency added as "zero" to the calculation. As per Tool 06 Project Emissions from Flaring Version 03.0 Paragraph 22, taking efficiency as zero for enclosed flares is possible and conservative. Due to the fact that flare efficiency is assumed to be zero $F_{CH4,flared,y}$ becomes zero also. And $F_{CH4,EL,y}$ becomes equal to $F_{CH4,PJ,y}$.

For the year 2014, as we can see from the ER Excel spreadsheet; $F_{CH4,\ PJ,\ 2014}$ =5,460.34; $F_{CH4,\ EL,\ 2014}$ = 5,460.34 *tCH_4 and* $F_{CH4,\ flared,\ 2014}$ = 0 *for the year of 2014.*

For year 2015; $F_{CH4,\ PJ,\ 2015}$ =7,598.15; $F_{CH4,\ EL,\ 2015}$ = 7,598.15 tCH_4 and $F_{CH4,\ flared,\ 2015}$ = 0 for the year of 2015.

For year 2016; $F_{CH4,\ PJ,\ 2016}$ =6,601.54; $F_{CH4,\ EL,\ 2016}$ = 6,601.54 tCH_4 and $F_{CH4,\ flared,\ 2016}$ = 0 for the year of 2016

9 https://cdm.unfccc.int/filestorage/E/Y/F/EYFHCV3K4J5P06DTQSG9WLMOBNUX2I/EB67_repan12_ACM0001_ver13.0.0.pdf?t=d1N8bml5NXBufDBcqEutRdBgweII-mXeF-YD

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

Project emissions from flaring gases containing methane

While flare efficiency could not be confirmed for each minutes, the efficiency added as "zero" to the calculation. Due to the fact that flare efficiency is assumed to be zero, $F_{CH4,flared,y}$ becomes zero also. And thus, all LFG that is sent to the flare unit ends up as project emissions.

$PE_{flare,}$ =25 $tCO2/tCH_4$ * 79,757 (Baseline Emissions Methane tab column M) kg CH_4/hr * (1-0) * 10^{-3} $tCH4/kgCH_4$ = 1,995 tCO2e

Amount of methane destroyed by electricity production (F_CH4, electricity, y)

$$F_{CH4,EL,y} = LFG_{electricity,y} * w_{CH4} * D_{CH4} \quad \textbf{(10)}$$

For verification purposes, the LFG consumption in the flare and gen-sets throughout the monitoring period was obtained from measurement devices.

$F_{\_CH4\_EL}$ can be read as19,660.03 tons from Column H of Baseline Emissions Methane tab of ER Excel workbook during Monitoring Period.

Project emissions from consumption of fossil fuels due to project activity

$$PE_y = PE_{EC,y} + PE_{FC,y} \quad \textbf{(12)}$$

Where:

PE_y Project emissions in year *y* (t CO2/yr)

$PE_{EC,y}$ Emissions from consumption of electricity due to the project activity in year *y* (t CO2/yr)

$PE_{FC,y}$ Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year *y* (t CO2/yr)

There is no project emissions from consumption of electricity while the electricty consumed is already subtracted from gross electricty generation. Project emission is caused by consumption of fosil fuel by the Project activity. That is calculated using the "Tool to calculate project or leakage CO emissions from fossil fuel combustion"

$$PE_{FC,y} = \sum_k FC_{i,j,y} xCOEF_{j,y} \quad \textbf{(13)}$$

Where:

$PE_{EC,y}$ Project emissions for electricity consumption in year y (tCO2/yr)

$FC_{i,j,,y}$ Quantity of fuel type i combusted in process j in the year y,

$COEF_{j,y}$ emission coefficient of fuel type i in the year y (t CO2)

The CO_2 emission coefficient is calculated following Option B based on net calorific value and CO_2 emission factor of the fuel type I as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y} \quad \textbf{(14)}$$

Where;

$COEF_{i,y}$ CO_2 emission coefficient of fuel type i in year y

$NCV_{i,y}$ the weighted average net calorific value of the fuel type I in year y
$EF_{CO2,y}$ the weighted average CO_2 emission factor of fuel type I in year y
i are the fuel types combusted in process j during the year y

Total Fuel Consumption in Liters	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2016 - Total Diesel Consumption (lt)	107.0000	112.0000	85.0000	0.0000	0.0000	0.0000	15.0000	0.0000	50.0000	0.0000	50.0000	200.0000	619.0000
2015 - Total Diesel Consumption (lt)	0.0000	30.0000	0.0000	198.0000	55.0000	386.0000	0.0000	0.0000	0.0000	62.0000	10.0000	50.0000	791.0000
2014 - Total Diesel Consumption (lt)	n/a	n/a	n/a	0.0000	0.0000	0.0000	0.0000	50.0000	74.0000	32.0000	0.0000	0.0000	156.0000
												TOPLAM =	1566.0000

Total Fuel Consumption in tonnes	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2016 - Total Diesel Consumption (tons)	0.0890	0.0932	0.0707	0.0000	0.0000	0.0000	0.0125	0.0000	0.0416	0.0000	0.0416	0.1664	0.5150
2015 - Total Diesel Consumption (tons)	0.0000	0.0250	0.0000	0.1647	0.0458	0.3212	0.0000	0.0000	0.0000	0.0516	0.0083	0.0416	0.6581
2014 - Total Diesel Consumption (tons)	n/a	n/a	n/a	0.0000	0.0000	0.0000	0.0000	0.0416	0.0616	0.0266	0.0000	0.0000	0.1298
												TOPLAM =	1.3029

Project Emissions	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2016 - Project Emissions	0.2883	0.3018	0.2291	0.0000	0.0000	0.0000	0.0404	0.0000	0.1347	0.0000	0.1347	0.5389	2
2015 - Project Emissions	0.0000	0.0808	0.0000	0.5336	0.1482	1.0402	0.0000	0.0000	0.0000	0.1671	0.0269	0.1347	3
2014 - Project Emissions	n/a	n/a	n/a	0.0000	0.0000	0.0000	0.0000	0.1347	0.1994	0.0862	0.0000	0.0000	1
												TOPLAM =	6

In the following Table, it is possible to see monthly used diesel for project activity purposes. These values in liters are directly retrieved from project engineer.

Total Diesel consumption = 1,556 liters
Total consumed fuel in tonnes = 1.3 tons
Emission factor (kg/Tj) = 0.0748 tCO2/Gj and NCV (Gj/Tt) = 43.3 Gj/Tt
COEF = 3.1863 and finally PE = 3.2 *1.3 = 4.2 tCO2/yr

E.3. Calculation of leakage emissions

No leakage needs to be considered.

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

	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	495,770	2,001	0	-	493,769	493,769

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)
493,769 tCO2e	172,746 tCO2e

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

Estimated emission reduction in ex ante calculation of registered PDD Version 8 is 62,812 tCO2e for 2014, 64,031 tCO2e for 2015 and 61,391 tCO2e for 2016. If the 2014 ER estimate is to be apportioned (275 days) along with the emissions of 2015 and 2016, the value comes out to be 62,812 *(275/365) + 64,031 + 61,391 = 172,746 tCO2e and actual emission reduction achieved during this monitoring period is 493,769 (for 01/04/2014-31/12/2016, 1006 days). The actual emission

reductions achieved during the monitoring period exceed the estimated values. The percentage of the difference between actual and estimated is % 186.

E.6. Remarks on increase in achieved emission reductions

Year	PDD ER Estimation	Current Monitoring Period
01.04.2014 – 31.12.2014	62,812	135,799
01.01.2015 – 31.12.2015	64,031	190,102
01.01.2016 – 31.12.2016	61,391	167,868
TOTAL	172,746	493,769

The actual value of emission reduction has been more than estimated in registered PDD; this was since ex-ante estimations are based on conservative default values such as the "collection efficiency", which by default is 50%, a MCF value of 1 by default and a "correction factor" of 0.75 etc. These default values provide a rough ex-ante estimation that is impossible to match precisely with ex-post measuring results. If the default values of the correction factor (0.75) and collection efficiency (50%) were not applied, the FOD model would have resulted in approximately 460,656 tCO_2e. In addition, factors such as instantaneous atmosphere pressure and temperature, methane ratio in the gas, and engine maintenance work affect the methane volume to engines. Also, as the following graph from the feasibility study suggests, LFG volumes produced are expected to reach their highest levels between 2014 and 2016.

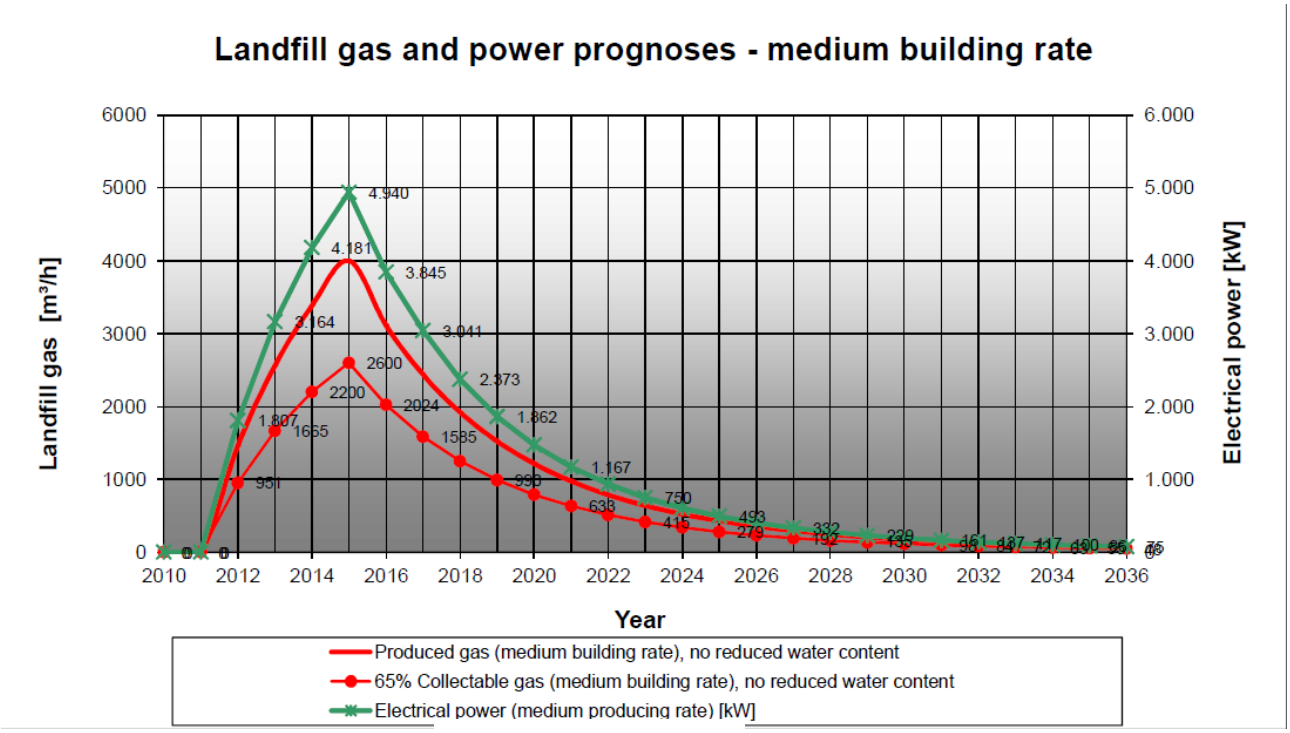

Figure 3: LFG prognoses

A comparison between estimated and the actual net electricity generations for 2014, 2015 and 2016 years is given below. As seen from the Table for years 2015 and 2016, actual net electricity generation was more than 30% than the estimated values in the registered PDD.

	2014	2015	2016
Estimated Net Electricity Generation	24,907 MWh	24,907 MWh	24,907 MWh
Actual Net Electricity Generation	25,726 MWh	37,945 MWh	36,878 MWh
Difference	+3.18%	+34.36%	+32.46%

A comparison between estimated methane generation potential and the actual methane generations for 2014, 2015 and 2016 is given in the table below. As seen from the table below, for years 2015 and 2016, actual methane generation was more than 40% than the estimated values in the registered PDD.

	2014	2015	2016
Estimated Methane Generation Potential	99,156 tCO2e	101,594 tCO2e	96,314 tCO2e
Actual Methane Generation	137,233 tCO2e	190,966 tCO2e	165,294 tCO2e
Difference	+27.75 %	+46.80 %	+41.73 %

Moreover, higher LFG capture results from high quality and efficient piping systems laid in the waste, professional engineering design and operation, careful waste terracing and a low percentage of repairs. Finally, the GWP value was taken as 21 in the registered PDD, whereas during the crediting period, it has been accepted as 25; this can result in higher emission reductions also.

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

N/A

Sustainable Monitoring Report

According to the requirements of Gold Standard Version 2.1, the project activity must be assessed against a matrix of sustainable development indicators. Project activity's contribution to sustainable development is based on indicators of;

- environmental sustainability,
- social sustainability & development
- economic & technological development

The indicators that have to be monitored is defined in the Gold Standard Passport of the **Kayseri Landfill gas** under a monitoring plan.

Sustainable Development Indicators that have to be monitored

Air Quality

Monitoring Table from GS Passport of Kayseri Landfill gas

No		1
Indicator		Air Quality
Mitigation measure		a) No precautions required b) No precautions required
Chosen parameter		a) Level of hydrogen sulphide combusted in the gas engines. b) Amount of CO, NMVOC
Current situation of parameter		a) No quantitative information is available for projection of described emission rates. b) Not applicable
Estimation of baseline situation of parameter		a) Not applicable b) According to latest official data CO and NMVOC emissions due to electricity generation in 2010 are: 0.134 tons/GWh and 0.034 tons/GWh respectively [10]
Future target for parameter		a) Avoidance of significant amount of hydrogen sulphide. b) CO: 3.3 tonnes NMVOC: 0.8 tonnes
Way of monitoring	How	a) Between 0-1% of volume of the landfill gas is known to contain sulfides. The amount of sulphide will be calculated based on the amount of landfill gas combusted in the engines as followed: Vsulphide destroyed=VLFGdestroyed * 0.005 (Where "V" represents the volume in m3. A conservative approach of 0.5% is set for the sulphide content.) b) Amount of electricity generated will be monitored to calculate estimated CO and NMVOC emission reductions by project activity.
	When	a) Annually b) Annually
	By who	Assigned technician by Plant Manager or assigned carbon consultant

[10] The unit emissions are calculated as dividing emission amount for each parameter with net electricity amount. (For CO see TUIK: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=8537&tb_id=7and NMVOC emission amounts see TUIK: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=8537&tb_id=8; For net electricity generation in 2010 see TEİAŞ http://www.teias.gov.tr/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/ithalat-ihracat(50-54)/52.xls.

Monitoring of Air Quality Indicator

No	1
Indicator	Air Quality
Remarks on the monitoring process of the parameter	Monitoring of the parameter is based on the data available from TUİK and electricity generation of the plant.
Current situation of parameter	According to the current data available electricity amount produced (100,551 MWh/period) by Kayseri landfill gas project, amount of avoided emissions are as below[11]: NO_x =129.4 tons; CO=14.6 tons; NMVOC=3.1 tons
Other Data Sources	No other data sources then TUIK official data and electricity generation of the plant.
Scoring of the indicator compared to Baseline	+

No	1
Indicator	Air Quality
Remarks on the monitoring process of the parameter	Odour and health improvement
Current situation of parameter	Reduction of odour: By effectively collecting LFG that would otherwise be emitted freely, the Project reduces H_2S (a foul smelling gas) emissions
Other Data Sources	Interview with stakeholder.
Scoring of the indicator compared to Baseline	+

Water Quality and Quantity
Monitoring Table from GS Passport of Kayseri Landfill gas

No		2a
Indicator		Water Quality and Quantity
Mitigation measure		No precautions required
Chosen parameter		Amount of avoided wastewater to be discharged to the environment by project activity.
Current situation of parameter		Not applicable
Estimation of baseline situation of parameter		+20,500 m^3 of wastewater production with each GWh electricity generated[12].
Future target for parameter		-509,800 m^3/year wastewater avoidance with annual generation of the project.
Way of monitoring	How	a) Amount of electricity generated will be monitored to calculate estimated amount of avoided wastewater discharge by project activity.
	When	Annually
	By who	Assigned technician by Plant Manager or assigned carbon consultant

No	2b
Indicator	Water Quality and Quantity
Mitigation measure	Transfer of leachate to wastewater plant of Municipality

[11] For NOx: http://www.tuik.gov.tr/HbGetir.do?id=13482&tb_id=6

[12] For Wastewater discharged in 2008 by thermal PPs see cell A5 of Table-2 from: http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=10732&tb_id=2

Chosen parameter		Amount of avoided leachate be discharged to the environment
Current situation of parameter		Leachate left to decay by municipality which cause water and soil pollution
Estimation of baseline situation of parameter		Continuation of the situation
Future target for parameter		Avoidance of leachate
Way of monitoring	How	Transfer receipt provided by Municipality
	When	annually
	By who	Assigned technician by Plant Manager or carbon consultant

Monitoring of Water Quality and Quantity Indicator

No	2a
Indicator	Water Quality and Quantity
Remarks on the monitoring process	Monitoring process was based on the calculation
Current situation of parameter	In 2014, 6,400,042*1000m^3 waste water was discharged by thermal power plants in Turkey. Net electricity generation in 2014 was 251,962.8 MWh, corresponding to 25.4*1000 m3/GWh discharged waste water. Annual Electricity Generation of Project Activity is 100.551 GWh/y and so thus, amount of Avoided Wastewater Discharge per year by Project Activity is 2,554.1x1000 m^3/y. Additionally, Water will be used only for daily consumption. 17 workers were employed during operation. Daily water usage per worker is 0,181m^3.The wastewater produced by the Project Activity is calculated as; 17*0,181*365/1000 = 1.123*1000 m^3/year Thus, Total avoided wastewater discharge per year can be calculated as 2,554.1x1000 m^3/y - 1.123*1000 m^3/y=2,553.0 *1000 m^3/y And total avoided wastewater discharge during the Monitoring Period can be calculated as; 2,553 x1000 m^3/y *(275/365) + 2,553 x1000 m^3/y + 2,553 x1000 m^3/y = 7029.4*1000 m^3.
Other Data Sources	No other sources of data then calculation sheet and references.
Scoring of the indicator compared to Baseline	+

No	2b
Indicator	Water Quality and Quantity
Remarks on the monitoring process	Leachate collection pool has a volume of 1,368 m^3 and in 6 days it can be totally filled up. So, it can be assumed that hourly leachate flow rate is 9,5 m^3/h. Total amount of leachate generated during monitoring period can be calculated as; For 2014 as 1,368 m^3 * (275days/6days) = 62,700m^3 For 2015 1,368 m^3 * (365days/6days) = 83,220m^3 For 2016 1,368 m^3 * (365days/6days) = 83,220m^3. Total amount during monitoring period = 229,140 m^3. The leachate is being transferred to the sewerage system of Kayseri via pipelines and there is a valve which can also be employed to store leachate for several days. So that, transfer

	of leachate can be accomplished simultaneously or it can be stored for six days and then leachate can be transferred to the Wastewater Treatment Plant of Kayseri.
Current situation of parameter	Transfer of leachate to waste water plant of Municipality
Other Data Sources	No other source than the receipt provided by Municipality
Scoring of the indicator compared to Baseline	+

Soil Condition
Monitoring Table from GS Passport of Kayseri Landfill gas

No		3
Indicator		Soil condition
Mitigation measure		No precautions required
Chosen parameter		Amount of avoided NOx emissions,
Current situation of parameter		Not applicable
Estimation of baseline situation of parameter		According to latest official data NOx emissions due to electricity generation in 2010 is: 2.218 tons/GWh[13].
Future target for parameter		-55.2 tons/year avoidance with annual generation of the project.
Way of monitoring	How	Amount of electricity generated will be monitored to calculate estimated NOx emission reductions by project activity.
	When	Annually
	By who	Assigned technician by Plant Manager or assigned carbon consultant

Monitoring of Soil Conditions

No	3
Indicator	Soil condition
Remarks on the monitoring process	Monitoring process was based on the calculation.
Current situation of parameter	According to the current data available electricity amount produced (100,551 MWh) by Kayseri landfill gas project, amount of avoided NOx emissions is as below: 129.4 tons/year NOx avoidance with annual generation of the project.
Other Data Sources	No other sources of data then calculation sheet and references.
Scoring of the indicator compared to Baseline	0

Quality of employment
Monitoring Table from GS Passport of Kayseri Landfill gas

No	4
Indicator	Quality of employment
Mitigation measure	Health and Safety Trainings
Chosen parameter	a) Number of employees having Health & Safety Trainings b) Personal protection equipment
Current situation of parameter	None
Estimation of baseline situation of parameter	Not applicable

[13] The unit emissions are calculated as dividing emission amount for each parameter with net electricity amount. (For NOx emission amount see TUIK: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=6276&tb_id=6) ; For net electricity generation in 2008 see TEİAŞ: http://www.teias.gov.tr/istatistik2008/30(84-08).xls. Calculation is further substantiated in Monitoring Plan of CM Calculation Worksheet, which is available to DOE.

Future target for parameter		a) Trainings completed b) Provision of workers with required equipment in line with the Regulations
Way of monitoring	How	a) Training certificates or records for attendance to the trainings. In the following years, only new trainings will be reported. b) Checking equipment and procedural documents by DOE on site visit.
	When	a) Once during the first verification, only certificates of new employees will be provided at the end of the each monitoring period b)Annually
	By who	Assigned technician by Plant Manager or assigned carbon consultant.

Monitoring of Quantitative employment and income generation

No	4
Indicator	Quality of employment
Remarks on the monitoring process of the parameters	Monitoring process was handled by; training certificates and checking equipment
Current situation of parameter	For 2014:There were 17 people employed, and all of them attended the Health & Safety training. For 2015:There were 17 people employed, and all of them attended the Health & Safety training For 2016:There were 17 people employed, and all of them attended the Health & Safety training
Other Data Sources	No other sources of data than certificates and DOE interviews.
Scoring of the indicator compared to Baseline	+

Access to affordable and clean energy services
Monitoring Table from Passport of Kayseri Landfill gas

No		5
Indicator		Access to affordable and clean energy services
Mitigation measure		None
Chosen parameter		Change in energy use
Current situation of parameter		0
Estimation of baseline situation of parameter		Not applicable
Future target for parameter		25.8 GWh/yr (annual estimated generation)
Way of monitoring	How	Amount of electricity generated will be monitored
	When	Annually
	By who	Assigned technician by Plant Manager or assigned carbon consultant

Monitoring of Access to affordable and clean energy services

No	5
Indicator	Access to affordable and clean energy services
Remarks on the monitoring process of the parameters	Monitoring process was handled by calculated electricity generation
Current situation of parameter	100.55 GW/period electricity generation
Other Data Sources	No other sources of data than PMUM data

Scoring of the indicator compared to Baseline	+

Quantitative employment and income generation

Monitoring Table from Passport of Kayseri Landfill gas

No		6
Indicator		Quantitative employment and income generation
Mitigation measure		No mitigation measures are required.
Chosen parameter		Number of employment
Current situation of parameter		0
Estimation of baseline situation of parameter		Not applicable
Future target for parameter		Local recruitment
Way of monitoring	How	Social security records
	When	Annually (Once at the end of the each monitoring period)
	By who	Assigned technician by Plant Manager or assigned carbon consultant.

Monitoring of Quantitative employment and income generation

No	6
Indicator	Quantitative employment and income generation
Remarks on the monitoring process of the parameters	The parameter is based on the SGK documents
Current situation of parameter	17 staff were employed for the project. [14]
Other Data Sources	No other sources of data than SGK documents
Scoring of the indicator compared to Baseline	+

[14] Related documents have been now provided to VVB.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Her Enerji Üretim Sanayi ve Ticaret A.Ş. (Her Enerji)
Street/P.O. Box	Kayseri Asfaltı 8.km.
Building	
City	Koca Sinan / Kayseri
State/region	
Postcode	
Country	TURKEY
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Contact person	Hakkı Azizlerlioğlu
Title	Project Manager
Salutation	Mr.
Last name	Azizlerlioğlu
Middle name	
First name	Hakkı
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	

Project participant and/or responsible person/ entity	☐ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Life İklim ve Enerji Ltd.Şti.
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State/Region	Ankara
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Website	http://www.lifeenerji.com.tr
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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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