

TEMPLATE

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

RELATED SUPPORT - **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

Key Project Information

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KEY PROJECT INFORMATION

Key Project Information

GS ID (s) of Project (s)	GS 1068 ¹
Title of the project (s) covered by monitoring report	Bursa-Hamitler Landfill Gas Collection and Energy Utilization Project
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	05
Version number of the monitoring report	08
Completion date of the monitoring report	10/03/2025
Date of project design certification	29/08/2013
Date of Last Annual Report	11/12/2023
Monitoring period number	1 st of the 2 nd crediting period
Duration of this monitoring period	04/11/2022 – 31/07/2023 (both dates included) ²
Project Representative	EKI Energy Services Limited
Host Country	Türkiye
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	Large-scale Consolidated Methodology ACM0001 “Flaring or use of landfill gas” Version 19.0

¹ <https://registry.goldstandard.org/projects/details/53>

² 2) As per the clarification reference no. CL_149 and the response dated 21/02/2023, the Secretariat has confirmed that in cases of delayed submission for design certification renewal, GS credits can be claimed from the date of submission of the Final Validation Report to the certification body. During the verification process, it was observed that the monitoring period start date of 04/11/2022 aligns with the date of submission of the Final Validation Report for design certification renewal, ensuring compliance with the applicable guidelines.

Product Requirements applied

- ☒ GHG Emissions Reduction & Sequestration
- ☐ Renewable Energy Label
- ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
SDG 13 Take urgent action to combat climate change and its impacts	Reduction of Greenhouse gas emission	122,614 tCO ₂	GS-VER
SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all	Electricity generated using landfill gas	25,946	MWh
SDG 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Employment generated due to the project activity	19 employment and 2 trainings	Number

Table 2 – Product Vintages

		Amount Achieved
Start Dates	End Dates	SDG 13
04/11/2022	31/12/2022	29,090 tCO ₂ e
01/01/2023	31/07/2023	93,524 tCO ₂ e

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

Bursa Landfill Gas Recovery and Utilization Project (hereafter referred to as "the Project") is being developed by "ITC-KA Enerji Üretim San. ve Tic. A.Ş."³ (hereafter referred to as the "Project Participant"). On 14/01/2011 Bursa Greater Municipality transferred the right of use of the landfill area to the Project Participant.

The objective of the project activity is to capture and utilize the LFG (Landfill Gas) from Hamitler Landfill Area for electricity generation which will be exported to the national grid. The Hamitler Landfill Area, is located in Bursa Province, has been established as a wild landfill area in 1996 and has been operational since then accepting approximately 2,000 ton/day Municipal Waste (MSW) from approximately 2.6 million inhabitants of Bursa Province. The estimated average amount of MSW to be supplied to the landfill during the current crediting period will be 2,413 tons/day. It is estimated that a total of around 23 million tons of MSW will be accumulated in the landfill area by the end of 2029.

The project activity involves the covering of the landfill area and installation of a gas extraction system, capturing the LFG and feeding it to gas engines for electricity generation. Any excess of LFG (during emergency / non-operational phase of gas engine) will be flared in an enclosed flare system. The total installed capacity of the electricity generation unit under the project activity is 9.8 MW⁴ with an estimated electricity generation of approximately 68,600 MWh/year⁵. The generated electricity will be delivered to the national grid.

In the baseline situation the LFG was released into the atmosphere without any collection, flaring or utilization. Landfill gas is one of the largest sources of methane emissions to the atmosphere and typically contains approximately 50% methane⁶, which is a potent greenhouse gas.

The baseline scenario is the same as the existing scenario, in which the municipal waste is deposited and left for decay at the landfill site, leading to generate and release of large amounts of landfill gas. Landfill gas is one of the largest sources of methane emissions to the atmosphere and typically contains 50% methane, a potent greenhouse gas. GHG emission reductions will be achieved by two means.

³ The owner of the project is changed from ITC Bursa Enerji Üretim Sanayi ve Ticaret A.Ş. to ITC-KA Enerji Üretim Sanayi ve Ticaret A.Ş. New generation license in the name of ITC-KA Enerji Üretim Sanayi ve Ticaret A.Ş. is given by EPDK on 03/02/2022 as a continuation of the old generation license.

⁴ The Generation License obtained from EMRA (Electricity Market Regulatory Authority) is available to the VVB)

⁵ Based on the assumption of a 7000h operational hour when reaching full capacity of 9.8MW.

⁶ US Environmental Protection Agency: Facts About Landfill Gas
<http://www.dem.ri.gov/programs/benviron/waste/central/lfgfact.pdf>

- By collection and destruction of methane by power generation, and;
- Displacing an equal amount of electricity generated by power plants connected to the electricity system.

The total estimated GHG emission reductions of the project activity for the second crediting period are 1,828,257 tCO₂e as per registered PDD Version 05.

Prior Consideration of GS VERs:

The important milestones of the project activity addressing the prior consideration are presented as follows:

Date	Event
10/12/2010	Board Decision on GS VERs
14/01/2011	Transfer of Landfill to the PP
21/04/2011	LSC meeting
20/06/2011	Start of construction
19/05/2012	Commissioning of five power generation units (confirmed through the Temporary Acceptance Protocol)
27/07/2012	Commissioning of one power generation units (confirmed through the Temporary Acceptance Protocol)
07/09/2012	Commissioning of one power generation units (confirmed through the Temporary Acceptance Protocol)
19/05/2012 – 18/05/2019	First crediting period ⁷
19/05/2012 – 31/12/2013	First monitoring period
19/05/2019 – 18/05/2026	Second crediting period (Due to the delay in design certification renewal, there is a gap of issuance of emission reduction from 19/05/2019 to 03/11/2022. The deviation request dated 17/01/2022 regarding this issue was not approved. Therefore, no issuance has been or could be claimed for a delayed period in design certification renewal, i.e. from 19/05/2019 to 03/11/2022).
03/02/2022	New generation license in the name of ITC-KA Enerji Üretim Sanayi ve Ticaret A.Ş. is given by EPDK
04/11/2022-31/07/2023	1 st monitoring period of the 2 nd crediting period
30/11/2023	Physical site visit for the first monitoring period of second crediting period

⁷ The estimated starting date of the crediting period is defined as 01/09/2012 as per the registered PDD. However, first five gas engines were in operation on 19/05/2012 as confirmed through the temporary acceptance protocol. Therefore, the date is revised in the monitoring report.

Both awareness and consideration could be demonstrated transparently through the timeline of the project activity. The board has decided to put an offer to the tender of Bursa Landfill Management by the Municipality based on the GS VERs revenues. This decision has been documented very clearly and transparently through the board decision on 10/12/2010, which predates any kind of action towards implementation of the project activity.

Contribution to Sustainable Development:

The project activity will also contribute significantly to the region's sustainable development:

- The project activity will significantly improve local air quality by reducing the amount of pollutants emissions contained in the LFG. Landfill areas cause odour nuisance and have a high risk of explosion and fire. By properly covering the landfill and extracting the landfill gas, the odour nuisance and risk of explosion and fire will be significantly reduced.
- The project activity will result in the creation of local employment.
- The project activity will contribute to reduce global warming by reducing CH₄, which has a global warming potential 28 times of CO₂.
- The project results in the transfer of knowledge on waste management principles

Eligibility of the project under Gold Standard

The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document, V1.2⁸, as described below:

- (a) Project Type: The project includes the LFG extraction and utilization activity. Since the project includes methane recovery and considers emission reductions from both methane avoidance and make use of landfill recovered for the delivery of energy services (electricity) the project is an eligible project in accordance with 1.3.1 of the Annex A – Additional Eligibility Criteria for Specific Project Types under Gold Standard for The Global Goals Renewable Energy Activity Requirements, Version 1.4. The project applies methodologies Approved consolidated baseline methodology ACM0001: Flaring or use of landfill gas Version 19.0, which is an approved methodology under Gold Standard.
- (b) Project Location: The project is located in Türkiye is eligible. Refer section A.2 for the geo-coordinates.
- (c) Project Area, Boundary and Scale: The project activity follows the UNFCCC approved methodology (ACM0001: Flaring or use of landfill gas Version 19.0) and project Area and Boundary is defined in line with methodological requirement. The project activity is a Waste Handling and Disposal project along with electricity generation units and qualifies under large scale projects. In

⁸ https://globalgoals.goldstandard.org/standards/101_V1.2_PAR_Principles-Requirements.pdf

accordance with GS Product Requirement - GHG Emissions Reduction & Sequestration Product Requirements, Version 2.1. Paragraph 9: Project Scale, All Projects exceeding the small-scale thresholds are defined as large scale. The project activity being a landfill gas and alternate water treatment measures belongs to Type 3: Other project activities. Since the annualized emission reduction from the project activity of 261,180 tCO₂e/year is higher than small-scale thresholds of 60,000 tCO₂e per year in any year of the crediting period therefore the project activity complies to the large-scale project activity).

- (d) Host Country Requirements: The projects have obtained all the required clearances for the commissioning of the project from the host country government and is in compliance with applicable Host Country's legal, environmental, ecological and social regulations.
- (e) Contact Details: Please refer Appendix 2 for the contact details. ITC-KA Enerji Üretim San. ve Tic. A.Ş. is acting as project proponent (PP) of project activity.
- (f) Legal ownership: please refer section A.1.2 for the legal ownership details.
- (g) Other Rights: The project activity adapts Turkish Republic Laws and Regulations governing the landfill gas component.
- (h) Official Development Assistance (ODA) Declaration: Refer Section A.5 for the information of funding sources of projects.

The project activity results in displacement of electricity from fossil fuel powered power stations supplying to the grid while contributing to sustainable development of Türkiye. Hence, the project contributes to the Gold Standard Vision and Mission.

As per section 1 Scope and Applicability of GS4GG-Renewable-Energy-Activity-Requirements-v1.4⁹, the project activity conforms (a) Gold Standard for the Global Goals Principles & Requirements (and associated documents) AND (b) Gold Standard Renewable Energy Activity Requirements.

As per the Renewable-Energy-Activity-Requirements-v1.4¹⁰, section 2 Eligible Project Types is described below:

- The project activity is in compliance to section 2.1.2 (a) of Renewable-Energy-Activity-Requirements-v1.4, as the project is generating electricity from non-fossil fuel i.e., from landfill gas and biogas.
- As per the section 2.1.2 (b), this project comprises of electricity generation through landfill gas and biogas and supplying electricity to the grid.

⁹ https://globalgoals.goldstandard.org/standards/202_V1.4_AR-Renewable-Energy-Activity-Requirements.pdf

¹⁰ https://globalgoals.goldstandard.org/standards/202_V1.4_AR-Renewable-Energy-Activity-Requirements.pdf

- The project is grid connected energy project and not supplying electricity to a mini-grid and therefore is not required to refer to Community Services Activity Requirements (2.1.2 (c)).
- As per Section 2.1.4 since the project includes waste to energy projects that involve utilization of landfill gas/biogas to electricity generation the project is not required to satisfy the eligibility condition of section 2.1.3.
- The project activity is not generating on-site energy for captive consumption at an industrial facility therefore the eligibility criteria is not applicable to the project activity (2.1.2(d)).
- In accordance with Electricity Market Production Capacity Projections List¹¹

Years	2021	Share in 2021 (%)
Lignite	61.33	14.26%
Hard Coal	5.91	1.37%
Imported Coal	26.82	6.23%
Natural Gas	176.01	40.91%
Geothermal	1.40	0.33%
Fuel Oil	9.22	2.14%
Diesel	0.15	0.03%
Nuclear	21.00	4.88%
Other	1.41	0.33%
Thermal Total	316.11	70.49%
Biogas + Waste	1.20	0.28%
Hydro	116.56	27.09%
Wind	9.21	2.14%
Total	443070	100.0%

The above data clearly shows that the percentage generation capacity from biogas+waste is 0.28% and the level of penetration is lower than 5% of the total grid installed capacity. Therefore, the project is eligible (2.1.3). Although in accordance with paragraph 2.1.4 and 2.1.5 the project is not required to establish its eligibility against paragraph 2.1.3.

- The project activity includes use of landfill gas for power generation and claims for emission reductions from both methane avoidance (including from the flared biogas fraction) and non-renewable fuel substitution and is demonstrated that the system was designed in a way to at least make use of some of the biogas recovered for the delivery of energy services (e.g., electricity, heat) in accordance to Annex A (Additional Eligibility criteria for specific project types) of Renewable-Energy-Activity-Requirements-v1.4 document is not applicable for the project activity.
- In accordance with paragraph 2.1.8 Additional eligibility criteria for specific Renewable Energy project technologies like Hydropower, projects using biomass

¹¹ EMRA | Energy Market Regulatory Authority (epdk.gov.tr)

resources, biogas, waste heat/gas recovery, fossil co-generation, waste incineration and gas, and waste handling and disposal etc., are prescribed in Annex A. In accordance with Technology Specific Eligibility Criteria under Annex-A

Methane recovery project activities shall be eligible for emission reductions from both methane avoidance (including from the flared biogas fraction) and non-renewable fuel substitution as long as evidence is provided on time for validation to demonstrate that the system was designed in a way to at least make use of some of the biogas recovered for the delivery of energy services (e.g., electricity, heat).	The project activity includes use of recovered landfill gas and biogas for power generation and export of the power to the national grid. Since the project activity is designed to make use of the biogas recovered for the delivery of energy services i.e. electricity generation therefore the project activity is eligible for emission reductions from both methane avoidance and non-renewable fuel substitution (substituting grid power generated in the fossil fuel-based power plant)
Methane recovery project activities at wastewater treatment plants related to Palm Oil production shall comply with all the Palm Oil related rules mentioned above (paragraph 1.2.7 above).	The project activity does not include methane recovery at wastewater treatment plants related to Palm Oil production and hence is not applicable to project activity.

- The project activity is not seeking the renewable Energy Labels, hence criteria 2.1.6 of Renewable-Energy-Activity-Requirements-v1.4 document is not applicable for project activity.
- There is no potential for double counting of impacts if the Project Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature and confirm that the project is not registered with any other voluntary or compliance schemes.¹²

Accordingly, project activity registered under Gold Standard with ID No. GS 1068.

Please refer below link: <https://registry.goldstandard.org/projects/details/53>

Currently, the project activity is operational with a total of 7 gas engines with a total installed capacity of 9.80 MW. In the registered PDD Version 05, it is estimated that the activity will generate approximately 68,600 MWh of energy and is delivered to the

¹² Declaration on double counting is submitted to DOE.

national grid. The Project activity is estimated to reduce 261,180 tCO₂/year CO₂ emission reductions during the second crediting period.

A.2. Location of project

Host Country: Türkiye
Marmara Region, Bursa Province

Bursa is located at the south of Marmara region and is the 4th largest city in Turkey with a population of approximately 2,600,000 inhabitants. The Hamitler landfill is the largest landfill area within Bursa Province and is located in Osmangazi District.

Coordinates of the project: Latitude: 40°15'50.23"N, Longitude: 28°58'24.36" E

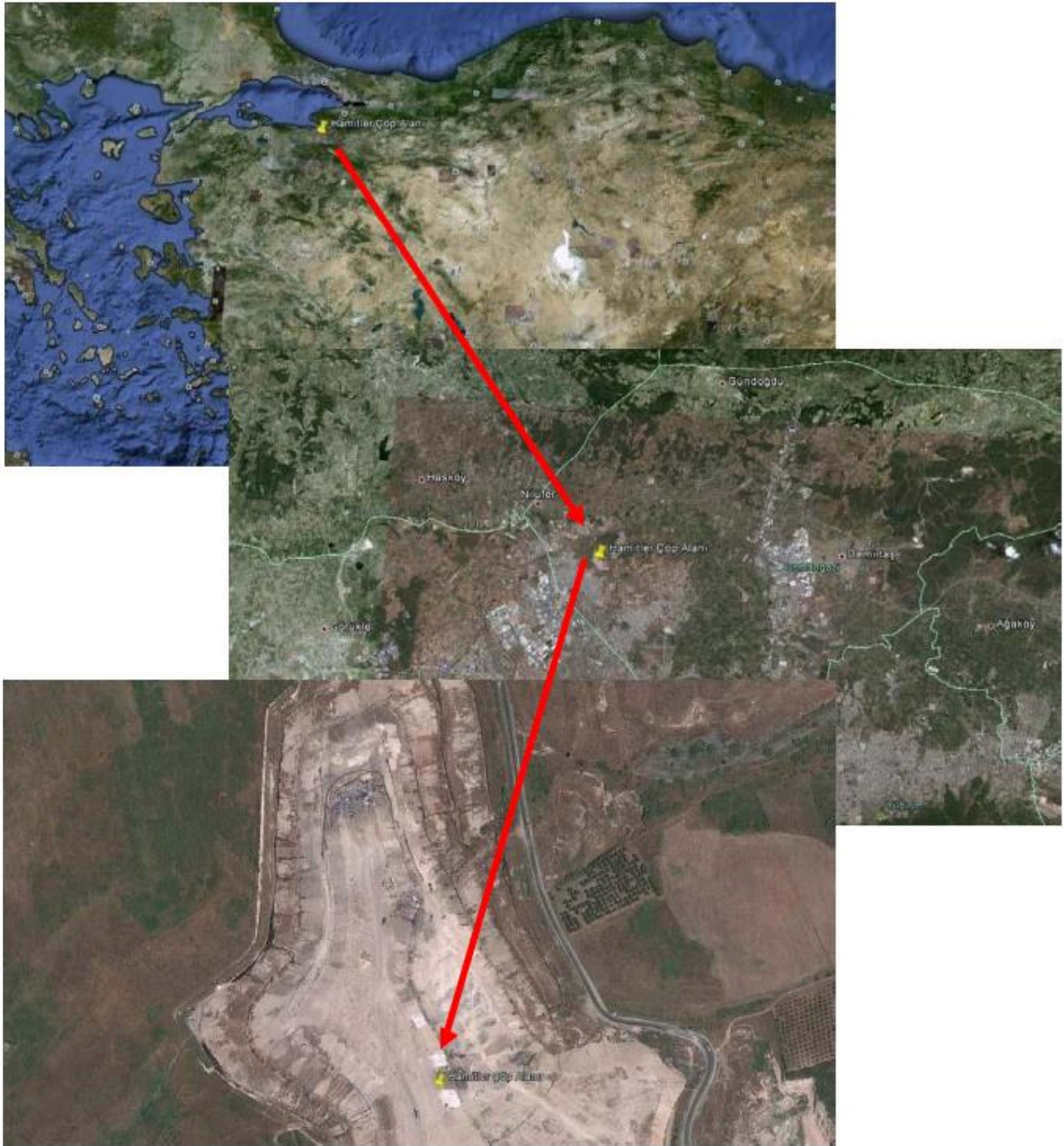


Figure 1. Project Location in the Map

The postal address of the project area is as followed:
Geçit Mh. 2.Gündoğdu Sk. No: 120 Osmangazi/Bursa

A.3. Reference of applied methodology

Applied approved baseline and monitoring methodologies:

- Approved consolidated baseline methodology ACM0001 "Flaring or use of landfill gas" Version 19.0¹³

Used tools:

- "Combined tool to identify the baseline scenario and demonstrate additionality" Version 07.0¹⁴
- "Emissions from solid waste disposal sites" Version 08.1¹⁵;
- "Tool to calculate the emission factor for an electricity system" Version 07.0¹⁶;
- "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 03.0¹⁷.
- "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" Version 03.0.1¹⁸
- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"-Version 03.0¹⁹

A.4. Crediting period of project

20/06/2011²⁰ The project start date relates to the date of construction agreement which commitment of expenditures related to the implementation of the Project and is therefore selected as the start date of the project in accordance to Paragraph 4.1.39 of the Principles and Requirement Version 1.2.

The Project is a "regular" project activity as per Paragraph 4.1.42 of the Principles and Requirement Version 1.2 as the Local Stakeholders Consultation Meeting was carried out (on 21/04/2011) before the start date of the project activity which is 20/06/2011.

The first crediting period start date of the project was 19/05/2012 with choice of renewable crediting period. The PDD submitted for renewal indicates the second renewable crediting period start date as 01/08/2022:

1st crediting period: 19/05/2012 to 18/05/2019

2nd crediting period: 01/08/2022 to 31/07/2029

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

¹³ <https://cdm.unfccc.int/methodologies/DB/JPYB4DYQUXQPZLBDVPHA87479EMY9M>

¹⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf>

¹⁵ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v8.1.pdf>

¹⁶ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

¹⁷ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf>

¹⁸ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>

¹⁹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v3.0.pdf>

²⁰ Date of Construction Agreement

Bursa Landfill Gas Recovery and Utilization Project (hereafter referred to as "the Project") is being developed by "ITC-KA Enerji Üretim San. ve Tic. A.Ş.²¹" (hereafter referred to as the "Project Participant"). On 14/01/2011 Bursa Greater Municipality transferred the right of use of the landfill area to the Project Participant.

Hamitler Landfill Area was opened in 1996 and operated by the municipality as an uncontrolled dumpsite without any LFG extraction, flaring or utilization. The scenario existing prior to the start of implementation of the project activity is the same as the baseline scenario.

The purpose of the project activity is to recover the LFG gas accumulated in the landfill area and generate electricity via gas engines to generate electricity. In order to recover the LFG, the closed lots of the landfill will be covered by an appropriate layer to maximize the collection efficiency. The LFG is collected actively via collection system.

The important milestones of the project activity addressing the prior consideration are presented as follows:

Date	Event
10/12/2010	Board Decision on GS VERs
14/01/2011	Transfer of Landfill to the PP
21/04/2011	LSC meeting
20/06/2011	Start of construction
19/05/2012	Commissioning of five power generation units (confirmed through the Temporary Acceptance Protocol)
27/07/2012	Commissioning of one power generation units (confirmed through the Temporary Acceptance Protocol)
07/09/2012	Commissioning of one power generation units (confirmed through the Temporary Acceptance Protocol)
19/05/2012 – 18/05/2019	First crediting period ²²
19/05/2012 – 31/12/2013	First monitoring period
19/05/2019 – 18/05/2026	Second crediting period
03/02/2022	New generation license in the name of ITC-KA Enerji Üretim Sanayi ve Ticaret A.Ş. is given by EPDK
04/11/2022-31/07/2023	1 st monitoring period of 2 nd crediting period.
30/11/2023	Physical site visit for the first monitoring period of second crediting period

²¹ The owner of the project is changed from ITC Bursa Enerji Üretim Sanayi ve Ticaret A.Ş. to ITC-KA Enerji Üretim Sanayi ve Ticaret A.Ş. New generation license in the name of ITC-KA Enerji Üretim Sanayi ve Ticaret A.Ş. is given by EPDK on 03/02/2022 as a continuation of the old generation license.

²² The estimated starting date of the crediting period is defined as 01/09/2012 as per the registered PDD. However, first five gas engines were in operation on 19/05/2012 as confirmed through the temporary acceptance protocol. Therefore, the date is revised in the monitoring report.

7 sets of GE Jenbacher 1.4 MW gas engines installed within the scope of the project activity. An enclosed flare system is also installed to burn the excess LFG in a controlled environment and disposal of it safely to the atmosphere. The specifications of gas engine are given in Table below.

Manufacturer	Engine Type	Capacity (MWm / MWe)	Gas Volume (Full Load to Part Load)	Electrical Efficiency (Full Load to Part Load)
GE Jenbacher GmbH & Co OG	JGS 420 GS-B121	Electrical Generation Capacity - 1.415 MW Mechanical capacity - 1.450 MW	Full load - 755 Nm ³ /h Part Load - 583 / 410 Nm ³ /h	Full load 41.6 % Part Load - 40.4 / 38.1 %

The generated electricity is exported to the national grid, through Bursa II TM transformer station via Medium Voltage Level.

In this monitoring period, there have been no changes in the project design, the project activity was operational as described in the Design Certified PDD during this monitoring period.

B.1.1 Forward Action Requests

FAR #1: Refer Site Visit and Remote Audit Requirements §3.2.2 "A physical site visit by VVB is mandatory at the next verification of a project"

Response: A physical site visit was conducted on 30/11/2023.

FAR #2: 5.1.39: Transparent, annual update reports need to be provided for Projects that have achieved the Project Design Certification stage. An annual report shall be submitted for each monitoring year by the end of next calendar year for which verification is not completed. If a verification is in progress but not completed, then an Annual Report is still required by the end of calendar year.

Response: Annual report²³ is submitted to GS on 11/12/2023. Please refer to the GS Registry page of the project.

FAR # 3: Verifying VVB shall ensure there is no ER claim for the period 19/05/2019 to 18/05/2020 as per deviation not approved by GS dated 17/01/2022 states "As per the

²³ Annual report is shared with VVB.

requirements of para 5.1.46 of Principle and Requirements, no issuance can be claimed for a period of delay in design certification renewal”.

Response: As per the deviation request, no issuance will be claimed for a period of delay in design certification. The selected issuance period is from 04/11/2022 to 31/07/2023.

B.2. Post-Design Certification changes

B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

A deviation was requested on 17/01/2022, regarding the issuance of the period of delay due to the delay in design renewal. The deviation request was not approved, and no issuance is claimed for the period of delay in design certification renewal.

Also, the deviation request dated 01/04/2024 on design change due to the change in the capacity was not approved since the capacity change is beyond this monitoring period of 04/11/2022 to 31/07/2023. Therefore, no design change is applicable for this monitoring period.

B.2.2. Corrections

Not applicable

B.2.3. Changes to start date of crediting period

Not applicable

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

Not applicable

B.2.5. Changes to project design of approved project

Not applicable

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

Monitoring Plan

Monitoring will be carried out following the procedures set by the consolidated baseline methodology ACM0001 version 19.0 and all applicable tools of the above explained parameters. The monitoring consists of:

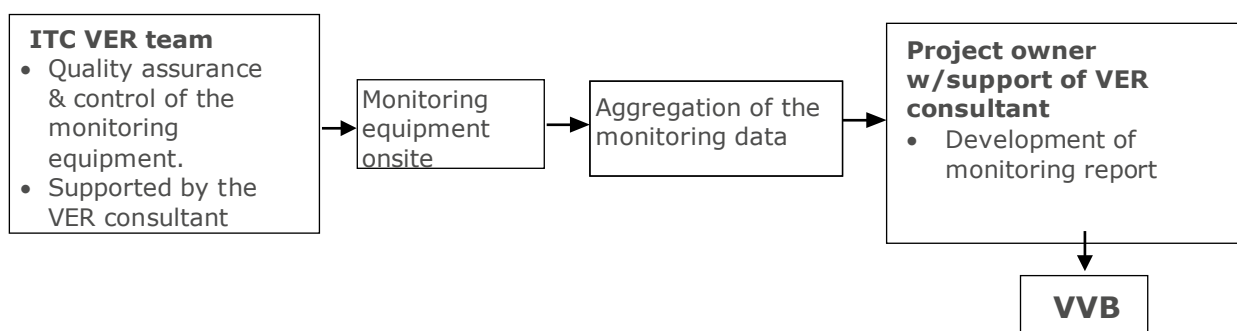
- Amount of landfill gas combusted in power generation units
- Temperature of the landfill gas sent to power generation to ensure compliance regarding dry basis for measurement
- Concentration of methane of the landfill gas

- Total amount of electricity exported to the grid
- Operating hours of power generation units
- Total amount of the electricity imported from the grid

Responsibilities for Monitoring

The project owner is responsible for the operation and maintenance of the landfill and the installed equipment. The project owner is also responsible for the administration of the data, setting up a VER team who will be responsible for monitoring all data required to estimate emission reductions.

In the diagram below the organization of monitoring management and data application is presented.



Registration of the Monitored Data

ITC VER-Team will be responsible for quality assurance and quality control of the monitoring equipment. The data measured by the monitoring equipment will be stored and will be processed into a monitoring report, which will be submitted by the project owner. All the monitored data will be stored during the crediting period and for at least two years after the end of the crediting period, whichever occurs later.

Corrective actions and emergency preparedness

The VER-Team will regularly check the monitoring system for errors. In the case of errors, corrective actions will be undertaken by the VER-Team, or if required, by the supplier of the monitoring equipment.

QA/QC procedure

Strong quality assurance and quality control procedures will be taken to monitor the equipment and data collection. Equipment and facilities will be subject to a regular maintenance and testing regime to ensure accuracy following the supplier's manual.

The main and secondary meter readings are recorded monthly and cross-checked whether calibration is required. Maintenance and calibration of TEIAS meters is being carried out according to the System Usage Agreement. The meters are tested regularly as the instructions of the manufacturer or legal requirements. In addition, the calibration frequency of the meters is 10 years, and it is under the responsibility of TEIAS. Since TEIAS meters are sealed by TEIAS, the project proponent cannot intervene

with the devices. The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export and the import. Data measured by meters is crosschecked with the EPIAS records and meter reading forms obtained from TEİAŞ or authorized distribution company by TEİAS.

Measuring of exported and imported electricity

The main meter for the monitoring of the electricity import and export is at grid connection. Monthly protocols based on the readings, that are confirmed by both TEİAS, and the project participant are prepared by the end of each month and stored. These protocols are also the basis of invoicing for the electricity sales from the project activity. The electricity meters are bidirectional and will measure both the imported and exported electricity from and to the grid.

The following figure shows the position of the different measurement points within the project boundary:

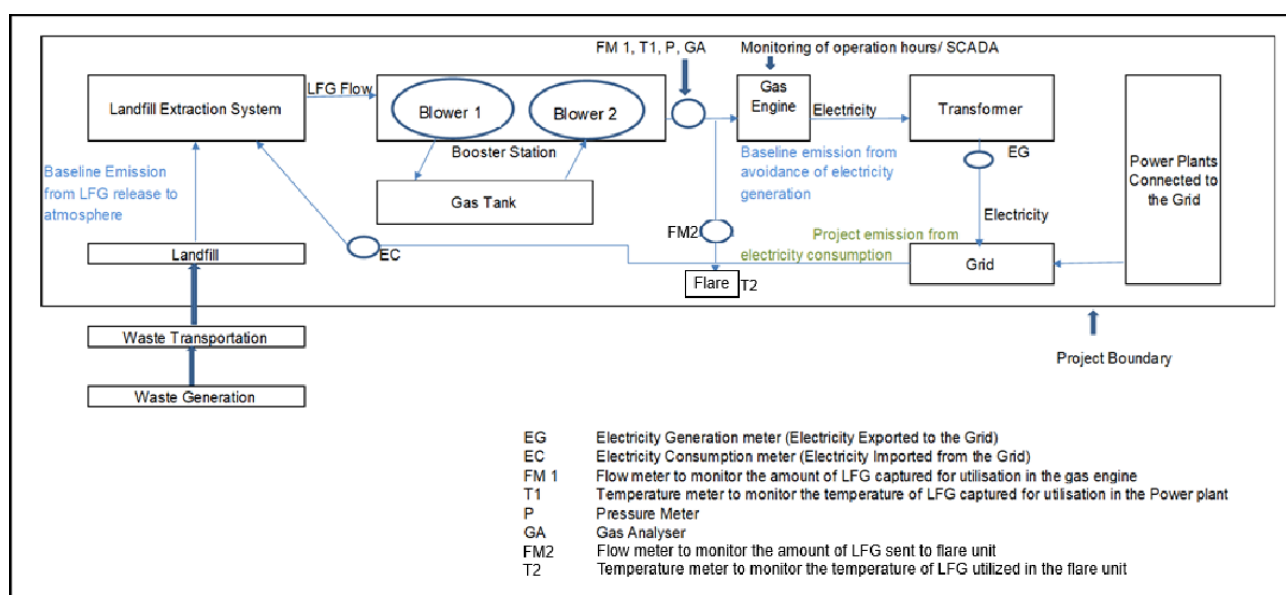


Figure 2. Monitoring Points

There is a flare unit connected between the booster units and gas engines where the flow is directed to either the flare unit or engines. The gas amount sent to flare unit is monitored with a flow meter located before the flare unit and the temperature at the flare unit is monitored with the thermocouple (0 - 1.000°C range) located at the flare unit itself.

However, although the flare unit exists at the site (which is obligated by the legislations), no gas has been directed to flare unit within the current monitoring period of the project.

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data and parameters under ACM0001 "Flaring or Use of Landfill Gas" Version 19.0, that are available at validation and not monitored:

SDG13

Data/parameter	ID.1 / OX_{top_layer}
Unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline
Source of data	Consistent with how oxidation is accounted for in the methodological tool "Emissions from solid waste disposal sites"
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	As referred under ACM0001 "Flaring or use of landfill gas" Version 19.0
Purpose of data	Calculation of baseline emissions
Additional comment	Applicable to Step A defined under ACM0001 "Flaring or use of landfill gas" Version 19.0

Data/parameter	ID.2 / GWP_{CH_4}
Unit	tCO ₂ e/tCH ₄
Description	Global warming potential of CH ₄
Source of data	IPCC 6 th Assessment Report
Value(s) applied	28
Choice of data or Measurement methods and procedures	Default value of 28 from IPCC Sixth Assessment Report (AR6)
Purpose of data	Estimation of baseline emission
Additional comment	This parameter is fixed ex-ante

Data/parameter	ID.3 / η_{PJ}
Unit	Dimensionless
Description	Efficiency of the LFG capture system that will be installed in the project activity

Source of data	ACM0001 "Flaring or use of landfill gas" Version 19.0
Value(s) applied	50%
Choice of data or Measurement methods and procedures	Default value under ACM0001 "Flaring or use of landfill gas" Version 19.0
Purpose of data	Estimation of baseline emission
Additional comment	Applicable to ACM0001 "Flaring or use of landfill gas" Version 19.0

Data/parameter	ID.4 / R_u
Unit	$\text{Pa.m}^3/\text{kmol.K}$
Description	Universal ideal gases constant
Source of data	Tool to determine the mass flow of a greenhouse gas in a gaseous stream Version 03.0.0
Value(s) applied	8.314
Choice of data or Measurement methods and procedures	As referred under "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/parameter	ID.5 / MM _{CH₄}		
Unit	kg/kmol		
Description	Molecular mass of CH ₄		
Source of data	Tool to determine the mass flow of a greenhouse gas in a gaseous stream- Version 03.0.0		
Value(s) applied	Compound	Structure	Molecular mass (kg/kmol)
	Methane	CH ₄	16.04
Choice of data or Measurement methods and procedures	As referred under “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”		

Purpose of data	Calculation of baseline emissions
Additional comment	-

Data and parameters under "Emissions from solid waste disposal sites" Version 08.1; that are available at validation and not monitored:

Data/parameter	ID.6 / ϕ_{default}
Unit	-
Description	Default value for the model correction factor to account for model uncertainties
Source of data	"Emissions from solid waste disposal sites" Version 08.1
Value(s) applied	0.75
Choice of data or Measurement methods and procedures	As referred under "Emissions from solid disposal sites" Version 08.1
Purpose of data	Estimation of baseline emissions
Additional comment	This value is estimated ex-ante

Data/parameter	ID.7 / 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	Based on an extensive review of published literature on this subject, including the IPCC 2006 Guidelines for National Greenhouse Gas Inventories (Methodological tool – Emissions from solid waste disposal sites Version 08.1)
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	Oxidation factor is based on methodological tool – Emissions from solid waste disposal sites Version 08.1
Purpose of data	Estimation of baseline emission
Additional comment	This value is estimated ex-ante

Data/parameter	ID.8 / F
Unit	-
Description	Fraction of methane in the SWDS gas (volume fraction)
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.5

Choice of data or Measurement methods and procedures	This factor reflects the fact that some degradable organic carbon does not degrade, or degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0.5 is recommended by IPCC.
Purpose of data	Estimation of baseline emission
Additional comment	This value is estimated ex-ante

Data/parameter	ID.9 / $DOC_{f,default}$
Unit	Weight fraction
Description	Default value for the fraction of degradable organic carbon (DOC) in MSW that decomposes in the SWDS
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.5
Choice of data or Measurement methods and procedures	In accordance with tool "Emissions from solid waste disposal sites" Version 08.1, 0.5 value is justified.
Purpose of data	Estimation of baseline emission
Additional comment	The proposed project activity falls under Application A (in line with ACM0001 "Flaring or use of landfill gas" Version 19.0)

Data/parameter	ID.10 / $MCF_{default}$
Unit	-
Description	Methane correction factor
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.8
Choice of data or Measurement methods and procedures	In accordance with tool "Emissions from solid waste disposal sites" Version 08.1, 0.8 value is justified for unmanaged solid waste disposal sites- deep and/or with high water table.
Purpose of data	Estimation of baseline emission
Additional comment	The baseline falls under the definition "unmanaged solid waste disposal site-deep"

Data/parameter	ID.11 / DOC_j
Unit	-

Description	Fraction of degradable organic carbon (by weight) in waste type j														
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 2.4 and Table 2.5)														
Value(s) applied	The following values for the different waste types have been applied: <table> <tr> <th>Waste type j</th><th>DOC_j (% wet waste)</th></tr> <tr> <td>Wood and wood products</td><td>43</td></tr> <tr> <td>Pulp, paper and cardboard</td><td>40</td></tr> <tr> <td>Food, food waste, beverages and tobacco</td><td>15</td></tr> <tr> <td>Textiles</td><td>24</td></tr> <tr> <td>Garden, yard and park waste</td><td>20</td></tr> <tr> <td>Glass, plastic, metal, other inert</td><td>0</td></tr> </table>	Waste type j	DOC _j (% wet waste)	Wood and wood products	43	Pulp, paper and cardboard	40	Food, food waste, beverages and tobacco	15	Textiles	24	Garden, yard and park waste	20	Glass, plastic, metal, other inert	0
Waste type j	DOC _j (% wet waste)														
Wood and wood products	43														
Pulp, paper and cardboard	40														
Food, food waste, beverages and tobacco	15														
Textiles	24														
Garden, yard and park waste	20														
Glass, plastic, metal, other inert	0														
Choice of data or Measurement methods and procedures	In accordance with the "Emissions from solid waste disposal sites" Version 08.1														
Purpose of data	Estimation of baseline emission														
Additional comment	This value is estimated ex-ante														

Data/parameter	ID.12 / k_j															
Unit	1/yr															
Description	Decay rate for the waste type j															
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (Volume 5, Table 3.3)															
Value(s) applied	The following values for the different waste types have been applied: <table><tr><th colspan="2" rowspan="2">Waste type j</th><th colspan="2">Boreal and Temperate (MAT < 20°C)</th></tr><tr><th>Dry (MAP/PET >1)</th><th>Wet (MAP/PET 1)</th></tr><tr><td rowspan="2">Slowly degrading</td><td>Pulp, paper, cardboard</td><td>0.04</td><td>0.06</td></tr><tr><td>Wood, wood products and straw</td><td>0.02</td><td>0.03</td></tr></table>			Waste type j		Boreal and Temperate (MAT < 20°C)		Dry (MAP/PET >1)	Wet (MAP/PET 1)	Slowly degrading	Pulp, paper, cardboard	0.04	0.06	Wood, wood products and straw	0.02	0.03
Waste type j		Boreal and Temperate (MAT < 20°C)														
		Dry (MAP/PET >1)	Wet (MAP/PET 1)													
Slowly degrading	Pulp, paper, cardboard	0.04	0.06													
	Wood, wood products and straw	0.02	0.03													

	Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05	0.10
	Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06	0.185
Choice of data or Measurement methods and procedures	In accordance with the Tool 04: "Emissions from solid waste disposal sites" Version 08.1			
Purpose of data	Estimation of baseline emission			
Additional comment	According to the latest available report on Bursa Provincial Environment Annual Report (2008) ⁶³ the Mean Annual Temperature (MAT) is 15.4°C (p39 table C.5); Mean Annual Precipitation (MAP) is 639.1 mm (p40 table C.7) and Potential Evapotranspiration (PET) is 30.9 (p39 table C.6).			

Data and parameters under the "Tool to calculate the emission factor for an electricity system" Version 07.0, that are available at validation and not monitored:

Data/parameter	ID.13 / EG _{m,y}																				
Unit	MWh																				
Description	Net electricity generated by power plant/unit m																				
Source of data	TEIAS (Turkish Electricity Transmission Company) https://www.teias.gov.tr/turkiye-elektrik-uretim-iletim-istatistikleri																				
Value(s) applied	<table><tr><th colspan="3">Electricity Generated and delivered to the Grid</th></tr><tr><td></td><td>2010</td><td>2011</td></tr><tr><td>Natural Gas</td><td>12,787,008</td><td>12,316,264</td></tr><tr><td>Lignite</td><td>155,593</td><td>0</td></tr><tr><td>Coal</td><td>9,080,000</td><td>4,320,000</td></tr><tr><td>Fuel Oil</td><td>258,824</td><td>1,026,593</td></tr></table>			Electricity Generated and delivered to the Grid				2010	2011	Natural Gas	12,787,008	12,316,264	Lignite	155,593	0	Coal	9,080,000	4,320,000	Fuel Oil	258,824	1,026,593
Electricity Generated and delivered to the Grid																					
	2010	2011																			
Natural Gas	12,787,008	12,316,264																			
Lignite	155,593	0																			
Coal	9,080,000	4,320,000																			
Fuel Oil	258,824	1,026,593																			
Choice of data or Measurement methods and procedures	According to “Turkish Statistics Law and Official Statistics Program” TEIAS, the Turkish Electricity Transmission Company is the official source for the related data.																				
Purpose of data	Used to calculate the combined margin emission factor																				

Additional comment	-																								
Data/parameter	ID.14 / $FC_{i,y}$																								
Unit	tonnes (m ³ for gaseous fuels)																								
Description	Amount of fossil fuel type i consumed in the project electricity system by generation sources in year y (2009-2011)																								
Source of data	TEIAS (Turkish Electricity Transmission Company) https://www.teias.gov.tr/turkiye-elektrik-uretim-iletim-istatistikleri																								
Value(s) applied	<table><tr><th colspan="4">Amount of Fossil Fuel</th></tr><tr><th></th><th>2009</th><th>2010</th><th>2011</th></tr><tr><td>Natural Gas</td><td>20,978,040</td><td>21,783,414</td><td>22,804,587</td></tr><tr><td>Lignite</td><td>63,620,177</td><td>56,689,392</td><td>61,507,310</td></tr><tr><td>Coal</td><td>6,621,177</td><td>7,419,703</td><td>10,574,434</td></tr><tr><td>Fuel Oil</td><td>1,783,366</td><td>925,276</td><td>546,655</td></tr></table>	Amount of Fossil Fuel					2009	2010	2011	Natural Gas	20,978,040	21,783,414	22,804,587	Lignite	63,620,177	56,689,392	61,507,310	Coal	6,621,177	7,419,703	10,574,434	Fuel Oil	1,783,366	925,276	546,655
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Choice of data or Measurement methods and procedures	According to “Turkish Statistics Law and Official Statistics Program” TEIAS, the Turkish Electricity Transmission Company is the official source for the related data.																								
Purpose of data	Used to calculate the combined margin emission factor																								
Additional comment	-																								

Data/parameter	ID.15 / $NCV_{i,y}$																				
Unit	GJ/tonnes (m ³ for gaseous fuels)																				
Description	Net calorific value (energy content) of fossil fuel type i in year y																				
Source of data	TEIAS (Turkish Electricity Transmission Company) https://www.teias.gov.tr/turkiye-elektrik-uretim-iletim-istatistikleri																				
Value(s) applied	<table><tr><th colspan="4">Net Calorific Value</th></tr><tr><td></td><td>2009</td><td>2010</td><td>2011</td></tr><tr><td>Natural Gas</td><td>37.177</td><td>37.382</td><td>37.100</td></tr><tr><td>Lignite</td><td>6.427</td><td>7.131</td><td>7.298</td></tr><tr><td>Coal</td><td>22.215</td><td>22.316</td><td>22.794</td></tr></table>	Net Calorific Value					2009	2010	2011	Natural Gas	37.177	37.382	37.100	Lignite	6.427	7.131	7.298	Coal	22.215	22.316	22.794
Net Calorific Value																					
	2009	2010	2011																		
Natural Gas	37.177	37.382	37.100																		
Lignite	6.427	7.131	7.298																		
Coal	22.215	22.316	22.794																		

	<table><tr><td>Fuel Oil</td><td>40.091</td><td>40.201</td><td>41.628</td></tr></table>	Fuel Oil	40.091	40.201	41.628
Fuel Oil	40.091	40.201	41.628		
Choice of data or Measurement methods and procedures	According to “Turkish Statistics Law and Official Statistics Program” TEIAS, the Turkish Electricity Transmission Company is the official source for the related data.				
Purpose of data	Estimation of baseline emission				
Additional comment	-				

Data/parameter	ID.16 / $EF_{CO_2,i,y}$										
Unit	tCO ₂ /GJ										
Description	CO ₂ emission factor of fossil fuel type i" used in power unit min year y										
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 Chapter 1 of Volume 2 (Energy) of the 2006 IPCC Guidelines for National Greenhouse Gas Inventory https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf										
Value(s) applied	<table> <tr> <th colspan="2">EF (tons/GJ)</th></tr> <tr> <td>Natural Gas</td><td>0.0540</td></tr> <tr> <td>Lignite</td><td>0.0909</td></tr> <tr> <td>Coal</td><td>0.0946</td></tr> <tr> <td>Fuel Oil</td><td>0.0726</td></tr> </table>	EF (tons/GJ)		Natural Gas	0.0540	Lignite	0.0909	Coal	0.0946	Fuel Oil	0.0726
EF (tons/GJ)											
Natural Gas	0.0540										
Lignite	0.0909										
Coal	0.0946										
Fuel Oil	0.0726										
Choice of data or Measurement methods and procedures	There is no information on the fuel specific default emission factor in Turkey, hence, IPCC values has been used.										
Purpose of data	Estimation of baseline emission										
Additional comment	-										

Data/parameter	ID.17 / $\eta_{m,y}$
Unit	%
Description	Average net energy conversion efficiency of power unit m in year y

Source of data	"Tool to calculate the emission factor for an electricity system" version 07.0.0										
Value(s) applied	<table border="1"> <thead> <tr> <th></th><th>Average conversion efficiency $\eta_{m,y}$</th></tr> </thead> <tbody> <tr> <td>Natural Gas</td><td>IPCC default value of 60% for combined cycle</td></tr> <tr> <td>Lignite</td><td>IPCC default value of 45% for Supercritical IPCC default value of 41.4% for PFBS</td></tr> <tr> <td>Coal</td><td>IPCC default value of 45% for Supercritical IPCC default value of 41.4% for PFBS</td></tr> <tr> <td>Fuel Oil</td><td>IPCC default value of 46% for combined cycle</td></tr> </tbody> </table>		Average conversion efficiency $\eta_{m,y}$	Natural Gas	IPCC default value of 60% for combined cycle	Lignite	IPCC default value of 45% for Supercritical IPCC default value of 41.4% for PFBS	Coal	IPCC default value of 45% for Supercritical IPCC default value of 41.4% for PFBS	Fuel Oil	IPCC default value of 46% for combined cycle
	Average conversion efficiency $\eta_{m,y}$										
Natural Gas	IPCC default value of 60% for combined cycle										
Lignite	IPCC default value of 45% for Supercritical IPCC default value of 41.4% for PFBS										
Coal	IPCC default value of 45% for Supercritical IPCC default value of 41.4% for PFBS										
Fuel Oil	IPCC default value of 46% for combined cycle										
Choice of data or Measurement methods and procedures	Default values have been used.										
Purpose of data	Estimation of baseline emission										
Additional comment	This value is estimated ex-ante										

Data/parameter	ID.18 / $EF_{grid,CM,y}$
Unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor for the project electricity system in year y
Source of data	Calculated
Value(s) applied	0.4929
Choice of data or Measurement methods and procedures	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh) $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 25% W_{BM} = Weighting of build margin emissions factor (%) = 75%
Purpose of data	Estimation of baseline and project emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period

D.2 Data and parameters monitored

Data and parameters under ACM0001 "Flaring or use of landfill gas" Version 19.0, that are monitored:

SDG 13

Data / Parameter	M.ID.1 / $Op_{j,h}$
Unit	-
Description	Operation of the equipment that consumes the LFG
Source of data	Project participant
Value(s) applied	2022- 5,621 h 2023- 16,728 h
Measurement methods and procedures	Operation of gas engines monitored by: - Products generated (such as electricity generation) $Op_{j,h}=0$ when: - No products are generated in hour h Otherwise $Op_{j,h}=1$
Monitoring frequency	Aggregated yearly. The system in place is related to the three shifts policy guaranteeing 24-hour support. So once per shift the totalized values are recorded manually.
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	Data will be archived electronically during the crediting period and two years after.

Data / Parameter	M.ID.2 / Management of SWDS
Unit	-
Description	Management of SWDS
Source of data	Please refer to the photographs before and after the implementation of the project activity.
Value(s) applied	SWDS is rehabilitated after the implementation of the project activity.
Measurement methods and procedures	Project developer refers to the original design of the landfill to ensure that any practice to increase methane generation has been occurring prior to the implementation of the project activity.

	Any change in the management of the SWDS after the implementation of the project activity is justified by referring to technical or regulatory specifications.
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	M.ID.3 / $BE_{CH_4,SWDS,y}$								
Unit	tCO ₂ e/yr.								
Description	Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y								
Source of data	$BE_{CH_4,SWDS,y}$ is determined using the methodological tool "Emissions from solid waste disposal sites" Version 08.1								
Value(s) applied	<table border="1"> <thead> <tr> <th>Period</th><th>$BE_{CH_4,SWDS,y}$ (tCO₂e)</th></tr> </thead> <tbody> <tr> <td>04/11/2022 – 31/12/2022</td><td>26,133</td></tr> <tr> <td>01/01/2023 – 31/07/2023</td><td>83,705</td></tr> <tr> <td>Total</td><td>109,838</td></tr> </tbody> </table>	Period	$BE_{CH_4,SWDS,y}$ (tCO ₂ e)	04/11/2022 – 31/12/2022	26,133	01/01/2023 – 31/07/2023	83,705	Total	109,838
Period	$BE_{CH_4,SWDS,y}$ (tCO ₂ e)								
04/11/2022 – 31/12/2022	26,133								
01/01/2023 – 31/07/2023	83,705								
Total	109,838								
Measurement methods and procedures	As required per ACM0001 "Flaring or use of landfill gas" Version 19.0								
Monitoring frequency	Continuous								
QA/QC procedures	-								
Purpose of data	Calculation of baseline emissions								
Additional comment	Data will be archived electronically during the crediting period and two years after.								

Data and parameters under "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 03.0, that are monitored:

Data / Parameter	M.ID.4 / V _{t,db}		
Unit	m ³ dry gas/h		
Description	Volumetric flow of the gaseous stream in time interval t on a dry basis		
Source of data	Flow meter		
Value(s) applied	Period	Value (Nm ³)	Value (m ³ dry gas/h)
	04/11/2022 – 31/12/2022	2,842,049	25,022,234
	01/01/2023 – 31/07/2023	9,317,738	86,269,155
	Total	12,159,787	111,291,390

Measurement methods and procedures	Measurement of the total amount of captured landfill gas will be continuously performed by using flow meters and all data will be archived electronically. $V_{t,db}$ is measured in normal conditions.					
Monitoring frequency	The monitoring system works with continuous measurement devices.					
QA/QC procedures	The flow meters are subject to a regular maintenance and testing regime to ensure accuracy. Records of calibration and maintenance is archived. According to the Regulation on Measurement and Inspection of Measurement Devices ²⁴ , the calibration frequency is set as 10 years.					
	Brand	Type	Serial No	Period of Use	Calibration Date	Calibration Due Date
	ABB	266DSHBS HA1A1E1	3K646 62005 0061	- 08/12/2022 ²⁵	26/10/2020	25/10/2030
	ABB	266DSHBS HA1A1E1	3K646 61100 9412	08/12/2022-	29/11/2022	28/11/2032
	SAGE	401-05-12	22519 1-13560 0	-	14/03/2022	13/03/2032
Purpose of data	Calculation of baseline emissions					
Additional comment	Used to calculate $F_{CH_4,EL,y}$ under ACM0001 Version 19.0					

Data / Parameter	M.ID.5 / $v_{CH_4,t,db}$
Unit	$m^3 CH_4 / m^3$ dry gas
Description	Volumetric fraction of CH_4 in a time interval t on a dry basis

²⁴ <https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=6381&mevzuatTur=KurumVeKurulusYonetmeligi&mevzuatTertip=5>

²⁵ This ABB flow meter with serial number of 3K646620050061 used until 08/12/2022 was replaced with another pre-calibrated ABB flow meter with serial number of 3K646611009412 on 08/12/2022.

Source of data	The volumetric fraction of CH ₄ will be monitored with a gas analyzer				
Value(s) applied	Period		Value (%)		
	04/11/2022 – 31/12/2022		50.97%		
	01/01/2023 – 31/07/2023		49.82%		
Measurement methods and procedures	Continuous gas analyzer operating in dry basis				
Monitoring frequency	Continuous				
QA/QC procedures	Calibration should include zero verification with an inert gas (e.g., N ₂) and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). According to the regulation on Measurement and Inspection of Measurement Devices ²⁶ , the calibration frequency is set as 10 years.				
	Brand	Type	Serial No	Calibration Date	Calibration Due Date
	SIEMENS	Ultramat23	N1H8919	27/04/2022	26/04/2032
Purpose of data	Calculation of baseline emissions				
Additional comment	-				

Data / Parameter	M.ID.6 / T _t
Unit	K
Description	Temperature of the gaseous stream in time interval t
Source of data	Temperature reading instruments
Value(s) applied	Below 60°C
Measurement methods and procedures	Measured continuously to determine the density of methane D_{CH₄}. No separate monitoring of temperature is necessary when using flow meters that automatically measure temperature

²⁶<https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=6381&mevzuatTur=KurumVeKurulusYonetmeligi&mevzuatTertip=5>

	and pressure, expressing LFG volumes in normalized cubic meters.																									
Monitoring frequency	Continuous																									
QA/QC procedures	The temperature meters are subject to a regular maintenance and testing regime to ensure accuracy. Records of calibration and maintenance will be archived. According to the regulation on Measurement and Inspection of Measurement Devices²⁷, the calibration frequency is set as 10 years. <table><tr><th>Brand/Type</th><th>Serial Number</th><th>Dates of Use</th><th>Calibration Date</th><th>Calibration Due Date</th></tr><tr><td>ELIMKO / PT-100</td><td>11/32116T</td><td>(- 24/04/2023) & (08/09/2023-)²⁸</td><td>27/04/2022</td><td>26/04/2032</td></tr><tr><td>J&C / OR03-B1H09-15 ÜR1/2 "NPT</td><td>1802-03180</td><td>24/04/2023- 08/09/2023</td><td>17/11/2022</td><td>16/11/2032</td></tr><tr><td>ELIMKO / RT30-1P06-20-U-W</td><td>11/32114T</td><td>(- 24/04/2023) & (08/09/2023-)²⁹</td><td>27/04/2022</td><td>26/04/2032</td></tr><tr><td>J&C / OR03-B1H09-15 ÜR1/2 "NPT</td><td>1309-10837</td><td>24/04/2023- 08/09/2023</td><td>17/11/2022</td><td>16/11/2032</td></tr></table>	Brand/Type	Serial Number	Dates of Use	Calibration Date	Calibration Due Date	ELIMKO / PT-100	11/32116T	(- 24/04/2023) & (08/09/2023-) ²⁸	27/04/2022	26/04/2032	J&C / OR03-B1H09-15 ÜR1/2 "NPT	1802-03180	24/04/2023- 08/09/2023	17/11/2022	16/11/2032	ELIMKO / RT30-1P06-20-U-W	11/32114T	(- 24/04/2023) & (08/09/2023-) ²⁹	27/04/2022	26/04/2032	J&C / OR03-B1H09-15 ÜR1/2 "NPT	1309-10837	24/04/2023- 08/09/2023	17/11/2022	16/11/2032
Brand/Type	Serial Number	Dates of Use	Calibration Date	Calibration Due Date																						
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J&C / OR03-B1H09-15 ÜR1/2 "NPT	1802-03180	24/04/2023- 08/09/2023	17/11/2022	16/11/2032																						
ELIMKO / RT30-1P06-20-U-W	11/32114T	(- 24/04/2023) & (08/09/2023-) ²⁹	27/04/2022	26/04/2032																						
J&C / OR03-B1H09-15 ÜR1/2 "NPT	1309-10837	24/04/2023- 08/09/2023	17/11/2022	16/11/2032																						

²⁷<https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=6381&mevzuatTur=KurumVeKurulYonetmeligi&mevzuatTertip=5>

²⁸ This device ELIMKO with serial number of 11/32116T was replaced with J&C device with serial number of 1802-03180 on 24/04/2023 and J&C device was used until 08/09/2023 when the ELIMKO device with serial number of 11/32116T was installed back.

²⁹ This device ELIMKO with serial number of 11/32114T was replaced with J&C device with serial number of 1309-10837 on 24/04/2023 and J&C device was used until 08/09/2023 when the ELIMKO device with serial number of 11/32114T was installed back

Purpose of data	Calculation of baseline emissions
Additional comment	Since all parameters are converted to normal conditions during the monitoring process, this parameter is only monitored to verify the applicability condition is met related gaseous stream flow temperature being 60°C.

Data and parameters under “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” Version 03, that are monitored:

SDG 7 & SDG 13

Data / Parameter	M.ID.7 / EG _{PJ,y}																				
Unit	MWh																				
Description	Amount of electricity generated using LFG by the project activity in year y																				
Source of data	Electricity meter																				
Value(s) applied	<table><tr><th>Period</th><th>Value (MWh)</th></tr><tr><td>04/11/2022 – 31/12/2022</td><td>6,005</td></tr><tr><td>01/01/2023 – 31/07/2023</td><td>19,941</td></tr><tr><td>Total</td><td>25,946</td></tr></table>			Period	Value (MWh)	04/11/2022 – 31/12/2022	6,005	01/01/2023 – 31/07/2023	19,941	Total	25,946										
Period	Value (MWh)																				
04/11/2022 – 31/12/2022	6,005																				
01/01/2023 – 31/07/2023	19,941																				
Total	25,946																				
Measurement methods and procedures	The quantity of net electricity generation supplied to the grid by the project plant will be monitored based on the main meter (also referred as TEİAŞ meters) readings.																				
Monitoring frequency	Continuous monitoring and monthly recording																				
QA/QC procedures	Maintenance and calibration of equipment will be carried out according to the instructions of the manufacturer. The electricity meters are used to measure the net electricity exported to the grid and used for billing purposes. Therefore, the meters are sealed by TEİAŞ (Turkish Electricity Transmission Company). Maintenance and calibration of equipment is carried out according to recognised procedures³⁰. According to the regulation on Measurement and Inspection of Measurement Devices, the calibration frequency is set as 10 years. <table><tr><td></td><td>Main Meter</td><td>Back-up Meter</td></tr><tr><td>Brand</td><td>Landis + Gry</td><td>Makel</td></tr><tr><td>Type</td><td>ZG410CR-1040</td><td>C520.AMT.2556.RS485 R Role</td></tr><tr><td>Serial No</td><td>50979650</td><td>80347877</td></tr><tr><td>Production Year</td><td>2014</td><td>2021</td></tr><tr><td>Calibration Date</td><td>03/10/2014</td><td>04/08/2022</td></tr></table>				Main Meter	Back-up Meter	Brand	Landis + Gry	Makel	Type	ZG410CR-1040	C520.AMT.2556.RS485 R Role	Serial No	50979650	80347877	Production Year	2014	2021	Calibration Date	03/10/2014	04/08/2022
	Main Meter	Back-up Meter																			
Brand	Landis + Gry	Makel																			
Type	ZG410CR-1040	C520.AMT.2556.RS485 R Role																			
Serial No	50979650	80347877																			
Production Year	2014	2021																			
Calibration Date	03/10/2014	04/08/2022																			

³⁰ According to the regulation on Measurement and Inspection of Measurement Devices , the calibration frequency is set as 10 years Reference:
<http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.12316&MevzuatIliski=0&sourceXmlSearch=>

	Calibration Due Date	02/10/2024	03/08/2032
Purpose of data	Calculation of baseline emissions		
Additional comment	Data will be archived electronically during the crediting period and two years after. EG_{PJ,y} in ACM0001 Version 19.0 is referred as "EG_{PJ,grid,y}" under "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 03.0.		

Data / Parameter	M.ID.8 / EG _{EC, y}									
Unit	MWh									
Description	Amount of electricity consumed by the project activity in year y									
Source of data	Electricity meter									
Value(s) applied	<table><tr><th>Period</th><th>Value (MWh)</th></tr><tr><td>04/11/2022 – 31/12/2022</td><td>1.0764</td></tr><tr><td>01/01/2023 – 30/09/2023</td><td>7.9902</td></tr><tr><td>Total</td><td>9.0666</td></tr></table>		Period	Value (MWh)	04/11/2022 – 31/12/2022	1.0764	01/01/2023 – 30/09/2023	7.9902	Total	9.0666
Period	Value (MWh)									
04/11/2022 – 31/12/2022	1.0764									
01/01/2023 – 30/09/2023	7.9902									
Total	9.0666									
Measurement methods and procedures	The quantity of net electricity generation supplied to the grid by the project plant will be monitored based on the main meter (also referred as TEİAŞ meters) readings.									
Monitoring frequency	Continuous monitoring and monthly recording									
QA/QC procedures	Maintenance and calibration of equipment will be carried out according to the instructions of the manufacturer. The electricity meters are used to measure the net electricity exported to the grid and used for billing purposes. Therefore, the meters are sealed by TEİAŞ (Turkish Electricity Transmission Company). Maintenance and calibration of equipment is carried out according to recognised procedures³¹. In accordance with the regulation on metering equipment's, the calibration frequency is set for a 10-year period.									

³¹ According to the regulation on Measurement and Inspection of Measurement Devices, the calibration frequency is set as 10 years. Reference: <http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.12316&MevzuatIliski=0&sourceXmlSearch=>

		Main Meter	Back-up Meter
	Brand	Landis + Gry	Makel
	Type	ZG410CR-1040	C520.AMT.2556. RS485 R Role
	Serial No	50979650	80347877
	Production Year	2014	2021
	Calibration Date	03/10/2014	04/08/2022
	Calibration Due Date	02/10/2024	03/08/2032
Purpose of data	Calculation of project emissions		
Additional comment	Data will be archived electronically during the crediting period and two years after.		
	EG _{EC,y} in ACM0001 Version 19.0 is referred as "EC _{Pj,j,y} " under "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 03.0.		

Data / Parameter	M.ID.9 / TDL _{j,y}
Unit	%
Description	Average technical transmission and distribution losses for providing electricity for source j, in year y
Source of data	Used for ex-ante: IEA Statistics provided by The World Bank ³² Best available recent reliable and accurate data.
Value(s) applied	1.89%
Measurement methods and procedures	The grid company calculated the TDL factor monthly and use the factor directly for the creation of the monthly reports.
Monitoring frequency	Annually. In the absence of the data from the relevant year, most recent figures should be used.
QA/QC procedures	-
Purpose of data	Calculation of baseline and project emission
Additional comment	-

³² <https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=TR>

Data / Parameter	M.ID.10 / Operation of the energy plant
Unit	Hours/year
Description	Operation of the energy plant
Source of data	The number of hours is registered by a counting device in each power generation unit.
Value(s) applied	2022- 5,621 h 2023- 16,728 h
Measurement methods and procedures	Each engine has an own internal counting device.
Monitoring frequency	The system in place is related to the three shifts policy guaranteeing 24-hour support. So once per shift the totalized values are recorded manually.
QA/QC procedures	The data will be cross checked with energy generation.
Purpose of data	Estimation of baseline emission
Additional comment	Data will be archived electronically during the crediting period and two years after.

SDG 8

Data / Parameter	M.ID.11 / Number of Employment Generation
Unit	Number
Description	Number of people employed directly due to the project activity
Source of data	Plant records or the training records for all the employees/SSI Records/Letter from O&M independent for employment generation/VVB interview with employees, local stakeholders etc.
Value(s) applied	19 at the end of 2023 (31/12/2022) 19 at the end of monitoring period (31/07/2023)
Measurement methods and procedures	The SSI Records/staff register/HR records for income generation of staff/HR Policies regarding health insurance/social security is checked for staff income generation and company policy benefits. The employment covers number of men and number of women employed by the project activity. The job is of type temporary/permanent or skilled/unskilled, etc. Further, it is ensured that people get equal payment for equal work. The payment is based on work and no gender inequality for payment for work of equal value.

Monitoring frequency	Annually
QA/QC procedures	The information required for this parameter can be checked by VVB during site visit through interview with people or through relevant supporting documents.
Purpose of data	To monitor the SDG 8 Indicator
Additional comment	-

Data / Parameter	M.ID.12 / Quality of Employment								
Unit	-								
Description	Training to staff								
Source of data	Plant records or training records for all the employees / VVB interview with employees								
Value(s) applied	<table> <tr> <th>Period</th><th>Value</th></tr> <tr> <td>04/11/2022 – 31/12/2022</td><td>1</td></tr> <tr> <td>01/01/2023 – 31/07/2023</td><td>1</td></tr> <tr> <td>Total</td><td>2</td></tr> </table>	Period	Value	04/11/2022 – 31/12/2022	1	01/01/2023 – 31/07/2023	1	Total	2
Period	Value								
04/11/2022 – 31/12/2022	1								
01/01/2023 – 31/07/2023	1								
Total	2								
Measurement methods and procedures	The Project proponent has organised training for the staff on the technology and the monitoring of the plant operation, and the emergency and safety procedures.								
Monitoring frequency	Annually								
QA/QC procedures	The training records for all the employees								
Purpose of data	To monitor the SDG 8 Indicator								
Additional comment	-								

D.3. Comparison of monitored parameters with last monitoring period

Not applicable for non-Community Service Activities.

D.4. Implementation of sampling plan

Not Applicable

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

122,614 tCO₂e (for SDG 13)

0 MWh (for SDG 7)

0 employment generated and 0 trainings conducted (for SDG 8)

The emission reductions resulting from the project is calculated according to ACM0001 "Flaring or Use of Landfill Gas" Version 19.0

According to the referred methodology the emission reductions are calculated with the following equation:

$$ER_y = BE_y - PE_y \quad \text{Equation 26 in ACM0001 V19.0}$$

Where:

ER_y Emission reductions in year y (tCO₂e/year)

BE_y Baseline emissions in year y (tCO₂e/year)

PE_y Project emissions in year y (tCO₂e/year)

Baseline Emissions

In accordance with ACM0001 "Flaring or Use of Landfill Gas" Version 19.0, baseline emissions should 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 project activity;
- C) Heat generation using fossil fuels in the absence of project activity; and
- D) Natural gas used from the natural gas network in the absence of the project activity.

$$BE_y = BE_{CH_4,y} + BE_{EC,y} + BE_{HG,y} + BE_{NG,y} \quad \text{Equation 1 in ACM0001 V19}$$

Where:

BE_y Baseline emissions in year y (tCO₂e/yr.)

BE_{CH₄,y} Baseline emissions of methane from SWDS in year y (tCO₂e/yr.)

BE_{EC,y} Baseline emissions associated with electricity generation in year y (tCO₂e/yr)

BE_{HG,y} Baseline emissions associated with heat generation in year y (t CO₂/yr)

BE_{NG,y} Baseline emissions associated with natural gas use in year y (t CO₂/yr)

Since there is no heat generations or natural gas usage in the baseline scenario, only baseline emissions from methane emissions from SWDS (A) and electricity generation (B) will be taken into account. The baseline emissions are calculated as follows:

$$BE_y = BE_{CH_4,y} + BE_{EC,y}$$

The results of baseline emissions calculations are summarized in the below table.

Period	BE _{CH₄,y} (tCO ₂ e)	BE _{EC,y} (tCO ₂ e)	BE _y (tCO ₂ e)
04/11/2022 - 31/12/2022	26,133	2,959	29,092
01/01/2023 - 31/07/2023	83,705	9,827	93,532

Step (A): Baseline emissions of methane from the SWDS (BE_{CH₄,y})

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. In addition, the effect of methane oxidation that is present in the baseline and absent in the project is taken into account.

$$BE_{CH_4} = ((1 - OX_{top_layer}) \times F_{CH_4,PJ,y} - F_{CH_4,BL,y}) \times GWP_{CH_4} \quad \text{Equation 2 in ACM0001 V19}$$

Where:

BE _{CH₄,y}	Baseline emissions of methane from the SWDS in year y (t CO ₂ e/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 CH ₄ /yr.)
F _{CH₄,BL,y}	Amount of methane in the LFG that would be flared in the baseline in year y (tCH ₄ /yr.)
GWP _{CH₄}	Global warming potential of CH ₄ (tCO ₂ e/tCH ₄)

Step A.1: Ex-post determination of F_{CH₄,PJ,y}

During the crediting period F_{CH₄,PJ,y} is determined as the sum of quantities of methane flared and used in power plant(s) as follows:

$$F_{CH_4,PJ,y} = F_{CH_4,flared,y} + F_{CH_4,EL,y} + F_{CH_4,HG,y} + F_{CH_4,NG,y} \quad \text{Equation 3 in ACM0001 V19}$$

Where:

F _{CH₄,PJ,y}	Amount of methane in the LFG which is flared and/or used in the project activity in year y (tCH ₄ /yr)
F _{CH₄,flared,y}	Amount of methane in the LFG which is destroyed by flaring in year y (tCH ₄ /yr)
F _{CH₄,EL,y}	Amount of methane in the LFG which is used for electricity generation in year y (tCH ₄ /yr)
F _{CH₄,HG,y}	Amount of methane in the LFG which is used for heat generation in year y (t CH ₄ /yr)
F _{CH₄,NG,y}	Amount of methane in the LFG which is sent to the natural gas distribution network and/or dedicated pipeline and/or to the trucks in year y (t CH ₄ /yr)

Since there is no heat generations or natural gas usage therefore *Ex-post determination of $F_{CH_4,PJ,y}$* will be limited to methane emissions from SWDS (A) and electricity generation (B) will be taken into account.

$$F_{CH_4,PJ,y} = F_{CH_4,flared,y} + F_{CH_4,EL,y}$$

$F_{CH_4,EL,y}$ is determined using the "Tool to determine the mass flow of a greenhouse gas" in a gaseous stream" and monitoring the working hours of the power plant, so that no emission reduction are claimed for methane destruction during non-working hours. This is taken into account by monitoring the hours that the equipment utilizing the LFG is operating in year y ($Op_{j,h,y}$).

$F_{CH_4,PJ,y}$ is determined using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 03.0.0.

The tool provides procedures to determine the following parameter:

Parameter	SI Unit	Description
$F_{i,t}$	kg/h	Mass flow of greenhouse gas i (CO_2 , CH_4 , N_2O , SF_6 or a PFC) in the gaseous stream in time interval t.

The mass flow of CH_4 in LFG is determined through measurement of the flow and volumetric fraction of the gaseous stream (LFG). The "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" version 03.0.0 provides 6 different ways to make these measurements and the corresponding calculation option for $F_{i,t}$.

Table 2: Measurement options for $F_{i,t}$

Option	Flow of Gaseous Stream	Volumetric Fraction
A	Volume flow-dry basis	Dry or wet basis
B	Volume flow-wet basis	Dry basis
C	Volume flow-wet basis	Wet basis
D	Mass flow-dry basis	Dry or wet basis
E	Mass flow-wet basis	Dry basis
F	Mass flow-wet basis	Wet basis

Option A is applied in the project activity. Since option B and E has not been selected as an option, the absolute humidity of the gaseous stream will not be determined.

Option A:

According to the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" version 03 .0.0, flow measurement on a dry measurement is not doable for a wet gaseous stream. Therefore, it will be demonstrated that the temperature of the gaseous stream (T_t) is less than 60°C (333.15 K) at the flow measurement point.

The mass flow of CH_4 ($F_{CH_4,t}$) is determined as follows:

$$F_{CH_4,t} = V_{t,db} * v_{CH_4,t,db} * \rho_{CH_4,t} \quad \text{Equation 5 in TOOL08}$$

With

$$\rho_{CH_4,t} = P_t * MM_{CH_4} / R_u * T_t \quad \text{Equation 6 in TOOL08}$$

Where:

$F_{CH_4,t}$	Mass flow of CH ₄ in the gaseous stream in time interval t (kg gas/h)
$V_{t,db}$	Volumetric flow of the gaseous stream in time interval t on a dry basis (m ³ dry gas/h)
$V_{CH_4,t,db}$	Volumetric fraction of CH ₄ in the gaseous stream in a time interval t on a dry basis (m ³ gas CH ₄ /m ³ dry gas)
$\rho_{CH_4,t}$	Density of CH ₄ in the gaseous stream in time interval t (kg gas CH ₄ / m ³ gas CH ₄)
P_t	Absolute pressure of the gaseous stream in time interval t (Pa)
MM_{CH_4}	Molecular Mass of CH ₄ (kg/kmol)
R_u	Universal ideal gases content (Pa.m ³ /kmol.K)
T_t	Temperature of gaseous stream in time interval t (K)

The amount of methane destroyed by flaring ($F_{CH_4, flared,y}$)

The project participant opts to exclude the flare system from the baseline calculations and will not claim any emission reductions from the flaring activities (if any) within the crediting period, since the flare system is observed/envisaged to work none or for insignificant durations throughout the operational lifetime.

The exclusion of the emission reductions from flaring activities is conservative since it will result in no change (if there is no flaring activity) or decrease in the total emission reductions (if flaring activity is observed).

In accordance with the above explanation, the "Project emissions from flaring" Version 03, is not applied to the project activity and no emission reductions will be claimed from the flaring activity, therefore the amount of methane destroyed by flaring $F_{CH_4, flared,y}$ is fixed to "0".

Step A.2: Determination of $F_{CH_4,BL,y}$

This step provides a procedure to determine the amount of methane that would have been captured and destroyed (by flaring) in the baseline due to regulatory requirements, or to address safety and odour concerns. ACM0001 "Flaring or Use of Landfill Gas" version 19.0.0 provides 4 cases and corresponding instructions.

Situation at the start of the project activity:	Requirement to destroy methane	Existing LFG capture and destruction system
Case 1: No requirement to destroy methane exists and no existing LFG capture system	No	No

Situation at the start of the project activity:	Requirement to destroy methane	Existing LFG capture and destruction system
Case 2: Requirement to destroy methane exists and no existing LFG capture system	Yes	No
Case 3: No requirement to destroy methane exists and an LFG capture system exists	No	Yes
Case4: Requirement to destroy methane exists and LFG capture system exists	Yes	Yes

The situation at the start of the project activity falls under Case 1 since there are no legal requirements in Turkey to destroy methane and the LFG was not captured prior to the project activity.

Therefore:

$$F_{CH_4,BL,y}=0$$

The results of $BE_{CH_4,y}$ calculations are summarized in the below table.

Start date	End date	$F_{CH_4,PJ,y}$ (tCH ₄)	$F_{CH_4,BL,y}$ (tCH ₄)	$BE_{CH_4,y}$ (tCO _{2e})
04/11/2022	30/11/2022	492.01	0	12,398
01/12/2022	31/12/2022	545.06	0	13,735
01/01/2023	31/01/2023	524.21	0	13,210
01/02/2023	28/02/2023	480.34	0	12,104
01/03/2023	31/03/2023	511.69	0	12,894
01/04/2023	30/04/2023	441.05	0	11,114
01/05/2023	31/05/2023	448.84	0	11,310
01/06/2023	30/06/2023	444.13	0	11,192
01/07/2023	31/07/2023	471.49	0	11,881
Total for 2022		1,037.07	0	26,133
Total for 2023		3,321.73	0	83,705
Total for the monitoring period		4,358.80	0	109,838

Step B: Baseline emissions associated with electricity generation ($BE_{EC,y}$)

The baseline emissions associated with electricity generation in year y ($BE_{EC,y}$) is calculated in accordance with the "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation " Version 3.0. The electricity source k in the tool corresponds to the sources of electricity generated by the grid, which is identified as the most plausible baseline scenario. $EC_{BL,k,y}$ in the tool is equivalent to the net amount of electricity generated using LFG in year y ($EG_{PJ,y}$).

Generic approach

In the generic approach, baseline emissions from consumption of electricity are calculated based on the quantity of electricity consumed, an emission factor for electricity generation and a factor to account for transmission losses, as follows:

$$BE_{EC,y} = \sum EC_{BL,k,y} * EF_{EL,k,y} * (1 + TDL_{k,y}) \quad \text{Equation 2 in TOOL05 V3}$$

Where:

- $BE_{EC,y}$ Baseline emissions from electricity consumption in year y (tCO₂e/yr)
- $EC_{BL,k,y}$ Net amount of electricity generated using LFG in year y (MWh/yr)
- $EF_{EL,k,y}$ Emission factor for electricity generation source k in year y (tCO₂e/MWh)
- $TDL_{k,y}$ Average technical and transmission and distribution losses for providing electricity to source k in year y
- k the sources of electricity generated by the grid

$TDL_{k,y}$ value is taken as zero since the losses have already been excluded from the generation value.

Start date	End date	EG _{PJ,y} (MWh)	BE _{EC,y} (tCO ₂ e)
04/11/2022	31/12/2022	6,005	2,959
01/01/2023	31/07/2023	19,941	9,827
Total		25,946	12,786

Determination of the Emission Factor for Electricity Generation ($EF_{EL,k,y}$)

The emission factor of the Turkish grid ($EF_{grid,CM,y}$) is calculated by Ministry of Energy and Natural Resources in accordance with The Clean Development Mechanism method of the Intergovernmental Panel on Climate Change (IPCC) and published in Turkey National Network Grid Emission Factor Data Sheet³³.

The CO₂ emission factor for the displacement of electricity generated by power plants in the project activity and fed to the grid is estimated using Tool to calculate the emission factor for an electricity system version 7.0. The estimation is carried out through following steps

- (a) Step 1: Identify the relevant electricity systems;

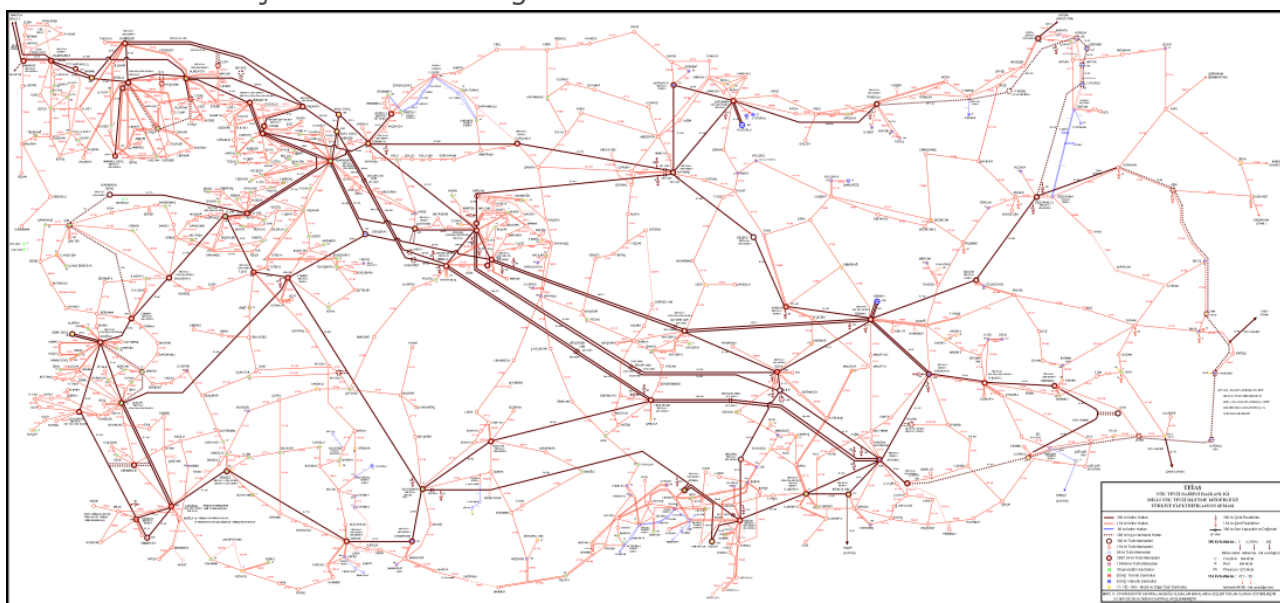
³³https://enerji.gov.tr/Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/2019_Sebeke_EF.pdf

- (b) Step 2: Choose whether to include off-grid power plants in the project electricity system (optional);
- (c) Step 3: Select a method to determine the operating margin (OM);
- (d) Step 4: Calculate the operating margin emission factor according to the selected method;
- (e) Step 5: Calculate the build margin (BM) emission factor;
- (f) Step 6: Calculate the combined margin (CM) emission factor.

Step 1: Identify the relevant electricity systems

As described in tool "For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used".

Keeping this into consideration the delineation of the national grid of Turkey by "Türkiye Elektrik İletim A.Ş. Genel Müdürlüğü" is considered for estimation.



Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

- Option I: Only grid power plants are included in the calculation.
- Option II: Both grid power plants and off-grid power plants are included in the calculation

The Project Participant has chosen only grid power plants in the calculation.

Step 3: Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

- (a) Simple OM; or
- (b) Simple adjusted OM; or

- (c) Dispatch data analysis OM; or
(d) Average OM.

The data required to calculate Simple adjusted OM and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on generation of electricity from low-cost/ must-run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

Table 3: In accordance with Electricity Market Production Capacity Projections List (TWh)³⁴

Years	2016	2017	2018	2019	2020	2021	Share in 2021 (%)
Lignite	61.24	61.33	61.33	61.33	61.33	61.33	14.26%
Hard Coal	5.91	5.91	5.91	5.91	5.91	5.91	1.37%
Imported Coal	37.90	39.63	39.67	39.67	39.67	26.82	6.23%
Natural Gas	175.07	175.15	176.01	175.79	176.01	176.01	40.91%
Geothermal	1.40	1.40	1.40	1.40	1.40	1.40	0.33%
Fuel Oil	9.22	9.22	9.22	9.22	9.22	9.22	2.14%
Diesel	0.15	0.15	0.15	0.15	0.15	0.15	0.03%
Nuclear	0	0	0	4.200	12.60	21.00	4.88%
Other	1.41	1.41	1.41	1.41	1.41	1.41	0.33%
Thermal Total	292.30	294.21	295.11	299.08	307.71	316.11	70.49%
Biogas + Waste	1.20	1.20	1.20	1.20	1.20	1.20	0.28%
Hydro	104.44	112.71	115.78	116.56	116.56	116.56	27.09%
Wind	9.21	9.21	9.21	9.21	9.21	9.21	2.14%
Total	407148	417317	421292	426044	434670	443070	100.0%

The above data clearly shows that the percentage of total grid generation by low-cost/ must-run plants (on the basis of average of five most recent years) for the national grid of Turkey is less than 50 % of the total generation capacity. Thus, the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation. The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

³⁴ [EMRA | Energy Market Regulatory Authority \(epdk.gov.tr\)](https://www.epdk.gov.tr)

(a) Ex-ante option: if the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.

OR

(b) Ex-post option: if the ex-post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

Step 4: Calculate the operating margin emission factor ($EF_{grid,OM,y}$) according to the selected method

For OM factor calculation, Chronological order of power generation plants from TEIAS Load Dispatch Department with, fuel types, electricity generation for the calculated year were used as input data. By using all the data which were mentioned above, Turkish Ministry of Energy and Natural Resources calculated $EF_{grid,OM,y}$ ³⁵ :

$$EF_{grid,OM,y} = 0.7258 \text{ tCO}_2/\text{MWh}$$

Step 5: Calculate the build margin (BM) emission factor ($EF_{grid,BM,y}$)

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100, Annex 4) para 72:

In terms of vintage of data, project participants can choose between one of the following two options:

(a) Option 1 - for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group at the time of PDD submission to the VVB for project verification. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the VVB. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

(b) Option 2 - For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

³⁵https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/2019_Sebeke_EF.pdf

Option 1 as described above is chosen by PP to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PD and is fixed for the entire crediting period.

For BM factor calculation by Turkish Ministry of Energy and Natural Resources $EF_{grid,BM,y}$ ³⁶ chronological order of power generation plants from TEIAS Load Dispatch Department with commissioning dates, plant names, fuel types, installed power values, electricity generation for the calculated year were used as input data.

$$EF_{grid,BM,y} = 0.4153 \text{ tCO}_2/\text{MWh}$$

Step 6: Calculate the combined margin (CM) emission factor ($EF_{grid,CM,y}$)

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100, Annex 4) para 81:

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

- (a) Weighted average CM; or
- (b) Simplified CM.

PP has chosen option (a) i.e weighted average CM to calculate the combined margin emission factor for the project activity.

The combined margin emission factor is calculated by using weighted average CM as per TOOL07 Version 07.0 formula below:

$$EF_{grid,BM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM} \quad \text{Equation 16 in TOOL07 V7}$$

Where:

$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,OM,y}$	Operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
W_{OM}	Weighting of operating margin emissions factor (%)
W_{BM}	Weighting of build margin emissions factor (%)

According to the Tool for power generation project activities other than wind and solar, for the second crediting period;

$W_{OM} = 0.25$ and $W_{BM} = 0.75$

Then:

³⁶https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyOnFktr/Belgeler/2019_Sebeke_EF.pdf

$$EF_{\text{grid,CM,y}} = 0.7258 \text{ tCO}_2/\text{MWh} \times 0.25 + 0.4153 \text{ tCO}_2/\text{MWh} \times 0.75 = 0.4929 \text{ tCO}_2/\text{MWh}$$

$$EF_{\text{grid,CM,y}} = 0.4929 \text{ tCO}_2/\text{MWh}$$

E.2. Calculation of project value or estimation of project situation of each SDG Impact

SDG 7: Affordable and Clean Energy

For the current monitoring period, the clean energy generation contributed by the project activity is 25,946 MWh.

SDG 13 Climate Action:

Project Emissions

In accordance with ACM0001 "Flaring or Use of Landfill Gas" version 19.0.0, the project emissions are calculated as follows:

$$PE_y = PE_{EC,y} + PE_{FC,y} + PE_{DT,y} + PE_{SP,y} \quad \text{Equation 22 in ACM0001 V19}$$

Where:

PE_y	Project emissions in year y (t CO ₂ /yr)
$PE_{EC,y}$	Emission from consumption of electricity due to the project activity in year y (tCO ₂ e/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 CO ₂ /yr)
$PE_{DT,y}$	Emissions from the distribution of compressed/liquefied LFG using trucks, in year y (t CO ₂ /yr)
$PE_{SP,y}$	Emissions from the supply of LFG to consumers through a dedicated pipeline, in year y (t CO ₂ /yr)

Since there is no consumption of fossil fuels due to the project activity, for purposes other than electricity generation, there are no emissions from fossil fuel consumption and therefore $PE_{FC,y}$ is equal to "0" and has not been included in equation. Also, the project activity does not include the distribution of compressed/liquefied LFG using trucks or the supply of LFG to consumers through a dedicated pipeline. Thus, $PE_{DT,y}$ and $PE_{SP,y}$ are zero.

Therefore, $PE_y = PE_{EC,y}$

The project emissions from consumption of electricity by the project activity $PE_{EC,y}$ shall be calculated using the "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation " Version 3.0. When applying the

tool, electricity sources j in the tool corresponds to the sources of electricity consumed due to the project activity.

$PE_{EC,y}$ is calculated as follows:

$$PE_{EC,y} = \sum EC_{PJ,y} * EF_{EL,j,y} * (1 + TDL_{j,y}) \quad \text{Equation 1 in TOOL05 V3}$$

Where:

$PE_{EC,y}$	Project emissions from electricity consumption in year y (tCO ₂ e/year)
$EC_{PJ,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/year)
$EF_{EL,j,y}$	Emission factor for electricity generation for source j in year y (tCO ₂ e/MWh)
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y

The combined margin emission factor of the applicable electricity system has been determined as emission factor for the electricity system ($EF_{EL,j,y}$), in line with Option A1 of scenario A (Electricity consumption from grid) under the "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 3.0.

$TDL_{j,y}$ value is taken as zero since the losses have already been excluded from the consumption value. Project emission value for the monitoring period is $PE_y = 10$ tCO₂ as can be seen from the table below.

Start date	End date	$EG_{EC,y}$ (MWh)	PE_y (tCO ₂ e)
04/11/2022	31/12/2022	1.0764	2
01/01/2023	31/07/2023	7.9902	8
Total		9.0666	10

Details of the calculations are presented in the emission reductions calculation sheet.

For the current monitoring period, the emission reductions contributed by the project activity (ER) is calculated as follows:

$$ER_y = BE_y - PE_y \quad \text{Equation 26 in ACM0001, V19.0}$$

Where:

ER_y	=	Emission reductions in year y (tCO ₂ e)
BE_y	=	Baseline emissions in year y (tCO ₂ e)
PE_y	=	Project emissions in year y (tCO ₂ e)

Period	BE _y (tCO ₂ e/year)	PE _y (tCO ₂ e/year)	ER _y (tCO ₂ e/year)
04/11/2022-31/12/2022	29,092	2	29,090
01/01/2023-31/07/2023	93,532	8	93,524
Total	122,624	10	122,614

SDG 8: Decent Work and Economic Growth

The project leads to employment opportunities which would not have been possible in the baseline scenario. The project generated 19 employment opportunities and also 2 trainings conducted for the current monitoring period.

E.3. Calculation of leakage

In accordance with ACM0001 "Flaring or Use of Landfill Gas" version 19.0, no leakage effects are accounted.

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Take urgent action to combat Climate Change and its impacts	122,624 tCO ₂ e	10 tCO ₂ e	122,614 ³⁷ tCO ₂ e
7	Ensure access to affordable, reliable, sustainable and modern energy for all	0 MWh	25,946 MWh	25,946 MWh
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	-	19 employments generated and 2 trainings conducted	19 employments generated and 2 trainings conducted

³⁷ Round down value

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values ³⁸ achieved during this monitoring period
13	193,201 tCO ₂ e	122,614 tCO ₂ e
7	50,745 MWh	25,946 MWh
8	5 workers employed will be continued during the crediting period and at least 1 training will be conducted	19 employments generated and 2 trainings conducted

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

SDG7: Affordable and Clean Energy

The annual estimated power generation for the project activity is 68,600 MWh, thus considering the number of days covered during present monitoring period to be 270, the estimated power generation will be 50,745 MWh.

SDG 13: Climate Action

The annual estimated emission reduction for the project activity is 261,180 tCO₂e, thus considering number of days covered during present monitoring period to be 270, the estimated emission reduction contributing towards SDG 13 will be 193,201 tCO₂e.

SDG 8: Decent Work and Economic Growth

The project is estimated to provide employment to 5 people and a minimum of 1 training per year.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

There is not any increase in SDG 7 and SDG 13 impacts from estimated value in approved PDD. There is a small increase in SDG 8 impacts of the project activity.

³⁸ Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

SECTION F. SAFEGUARDS REPORTING

A completed Safeguarding Principles Assessment is in Appendix 1 of registered PDD Version 05 ongoing monitoring is summarized below.

Principles	Mitigation Measures added to the Monitoring Plan
Principle 3-Community Health, Safety and Working Conditions	All the employees are trained about health and safety issues during operation phase of the project. Please refer to M.ID.12 / Quality of Employment parameter.

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

Stakeholder consultation for the project has been carried out at validation stage. Since the project was registered under previous version of GS, no specific mechanism defined for on-going stakeholder consultations post implementation. Prior to validation, various unofficial meetings have been carried out between the project owner and local communities.

Moreover, stakeholder engagement procedure was being conducted at the Bursa Hamitler LFG control room with the local stakeholders and head of Yenibağlar Neighborhood within verification process. The contact information of Company Executive of the company was given to head of Yenibağlar Neighborhood so that the local stakeholders will be able to reach company executive whenever they have any complaints, suggestions, or ideas about the project. Since the head of the neighborhood is the main contact person between the project owner and the local stakeholders, he made sure that there is continuous communication between the two parties. Moreover, the logbook was delivered to the head of Yenibağlar Neighborhood. The logbook is present at the project site in order to account continuous ongoing grievance mechanism. No grievances were received in this monitoring period.

G.2. Report on any stakeholder mitigations that were agreed to be monitored.

Not Applicable since there were no stakeholder mitigations were agreed to be monitored for the current monitoring period.

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

Not Applicable since the project did not receive any legal disputes during the current monitoring period.

Revision History

Version	Date	Remarks
1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption