Gold Standard
for the Global Goals

TEMPLATE

# KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.2**

RELATED SUPPORT

- **TEMPLATE GUIDE Key Project Information & Project Design Document v.1.2**

This document contains the following Sections


Key Project Information

0 – Description of project

0 - Application of approved Gold Standard Methodology (ies) and/or demonstration of SDG Contributions

0 – Duration and crediting period

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0 - Contact information of Project participants

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0 - Summary of Approved Design Changes

# KEY PROJECT INFORMATION

| | |
|---|---|
| GS ID of Project | GS11226 |
| Title of Project | PANAB TEKIRDAG BIOGAS PLANT |
| Time of First Submission Date | 22/06/2021 |
| Date of Design Certification | - |
| Version number of the PDD | 12 |
| Completion date of version | 23/10/2023 |
| Project Developer | PANAB TEKİRDAĞ ENERJİ ANONİM ŞİRKETİ |
| Project Representative | GTE KARBON SUSTAINABLE ENERJI EGITIM DANISMANLIK VE TICARET A.S. |
| Project Participants and any communities involved | - |
| Host Country (ies) | Turkey |
| Activity Requirements applied | ☐ Community Services Activities<br>☒ Renewable Energy Activities<br>☐ Land Use and Forestry Activities/Risks & Capacities<br>☐ N/A |
| Scale of the project activity | ☐ Micro scale<br>☐ Small Scale<br>☒ Large Scale |
| Other Requirements applied | N/A |
| Methodology (ies) applied and version number | ACM0001 Large-scale Consolidated Methodology: Flaring or use of landfill gas Version 19.0 |
| Product Requirements applied | ☒ GHG Emissions Reduction & Sequestration<br>☐ Renewable Energy Label<br>☐ N/A |

| Project Cycle: | ☐ Regular<br>☒ Retroactive |
|---|---|

**Table 1 – Estimated Sustainable Development Contributions**

| Sustainable Development Goals Targeted | SDG Impact (defined in B.6.) | Estimated Annual Average | Units or Products |
|---|---|---|---|
| 13 Climate Action (mandatory) | Amount of GHGs emissions avoided or sequestered | 192,586 | $tCO_2$ |
| 7 Affordable and Clean Energy | Annual average estimated renewable electricity generation | 53,025 | MWh |
| 8 Decent Work and Economic Growth | Project provides job opportunities. | 65 | People who are employed |

# SECTION A. DESCRIPTION OF PROJECT

## A.1 Purpose and general description of project

The owner of the proposed project is Panab Tekirdağ Enerji A.Ş. as per generation license dated on 01/10/2020 by EMRA. It is located in Süleymanpaşa district of Tekirdağ province in Turkey. The project's licensed capacity consists of 10 gas engine units with

the installed capacity of 1.451 MWm / 1.414 MWe each, resulting in 14.510 MWm / 14.140 MWe total capacity. The corresponding electricity generation is 106,050 MWh as indicated in the generation license[1]. Currently, 5 units are in operation with a total installed capacity of 7.255 MWm / 7.070 MWe. The remaining units are planned to be commissioned as the collected LFG amount increases. The project uses municipal solid waste including different types of wastes such as mixed domestic solid wastes and wastes from gardens/parks/streets. The fuel source of the project is defined as biomass / municipal solid waste – gasification.

Main goals of the project are;

- Waste collected from domestic sources will be decomposed.
- Heat demand of the facility will be met.
- Biogas will be used to produce clean electrical energy.

The project is a brownfield project. Prior to the proposed project activity, the wastes are left to decay within Tekirdağ landfill site and methane is emitted to the atmosphere without any control or utilization. With the proposed project, LFG generated in the involved landfill site will be captured by newly constructed LFG collection and utilization system. All of the captured LFG will be combusted to produce electricity for export to the grid. A flare device installed to destroy excess LFG when the LFG generation amount exceeds the utilization capacity of the LFG power generators.

The produced electricity contributes to reduction of GHG emissions through fossil fuel combustion and also the produced heat will be utilized. The project holds Environmental Impact Assessment (EIA) approval which is dated on 28/08/2020. Gas engines (GM1

[1] Generation License of PANAB Tekirdağ Biogas Plant

and GM2) were commissioned on 28/10/2020 and GM3-GM4-GM5 were commissioned on 25/12/2020.

The Project activity involves a single installation and has been located within the already existing landfill site, where the waste is transported from the city and the leachate is collected and stored. The proposed Project does not involve any operations on site, it will solely install the vertical and horizontal pipes to collect the LFG efficiently and generate power from collected LFG.

The extraction system shall include a network of vertical gas extraction wells, de-watering units and gas transport pipelines connected to a main collector system. The gas has been driven to gas engine. The electricity energy produced from LFG is calculated based on conservative assumptions and measurements. The generation will depend on the quantity of the LFG.

Project implementation includes Mechanical Separation Plant and Waste-derived Fuel Plant. There is also a data registry system which includes received wastes' source, codes, amounts, etc. Wastes entering the facility first are separated in the Mechanical Separation Plant depending on their type. Recyclable wastes are sent to the recycling facilities. Moreover, wastes obtained after separation (flammable / non-flammable) are sent to the Waste-Derived Fuel Plant.

The project baseline scenario for LFG is the atmospheric release of the LFG and the baseline scenario for electricity generation is the electricity generation in existing and/or new grid-connected power plants.
The project milestones are presented in Table 2.

**Table 2 - Milestones of Tekirdağ Biogas Plant Project**

| Milestone | Date |
|---|---|
| EIA Approval | 28/08/2020 |

| | |
|---|---|
| Generation License | 01/10/2020 |
| Crediting Period | 28/10/2020 – 27/10/2025 |
| Start Date (Date of gas generator purchase agreement ) | 26/06/2020 |
| Submission of project documents and initiation of review | 22/06/2021 |
| Payment of Preliminary Review fee | 29/06/2021 |
| Commissioning Date of Gas Engines GM1 and GM2 | 28/10/2020 |
| Commissioning Date of Gas Engines GM3, GM4 and GM5 | 25/12/2020 |
| Deviation Request | 18/05/2022 |
| Deviation Approval Decision | 23/05/2022 |

The project contributes to 192,586 tonnes of $CO_2e$ reduction annually and 962,928 tonnes of $CO_2e$ for the entire crediting period.

Tekirdağ Biogas Power Plant Project has not applied to any other registration/GHG programs; the quantity of emission reductions will be verified only under Gold Standard Certification. The project has been committed to retire eligible units equal to the quantity of Gold Standard VERs in case of double counting.

### A.1.1. Eligibility of the project under Gold Standard

Section 3.1.1 (titled as 'Eligible Project Types') of the document of Gold Standard for the Global Goals (GS4GG) Principles & Requirements[2] (Version 1.2) clearly states that

"A Project type is automatically eligible for Gold Standard Certification if there are approved Gold Standard Activity Requirements and/or Gold Standard Impact Quantification Methodologies associated with it or as referenced in Gold Standard Product Requirements" (ibid.:6)

In line with this statement, the proposed Project's type, as renewable energy production out of municipal solid waste, shall be considered as a Renewable Energy Activity. Hence, the document of "GS4GG Renewable Energy Activity Requirements[3] (Version 1.4)" will be used to define whether the proposed Project activity is automatically eligible for Gold Standard Certification.

The Section 1. (titled as 'Eligible Project Types & Scopes') of the GS4GG Renewable Energy Activity Requirements states that

"In order to be eligible for certification, Gold Standard Renewable Energy Projects must meet the following Eligibility and Criteria:

(a) Project shall generate and deliver energy services (e.g. mechanical work/electricity/heat) from non-fossil and renewable energy sources

[2] https://globalgoals.goldstandard.org/101-par-principles-requirements/

[3] https://globalgoals.goldstandard.org/202-ar-renewable-energy-activity-requirements/

(b) Project shall comprise of renewable energy generation units, such as photovoltaic, tidal/wave, wind, hydro, geothermal, waste to energy and renewable biomass:

- Supplying energy to a national or a regional grid; or
- Supplying energy to an identified consumer facility via national/regional grid through a contractual agreement such as wheeling." (ibid.:2)

In the case of the proposed Project, it generates and delivers energy services from non-fossil and renewable energy sources, comprises of renewable energy units and supplies electric energy to the national grid. Hence, it meets the Eligibility and Criteria.

As pointed out in the Section A.1. of this PDD, the proposed Project is designed to generate renewable energy, mainly electricity by using municipal solid waste. The proposed project, as a methane avoidance-based renewable energy activity, also meets the additional eligibility criteria prescribed for its project type, namely, project activity using biogas. Therefore, it is argued that the proposed Project is automatically eligible for Gold Standard Certification.

After reviewing all of the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document, it is argued that the proposed Project is automatically eligible for Gold Standard Certification. It is also important to note that the proposed Project will not benefit from other certification schemes or renewable energy labelling standards. The ways in which the proposed project activity meets eligibility criteria can be summarized as follows:

- The Project is seeking to issue solely GS4GG VER Certification;
- The Project is neither registered nor applied to any other Voluntary Emission Reductions Certification Scheme;
- The Project is a renewable energy installation activity;
- The Project activity includes physical action/implementation on the ground;
- The Project is located in Turkey, which is eligible for VER projects;

- The Project contributes to sustainable development goals;
- The Project is in compliance with GS safeguarding principles;
- Stakeholders are involved in the project implementation and planning during the local consultation meetings and feedback round;
- The Project outcomes are real and will be validated/verified by approved bodies;
- Additionality is demonstrated as per the applicable tools and methodologies.

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

- The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reduction from Manure Management Systems and Municipal Solid Waste
- The project type is power generation using Biogas Energy which is an eligible project type as it is in accordance with 1.1.1 a) and 1.1.1 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.
- The project activity results in displacement of electricity from thermal power plants while contributing to sustainable development of Turkey. Hence, the project contributes to the Gold Standard Vision and Mission.
- Biogas power is an approved project type and does not require approval from Gold Standard.
- This project activity is not associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, nor does it enhances or prolongs such energy generation.
- The project is not registered with any other schemes.

As stated in Section 2.1.3 of the document of Gold Standard for the Global Goals (GS4GG) Renewable Energy Activity Requirements (version 1.4)[4], New Gold Standard

[4] https://globalgoals.goldstandard.org/202-ar-renewable-energy-activity-requirements/

Verified Emission Reductions (GS VER) or Gold Standard labels for Certified Emission Reductions (GS CER), Renewable Energy projects connected to national or a regional electricity grid must be located in either a;

a. Least Developed Country (LDC), Small Island Developing State (SIDS) or a Land Locked Developing Country (LLDC) or

b. Low Income and Low Middle-income country where the penetration level of the proposed Renewable Energy Technology type is less than 5% of the total grid installed capacity, at the time of the first submission to preliminary review.

Although the project is located in Turkey which is an upper middle income country, since the proposed biogas project is considered primarily as a waste to energy project, it is eligible and may receive Issuance of Certified Impact Statements or Products for maximum three Certification Renewal Cycles (15 years in total) unless mentioned otherwise in the Product Requirements as informed by Sustain-Cert[5].

Also, Turkey does not have an emission cap or a regulation on emission trading. If new regulations are issued in the future, adjustments will be made accordingly.

Moreover, as per the para. 1.3.1 of Annex A of Gold Standard for the Global Goals (GS4GG) Renewable Energy Activity Requirements (version 1.4)[6], "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)." Since the

[5] The e-mail dated on 04/03/2020
[6] https://globalgoals.goldstandard.org/202-ar-renewable-energy-activity-requirements/

project activity prevents of methane emissions by capturing and utilize the methane produced (See Section A.3) and generates the electrical energy that would otherwise be generated using fossil fuels (See Section B.4), the project activity is eligible.

As per the GS requirement 5.1.51: Retroactive Projects shall submit for Preliminary Review within one year of the Project Start Date. For the proposed project, though the projects documents submitted within one year of Project start date, invoice has been paid the days after "one year" period. Therefore, Project Developers have applied for deviation and deviation request has been approved by GS on 23/05/2022.

### A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

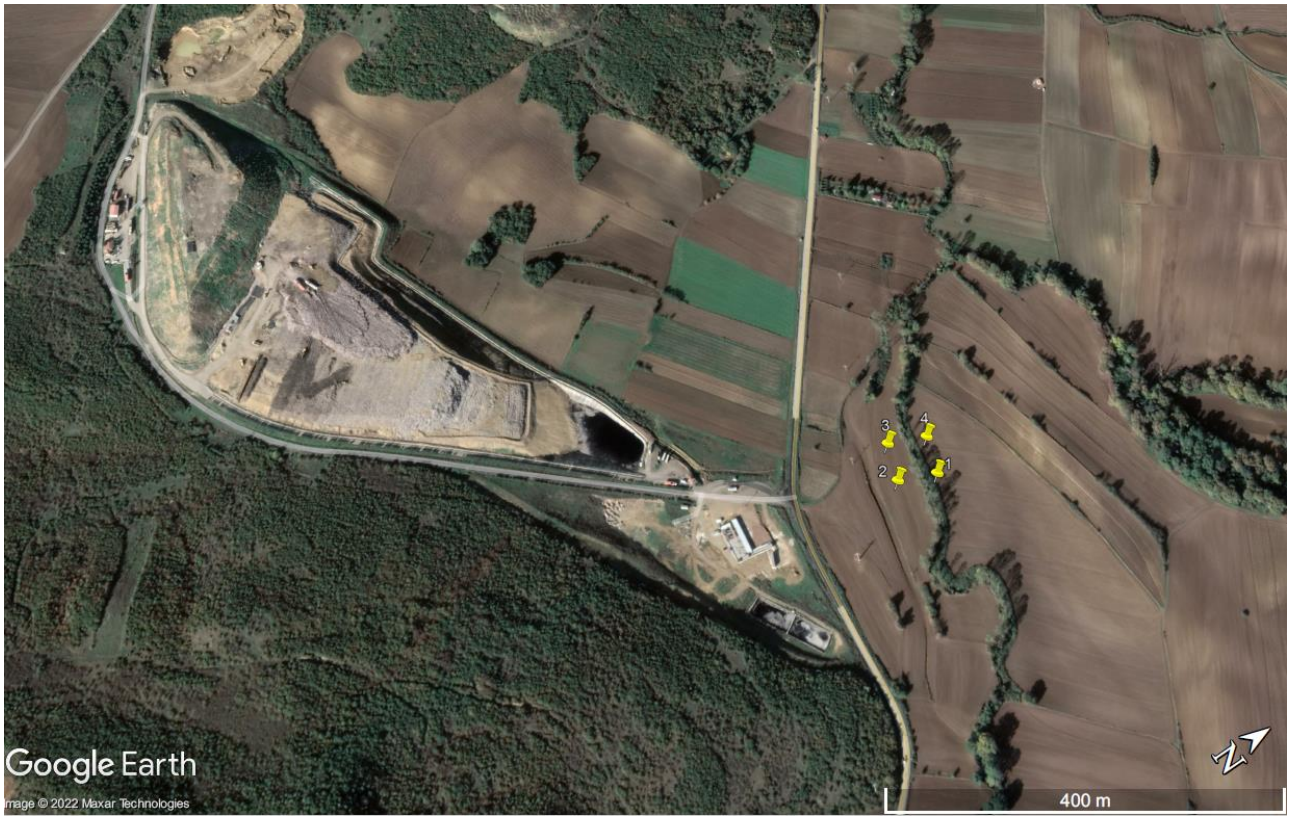
As per the pre-license issued by Energy Market Regulatory Authority (EMRA), all legal rights of the project is given to Panab Tekirdağ Enerji Anonim Şirketi until 07/05/2049. The owner of the licence is responsible for the construction of the facility, commissioning, production and sale of the electricity produced.
Tekirdağ Biogas Power Plant Project has not applied to any other registration/GHG programs; the quantity of emission reductions will be verified only under Gold Standard Certification. The project has been committed to retire eligible units equal to the quantity of Gold Standard VERs in case of double counting.

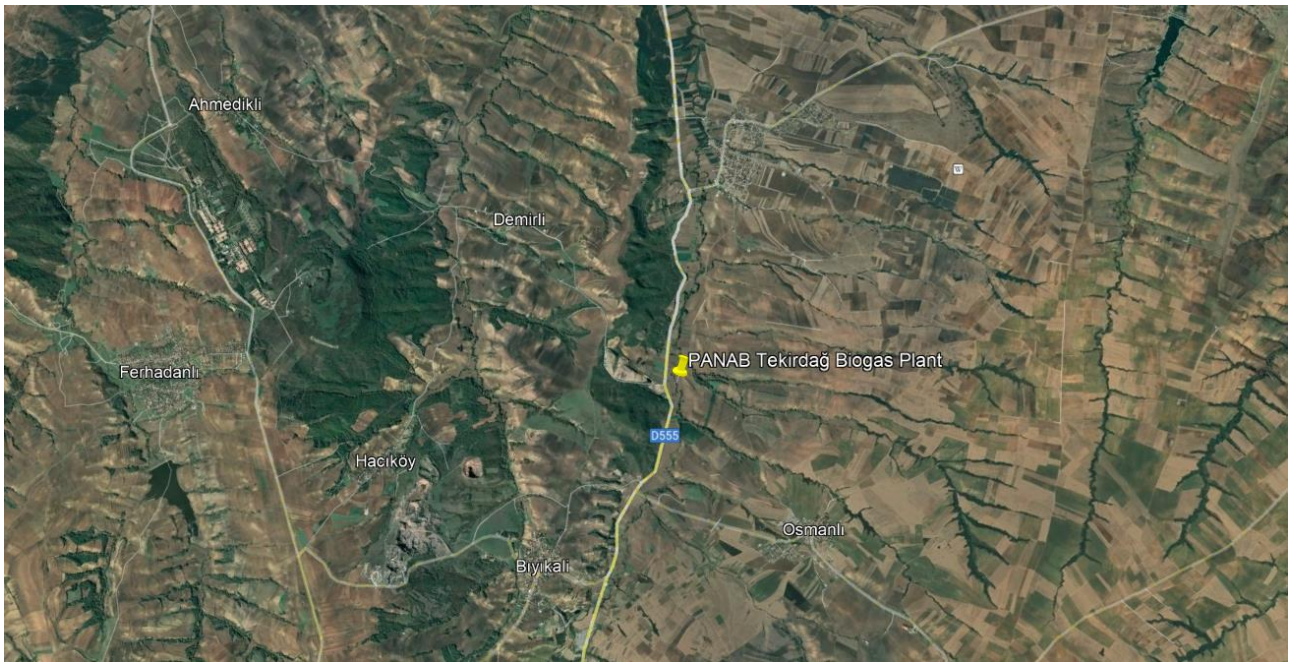
## A.2 Location of project

The project is located in Süleymanpaşa district of Tekirdağ province / Turkey.
The corner points of the project area indicated in the generation license[7] are presented in the table below.

[7] Generation License of PANAB Tekirdağ Biogas Plant

| | Latitude | Altitude |
|---|---|---|
| **1** | 530292.666 | 4543715.582 |
| **2** | 530274.150 | 4543673.711 |
| **3** | 530233.286 | 4543691.782 |
| **4** | 530251.801 | 4543733.652 |






## A.3 Technologies and/or measures

The project's licensed capacity consists of 10 gas engine units with the installed capacity of 1.451 MWm / 1.414 MWe each, resulting in 14.510 MWm / 14.140 MWe total capacity. The corresponding electricity generation is 106,050 MWh as indicated in the generation license[8]. Currently, 5 units are in operation with a total installed capacity of 7.255 MWm / 7.070 MWe and the corresponding annual electricity generation is 53,025 MWh.

The project activity provides energy to the national grid of Türkiye that have been otherwise provided by using fossil fuels.

[8] Generation License of PANAB Tekirdağ Biogas Plant

The Project activity is a brownfield project involving a single installation and has been located within the already existing landfill site, where the waste is transported from the city and the leachate is collected and stored. The project uses municipal solid waste of Tekirdağ Province (except Çorlu District) including different types of wastes such as mixed domestic solid wastes and wastes from gardens/parks/streets. The project provides better management option for wastes as around 385,712 ton/year. The proposed Project does not involve any operations on site, it will solely install the vertical and horizontal pipes to collect the LFG efficiently and generate power from collected LFG.

The extraction system shall include a network of vertical gas extraction wells, de-watering units and gas transport pipelines connected to a main collector system. The gas has been driven to gas engine. The electricity energy produced from LFG is calculated based on conservative assumptions and measurements. The generation will depend on the quantity of the LFG.

The project activity provides better management and utilization of waste that has been dumped to the existing landfill site. Thus, environmental and public health issues will be prevented due to wastes dumped to the uncontrolled landfill site.

Project implementation includes Mechanical Separation Plant and Waste-derived Fuel Plant. There is also a data registry system which includes received wastes' source, codes, amounts, etc. Wastes entering the facility first are separated in the Mechanical Separation Plant depending on their type. Recyclable wastes are sent to the recycling facilities. Moreover, wastes obtained after separation (flammable / non-flammable) are sent to the Waste-Derived Fuel Plant. According to the waste analysis report, 1.70% of the total waste are non-flammable.

The lifetime of the project activity is 28 years, 7 months and 6 days from 01/10/2020 to 07/05/2049 according to the generation license.

The technical lifetime of gas fired generator sets are stated as 50,000 hours (corresponding 5.7 years approximately) in the relevant tool[9]. Since the plant's gas engines commissioned in 2020, the lifetime of the gas engines will not exceed the crediting period.

Details of the equipment are presented below.

Flare:
Capacity: 5000 $m^3$/h
Efficiency: 98%
The flare has been manufactured by the project owner.

Gas Blower:
Brand: Continental Industrie
Model: 31
Operating speed: 3600 rpm

Gas Analyzer:
Brand: Siemens
Model: ULTRAMAT 23

Gas Flowmeter:
Brand: Testo
Model: 440
Operating temperature range: -20…+50 °C
Measurement temperature range: -200…+1370 °C
Accuracy in temperature measurement: ± (0.3°C +0.3% measured value)
Measurement differential pressure range: -150…+150 hPa
Accuracy in differential pressure measurement: ±0.05 hPa for (0 ... +1.00 hPa), ±0.2 hPa + 1.5% measurement value for (+1.01 ... +150 hPa)

[9] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf

Gas Engine:
Brand/Model: Jenbacher/ JMS 420 GS-L.L
Electrical output: 1414 kWe
Thermal output: 889 Kw
Nominal speed: 1500 rpm

Main Meter:
Brand: Landis
Type: ZMG405
Production Year: 2018
Serial number: 42066908

Back-up Meter:
Brand: Landis
Type: ZMG405
Production Year: 2020
Serial number: 51222278

According to the EIA report of the SWDS, prior to the project activity the following facilities and equipment was present:

- Solid waste disposal site
- Tire cleaning area
- Control building
- Weighbridge
- Leachate collection pond and leachate treatment facility

1 – Affordable and Clean Energy (SDG 7):

The project is expected to generate 53.025 GWh of clean energy per annum with the current installed capacity and contributes to share of low-cost / must-run sources.

2 – Decent Work and Economic Growth (SDG 8):

The project promotes job opportunities to 65 people. Social security documents of employees are the certain prove of that issue.

Training (including H&S) & Other Certification processes required by certain necessary professions will be provided to employees to protect human health&rights and develop. Hence, project contributes awareness of labour rights and safety precautions. Trainings of employees are done periodically as per national regulations and certifications are kept for the prove of the situation.

3- Take urgent action to combat climate change and its impacts (SDG 13)

The project contributes to 192,586 tonnes of CO2e/year reduction, which represent direct and quantifiable impact on climate security.

### A.4 Scale of the project

The CDM Methodology Booklet[10] (tenth edition) states that the Type (iii) project activities "that result in emission reductions of less than or equal to 60 kt $CO_2$ equivalent per year"(pg. 41) shall be considered as "Small-scale" project activities. Since the total estimated emission reduction of the proposed project activity is 192,586 $tCO_2$ equivalent per year, the Project's scale shall be defined as "Large-scale".

### A.5 Funding sources of project

No public funding is used for the project activity.

[10] https://cdm.unfccc.int/methodologies/documentation/1903/CDM-Methodology-Booklet_fullversion

# SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

## B.1. Reference of approved methodology (ies)

According to the Appendix B to the simplified modalities and procedures for small-scale CDM project activities, the proposed project activity falls under the following type and category:
Methodology: ACM0001 Version 19.0 Flaring or use of landfill gas

Sectoral Scope: 1 Energy industries (renewable - / non-renewable sources) as per 'Sectoral scopes related approved methodologies and DOEs and 13 Waste handling and disposal
Project type: Waste Handling and disposal

The UNFCCC approved baseline and monitoring methodology ACM0001 "Large-scale Consolidated Methodology Flaring or use of landfill gas", version 19.0[11] was applied for the project activity. Following tools have been used:

- Tool 03 Methodological Tool – Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion (version 03.0)
- Tool 04 Methodological Tool - Emissions from solid waste disposal sites. (version 08.0)
- Tool 05 Methodological Tool - Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)
- Tool 08 Methodological Tool - Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0.0)

[11]https://cdm.unfccc.int/filestorage/H/E/J/HEJ2MD41GB0PUZISL9FNTAYQV3875O/EB103_repan01_ACM0001.pdf?t=aFd8cmltNHhufDB0iuwFrui0enO_wdn0Jj6d

- Tool 07 Methodological Tool - Tool to calculate the emission factor for an electricity system (version 07.0)
- Tool to determine the remaining lifetime of equipment" (Version 01)
- Tool 32 Methodological Tool - Positive lists of technologies (version 04.0)

## B.2. Applicability of methodology (ies)

### ACM0001 Flaring or use of landfill gas Version 19.0 Applicability

| Methodology applicability | The proposed project |
|---|---|
| ACM0001 "Large-scale Consolidated Methodology Flaring or use of landfill gas", version 19.0 | |
| The methodology is applicable under the following conditions | |
| (a) Install a new LFG capture system in an existing or new (Greenfield) SWDS where no LFG capture system was or would have been installed prior to the implementation of the project activity; or | (a)The project involves the installation of a new LFG capture system in existing SWDS where no LFG capture system was or would have been installed prior to the implementation of the project activity |
| (b) Make an investment into an existing LFG capture system to increase the recovery rate or change the use of the captured LFG, provided that:<br>(i) The captured LFG was vented or flared and not used prior to the implementation of the project activity; and | The LFG was vented from the landfill site prior to the project activity. In Turkey; generally, SWDS still do not have LFG recovery, and result in methane emissions.[12]<br>According to the description above, (b) is not applicable. |

[12] Municipal Waste Statistics – Turkish GHG Inventory 1990 - 2020

| | |
|---|---|
| (ii) In the case of an existing active LFG capture system for which the amount of LFG cannot be collected separately from the project system after the implementation of the project activity and its efficiency is not impacted on by the project system: historical data on the amount of LFG capture and flared is available; | |
| (c) Flare the LFG and/or use the captured LFG in any (combination) of the following ways:<br>(i) Generating electricity;<br>(ii) Generating heat in a boiler, air heater or kiln (brick firing only) or glass melting furnace; and/or<br>(iii) Supplying the LFG to consumers through a natural gas distribution network;<br>(iv) Supplying compressed/liquefied LFG to consumers using trucks;<br>(v) Supplying the LFG to consumers through a dedicated pipeline; | (i)The project activity utilizes the captured LFG to generate electricity. |
| (d) Do not reduce the amount of organic waste that would be recycled in the absence of the project activity.<br>1. When demonstrating compliance with requirement (d) above, the PP may: | (d)<br>(a)Before the Tekirdağ Biogas Plant, there was not any LFG system and managed SWDS, the wastes were disposed to the project area with an uncontrolled manner. In Turkish waste management inventory there is no organic waste recycle facility at the |

| | |
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| (a) Describe the prevailing waste management practices pertinent to organic waste recycling in the area that is served by the landfill. The area served by the landfill should be clearly identified in the PDD, with supporting evidence (e.g. by providing contracts or licenses);<br><br>(b) Identify any facility(ies) that recycle the organic fraction of the waste in the area identified in (a) above.; and<br><br>(c) If there are facilities identified in (b) above, explain whether the project activity will impact the amount of organic waste which is recycled in the absence of the project.<br><br>(d) If the facility(ies) identified in (c) above is(are) not operating at its maximum capacity, explain, with supporting evidence (e.g. by providing a balance of processed waste or receipts for transported waste), why the organic fraction of the solid waste would not have been treated in this(ese) facility(ies).<br><br>2. In doing so, the PPs may conduct interviews with authorities, refer to national/local statistics or studies related to MSW management in the area, and obtain opinion from relevant local experts. | reasonable proximity of the project. The area served by the landfill has been clearly stated with corner coordinates in Section 1.12.<br><br>The project activity generates electricity through LFG and do not reduce the amount of organic waste that would be recycled.<br><br>According to the description above, (b), (c), (d) and 2 are not applicable. |
| The methodology is only applicable if the application of the procedure to identify the baseline scenario confirms that the most plausible baseline scenario is: | |

| | |
|---|---|
| (a) Atmospheric release of the LFG or capture of LFG and destruction through flaring to comply with regulations or contractual requirements, to address safety and odour concerns, or for other reasons; and | (a) In the baseline scenario of the project activity, LFG is released to the atmosphere. |
| (b) In the case that the LFG is used in the project activity for generating electricity and/or generating heat in a boiler, air heater, glass melting furnace or kiln:<br>(i) For electricity generation: that electricity would be generated in the grid or in captive fossil fuel fired power plants; and/or<br>(ii) For heat generation: that heat would be generated using fossil fuels in equipment located within the project boundary; | (b) In the project activity, LFG is used for generating electricity that would otherwise be generated in the fossil fuel fired power plants. |
| (c) In the case of LFG supplied to the end-user(s) through natural gas distribution network, trucks or the dedicated pipeline, the baseline scenario is assumed to be displacement of natural gas. | (c) LFG is not supplied to the end-user(s) through natural gas distribution network, trucks or the dedicated pipeline, the baseline scenario is assumed to be displacement of natural gas. Therefore, not applicaple. |
| (d) In the case of LFG from a Greenfield SWDS, the identified baseline scenario is atmospheric release of the LFG or capture of LFG in a managed SWDS and destruction through flaring to comply with regulations or contractual requirements, to address safety and odour concerns, or for other reasons. | (d) The project activity involves already existing SWDS. |
| This methodology is not applicable: | |
| (a) In combination with other approved methodologies. For instance, ACM0001 cannot be used to claim emission reductions for the displacement of fossil fuels in a kiln or glass melting furnace, where the purpose of the CDM project activity is to implement energy | a) The methodology is not applied with other approved methodologies.<br>. |

| | |
|---|---|
| efficiency measures at a kiln or glass melting furnace; | |
| (b) If the management of the SWDS in the project activity is deliberately changed during the crediting in order to increase methane generation compared to the situation prior to the implementation of the project activity. | b) The management of the SWDS before the implementation of the project is handled by the Tekirdağ Municipality. The project proponent does not have any control over SWDS management which is under management of Tekirdağ Municipality. Thus, the project proponent cannot do anything to change the SWDS management and increase methane generation prior to the project implementation. The para 5.b of the ACM0001, "If the management of the SWDS in the project activity is deliberately changed during the crediting in order to increase methane generation compared to the situation prior to the implementation of the project activity", is not valid so the project is applicable to ACM0001 |

| **Applicability of Tools** | **The proposed project** |
|---|---|
| **Tool 03 Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion (version 03.0)** | |

| | |
|---|---|
| This tool provides procedures to calculate project and/or leakage CO2 emissions from the combustion of fossil fuels. It can be used in cases where CO2 emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties. Methodologies using this tool should specify to which combustion process j this tool is being applied. | The applied methodology refers to the tool and specifies the combustion process . |
| **Tool 04 Methodological Tool --Emissions from solid waste disposal sites. (version 08.0.0)** | |
| The tool can be used to determine emissions for the following types of applications:<br><br>Application A: The CDM project activity mitigates methane emissions from a specific existing SWDS. Methane emissions are mitigated by capturing and flaring or combusting the methane (e.g. “ACM0001: Flaring or use of landfill gas”). The methane is generated from waste disposed in the past, including prior to the start of the CDM project activity. In these cases, the tool is only applied for an ex ante estimation of emissions in the project design document (CDM-PDD). The emissions will then be monitored during the crediting period using the applicable approaches in the relevant methodologies (e.g. measuring the | It is easily identified that the project activity meets the tool’s applicability conditions Application A.<br><br>The proposed activity involves the collection and utilization of the LFG with an electricity component. Expected disposed waste amount is 385,712 tonnes/years. |

| | |
|---|---|
| amount of methane captured from the SWDS);<br><br>Application B: the CDM project activity avoids or involves the disposal of waste at a SWDS.<br><br>An example of this application of the tool is ACM0022, in which municipal solid waste (MSW) is treated with an alternative option, such as composting or anaerobic digestion, and is then prevented from being disposed of in a SWDS. The methane is generated from waste disposed or avoided from disposal during the crediting period. In these cases, the tool can be applied for both ex ante and ex post estimation of missions. These project activities may apply the simplified approach detailed in 0 when calculating baseline emissions. | |
| These two types of applications are referred to in the tool for determining parameter | As stated above, Application A describes the project activity since the project mitigates the methane emissions by capturing and utilizing the LFG for electricity generation. |
| In the case that: (a) different types of residual waste are disposed or prevented from disposal; or that (b) both MSW and residual waste(s) are prevented from disposal, then the tool should be applied separately to each residual waste and to the MSW. | The project activity utilizes only the LFG from the MSW. |
| **Tool 05 Baseline, project and/or leakage emissions from electricity consumption and**<br><br>**monitoring of electricity generation (Version 03.0)** | |

<table>
<tr><td colspan="2">If emissions are calculated for electricity consumption, the tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption:</td></tr>
<tr><td>(a) Scenario A: Electricity consumption from the grid. The electricity is purchased from the grid only, and either no captive power plant(s) is/are installed at the site of electricity consumption or, if any captive power plant exists on site, it is either not operating or it is not physically able to provide electricity to the electricity consumer;<br><br>(b) Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants are installed at the site of the electricity consumer and supply the consumer with electricity. The captive power plant(s) is/are not connected to the electricity grid; or<br><br>(c) Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants operate at the site of the electricity consumer. The captive power plant(s) can provide electricity to the electricity consumer. The captive power plant(s) is/are also connected to the electricity grid. Hence, the electricity consumer can be provided with electricity from the captive power plant(s) and the grid</td><td>(a) The project activity does not consume electricity from grid.<br><br>However, when electricity generators are under regular maintenance and sometimes shut down, the electricity will be imported from the Power Grid during this period of time for energy need of the plant. Therefore, parts (b) and (c) are not applicable.</td></tr>
<tr><td colspan="2">This tool can be referred to in methodologies to provide procedures to monitor amount of electricity generated in the project scenario, only if one out of the following three project scenarios applies to the recipient of the electricity generated:</td></tr>
</table>

| | |
|---|---|
| (a) Scenario I: Electricity is supplied to the grid;<br><br>(b) Scenario II: Electricity is supplied to consumers/electricity consuming facilities; or<br><br>(c) Scenario III: Electricity is supplied to the grid and consumers/electricity consuming facilities. | (a) The electricity generated by the project activity is supplied to the grid.<br><br>Therefore, parts (b) and (c) are not applicable |
| This tool is not applicable in cases where captive renewable power generation technologies are installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage. The tool only accounts for CO2 emissions. | The project activity and the baseline scenario does not involve the installation of captive renewable power generation technologies. |
| **Tool 07 Tool to calculate the emission factor for an electricity system (version 07.0)** | |
| This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). | The project activity supplies electricity to the Turkish National Grid. Hence, this condition is met. |
| Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option | CO2 emission factor for the displacement of electricity generated by power plants in an electricity system is determined by calculating the “combined margin” emission factor (CM) of the electricity system. The combined margin emission factor for grid power plants only calculated by |

| | |
|---|---|
| IIb. If option IIa is chosen, the conditions specified in “Appendix 1: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity. | the Ministry of Energy and Natural Resources of Türkiye is used in calculations. |
| In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country. | Project is not a CDM project and although Turkiye is still listed in Annex I, Turkiye has not taken any emission reduction commitment. |
| Under this tool, the value applied to the CO2 emission factor of biofuels is zero. | Tool is applied by the Ministry of Energy and natural Resources considering the specific options and requirements which includes using "0" for renewables and biofuels. |
| **Tool 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0.0)** | |

| | |
|---|---|
| a) Typical applications of this tool are methodologies where the flow and composition of residual or flared gases or exhaust gases are measured for the determination of baseline or project emissions. | The composition and flow of the LFG are measured to determine baseline emissions in the context of the project activity. |
| b) Methodologies where CO2 is the particular and only gas of interest should continue to adopt material balances as the means of flow determination and may not adopt this tool as material balances are the cost effective way of monitoring flow of CO2. | $CO_2$ is not a gas of interest in the project activity[13]. |
| The underlying methodology should specify:<br>(a) The gaseous stream the tool should be applied to;<br>(b) For which greenhouse gases the mass flow should be determined;<br>(c) In which time intervals the flow of the gaseous stream should be measured; and<br>(d) Situations where the simplification offered for calculating the molecular mass of the gaseous stream | (a) ACM0001: Flaring or use of landfill gas --- Version 19.0 refers to the tool and specifies (a), (b), (c) and (d). |

[13] Gas Analysis Report

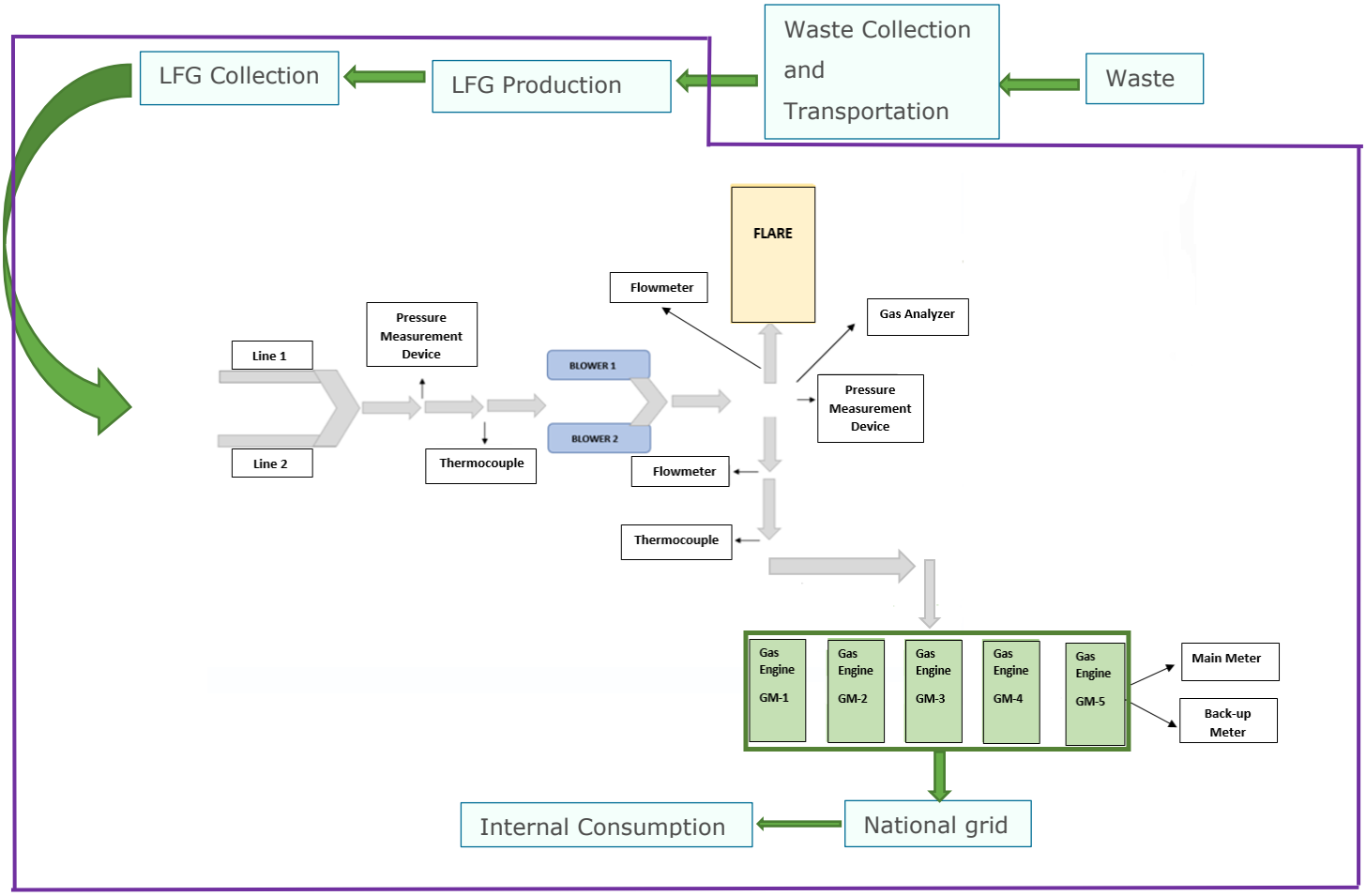
| | | |
|---|---|---|
| | (equations (3) or (17)) is not valid (such as the gaseous stream is predominantly composed of a gas other than $N_2$). | |
| | **Tool 07 Tool to calculate the emission factor for an electricity system (version 07.0)** | |
| | This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). | The project activity supplies electricity to the national grid. |
| | **Tool 32 Positive lists of technologies (version 04.0)** | |
| | The use of this methodological tool is not mandatory for the project participants of a CDM project activity or CDM PoA for demonstrating their additionality. | |
| | This methodological tool shall be applied in conjunction with a small-scale or large-scale methodology which refers to this tool. | The applied methodology ACM0001: Flaring or use of landfill gas --- Version 19.0 refers to Tool 32. |

Emission reduction is more than 60 kt CO2 equivalent annually, for the sake of conservative approach, the emission methodology ACM0001 is preferred. Therefore, the large scale methodology is used.

### B.3. Project boundary

According to the ACM0001 methodology, the project boundary is the site of the project activity where the gas is captured and destroyed/used. The project boundary includes

the power generator, which is connected to the grid. For the proposed project activity, electricity is sourced and transmitted to the grid. The difference is the net generation of the project activity. The electricity energy produced from LFG is calculated based on conservative assumptions and measurements. Furthermore, it will not be sourced from a captive generation source or power plant. The project boundary for the project activity is as demonstrated in the figure below




| Source | | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline | Emissions from decomposition of | $CO_2$ | No | CO2 emissions from the decomposition of organic waste are not accounted. |

| Source | | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| | waste at the SWDS | $CH_4$ | Yes | The major source of emissions in the baseline |
| | | $N_2O$ | No | N2O emissions are small compared to CH4 emissions from landfills. Exclusion of this gas is conservative. |
| | Emissions from electricity generation | $CO_2$ | Yes | Major emission source |
| | | $CH_4$ | No | Excluded for simplification. This is conservative |
| | | $N_2O$ | No | Excluded for simplification. This is conservative |
| Project | Emissions from fossil fuel consumption for purposes other than electricity generation | $CO_2$ | Yes | This may be an important source of emissions in the project activity |
| | | $CH_4$ | No | Excluded for simplification. This emission source is assumed to be very small |
| | | $N_2O$ | No | Excluded for simplification. This emission source is assumed to be very small |
| | Emissions from electricity consumption due to the project activity | $CO_2$ | Yes | This is an important source of emissions in the project activity |
| | | $CH_4$ | No | Excluded for simplification. This emission source is assumed to be very small |
| | | $N_2O$ | No | Excluded for simplification. This emission source is assumed to be very small. |
| | Emissions from flaring | $CO_2$ | No | Emissions are considered negligible |

| Source | | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| | | $CH_4$ | Yes | May be an important emission source |
| | | $N_2O$ | No | Emissions are considered negligible |

## B.4. Establishment and description of baseline scenario

As the ACM0001 Large-scale Consolidated Methodology Flaring or use of landfill gas suggests, Project participants may either apply the simplified procedures in section 5.3.1 below or the procedures in section 5.3.2 to select the most plausible baseline scenario and demonstrate additionality.

To identify baseline scenario, section 5.3.1 Simplified procedures to identify the baseline scenario and demonstrate additionality of Large-scale Consolidated Methodology Flaring or use of landfill gas Version 19.0 was followed.

According to paragraph 22 of the applied methodology, "The baseline scenario for LFG is assumed to be the atmospheric release of the LFG or capture of LFG and destruction through flaring to comply with regulations or contractual requirements, to address safety and odour concerns, or for other reasons"

Therefore, The project baseline scenario for LFG is "the atmospheric release of the LFG".

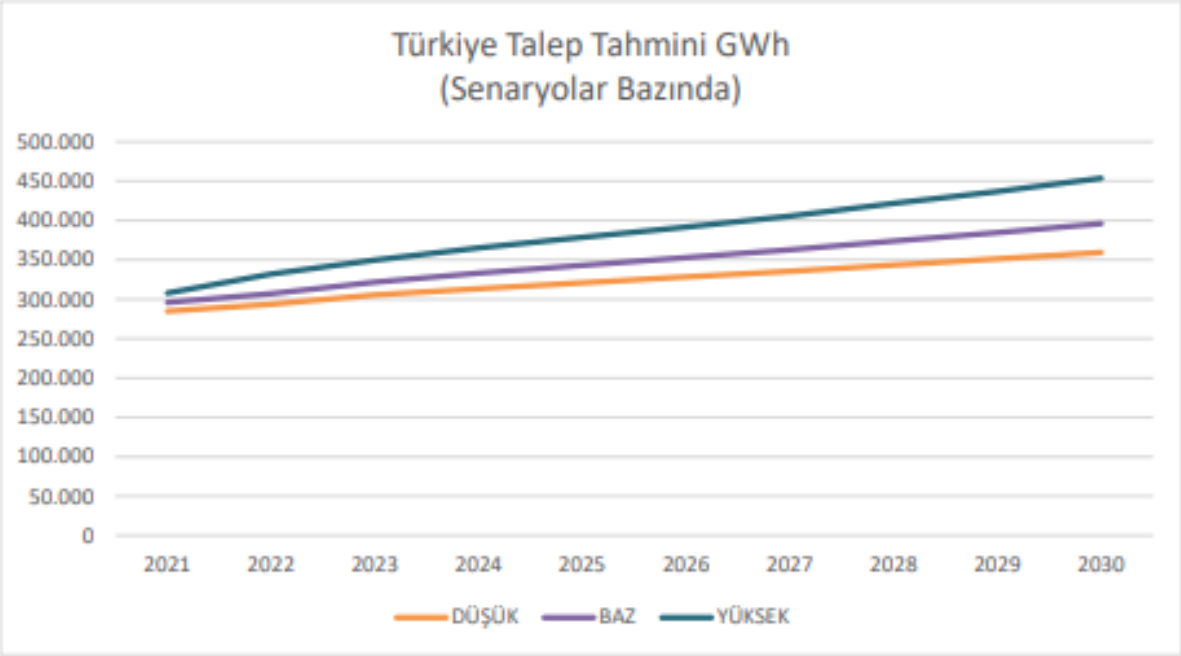
According to paragraph 23 of the applied methodology "If all or part of the electricity generated by the project activity is exported to the grid, the baseline scenario for all or the part of the electricity exported to the grid is assumed to be electricity generation in existing and/or new grid-connected power plants. If all or part of the electricity is supplied to off-grid application, the baseline electricity generation equipment is assumed to correspond to the default emission factor from Option B2 of the "Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation".

Thus, the baseline scenario for electricity generation is "electricity generation in existing and/or new grid-connected power plants". According to Turkish Electricity Transmission Corporation (TEİAŞ) statistics, the fossil-fuel based electricity generation share in total electricity generation in Turkey is over 56.5% by 2018[14].

| *ANNUAL DEVELOPMENT OF RENEWABLE ELECTRICITY GENERATION SHARE IN TURKEY TOTAL ELECTRICITY GENERATION (2019)* | | | | | | | |
|---|---|---|---|---|---|---|---|
| *YEAR* | *HYDRO (MW)* | *GEOTERMAL (MW)* | *WIND (MW)* | *SOLAR (MW)* | *BİOMASS (MW)* | *RENEWABLE INSTALLED CAPACITY (MW)* | *TOTAL INSTALLED CAPACITIY (MW)* |
| **2019** | 88,822.8 | 8,951.7 | 21,730.7 | 9,249.8 | 3.522,7 | 88.822,8 | 88.550,8 |
| % in Renewable Installed Capacity | 67% | 7% | 16% | 7% | 3% | 100% | - |
| % in Total Installed Capacity | 29% | 3% | 7% | 3% | 1% | 43.5% | 100% |

[14] https://webapi.teias.gov.tr/file/3b6826b3-a880-4b42-8ba3-e5915a2281ea?download

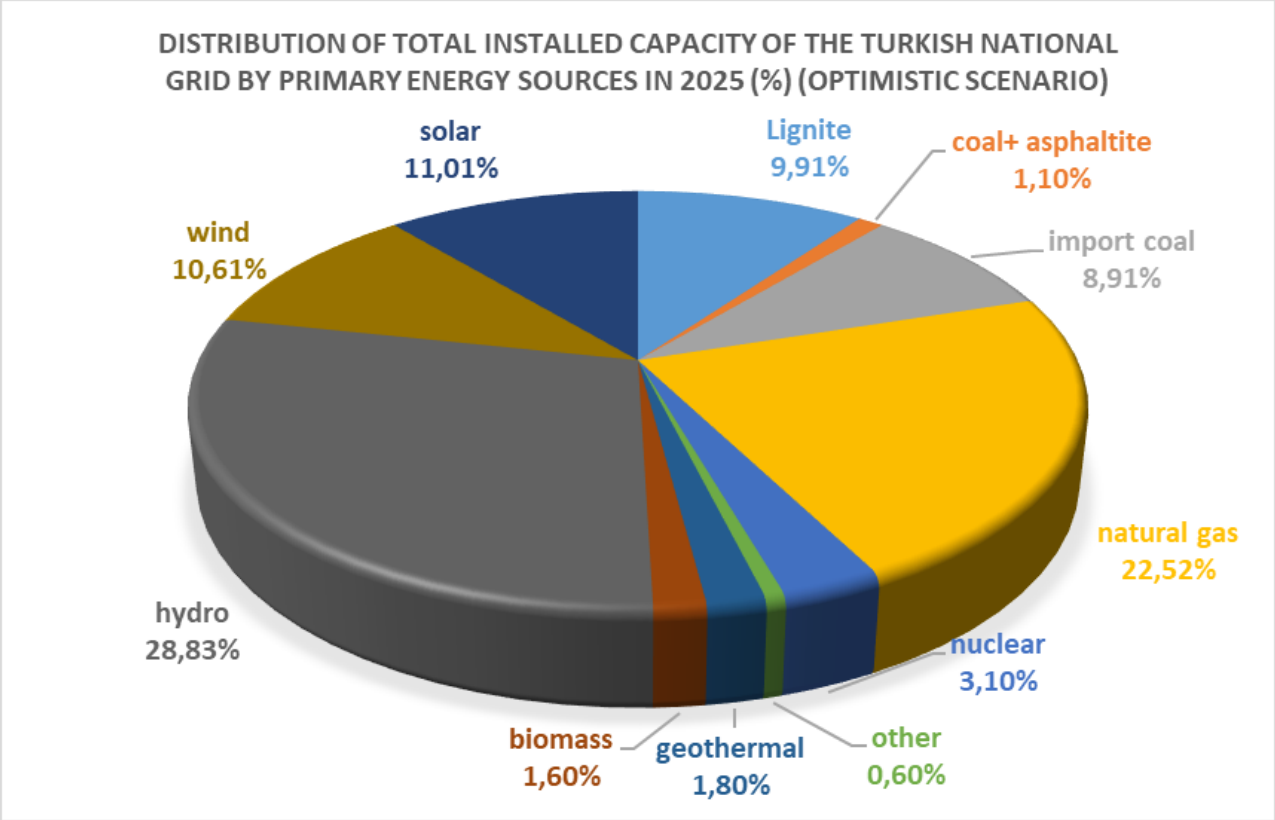
Moreover, Turkey's energy demand is rapidly increasing in line mainly with the increases in its population and its economy. TEİAŞ's estimations on the demand of gross electricity consumption in Turkey between 2021 and 2030 can be seen in the Chart below[15].




Moreover, TEİAŞ, in its report on "The Projections on Capacity Generation[16]", analyses the estimations on changes in electricity generation capacities in Turkey between 2021 and 2025, based on different scenarios. The distribution of total installed capacity of the Turkish national grid by primary energy resources in 2025 in optimistic scenario can be seen in the chart below.

[15] TEİAŞ Report on Demand Estimations in 10 Years (2021-2030), Table 71, pg. 54 file:///C:/Users/Lenovo/Downloads/2021-2030%20Talep%20Tahmin%20Raporu.pdf

[16] Page 46, https://www.epdk.gov.tr/Detay/DownloadDocument?id=mX/P3YDBw1U=




As seen in the chart, although it is estimated that the share of renewable energy sources in the total installed capacity of the Turkish national grid would exceed 50% by 2025, the share of biogas and biomass energy sources would remain almost the same, only 1.6% (only 0.6% increase from 2019 to 2025). That means that the share of biogas- and biomass-based renewable energy sources in the Turkish national grid is estimated to show no changes from 2019 to 2025, despite their potential pointed out by the 'Bioenergy and Food Security (BEFS) Assessment for Turkey: Sustainable bioenergy options from crop and livestock residues[17]' published by Food and Agriculture Organization of the United Nations (FAO) and European Bank for Reconstruction and Development (EBRD) in 2016.

[17] http://www.fao.org/3/a-i6480e.pdf

Hence, it is reasonable to claim that it is estimated that whilst the share of biogas- and biomass-based renewable energy sources in the total installed capacity of the Turkish national grid could remain almost the same by 2025, Turkey's electricity grid would continue to be dominated by fossil fuel burning power plants which are seen as the quickest solutions in short term to meet the demand and to enable energy security in terms of supply.

## B.5. Demonstration of additionality

For demonstrate additionality, section 5.3.1 Simplified procedures to identify the baseline scenario and demonstrate additionality of Large-scale Consolidated Methodology Flaring or use of landfill gas Version 19.0 was followed. According to paragraph 21,

"For the simplified procedure to demonstrate additionality, the project proponent shall refer to the methodological tool "TOOL32: Positive lists of technologies"

According to Section 5.1.1 of Tool 32 " Positive lists of technologies",

"The project activities and PoAs at new or existing landfills (greenfield or brownfield) are deemed automatically additional, if it is demonstrated that prior to the implementation of the project activities and PoAs the landfill gas (LFG) was only vented and/or flared (in the case of brownfield projects) or would have been only vented and/or flared (in the case of greenfield projects) but not utilized for energy generation, and that under the project activities and PoAs any of the following conditions are met:

(a) The LFG is used to generate electricity in one or several power plants with a total nameplate capacity that equals or is below 10 MW;

(b) The LFG is used to generate heat for internal or external consumption;

(c) The LFG is flared."

Since the proposed project activity is a brownfield project prior to which the LFG was only vented and the project activity involves the LFG use for electricity generation, the project is deemed automatically additional. Also, although the licensed capacity is 14.14 which is above 10MW, the project currently meets the condition (a) with a current

installed capacity of 7.255 MWm / 7.070 Mwe. A capacity increase is not expected in near future. In the case of an increase an investment analysis will be carried out to demonstrate additionality.

B.5.1 Prior Consideration

As per the GS requirement 5.1.51: Proposed Project is retoactive. Retroactive Projects shall submit for Preliminary Review within one year of the Project Start Date. For the proposed project, though the projects documents submitted (22/06/2021) within one year of project start date (26/06/2020), reviewed by GS and listed.

B.5.2 Ongoing Financial Need

N/A

### B.6. Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

| Sustainable Development Goals Targeted | Most relevant SDG Target | SDG Impact<br><br>Indicator (Proposed or SDG Indicator) |
|---|---|---|
| 13 Climate Action (mandatory) | 13.2 Integrate climate change measures into national policies strategies and planning | 13.2.1 Number of countries with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change |
| 8 Decent Work and Economic | 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with | 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities |

| | | |
|---|---|---|
| | disabilities, and equal pay for work of equal value | 8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status |
| | 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment | 8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status |
| 7 Affordable and Clean Energy | By 2030, increase substantially the share of renewable energy in the global energy mix | 7.2.1 Renewable energy share in the total final energy consumption |

B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

SDG 7: Affordable and Clean Energy

Relevant Target of SDG 7

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix

Relevant Indicator of SDG 7

7.2.1 Renewable energy share in the total final energy consumption

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel and this is one of the methodological reason for choosing simple OM method to calculate emission factor. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 53.025 GWh of clean energy per annum with the current installed capacity and contributes to share of low-cost / must-run sources. Hence, contribution of the project could be followed via indicator "Renewable energy share in the total final energy consumption" and following target: ''By 2030,

increase substantially the share of renewable energy in the global energy mix". This project increases the renewable energy sharing of global energy mix and contribute to improved air quality by reducing air pollution.

SDG 8: Decent Work and Economic Growth (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all):

Relevant Target of SDG 8

8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment Relevant Indicators of SDG 8.

8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities

The project promotes job opportunities. Social security documents of employees are the certain prove of that issue.

8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status

8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status

Training (including H&S) & Other Certification processes required by certain necessary professions will be provided to employees to protect human health & rights and develop. Hence, project contributes awareness of labour rights and safety precautions. Trainings of employees are done periodically as per national regulations and certifications are kept for the prove of the situation.

"Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status":

SDG13 : Climate Action (Taking urgent action to combat climate change and its impacts):

Relevant Target of SDG 13

13.2 Integrate climate change measures into national policies strategies and planning

Relevant Indicator of SDG 13

13.2.1 Number of countries with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change

The project leads to mitigation of 192,586 $tCO_2$ per annum. The project contributes to the target of SDG 13 which could be expressed via following indicator:

"Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning": The project's contribution is done through training and awareness raising of local people and setting good example by investing to the climate friendly technology.

B.6.2 Data and parameters fixed ex ante

**SDG13**

| | |
|---|---|
| Data/parameter | **OX** |
| Unit | - |
| Description | Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste) |
| Source of data | Based on an extensive review of published literature on this subject, including the IPCC 2006 Guidelines for National Greenhouse Gas Inventories |
| Value(s) applied | 0.1 |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | When methane passes through the top-layer, part of it is oxidized by methanotrophic bacteria to produce CO2. The |

| | |
|---|---|
| | oxidation factor represents the proportion of methane that is oxidized to CO2 This should be distinguished from the methane correction factor (MCF) which is to account for the situation that ambient air might intrude into the SWDS and prevent methane from being formed in the upper layer of SWDS |

| | |
|---|---|
| Data/parameter | **$GWP_{CH4}$** |
| Unit | t $CO_2e$/t $CH_4$ |
| Description | Global Warming Potential for $CH_4$ |
| Source of data | IPCC |
| Value(s) applied | The GWP of methane is taken as 25 till 31/12/2020 and 28 thereafter as per following the GS rule updates |
| Choice of data or Measurement methods and procedures | Default value from IPCC is used as per the applied methodology. |
| Purpose of data | Used in project emission/baseline calculations. |
| Additional comment | - |

| | |
|---|---|
| Data/parameter | **$MCF_{default}$** |
| Unit | N/A |
| Description | Methane conversion factor |
| Source of data | According to tool "Emissions from solid waste disposal sites"_v.08 |
| Value(s) applied | 1.0 |

| | |
|---|---|
| Choice of data or Measurement methods and procedures | |
| Purpose of data | Used in project emission/baseline calculations. |
| Additional comment | - |

| | |
|---|---|
| Data/parameter | $\eta_{PJ}$ |
| Unit | % |
| Description | Efficiency of the LFG capture system that will be installed in the project activity |
| Source of data | ACM0001 version 19.0 |
| Value(s) applied | 50% |
| Choice of data or Measurement methods and procedures | Default value stated in the applied methodology. |
| Purpose of data | Used in project emission calculation. |
| Additional comment | Applicable to section 5.4.1.2 of ACM0001 Flaring or use of landfill gas |

| | |
|---|---|
| Data/parameter | $\varphi_{default}$ |
| Unit | - |
| Description | Default value for the model correction factor to account for model uncertainties |
| Source of data | - |

<table>
<tr><td>Value(s) applied</td><td>For project or leakage emissions: φdefault = 1.<br><br>For baseline emissions: refer to the table below to identify the appropriate factor based on the application of the tool (A or B) and the climate where the SWDS is located.<br><br><table><tr><td></td><td>Humid/wet Conditions</td><td>Dry Conditions</td></tr><tr><td>Application A</td><td>0.75</td><td>0.75</td></tr><tr><td>Application B</td><td>0.85</td><td>0.80</td></tr></table><br>For the project activity application A of the Tool 04 Emissions from solid waste disposal sites is valid, 0.75 which is the value for Application A.</td></tr>
<tr><td>Choice of data or Measurement methods and procedures</td><td>-</td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Additional comment</td><td>The table above is applicable to Option 1 in the procedure “Determining the model correction factor (φy)” in Tool 04 Emissions from solid waste disposal sites version 08.0.</td></tr>
</table>

| | |
|---|---|
| Data/parameter | **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 | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | Upon biodegradation, organic material is converted to a mixture of methane and carbon dioxide |

| | |
|---|---|
| Data/parameter | **$DOC_{f,default}$** |
| 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 | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | This factor reflects the fact that some degradable organic carbon does not degrade, or degrades very slowly, in the SWDS. This default value can only be used for:<br>(a) Application A; or<br>(b) Application B if the tool is applied to MSW.<br>An alternative to using the default factor is to estimate DOCf,y or<br>DOCf,m using equations (9), (10) and (11) in Tool 04 Emissions from solid waste disposal sites Version 08.0 |

| | |
|---|---|
| Data/parameter | **$DOC_j$** |

| | |
|---|---|
| Unit | - |
| Description | Fraction of degradable organic carbon in the waste type j (weight fraction) |
| Source of data | IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5) |
| Value(s) applied | For MSW, the following values for the different waste types j should be applied:<br><br>Default values for $DOC_j$<br><br>Wood and wood products: 43<br>Pulp, paper and cardboard (other than sludge): 40<br>Food, food waste, beverages and tobacco (other than sludge): 15<br>Textiles: 24<br>Garden, yard and park waste: 20<br>Glass, plastic, metal, other inert waste: 0 |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | The procedure for the ignition loss test is described in BS EN 15169:2007 Characterization of waste. Determination of loss on ignition in waste, sludge and sediments.<br>The percentages listed in table above are based on wet waste basis which are concentrations in the waste as it is delivered to the SWDS. The IPCC Guidelines also specify DOC values on a dry waste basis, which are the concentrations after complete removal of all moist from the waste, which is not believed practical for this situation<br><br>Tool 04 Emissions from solid waste disposal sites version 08.0 is used. |

| | |
|---|---|
| Data/parameter | $k_j$ |
| Unit | 1/yr |
| Description | Decay rate for the waste type j |
| Source of data | IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3) |
| Value(s) applied | Apply the following default values for the different waste types j:<br>Default values for the decay rate (kj)<br>For Tekirdağ Province,<br>MAT is 14.1 °C < 20°C<br>MAP is 583 mm[19]<br>PET is 280 mm for Tekirdağ[20]<br>MAP/PET= 2.08<br>The values for boreal and temperate and WET conditions were applied. For all waste types, MAT≤ 20°C and MAP/PET>1.For pulp, paper, cardboard (other than sludge), textiles the applied value is 0.06; for wood, wood products and straw the applies value is 0.03; for other (non-food) organic putrescible garden and park waste, 0.10 was applied; for food, food waste, sewage sludge, beverages and tobacco, the applied value is 0.185. |

| Waste type j | Boreal and Temperate (MAT≤20°C) | | Tropical (MAT>20°C) | |
|---|---|---|---|---|
| | Dry (MAP/PET <1) | Wet (MAP/PET >1) | Dry (MAP< 1000mm) | Wet (MAP > 1000 mm) |

[19] https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?m=TEKIRDAG
[20]https://iklimdegisikligi.tekirdag.bel.tr/file/iklim_degisikligi_kitabi.pdf

| | | | | | |
|---|---|---|---|---|---|
| Slowly | Pulp, paper, cardboard (other than sludge), textiles | 0.04 | 0.06 | 0.045 | 0.07 |
| | Wood, wood products and straw | 0.02 | 0.03 | 0.025 | 0.035 |
| Moderately | Other (non-food) organic putrescible garden and park waste | 0.05 | 0.10 | 0.065 | 0.17 |
| Rapidly | Food, food waste, sewage sludge, beverages and tobacco | 0.06 | 0.185 | 0.085 | 0.40 |

Note: MAT – mean annual temperature, MAP – Mean annual precipitation, PET – potential evapotranspiration. MAP/PET is the ratio between the mean annual precipitation and the potential evapotranspiration.

If a waste type disposed in a SWDS cannot clearly be attributed to one of the waste types in the table above, project participants should choose, among the waste types that have similar characteristics, the waste type where the values of $DOC_j$ and $k_j$ result in a conservative estimate (lowest emissions), or request a revision of/deviation from this methodology.

In the case of EFB, as their characteristics are similar to garden waste, the parameter values correspondent of garden waste shall be used. In case of sludge from pulp and paper industry, a conservative value of 0.03 shall be used for all precipitation and temperature combinations

| | |
|---|---|
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | - |

| | |
|---|---|
| Data/parameter | $\mathbf{EF_{grid,CM,y}}$ |
| Unit | t $CO_2$/MWh |
| Description | Combined margin emission factor for the grid in year y |
| Source of data | Turkey National Network Emission Factor Information Form[21] published on 20/09/2022. |
| Value(s) applied | 0.5552 |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Baseline emission calculation |
| Additional comment | - |

[21]https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf

| Data/parameter | **$TDL_{j,y}$ and $TDL_{k,y}$** |
|---|---|
| Unit | % |
| Description | Average technical transmission and distribution losses for providing electricity to source j, k in year y |
| Source of data | annual average value based on the most recent data available within the host country |
| Value(s) applied | 12.1% distribution loss + 1.9% transmission loss= 14%[22] |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | - |

| Data/parameter | **Ru** |
|---|---|
| Unit | Pa.m3 /kmol.K |
| Description | Universal ideal gases constant |
| Source of data | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream |
| Value(s) applied | 8,314 |
| Choice of data or Measurement | - |

[22] https://webim.teias.gov.tr/file/01638a5d-94aa-484b-9c48-b4c86fa99469?download

| | |
|---|---|
| methods and procedures | |
| Purpose of data | Ex post determination of $F_{CH4, PJ,y}$ |
| Additional comment | - |

| | |
|---|---|
| Data/parameter | **$MM_i$** |
| Unit | kg/kmol |
| Description | Molecular mass of greenhouse gas i |
| Source of data | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream |
| Value(s) applied | Compound: Methane; Structure: $CH_4$; Molecular mass (kg/kmol): 16.4 |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Ex post determination of $F_{CH4, PJ,y}$ |
| Additional comment | - |

| | |
|---|---|
| Data/parameter | **$SPEC_{flare}$** |
| Unit | Temperature - °C<br>Flow rate or heat flux - kg/h or m3 /h<br>Maintenance schedule - number of days |
| Description | Manufacturer's flare operating specifications for temperature, flow rate and maintenance schedule |

| | |
|---|---|
| Source of data | Project owner (flare manufacturer) |
| Value(s) applied | Temperature-<br>Flow rate- 5000 $m^3/h$<br>Maintenance schedule- |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Project emission calculations |
| Additional comment | - |

B.6.3 Ex ante estimation of SDG Impact

1 – Affordable and Clean Energy (SDG 7):

The project is expected to generate 53.025 GWh of clean energy per annum with the current installed capacity and contributes to share of low-cost / must-run sources.

2 – Decent Work and Economic Growth (SDG 8):

The project promotes job opportunities to 65 people. Social security documents of employees are the certain prove of that issue.

Training (including H&S) & Other Certification processes required by certain necessary professions will be provided to employees to protect human health & rights and develop. Hence, project contributes awareness of labour rights and safety precautions. Trainings of employees are done periodically as per national regulations and certifications are kept for the prove of the situation.

All employee s will attend trainings on first aid and health & safety. For positions that require specific skills (such as high voltage equipment) staff will either be trained or certified staff will be recruited. Training details can be found in the monitoring plan.

3 – Climate Action (SDG 13):

As per the tool, the latest official emission factor of Turkey that is used in the projects depending on the project type published by the Ministry of Energy and Natural Resources The ex-ante emission reductions (ERy) are calculated as follows:

The Large-scale Consolidated Methodology Flaring or use of landfill gas[23] (pg. 23) states that the emission reduction $ER_y$ by the project activity during a given year y is the difference between the baseline emissions ($BE_y$) and the project emissions ($PE_y$), as follows:

$$ER_y = BE_y - PE_y$$

Where:

$ER_y$ = Emission reductions in year y ($tCO_2/yr$)

$BE_y$ = Baseline emissions in year y ($tCO_2/yr$)

$PE_y$ = Project emissions in year y ($tCO_2/yr$)

*Accordingly,*

$ER_y$ = 195,943 $tCO_2/yr$ – 3,357 $tCO_2/yr$

**$ER_y$ = 192,586 $tCO_2/yr$**

In detail:

**Baseline Emissions**

[23] https://globalgoals.goldstandard.org/wp-content/uploads/2017/06/401.13-ER-MMS.pdf

As stated and justified earlier in the PDD, ACM0001 Large-scale Consolidated Methodology Flaring or use of landfill gas[24] version 19.0 is applied to the proposed project activity. The consolidated baseline methodology calculates baseline emissions as follows:

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

(**Equation 1** from Large-scale Consolidated Methodology Flaring or use of landfill gas version 19.0)

Where:

$BE_y$ = Baseline emissions in year y (t $CO_2$e/yr)

$BE_{CH4,y}$ = Baseline emissions of methane from the SWDS in year y (t $CO_2$e/yr)

$BE_{EC,y}$ = Baseline emissions associated with electricity generation in year y (t $CO_2$/yr)

$BE_{HG,y}$ = Baseline emissions associated with heat generation in year y (t $CO_2$/yr)

$BE_{NG,y}$ = Baseline emissions associated with natural gas use in year y (t $CO_2$/yr)

In the baseline scenario there are no emissions associated with heat generation and natural gas use. Therefore, $BE_{,y}$ becomes:

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

**$BE_{,y}$ = 162,382 +33,561 = 195,943**

***Baseline emissions of methane from the SWDS (BECH4,y):***

To go on; according to ACM0001 version 19.0, Baseline emissions of methane from the SWDS are determined as follows, based on the amount of methane that is captured

[24] https://cdm.unfccc.int/filestorage/H/E/J/HEJ2MD41GB0PUZISL9FNTAYQV3875O/EB103_repan01_ACM0001.pdf?t=dnl8cjhoNHRxfDBZ2msbuPjKDrpsCDo8U8EW

under the project activity and the amount that would be captured and destroyed in the baseline (such as due to regulations). In addition, the effect of methane oxidation that is present in the baseline and absent in the project is taken into account:

$$BE_{CH4} = \left(\left(1 - OX_{top\_layer}\right) \times F_{CH4,PJ,y} - F_{CH,BL,y}\right) \times GWP_{CH4}$$

Where:

$BE_{CH4,y}$ = Baseline emissions of methane from the SWDS in year y (t $CO_2e$/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 (t $CH_4$/yr)

$GWP_{CH4}$ = Global warming potential of $CH_4$ (t $CO_2e$/t $CH_4$)

$BE_{CH4,y}$ = ((1-0.1)*6,444-0)*28

$BE_{CH4,y}$ = 162,382 t $CO_2e$/yr

***Ex post determination of $F_{CH4,PJ,y}$***

During the crediting period, FCH4,PJ,y is determined as the sum of the quantities of methane flared and used in power plant(s), boiler(s), air heater(s), glass melting furnace(s), kiln(s) and natural gas distribution, as follows:

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

Where:

$F_{CH4,PJ,y}$ = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t $CH_4$/yr)

$F_{CH4,flared,y}$ = Amount of methane in the LFG which is destroyed by flaring in year y (t $CH_4$/yr)

$F_{CH4,EL,y}$ = Amount of methane in the LFG which is used for electricity generation in year y (t $CH_4$/yr)

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

$F_{CH4,NG,y}$ = Amount of methane in the LFG which is sent to the natural gas distribution network and/or dedicated pipeline and/or to the trucks in year y (t $CH_4$/yr)

There are no use of natural gas, no heat generation and flaring is done only for emergencies during the project activity. Therefore $F_{CH4,PJ,y}$ becomes:

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

$F_{CH4,EL,y}$ 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(s), boiler(s), air heater(s), glass melting furnace(s) and kiln(s), 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 (Opj,h,y).

According to the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" The mass flow of greenhouse gas i (Fi,t) is determined as follows :

$$F_{i,t} = V_{t,db} \times v_{i,t,db} \times \rho_{i,t}$$

With:

$$\rho_{i,t} = \frac{P_t \times MM_i}{R_u \times T_t}$$

Where:

$F_{i,t}$ = Mass flow of greenhouse gas i 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)

$v_{i,t,db}$ = Volumetric fraction of greenhouse gas i in the gaseous stream in a time interval t on a dry basis ($m^3$ gas i/$m^3$ dry gas)

$\rho_{i,t}$ = Density of greenhouse gas i in the gaseous stream in time interval t (kg gas i/m³ gas i)

$P_t$ = Absolute pressure of the gaseous stream in time interval t (Pa)

$MM_i$ = Molecular mass of greenhouse gas i (kg/kmol)

$R_u$ = Universal ideal gases constant (Pa.m$^3$ /kmol.K)

Tt = Temperature of the gaseous stream in time interval t (K)

$\rho_{i,t}$ = (600*16.04)/(8.314*310.15) = 3.73 kg/m$^3$

$F_{i,t}$ = 1,154.4*0.59*3.73 = 2,542 kg/h

**Ex ante estimation of $F_{CH4,PJ,y}$**

An ex ante estimate of $F_{CH4,PJ,y}$ is required to estimate baseline emission of methane from the SWDS (according to equation (2)) in order to estimate the emission reductions of the proposed project activity in the CDM-PDD. It is determined as follows:

$$F_{CH4,PJ,y} = \eta_{PJ} \times BE_{CH4,SWDS,y} / GWP_{CH4}$$

Where:

$F_{CH4,PJ,y}$ = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t $CH_4$/yr)

$BE_{CH4,SWDS,y}$ = Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y (t $CO_2$e/yr)

$\eta_{PJ}$ = Efficiency of the LFG capture system that will be installed in the project activity

$GWP_{CH4}$ = Global warming potential of CH4 (t $CO_2$e/t $CH_4$)

$BE_{CH4,SWDS,y}$ is determined using the methodological tool "Emissions from solid waste disposal sites". The following guidance should be taken into account when applying the tool:

$F_{CH4,PJ,y}$ = 0.50*360,850/28 = 6,444 t $CH_4$/yr

$$\left.\begin{matrix} BE_{CH4,SWDS,y} \\ PE_{CH4,SWDS,y} \\ LE_{CH4,SWDS,y} \end{matrix}\right\} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times (1 - OX) \times \frac{16}{12} \times F \times DOC_{f,y}$$
$$\times MCF_y \times \sum_{x=1}^{y} \sum_{j} \left(W_{j,x} \times DOC_j \times e^{-k_j \times (y-x)} \times \left(1 - e^{-k_j}\right)\right)$$

Where :

$BECH4,SWDS,y$

$PECH4,SWDS,y$

$LECH4,SWDS,y$ = Baseline, project or leakage methane emissions occurring in year y generated from waste disposal at a SWDS during a time period ending in year y (t $CO_2e$/yr)

x = Years in the time period in which waste is disposed at the SWDS, extending from the first year in the time period (x = 1) to year y (x = y)

y = Year of the crediting period for which methane emissions are calculated (y is a consecutive period of 12 months)

$DOC_{f,y}$ = Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for year y (weight fraction)

$W_{j,x}$ = Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x (t)

$\varphi_y$ = Model correction factor to account for model uncertainties for year y

$f_y$ = Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y

$GWP_{CH4}$ = Global Warming Potential of methane

$OX$ = Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)

F = Fraction of methane in the SWDS gas (volume fraction)

$MCF_y$ = Methane correction factor for year y

$DOC_j$ = Fraction of degradable organic carbon in the waste type j (weight fraction)

k = Decay rate for the waste type j (1 / yr)

j = Type of residual waste or types of waste in the MSW

$BE_{CH4,SWDS,y}$ for garden yard and park wastes,

1*(1-0)*28*(1-0.1)*(16/12)*0.5*0.20*1.0*(8,447*0.20*1*(1-e-0.185)= 10,394 t $CO_2$e/yr

***Determination of $F_{CH4,BL,y}$***

This section provides a procedure to determine the amount of methane that would have been captured and destroyed (by flaring) in the baseline due to regulatory or contractual requirements, to address safety and odour concerns, or for other reasons (collectively referred to as requirement in this section). The four cases in Table 3 are distinguished. The appropriate case should be identified, and the corresponding instructions followed.

| Situation at the start of the project activity | Requirement to destroy methane | Existing LFG capture and destruction system |
|---|---|---|
| Case 1 | No | No |
| Case 2 | Yes | No |
| Case 3 | No | Yes |
| Case 4 | Yes | Yes |

Case 1: No requirement to destroy methane exists and no existing LFG capture system

In this situation:

$F_{CH4,BL,y}$=0

***Baseline emissions associated with electricity generation ($BE_{EC,y}$)***

The baseline emissions associated with electricity generation in year *y* (*BEEC,y*) shall be calculated using the "Methodological tool Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation ". When applying the tool:

(a) The electricity sources k in the tool correspond to the sources of electricity generated identified in the selection of the most plausible baseline scenario; and

(b) $EC_{BL,k,y}$ in the tool is equivalent to the net amount of electricity generated using LFG in year y ($EG_{PJ,y}$).

$$BE_{EC,y} = \sum_{k} EC_{BL,k,y} \times EF_{EF,k,y} \times (1 + TDL_{k,y})$$

Where:

$BE_{EC,y}$ = Baseline emissions from electricity consumption in year y (t $CO_2$ / yr)

$EC_{BL,k,y}$ = Quantity of electricity that would be consumed by the baseline electricity consumer k in year y (MWh/yr)

$EF_{EF,k,y}$ = Emission factor for electricity generation for source k in year y (t $CO_2$/MWh)

$TDL_{k,y}$ = Average technical transmission and distribution losses for providing electricity to source k in year y

k = Sources of electricity consumption in the baseline

$BE_{EC,y}$ = 53,025 *0.552*(1+0.14)

$BE_{EC,y}$ = 33,561 t $CO_2$ / yr)

**Project Emissions**

Large-scale Consolidated Methodology flaring or use of landfill gas[25] states that project emissions in year y are calculated for alternative waste treatment option implemented in the project activity as follows:

$$PE_y = PE_{EC,y} + PE_{FC,y} + PE_{DT,y} + PE_{SP,y}$$

Where:

$PE_y$ = Project emissions in year y (t $CO_2$/yr)

$PE_{EC,y}$ = Emissions from consumption of electricity due to the project activity in year y (t $CO_2$/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)

The project emissions from consumption of electricity by the project activity (PEEC,y) shall be calculated using the "Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation". When applying the tool:

(a) $EC_{PJ,k,y}$ in the tool is equivalent to the amount of electricity consumed by the project activity in year y ($EC_{PJ,y}$); and

[25]https://cdm.unfccc.int/filestorage/H/E/J/HEJ2MD41GB0PUZISL9FNTAYQV3875O/EB103_repan01_ACM0001.pdf?t=UEp8cjhpeTk2fDCO0iM48ogxSWgTsM-s1a3s

(b) If in the baseline a proportion of LFG is destroyed ($F_{CH4,BL,y}$>0), then the electricity consumption in the tool ($EC_{PJ,j,y}$) should refer to the net quantity of electricity consumption (i.e. the increase due to the project activity). The determination of the amount of electricity consumed in the baseline shall be transparently documented in the CDM-PDD.

$$PE_{EC,y} = \sum_{j} EC_{PJ,j,y} \times EF_{EF,j,y} \times (1 + TDL_{j,y})$$

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (t $CO_2$ / yr)

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption

source j in year y (MWh/yr)

$EF_{EF,j,y}$ = Emission factor for electricity generation for source j in year y

(t $CO_2$/MWh)

$EF_{EF,k,y}$ = Emission factor for electricity generation for source k in year y

(t $CO_2$/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing

electricity to source j in year y

j = Sources of electricity consumption in the project

$PE_{EC,y}$ = 53,025*0.5552*(1+0.14) = 3,357 t $CO_2$ / yr

**Leakage emissions**

No leakage effects are accounted for under the applied methodology.

**Emission Reduction**

In accordance with the Large-scale Consolidated Methodology Flaring or use of landfill gas, the emission reduction $ER_y$ by the project activity during a given year y is the difference between the baseline emissions ($BE_y$) and the sum of project emissions ($PE_y$) as follows:

$$ER_y = BE_y - PE_y$$

$ER_y$ = 195,943 $tCO_2$/yr – 3,357 $tCO_2$/yr

**$ER_y$ = 192,586 $tCO_2$/year**

B.6.4 Summary of ex ante estimates of each SDG Impact

1 – Affordable and Clean Energy (SDG 7):

The project is expected to generate 53.025 GWh of clean energy per annum with the current installed capacity and contributes to share of low-cost / must-run sources.

| Year | Baseline estimate (MWh) | Project estimate (MWh) | Net benefit (MWh) |
|---|---|---|---|
| 28/10/2020-31/12/2020 | 0 | 9,443 | 9,443 |
| 2021 | 0 | 53,025 | 53,025 |
| 2022 | 0 | 53,025 | 53,025 |
| 2023 | 0 | 53,025 | 53,025 |
| 2024 | 0 | 53,025 | 53,025 |
| 01/01/2025 - 27/10/2025 | 0 | 43,582 | 43,582 |
| **Total** | **0** | **265,125** | **265,125** |
| **Total number of crediting years** | 5 years | | |
| **Annual average over the crediting period** | 0 | 53,025 | 53,025 |

2 – Decent Work and Economic Growth (SDG 8):

The project promotes job opportunities to 65 people. Social security documents of employees are the certain prove of that issue.

Training (including H&S) & Other Certification processes required by certain necessary professions will be provided to employees to protect human health&rights and develop. Hence, project contributes awaraness of labour rights and safety precautions. Trainings of employees are done periodically as per national regulations and certifications are kept for the prove of the situation.

3- Take urgent action to combat climate change and its impacts (SDG 13)

The project contributes to 192,586 tonnes of CO2e/year reduction, which represent direct and quantifiable impact on climate security.

| Year | Baseline estimate | Project estimate | Net benefit |
|---|---|---|---|
| 28/10/2020-31/12/2020 | 34,893 | 598 | 34,295 |
| 2021 | 195,943 | 3,357 | 192,586 |
| 2022 | 195,943 | 3,357 | 192,586 |
| 2023 | 195,943 | 3,357 | 192,586 |
| 2024 | 195,943 | 3,357 | 192,586 |
| 01/01/2025 - 27/10/2025 | 161,049 | 2,760 | 158,289 |
| **Total** | **979,714** | **16,786** | **962,928** |
| **Total number of crediting years** | 5 | | |
| **Annual average over the crediting period** | 195,943 | 3,357 | 192,586 |

## B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

**SDG 13 and SGD 7**

| | |
|---|---|
| Data / Parameter | $EG_{PJ,y}$ |
| Unit | MWh |
| Description | Amount of electricity generated using LFG by the project activity in year *y* |
| Source of data | Electricity meter |
| Value(s) applied | 53,025 |
| Measurement methods and procedures | Archive electronically during project plus five years |
| Monitoring frequency | Annual |
| QA/QC procedures | Two calibrated meters backup each other. Maintenance and calibration of the metering devices are made by TEIAS. If there is a significant difference between the readings of two devices, maintenance and tests of the metering devices and the associated equipment are done before waiting for the periodical maintenance. The meters should comply with EPDK regulations which define the accuracy class of the meters as 0.2 or 0.5 depending on the capacity of the circuit as given in document in link (http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44). The main source for monitoring of electricity generation of the plant is the generation values in the EPIAS website which is accessible using a password |

<table>
<tr><td></td><td>provided to electricity generation companies. The values will be cross-checked with the electricity meter readings from the site. The primary source for emission reduction calculation will be EPIAS records, meter readings will be used for cross check. EPIAS records will be taken in consideration while calculating EGfacility, y.<br><br>After the first calibration of meters , calibration of meters are valid for ten years due to related legislation. Link of related regulation given below.<br>“ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ” / Article 926<br><br>Information regarding the electricity meters are presented in the table below.<br><table><tr><th></th><th>Main Meter</th><th>Back-up Meter</th></tr><tr><td>Brand</td><td>Landis</td><td>Landis</td></tr><tr><td>Type</td><td>ZMG405</td><td>ZMG405</td></tr><tr><td>Class</td><td>0.5</td><td>0.5</td></tr><tr><td>Serial No</td><td>42066908</td><td>51222278</td></tr><tr><td>Installation date</td><td>19/10/2020</td><td>19/10/2020</td></tr><tr><td>Calibration due dates</td><td>18/10/2030</td><td>18/10/2030</td></tr></table></td></tr>
<tr><td>Purpose of data</td><td>Baseline emission calculations</td></tr>
<tr><td>Additional comment</td><td>Estimated annual generation forming the basis for emission reduction calculation is 106,050 MWh as indicated in electricity generation licence.</td></tr>
</table>

[26] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | |
|---|---|
| Data / Parameter | $EC_{PJ,j,y}$; $EC_{LE,l,y}$ |
| Unit | MWh/yr |
| Description | Quantity of electricity consumed by the project electricity consumption source j in year y |
| Source of data | EPİAŞ records |
| Value(s) applied | Monthly values will be provided by the project owner for the crediting period |
| Measurement methods and procedures | Direct measurement or calculated based on measurements from more than one electricity meters |
| Monitoring frequency | Continuously |
| QA/QC procedures | Two calibrated meters backup each other. Maintenance and calibration of the metering devices are made by TEIAS. The internal consumption and generation values are read from the meters. If there is a significant difference between the readings of two devices, maintenance and tests of the metering devices and the associated equipment are done before waiting for the periodical maintenance. The meters should comply with EPDK regulations which define the accuracy class of the meters as 0.2 or 0.5 depending on the capacity of the circuit as given in document in link (http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44).<br>The main source for monitoring of electricity generation of the plant is the generation values in the EPIAS website which is accessible using a password provided to electricity generation companies. The values will be cross-checked with the electricity meter readings from the site. The primary source for emission reduction calculation will be EPIAS records, meter readings will be used for cross check. |

| | |
|---|---|
| | After the first calibration of meters, calibration of meters are valid for ten years due to related legislation. Link of related regulation given below.<br>"ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[27] |
| Purpose of data | Baseline emission calculations |
| Additional comment | - |

| | |
|---|---|
| Data / Parameter | **T** |
| Unit | Celcius |
| Description | Annual Average ambient temperature at project site |
| Source of data | Turkish State Meteorological Service. The value "14 Celcius" is taken for this project estimated emission reduction calculations. |
| Value(s) applied | 14 |
| Measurement methods and procedures | Measured value is obtained from Turkish State Meteorological Service. |
| Monitoring frequency | Annually |
| QA/QC procedures | - |
| Purpose of data | Baseline emission calculations |

[27] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | |
|---|---|
| Additional comment | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream version 03.0 is used. |

| | |
|---|---|
| Data / Parameter | $P_t$ |
| Unit | Pa |
| Description | Pressure of the gaseous stream in time interval t |
| Source of data | Site measurement |
| Value(s) applied | 600 |
| Measurement methods and procedures | Measured by pressure measurement device |
| Monitoring frequency | Continuous |
| QA/QC procedures | The details regarding the pressure measurement device is given below.<br>Brand: ABB<br>Type: 261GSFKTN21<br>Serial No: 3K646620045379<br>Calibration date: 08/02/2023<br>Calibration due dates: 07/02/2033<br><br>After the first calibration of the measurement devices, calibration is valid for ten years due to related legislation. Link of related regulation given below.<br>"ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[28] |

[28] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | |
|---|---|
| Purpose of data | Ex-post determination of FCH4,PJ,y |
| Additional comment | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream version 03.0 is used. |

| | |
|---|---|
| Data / Parameter | $T_t$ |
| Unit | K |
| Description | Temperature of the gaseous stream in time interval t |
| Source of data | Site measurement |
| Value(s) applied | 310,15 |
| Measurement methods and procedures | Measured by thermocouple |
| Monitoring frequency | Continuous |
| QA/QC procedures | The details regarding the thermocouple is given below.<br><br>**Brand**: I&C<br>**Type**: PT-100<br>**Serial No**: 2008-17974<br>**Calibration date**: 08/02/2023<br>**Calibration due dates**: 07/02/2033<br><br>After the first calibration of the measurement devices, calibration is valid for ten years due to related legislation. Link of related regulation given below. |

| | |
|---|---|
| | "ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[29] |
| Purpose of data | Ex-post determination of FCH4,PJ,y |
| Additional comment | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream version 03.0 is used. |

| | |
|---|---|
| Data / Parameter | $Op_{j,h}$ |
| Unit | - |
| Description | Operation of the equipment that consumes the LFG |
| Source of data | Project owner |
| Value(s) applied | Recorded by the project owner during the monitoring period |
| Measurement methods and procedures | - |
| Monitoring frequency | Hourly |
| QA/QC procedures | - |
| Purpose of data | - |
| Additional comment | ACM0001 Large-scale Consolidated Methodology Flaring or use of landfill gas |

[29] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

**SDG 13**

| | |
|---|---|
| Data / Parameter | Emissions Reductions in $tCO_2$ |
| Unit | $tCO_2$ |
| Description | Reduction of $CO_2$ emissions due to the proposed project activity's implementation. |
| Source of data | Project proponent. Annual baseline and project emissions, along with relevant parameters, such as combined margin (CM), will be used as reference in calculation of the emission reduction. |
| Value(s) applied | Combined Margin is fixed through the crediting period and the value is taken from official paper of Ministry of Natural Resources and Energy of Turkey (0.5552 $tCO_2$/MWh). |
| Measurement methods and procedures | The emission reduction is calculated by abstracting project emissions from baseline emissions |
| Monitoring frequency | Annually |
| QA/QC procedures | - |
| Purpose of data | Emission Reduction calculations |
| Additional comment | - Estimated annual emission reduction is 192,586 tonnes of $CO_2$eq. |

| | |
|---|---|
| Data / Parameter | $\mathbf{f_y}$ |
| Unit | % |

<table>
<tr><td>Description</td><td>Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y</td></tr>
<tr><td>Source of data</td><td>Select the maximum value from the following: (a) contract or regulation requirements specifying the amount of methane that must be destroyed/used (if available) and (b) historic data on the amount captured</td></tr>
<tr><td>Value(s) applied</td><td>The value will be provided by the project owner if the flare unit is used.</td></tr>
<tr><td>Measurement methods and procedures</td><td>Gas analyzer</td></tr>
<tr><td>Monitoring frequency</td><td>For application A: Once for the crediting period (fy = f)<br>For application B: Annually</td></tr>
<tr><td>QA/QC procedures</td><td>Equipment Specifications is given below. After the first calibration of the measurement devices, calibration is valid for ten years due to related legislation. Link of related regulation given below.<br>“ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ” / Article 9[30]<br><br><table><tr><th></th><th>Gas Analyzer</th></tr><tr><td>Brand</td><td>Siemens</td></tr><tr><td>Type</td><td>ULTRAMAT 23</td></tr><tr><td>Date of Calibration</td><td>23/03/2022</td></tr><tr><td>Calibration due dates</td><td>22/03/2032</td></tr></table></td></tr>
<tr><td>Purpose of data</td><td>Project emission calculations</td></tr>
</table>

[30] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | |
|---|---|
| Additional comment | Tool 04 Emissions from solid waste disposal sites version 08.0 is used. Project owner will provide the value during monitoring if the flare unit is used. |

| | |
|---|---|
| Data / Parameter | $V_{i,t,db}$ |
| Unit | m³ gas i/m³ dry gas |
| Description | Volumetric fraction of greenhouse gas i in a time interval t on a dry basis |
| Source of data | Site measurements |
| Value(s) applied | 59% |
| Measurement methods and procedures | Measured using gas analyzer |
| Monitoring frequency | Continuous |
| QA/QC procedures | Equipment Specifications is given below. After the first calibration of the measurement devices, calibration is valid for ten years due to related legislation. Link of related regulation given below.<br>"ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[31] |

| | **Gas Analyzer** |
|---|---|
| **Brand** | Siemens |
| **Type** | ULTRAMAT 23 |
| **Date of Calibration** | 23/03/2022 |

[31] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | | |
|---|---|---|
| | **Calibration due dates** | 22/03/2032 |
| Purpose of data | Ex-post determination of $F_{CH4,PJ,y}$ | |
| Additional comment | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream version 03.0 is used. | |

| | |
|---|---|
| Data / Parameter | $\mathbf{V_{,t,db}}$ |
| Unit | m³ dry gas/h |
| Description | Volumetric flow of the gaseous stream in time interval t on a dry basis |
| Source of data | Site measurements |
| Value(s) applied | 1,154.4 |
| Measurement methods and procedures | Measured by flowmeter |
| Monitoring frequency | Continuous |
| QA/QC procedures | - |
| Purpose of data | Ex-post determination of $F_{CH4,PJ,y}$ |
| Additional comment | TOOL 08 Tool to determine the mass flow of a greenhouse gas in a gaseous stream version 03.0 is used. |

| | |
|---|---|
| Data / Parameter | **Wx** |
| Unit | Ton |
| Description | Quantity of MSW |

<table>
<tr><td>Source of data</td><td>Tekirdağ provincial environmental status report</td></tr>
<tr><td>Value(s) applied</td><td>The total waste amount is 385,712 tonnes. The distribution of waste amounts based on the waste types is given in the table below.<br><br><table><tr><td>Waste Type</td><td>%</td><td>Amount</td></tr><tr><td>Wood and wood products</td><td>1.43</td><td>5,516</td></tr><tr><td>Pulp, paper and cardboard (other than sludge)</td><td>11.04</td><td>42,583</td></tr><tr><td>Food, food waste, beverages and tobacco (other than sludge)</td><td>46.16</td><td>178,045</td></tr><tr><td>Textiles</td><td>10.29</td><td>39,690</td></tr><tr><td>Garden, yard and park waste</td><td>2.19</td><td>8,447</td></tr><tr><td>Glass, plastic, metal, other inert waste</td><td>26.84</td><td>103,525</td></tr><tr><td>Others</td><td>2.05</td><td>7,907</td></tr><tr><td>Total</td><td>100</td><td>385,712</td></tr></table></td></tr>
<tr><td>Measurement methods and procedures</td><td>The amount of waste entering the SWDS is measured by weighbridge.</td></tr>
<tr><td>Monitoring frequency</td><td>Continuously, aggregated at least annually or monthly</td></tr>
<tr><td>QA/QC procedures</td><td>-</td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.2 Integrate climate change measures into national policies strategies and planning</td></tr>
<tr><td>Additional comment</td><td>-</td></tr>
</table>

| Data / Parameter | LFGelectricity,y |
|---|---|

| | |
|---|---|
| Unit | $m^3$ |
| Description | Total amount of landfill gas and biogas (under normal conditions of 0° and 1 Atm) combusted in the generator unit in year y |
| Source of data | Project owner |
| Value(s) applied | 8,657,937 |
| Measurement methods and procedures | The amount of LFG is measured using flow meter at the site. After the first calibration of the measurement devices, calibration is valid for ten years due to related legislation. Link of related regulation given below.<br>"ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 932<br><br>Brand: ABB<br>Type: 261GSFKTN21<br>Serial No: 3K646620045379<br>Calibration date: 22/09/2020<br>Calibration due dates: 21/09/2030 |
| Monitoring frequency | Measured continuously in real-time and recorded. |
| QA/QC procedures | Data is measured continuously with a flow meter by the Project owner. Flow meters will be subject to a regular maintenance and testing regime to ensure accuracy. This will ensure that the accuracy of the measurement instrument is maintained. The measurement frequency is equal to or more than one sampling each hour.<br>One flow meter is installed for all of the gen-sets. |

[32] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | |
|---|---|
| Purpose of data | Calculation of baseline emissions |
| Additional comment | |

| | |
|---|---|
| Data / Parameter | $w_{CH4}$ |
| Unit | % |
| Description | Methane fraction in the landfill gas |
| Source of data | Gas analyzer (at the main booster pipe) |
| Value(s) applied | 55% |
| Measurement methods and procedures | Equipment Specifications is given below. After the first calibration of the measurement devices, calibration is valid for ten years due to related legislation. Link of related regulation given below.<br>"ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[33] |
| Monitoring frequency | Measured continuously in real-time and recorded |
| QA/QC procedures | Methane content is measured directly and continuously with a gas analyzer. The gas analyzer will be maintained and calibrated regularly according to the manufacturer's |

| | **Gas Analyzer** |
|---|---|
| **Brand** | Siemens |
| **Type** | ULTRAMAT 23 |
| **Date of Calibration** | 23/03/2022 |
| **Calibration due dates** | 22/03/2032 |

[33] https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

| | |
|---|---|
| | requirements in order to ensure that required level of accuracy is maintained. The gas analyzer is subject to a regular maintenance and testing regime to ensure accuracy, therefore the analyzer will be calibrated according to the manufacturer's recommendations. The measurement interval is equal to or more than one sampling each hour. |
| Purpose of data | The percentage of methane in the landfill gas is used to calculated the amount of methane destroyed in the gas engine and flare units. It is also used to check whether it satisfies the minimum methane content threshold for the flare unit to ensure the gas is flared efficiently. |
| Additional comment | - |

| | |
|---|---|
| Data / Parameter | ηflare,m |
| Unit | % |
| Description | Flare efficiency in minute m |
| Source of data | Project owner (flare manufacturer) |
| Value(s) applied | 90% |
| Measurement methods and procedures | As per the Tool 06 Project emissions from flaring, for the determination of the flare efficiency of an enclosed flare, Option A:Default value has been selected.<br>The flare efficiency for the minute m (ηflare,m) is 90% when the following conditions are met to demonstrate that the flare is operating:<br>a) The temperature of the flare ($T_{EG.m}$), minimum methane content and the flow rate of the residual gas to the flare ($F_{RG,m}$) is within the manufacturer's specification for the flare (SPECflare) in minute m; and |

| | |
|---|---|
| | b) The flame is detected in the minute m ($Flame_m$)<br><br>Otherwise $\eta_{flare,m}$ is 0%. |
| Monitoring frequency | Measured continuously in real-time |
| QA/QC procedures | - |
| Purpose of data | - |
| Additional comment | - |

| | |
|---|---|
| Data / Parameter | Flamem |
| Unit | N/A |
| Description | Flame detection of flare in the minute m |
| Source of data | Flame detector unit |
| Value(s) applied | - |
| Measurement methods and procedures | - |
| Monitoring frequency | Continuously |
| QA/QC procedures | The flare unit installed for the project activity includes the flame detector as an integral safety component. This detector coupled with the electronic module installed in the control panel continuously detect flame presence by UV sensor. If the detector cannot see the flame (and cogeneration engine are in OFF), the main valve automatically closes and a flame is tried to be created with only pilot line. If this operation<br>fails, the system automatically shuts down and an alarm appears on the system. Therefore, the data availability also implies flame<br>detection. |

| | |
|---|---|
| Purpose of data | This parameter is added to comply with the methodological tool "Project emissions from flaring", v.03.0.0 and there is no direct use for these data in calculations. |
| Additional comment | - |

| | |
|---|---|
| Data / Parameter | **Quantity of Waste** |
| Unit | Ton |
| Description | Quantity of MSW |
| Source of data | Tekirdağ provincial environmental status report |
| Value(s) applied | 385,712 tonnes |
| Measurement methods and procedures | The amount of waste entering the SWDS is measured by weighbridge. |
| Monitoring frequency | Continuously, aggregated at least annually or monthly |
| QA/QC procedures | - |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | - |

**SDG 8 and Principle 3.6.1**

| | |
|---|---|
| Data / Parameter | **Quality of Employment** |
| Unit | Number of personnel certified/trained during operation phase |

| | |
|---|---|
| Description | Contribution to quality of employment by ensuring that the staff is trained and certified for the required positions |
| Source of data | Training Records (including H&S) & Other Certificates required by certain professions, if necessary |
| Value(s) applied | 65 |
| Measurement methods and procedures | All employees will attend trainings on first aid and health & safety. For positions that require specific skills (such as high voltage equipment) staff will either be trained or certified staff will be recruited. |
| Monitoring frequency | Annually |
| QA/QC procedures | The training programmes help increase the efficiency of the workforce and provides employees skilled at their job. This not only helps the company but to self-improvement of individual employees. |
| Purpose of data | To monitor the contribution to SDG 8 and Principle 3.6.1. |
| Additional comment | - |

| | |
|---|---|
| Data / Parameter | **Quantity of Employment** |
| Unit | - |
| Description | Number of personnel |
| Source of data | Social security records of employees |
| Value(s) applied | 65 |
| Measurement methods and procedures | Social security records of employees |
| Monitoring frequency | Annually |
| QA/QC procedures | - |

| | |
|---|---|
| Purpose of data | To monitor the contribution to SDG 8 and Principle 3.6.1. |
| Additional comment | - |

| | |
|---|---|
| Data / Parameter | **Management of SWDS** |
| Unit | - |
| Description | Management of SWDS |
| Source of data | Use different sources of data:<br>(a) Original design of the landfill;<br>(b) Technical specifications for the management of the SWDS;<br>(c) Local or national regulations |
| Value(s) applied | - |
| Measurement methods and procedures | Project participants should refer to the original design of the landfill to ensure that any practice to increase methane generation have been occurring prior to the implementation of the project activity. Any change in the management of the SWDS after the implementation of the project activity should be justified by referring to technical or regulatory specifications |
| Monitoring frequency | Annually |
| QA/QC procedures | - |
| Purpose of data | To monitor the contribution to SDG 8 and Principle 3.6.1. |
| Additional comment | ACM0001 Large-scale Consolidated Methodology Flaring or use of landfill gas  version 19.0 is used. |

**Principle 9.5: Hazardous and Non-hazardous Waste**

| | |
|---|---|
| Data / Parameter | Other Pollutants |

| | |
|---|---|
| Unit | - |
| Description | Proper management of waste oil |
| Source of data | Assessing disposal methods during site visits and checking waste oil disposal records. |
| Value(s) applied | Amount of waste oil generated and disposed during operation |
| Measurement methods and procedures | Waste oil from equipment will be collected properly in line with the relevant regulation and disposed via accredited abatement companies. |
| Monitoring frequency | Annually |
| QA/QC procedures | Waste oil will be disposed in line with regulation # 26952 on control of waste oils . |
| Purpose of data | To monitor the contribution to Principle 9.5 |
| Additional comment | - |

**Principle 9.4 Release of Pollutants**

| | |
|---|---|
| Data / Parameter | Leachate management |
| Unit | n.a. |
| Description | Leachate is successfully collected and treated. The Municipality has assigned a third party on site, who is responsible of treating leachate properly. The Municipality has provided a letter confirming that the leachate quality has improved after the Project start. |
| Source of data | Interview with the stakeholder or Municipality Letter |

| | |
|---|---|
| Value(s) applied | The Municipality has assigned a third party on site, who is responsible of treating leachate properly. |
| Measurement methods and procedures | N/A |
| Monitoring frequency | Once for each monitoring period |
| QA/QC procedures | N/A |
| Purpose of data | To monitor the contribution to Principle 9.4 |
| Additional comment | - |

B.7.2 Sampling plan

N/A

B.7.3 Other elements of monitoring plan

A monitoring plan has been developed that covers all the procedures required as per the approved methodology ACM0001. To guarantee the accuracy of the monitoring data periodic calibration of the installed monitoring equipment are carried out according to the requirements of the manufacturer. All data are registered and processed electronically. At each booster station a server unit receives all data sent from the meters and data in real time is saved to an internal memory at least hourly. Every day the server creates a file with all half-hourly data saved. The server also automatically calculates at least every hour the normal flow of landfill gas captured and of the biogas produced by the digester; the gas flow is multiplied with the real gas formula normating the gas flow to standard temperature and pressure. Temperature and pressure are real time values. The data stored at the booster station server are transferred once per month to a computer and a back up hard drive. In case of failures of the data recording system, no emission reduction will be claimed for that period.

Technical information regarding flow meter and gas analyzer are presented in the table below.

Table 3. Technical information of flow meter and gas analyzer

| | Flow Meter | Gas Analyzer |
|---|---|---|
| **Brand** | Endresss+Hauser | MRU GmbH |
| **Type** | Deltabar S PMD 75 | SWG 100 |
| **Serial No** | R902600109D | 081303 |
| **Date of Calibration** | 21/09/2020 (Final Inspection Report Date) | 22/09/2020 (Date of calibration certificate) |
| **Calibration due dates** | 20/09/2030 | 21/09/2030 |
| **Tolerance value** | ±0.05% | ±1.8% (for $CH_4$) |

The original data from the electricity meter are taken by a distance reading carried out by the Grid Company. The electricity data can be seen on a web page of EPIAS. The monthly electricity data are transferred to the excel sheet used for the emission reduction calculations. The project owner is Panab Tekirdağ Enerji A.Ş. and therefore responsible for the operation and the monitoring of the project activities. All the monitored data will be stored within the crediting period and for at least two years after the end of the crediting period.

Power Plant Manager will be responsible for the electricity generated, gathering all relevant data, and keeping the records.

Generation data collected during crediting period will be submitted to GTE who will be responsible for calculating the emission reduction subject to verification. Generation data will be used to prepare monitoring reports which will be used to determine the vintage from the project activity. These reports will be submitted to the duly authorized and appointed Designated Operational Entity 'VVB' before each verification period.

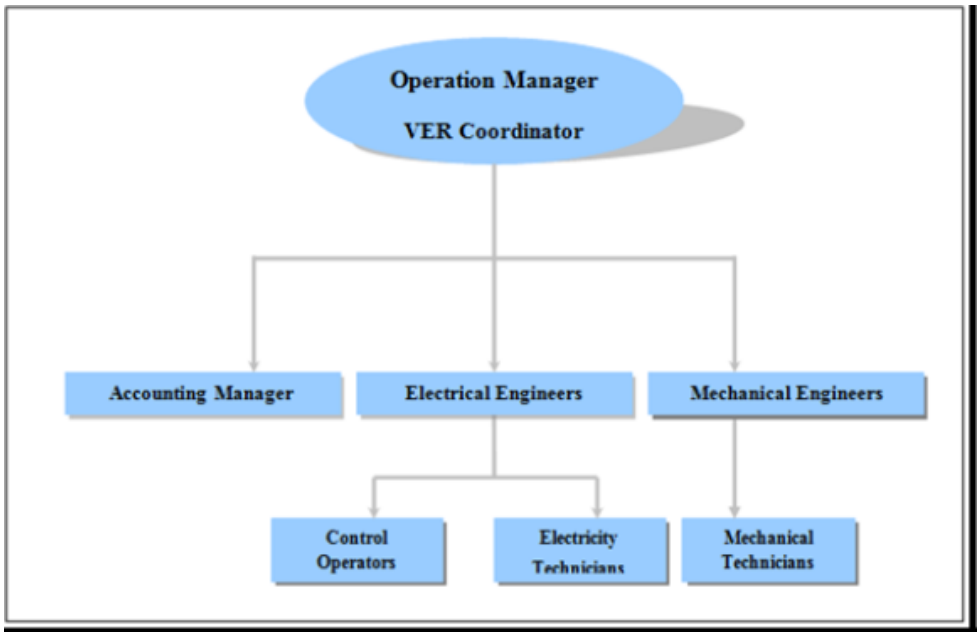



Figure 1. Site organizational chart

VER Team Members is expected to include the following staff:

**Plant Engineer:** Responsible for the control of the electricity supplied to the grid and imported from the grid with TEIAS. The electricity measurements are made by TEIAS remotely. The plant engineer checks these electricity measurement records and reports to the Operations Manager of the plant.

**Accounting Manager**: Responsible for keeping data about power sales, invoicing and purchasing.

**Operations Manager**: the VER coordinator, responsible for developing, executing, analyzing and improving the VER Monitoring/Reporting Procedures.

**GTE KARBON SURDURULEBILIR ENERJI EGT. DAN. VE TIC. A.S.**: Responsible for emission reduction calculations, preparing monitoring report and periodical verification process.

Installation of meter and data monitoring will be carried out according to the regulations by TEIAS. Two metering devices (one of them used as spare) will be used for monitoring the electricity generated by the power plant. Readings will be done using main metering devices and spare metering device will be used for comparison only. Data from metering devices will be recorded by TEIAS monthly (through remote reading). The main source for monitoring of electricity generation of the plant is the generation values in the EPIAS website which is accessible using a password provided to electricity generation companies. The values will be cross-checked with the electricity meter readings from

the site. The primary source for emission reduction calculation will be EPIAS records, meter readings will be used for cross check.
TEDAŞ is the governmental energy distribution institution in Turkey. However, it gives authorization to several local distribution companies in specific regions to manage local energy distribution works. Calibration of the meters are done by the distribution company every ten years.

Table 4. Current technical information of the electricity meters

| | Main Meter | Back-up Meter |
|---|---|---|
| **Brand** | Landis | Landis |
| **Type** | ZMG405 | ZMG405 |
| **Class** | 0.5 | 0.5 |
| **Serial No** | 42066908 | 51222278 |
| **Installation date** | 19/10/2020 | 19/10/2020 |
| **Calibration due dates** | 18/10/2030 | 18/10/2030 |

A flow diagram indicating the measurement points in the plant is presented below.

Local stakeholders are able to communicate with the project site personnel verbally to share their grievances and inputs in a Continuous Input / Grievance Expression Process Book. A book is provided by PP is available with Chief of the plant to note down Input / Grievance Expression if any local stakeholder would like to share. The grievance might be negative as well as positive can be provided by local stakeholders related to operation of the project activity. The book availability is also communicated to all local stakeholders by PP. PP will resolve all the grievances during whole crediting period.

# SECTION C. DURATION AND CREDITING PERIOD

## C.1. Duration of project

C.1.1 Start date of project

Start date of the project is the date of gas engine purchase agreement, 26/06/2020.

C.1.2 Expected operational lifetime of project

Operational lifetime is estimated as 28 years based on the remaining license period untill 07/05/2049.

### C.2. Crediting period of project

C.2.1 Start date of crediting period

Start date of the crediting period is 28/10/2020.

C.2.2 Total length of crediting period

The total length of this crediting period is 5 years.

## SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

### D.1 Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in Appendix 1, ongoing monitoring is summarised below.

| Principles | Mitigation Measures added to the Monitoring Plan |
|---|---|
| **Principle 9.4 Release of Pollutants** | Leachate management- Proper management of leachate |
| **Principle 6.1: Labour Rights** | Quality of Employment - Contribution to quality of employment by ensuring that the staff is trained and certified for the required positions |
| **Principle 9.5 Hazardous and Non-hazardous Waste** | Other Pollutants - Proper management of waste oil |

## D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

| | |
|---|---|
| Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy? | As stated in Gold Standard Gender Policy document, "foundational gender sensitive certification" which is mandatory for every project requires compliance with the gender 'do no harm' safeguard, gender-gap analysis and gender sensitive stakeholder consultations. Although the project is a renewable energy project and does not have negative impacts on men and women, it complies with the criteria mentioned. Moreover, Turkey has ratified ILO convention 100 and 111[34] and discrimination based on gender is illegal in Turkey. The project try to align with the national gender strategy. So, the project does not involve and is not complicit in any form of discrimination based on gender difference. |
| Question 2 - Explain how the project aligns with existing country policies, strategies and best practices | The project aims to create new employment and income opportunities within the scope of SDG 8 . While doing this, a gender-equal strategy is implemented by creating employment opportunities for both man and woman without discrimination. According to the Woman Empowerment Strategy Paper and Action Plan prepared by the Ministry of Family and Social Policies (2018), there are 21 targets classified under 5 main fields in order to enhance participation of women to the society.[35] In this action plan regarding the years 2018 – 2023, economy and employment-oriented |

[34] https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-ankara/documents/genericdocument/wcms_645630.pdf

[35] http://www.sp.gov.tr/upload/xSPTemelBelge/files/RySPo+KADININ_GUCLENMESI_STRATEJI_BELGESI_VE_EYLEM_PLANI_2018-2023_.pdf, Page 17

| | |
|---|---|
| | strategies are represented for women since the labor force activity of women is not at desired level compared to the EU countries. According to 2017 statistics tabulated in the report, labor force activity of women is declared as 33.6%[36] and it is aimed that this percentage will be 41% in 2023.[37] Accordingly, the project shows parallelism with the national strategies developed for women. |
| Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements? | Turkey has ratified ILO convention 100 and 11138 and discrimination based on gender is illegal in Turkey. The project tries to align with the national gender strategy. So, the project does not involve and is not complicit in any form of discrimination based on gender difference. Therefore, an Expert is not required for the Gender Safeguarding Principles & Requirements. |
| Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation? | An Expert is not required to assist with Gender issues at the Stakeholder Consultation. All stakeholders were invited to the Local Stakeholder Meeting without gender discrimination. Both women and men were invited and participated during Stakeholder Consultation. |

## SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

This project is a retroactive project. Hence draft stakeholder consultation report with self-assessment will be prepared and uploaded to the project page on sustain cert

[36] http://www.sp.gov.tr/upload/xSPTemelBelge/files/RySPo+KADININ_GUCLENMESI_STRATEJI_BELGESI_VE_EYLEM_PLANI_2018-2023_.pdf, Page 76

[37] http://www.sp.gov.tr/upload/xSPTemelBelge/files/RySPo+KADININ_GUCLENMESI_STRATEJI_BELGESI_VE_EYLEM_PLANI_2018-2023_.pdf, Page 79

[38] https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-ankara/documents/genericdocument/wcms_645630.pdf

soon. In addition, SCR was conducted and e-mail evidences of this process will be attached to self-assessed stakeholder consultation report.  The local stakeholder consultation report will be submitted during the first verification period.

### E.1 Summary of stakeholder mitigation measures

A remote local stakeholder consultation was conducted as per the covid-19 interim measures. Evaluation forms with project information notes are distributed to the residents of Demirli neighborhood which is the closest settlement to the project. The evaluation forms with the below project information notes were filled by the stakeholders.

# PANAB TEKİRDAĞ ELEKTRİK ÜRETİM SANTRALİ

## PROJE BİLGİ NOTU & SÜRDÜRÜLEBİLİR KALKINMA FORMU

Ülkemizde elektrik enerjisi ihtiyacı, sanayileşme, ekonomik gelişme ve nüfus artışı gibi nedenlerden dolayı hızla artmaktadır. Elektrik enerjisi üretebilmesi için gerekli yerli kaynakların (doğalgaz, petrol, vb) yetersizliği nedeniyle, Türkiye enerjide dışa bağımlı bir ülke konumundadır.

Biyokütle Enerji Santralleri (BES), yerli kaynakların kullanımına imkan vererek ithal yakıt bağımlılığını azaltması, ekonomik olması ve sera gazı salımına neden olmaması nedeniyle hızla artan elektrik enerjisi ihtiyacının karşılanmasında fosil yakıtlarla çalışan termik santrallere göre tercih edilmektedirler.

**Panab Tekirdağ Elektrik Üretim Santrali** Projesi, Tekirdağ İli, Süleymanpaşa İlçesi'nde olup, mevcut kentsel katı atıkların oluşturduğu metan gazını elektrik enerjisine dönüştürmek üzere planlanmış bir biyokütle enerji santralidir. Projenin toplam kapasitesi 14,140 MW'tır.

**Figür 1. Panab Tekirdağ Elektrik Üretim Santrali**

Projenin kurulu gücü Çevresel Etki Değerlendirmesi Yönetmeliğinde yer alan eşik değerden az olduğundan, kapsam dışı olarak değerlendirilmiştir. Projenin inşaası ve işletmesi esnasında ortaya çıkacak etkilerin en aza indirilmesi için gerekli önlemler alınmıştır.

Üretilecek olan elektrik enerjisi miktarı yılda yaklaşık 106,050 GWh olarak belirlenmiştir. Bu miktar yaklaşık olarak 36.000 nüfuslu bir yerleşim biriminin elektrik ihtiyacını karşılayacak seviyededir.

**Tablo 1. Tesis özellikleri**

| | Kurulu Gücü (MW) | Elektrik Üretimi (MWh/yıl) | Karbon dioksit Azaltımı ($tCO_2$) |
|---|---|---|---|
| **Panab Tekirdağ Elektrik Üretim Santrali** | 14,140 | 106.050 | 421.259 |

Söz konusu elektrik üretimi baz alınarak yapılan hesaplamalara göre, yenilenebilir kaynakların kullanımı nedeniyle yılda yaklaşık olarak 421.259 ton karbon dioksit ($CO_2$) azaltımı sağlayarak çevreye, hava kalitesine ve özellikle de iklim değişikliğine neden olan sera gazlarının azaltımına önemli ölçüde katkıda bulunacaktır.

The participants of the consultation are presented below.

| | |
|---|---|
| Volkan Değirmenci | Male |
| Onur Akın | Male |
| Erdem Ünlü | Male |
| Burhan Meşe | Male |
| Zahide Gür | Female |
| Erkan Baykal | Male |
| Seçil Ergün | Female |
| Kemal Gür | Male |
| Doğan Acar | Male |
| Mustafa Deniz Küçük | Male |
| Melek Acar | Female |
| Emirhan Gültekin | Male |
| Berkir Kılıç | Male |
| Kerem Pirinç | Male |
| Şenol Akata | Male |

No negative comments were received. The stakeholders mentioned following positive effects of the project activity:

- Job opportunities created by the project activity
- Contribution to public health and clean environment by better management of waste
- Utilization of waste by electricity generation
- Prevention of the release of greenhouse gases causing global warming to the atmosphere

Also, the stakeholder feedback round was conducted between 31/01/2023 and 03/03/2023. No comments were received during the SFR. The invitation e-mail and the evaluation form sent to the stakeholders are presented below.

Ayşegül İdil Kayan <idil.kayan@gte.com.tr>

**Gold Standard Panab Tekidag Biogas Plant - Stakeholder Feedback Round /Panab Tekirdağ Elektrik Üretim Santrali Geribildirim Süreci**

**Ayşegül İdil Kayan** <idil.kayan@gte.com.tr> Tue, Jan 31, 2023 at 2:20 PM
To: GTE Carbon <gte@gtecarbon.com>
Cc: info@wwf.org.tr, bilgi.tr@greenpeace.org, nfo@uk.mercycorps.org, press@mercycorps.org, cbragale@mercycorps.org, helio@helio-international.org, contact@helio-international.org, info@reeep.org, info@rec.org.tr, Annyta Luo <annyta.luo@goldstandard.org>, QA <qa@goldstandard.org>, certification <certification@goldstandard.org>, syadav@globaloffsetresearch.com, lmpsindore@gmail.com, thomas.finsterwald@myclimate.org

Sayın İlgili,
Gold Standard Validasyon (Onaylanma) Süreci çerçevesinde, Tekirdağ İli sınırlarında bulunan Panab Tekirdağ Elektrik Üretim Santrali Projesi için "Paydaş Geribildirim Süreci" başlatılmıştır. Proje ile ilgili dökümanlara, https://registry.goldstandard.org/projects/details/3215 adresinden ulaşabilirsiniz. Proje ile ilgili görüşlerinizi ise ekte bulunan bilgi notu içerisindeki "Sürdürülebilir Kalkınma Değerlendirmesi Formu"nu doldurarak 03/03/2023 tarihine kadar gte@gtecarbon.com adresine gönderebilirsiniz.
Saygılarımızla.

---

Dear Sir/Madame,
Within the scope of Gold Standard Validation Process – Stakeholder Feedback Round, you are kindly invited to provide your comments for "Panab Tekirdag Biogas Plant" located within the boundaries of Tekirdağ Province of Turkey. Please share your feedbacks using the form attached to the project information note. Related project documents are available via link shared below;

https://registry.goldstandard.org/projects/details/3215

Project will be open for comments via gte@gtecarbon.com until 03/03/2023.

Kind Regards.

--
**Ayşegül İdil Kayan**
**Proje Uzmanı / Project Expert**
INSPIRING SUSTAINABILITY
E. idil.kayan@gte.com.tr
T. +90 312 514 63 63
W. www.gte.com.tr
**Turkey:**
Maidan - M. Kemal Mah.
2118. Cad. No:4 C-Blok 42
06510 Çankaya / Ankara
**United Kingdom:**
74 A High Street,
Wanstead, E11 2RJ
London

**2 attachments**

# PANAB TEKIRDAG BIOGAS PLANT

## PROJECT INFORMATION NOTE & SUSTAINABLE DEVELOPMENT EVALUATION FORM

The energy demand of Türkiye is increasing rapidly due to industrialization, economical development and population growth. Since the local sources (natural gas, petroleum etc.) required to generate electricity are inadequate, Türkiye is a foreign-dependent country in terms of energy.

Biogas Power Plants (BPPs) are preferred over thermal power plants using fossil fuels in meeting the rapidly increasing energy demand, since they allow the use of domestic resources, reduce the dependence on imported fuel, are economical and not causing greenhouse gas emissions.

**Panab Tekirdag Biogas Plant** project is located in Süleymanpaşa District of Tekirdağ Province and it is a biogas power plant utilizing the methane produced by existing municipal solid wastes to generate electricity for the National grid of Türkiye. The total capacity of the project is 14.140 MW.

**Figure 1. Panab Tekirdag Biogas Plant**

Since the installed capacity of the project is less than the threshold value stated in the Environmental Impact Assessment Regulation, the project was considered out of the scope of EIA. Necessary measures have been taken to minimize the effects that may arise during the construction and operation of the project.

The amount of electrical energy to be produced has been determined as approximately 106.050 GWh per year. This amount is at a level to meet the electricity needs of a settlement with a population of approximately 36,000.

**Tablo 1. Properties of the plant**

| | Installed Capacity (MW) | Electricity Generation (MWh/yıl) | Emission Reduction ($tCO_2$) |
|---|---|---|---|
| **Panab Tekirdag Biogas Plant** | 14.140 | 106,050 | 421,259 |

According to the calculations based on the amount of electricity generation, the project activity will significantly contribute to the environment, air quality and especially the reduction of greenhouse gases that cause climate change by reducing approximately 421,259 tons of carbon dioxide ($CO_2$) per year due to the use of renewable resources.

## PANAB TEKIRDAG BIOGAS PLANT

### SUSTAINABLE DEVELOPMENT EVALUATION FORM

| Sustainable Development Indicators | Feedback | | |
|---|---|---|---|
| | Positive | Negative | N/A |
| Air quality (Sulfur dioxide, nitrogen oxides, soot, etc.) | | | |
| Water quality and quantity (Access to water resources) | | | |
| Soil quality (Fight against erosion, soil pollution, etc.) | | | |
| Other pollution sources (noise, light, etc. pollution sources) | | | |
| Biodiversity (Effect on protected species) | | | |
| Employment Quality (Working conditions, job security) | | | |
| Fight Against Poverty (Impact on the standard of living, access to health services, etc.) | | | |
| Access to clean energy sources (Reliable, cheap energy, impact on energy imports) | | | |
| Personal and institutional capacity (Education, awareness raising) | | | |
| Contribution to employment and income level (New job opportunity, income increase) | | | |
| Balance of Payments (Reducing foreign dependency, increasing investment) | | | |
| Technology transfer and technological competence (Using and adapting new technologies, etc.) | | | |

| | | |
|---|---|---|
| **Evaluator Information** | **Name Surname** | |
| | **Phone** | |
| | **Organization/Title** | |
| What are the aspects of the project that you find positive? | | |
| | | |
| What are the aspects of the project that you find negative? | | |
| | | |

**Communication Information:**

- GTE KARBON SÜRDÜRÜLEBİLİR ENERJİ EĞİTİM DANIŞMANLIK VE TİCARET A.Ş.

Address: MAIDAN Mustafa Kemal Mah. 2118. Cadde No:4 C Blok 42 Çankaya Ankara

Phone: +90 312 514 63 63

E-mail: gte@gte.com.tr

- PANAB TEKİRDAĞ ENERJİ ANONİM ŞİRKETİ

Address : Orhaniye Mahallesi Serpmeleri No:191/B, 06980 Kahramankazan, Ankara, Turkey

Phone : +90 312 815 55 22



## E.2 Final continuous input / grievance mechanism

| Method | Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers. |
|---|---|
| Continuous Input / | A grievance notebook is placed at Mukhtar' office in Demirli Neighborhood. Local stakeholders can fill in whenever there is a |

| | |
|---|---|
| Grievance Expression Process Book (mandatory) | complaint or a request which is regularly checked by the project manager. Stakeholders are also welcome to directly contact the power plant staff in case they have an input. |
| GS Contact (mandatory) | help@goldstandard.org |
| Other | - |

# APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into SECTION D above. Please refer to the instructions in the Guide to Completing this Form.

| Assessment Questions/ Requirements | Justification of Relevance (Yes/potentially/no) | How Project will achieve Requirements through design, management or risk mitigation. | Mitigation Measures added to the Monitoring Plan (if required) |
|---|---|---|---|
| **Principle 1. Human Rights** | | | |
| 1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or | No | Turkey has ratified European Convention on Human Right on 10/03/1954[39]. Therefore, the project is not expected to violate the rules regarding human rights. | No mitigation measure is required for this indicator. |

[39] https://www.echr.coe.int/Documents/CP_Turkey_ENG.pdf

| | | | |
|---|---|---|---|
| human rights abuses of any kind as defined in the Universal Declaration of Human Rights<br>2. The Project shall not discriminate with regards to participation and inclusion | | | |
| **Principle 2. Gender Equality** | | | |
| 1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women<br>2. Projects shall apply the principles of | No | Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[40]. It also shows parallelism with national strategies prepared | No mitigation measure is required for this indicator. |

[40] http://www.ilo.org/ankara/areas-of-work/equality-discrimination/lang--tr/index.htm

| | | | |
|---|---|---|---|
| nondiscrimination, equal treatment, and equal pay for equal work<br>3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks<br>4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s) | | for women employment by creating opportunities for all.<br><br>Moreover, the project outputs serve everyone without regarding gender. It provides electricity for all. | |
| **Principle 3. Community Health, Safety and Working Conditions** | | | |
| 1. The Project shall avoid community exposure to increased health risks | Yes | Turkey has ratified ILO convention 155 and about work safety and precautions[41] | A grievance notebook is placed at Mukhtar' office in Demirli Neighborhood. Local stakeholders can fill in |

[41] https://www.ilo.org/global/standards/subjects-covered-by-international-labour-standards/occupational-safety-and-health/WCMS_356966/lang--en/index.htm

| | | | |
|---|---|---|---|
| and shall not adversely affect the health of the workers and the community | | Demirli Neighborhood is the closest settlement to the project area. No complaints received so far regarding the odor and pest problem. | whenever there is a complaint or a request which is regularly checked by the project manager. Stakeholders are also welcome to directly contact the power plant staff in case the case of any complaints |
| **Principle 4.1 Sites of Cultural and Historical Heritage** | | | |
| Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture? | No | (a) No sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture were | No mitigation is required for this indicator. |
| >> | | | |

| | | | |
|---|---|---|---|
| | | observed in the project area[42]. | |
| **Principle 4.2 Forced Eviction and Displacement** | | | |
| Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)? | No | There were no settlement on project site on baseline scenario[43]. | No mitigation is required for this indicator. |
| >> | | | |
| **Principle 4.3 Land Tenure and Other Rights** | | | |
| a. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or | No | There were no settlement on project site on baseline | No mitigation is needed for this indicator. |

[42] Panab Tekirdağ Biogas Plant EIA Report, Section II.
[43] Panab Tekirdağ Biogas Plant EIA Report, Section II.

| | | | |
|---|---|---|---|
| access rights, usage rights or land ownership?<br>b. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership? | | scenario or not any private ownership[44]. | |
| >> | | | |
| **Principle 4.4 - Indigenous people** | | | |
| Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples? | No | No indigenous people was identified. And so no one will be affected by negative noise conditions[45]. | No mitigation is needed for this indicator. |
| >> | | | |

[44] Panab Tekirdağ Biogas Plant EIA Report, Section II.
[45] Panab Tekirdağ Biogas Plant EIA Report, Section II.

| | | | |
|---|---|---|---|
| **Principle 5. Corruption** | | | |
| 1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects | No | Turkey has ratified several conventions on bribery and corruption including OECD and UN conventions[46] | No mitigation is needed for this indicator. |
| **Principle 6.1 Labour Rights** | | | |
| 1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied | Yes | - Turkey has ratified ILO 87 and 98 conventions.<br>- Turkey has ratified ILO convention 155 and about work safety and precautions. Staff will be trained for HSE | The project activity provides job opportunities to 65 people[50].<br><br>Staff will be trained for HSE during operation phases. As per related regulations. |

[46] http://www.masak.gov.tr/en/LaunderingProceedsofCrime/Chronology.htm
[50] Social security records of employees

| | | | |
|---|---|---|---|
| in the ILO fundamental conventions<br>2. Workers shall be able to establish and join labour organisations<br>3. Working agreements with all individual workers shall be documented and implemented and include:<br>a) Working hours (must not exceed 48 hours per week on a regular basis), AND<br>b) Duties and tasks, AND | | during operation phases.<br><br>- Turkey is a party of IPEC[47],[48] since 1992 and ratified ILO convention 138 and 182[49].<br><br>- All employee are to be recruited according to the national legislations. | For other issues/indicators no mitigation measure is required for this indicator. |

[47] http://www.ilo.org/ipec/programme/lang--en/index.htm
[48] http://www.ilo.org/ipec/Regionsandcountries/lang--en/index.htm
[49] http://www.ilo.org/public/turkish/region/eurpro/ankara/about/sozlesmeler.htm

| | | | |
|---|---|---|---|
| c) Remuneration (must include provision for payment of overtime), AND<br>d) Modalities on health insurance, AND<br>e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND<br>f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave.<br>4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion) | | | |

| | | | |
|---|---|---|---|
| 5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures | | | |
| **Principle 6.2 Negative Economic Consequences** | | | |
| 1. Does the project cause negative economic consequences during and after project implementation? | No | The investment is capital intensive but operating as low cost plant. VER revenues help in shorter return periods for investment. Details are given in sensitivity analysis part of this report and IRR calculation sheet of the project for the justification. | No mitigation needed for this indicator. |
| >> | | | |
| **Principle 7.1 Emissions** | | | |

| | | | |
|---|---|---|---|
| Will the Project increase greenhouse gas emissions over the Baseline Scenario?<br>>> | No | Since it is a biogas power plant, the project is expected to have a positive impact on Climate Change by eliminating fossil fuels with renewable sources. Expected amount of CO2e: 192,586 tonnes (as indicated in emission reduction calculation sheet detaily). | No mitigation measure is required for this indicator. |
| **Principle 7.2 Energy Supply** | | | |
| Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?<br>>> | No | Project does not use any local fuel resource. It is connected to the national grid and with the current installed capacity, supply 53.025 GWh additional energy to the grid. | No mitigation measure is required for this indicator. |
| **Principle 8.1 Impact on Natural Water Patterns/Flows** | | | |

| | | | |
|---|---|---|---|
| Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?<br>>> | No | The project does not have any expected effects on the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) since there is no underground or other kind of water source on project site[51] | No mitigation measure is required for this indicator. |
| **Principle 8.2 Erosion and/or Water Body Instability** | | | |
| a. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? | No | The project does not directly or indirectly cause harm on soil and water[52]. During the operation phase of the project, wastewater | No mitigation measure is required for this indicator. |

[51] Panab Tekirdağ Biogas Plant EIA Report, Section II.
[52] Panab Tekirdağ Biogas Plant EIA Report, Section I

| | | | |
|---|---|---|---|
| b. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?<br>>> | | management will be carried out in accordance with the provisions of the "Water Pollution Control Regulation" (and all changes made in the regulation), which entered into force by publishing in the Official Gazette dated 31.12.2004 and numbered 25687. Moreover, project will not need process water during the operation phase based on its technical configuration. | |
| **Principle 9.1 Landscape Modification and Soil** | | | |
| Does the Project involve the use of land and soil for production of crops or other products?<br>>> | No | There were no settlement or agricultural activities on project site on baseline scenario or not any private ownership. | No mitigation measure is required for this indicator. |
| **Principle 9.2 Vulnerability to Natural Disaster** | | | |

| | | | |
|---|---|---|---|
| Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?<br>>> | No | Tekirdag and project site are in the 2rd Degree Seismic Zone[53] according to the earthquake zones determined by the General Directorate of Disaster Affairs. Hence construction of the project have been carried out accordingly. | All the design and construction works was performed in accordance with relevant regulation |
| **Principle 9.3 Genetic Resources** | | | |
| Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms | No | The project is not relevant since it is a renewable energy project. | No mitigation measure is required for this indicator. |

[53] Panab Tekirdağ Biogas Plant EIA Report, Section II

| | | | |
|---|---|---|---|
| that include GMOs in their processes and production)? | | | |
| >> | | | |
| **Principle 9.4 Release of pollutants** | | | |
| Could the Project potentially result in the release of pollutants to the environment? | Yes | Leachate is produced by the MSW in the landfill. | Leachate produced is collected and stored to be sent the treatment facility. |
| >> | | | |
| **Principle 9.5 Hazardous and Non-hazardous Waste** | | | |
| Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials? | Yes | Hazardous wastes are expected such as waste oils in the operation period. | Handling, storage and disposal of these wastes will be done according to the Turkish regulations. |
| >> | | | |
| **Principle 9.6 Pesticides & Fertilisers** | | | |
| Will the Project involve the application of pesticides and/or fertilisers? | No | The project is not relevant since it is a renewable energy project. | No mitigation measure is required for this indicator. |

| | | | |
|---|---|---|---|
| >> | | | |
| **Principle 9.7 Harvesting of Forests** | | | |
| Will the Project involve the harvesting of forests?<br>>> | No | Although the project area is a forest area, it does not contain a forest vegetation except a few trees and bushes remaining from the previous anthropogenic activities. The area has been allocated by the ministry of environment and forestry and it has been determined as solid waste disposal site by the Tekirdağ Governorship and the local environment board[54] | No mitigation measure is required for this indicator. |
| **Principle 9.8 Food** | | | |

[54] Panab Tekirdağ Biogas Plant EIA Report, Section III

| | | | |
|---|---|---|---|
| Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives? | No | The project is not relevant since it is a renewable energy project. | No mitigation measure is required for this indicator. |
| >> | | | |
| **Principle 9.9 Animal husbandry** | | | |
| Will the Project involve animal husbandry? | No | The project is not relevant since it is a renewable energy project. | No mitigation measure is required for this indicator. |
| >> | | | |
| **Principle 9.10 High Conservation Value Areas and Critical Habitats** | | | |
| Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, | No | No endemic, endangered and or threatened flora and fauna species were identified in the project site and its vicinity[55]. | No mitigation measure is required for this indicator. |

[55] Panab Tekirdağ Biogas Plant EIA Report, Section II

| | | | |
|---|---|---|---|
| landscapes, key biodiversity areas or sites identified? | | | |
| >> | | | |
| **Principle 9.11 Endangered Species** | | | |
| a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?<br><br>b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects? | No | No endemic, endangered and or threatened flora and fauna species were identified in the project site and its vicinity[56]. | No mitigation measure is required for this indicator. |

[56] Panab Tekirdağ Biogas Plant EIA Report, Section II

| | | | |
|---|---|---|---|
| >> | | | |

# APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

| | |
|---|---|
| Organization name | PANAB TEKİRDAĞ ENERJİ ANONİM ŞİRKETİ |
| Registration number with relevant authority | - |
| Street/P.O. Box | Orhaniye Mah. Orhaniye Küme Evleri |
| Building | No:191/B |
| City | Ankara |
| State/Region | Kahramankazan |
| Postcode | - |
| Country | Turkey |
| Telephone | +90 3128155522 |
| E-mail | muhasebe@panabenerji.com |
| Website | - |
| Contact person | Cahfer Öztürk |
| Title | Director of Finance |
| Salutation | Mr. |
| Last name | Öztürk |
| Middle name | |
| First name | Cahfer |
| Department | Finance |
| Mobile | +90 530 922 95 38 |
| Direct tel. | +90 3128155522 |
| Personal e-mail | muhasebe@panabenerji.com |

| | |
|---|---|
| Organization name | GTE KARBON SUSTAINABLE ENERJI EGITIM DANISMANLIK VE TICARET A.S. |
| Registration number with relevant authority | - |
| Street/P.O. Box | 2118. Cadde No:4 |
| Building | Maidan C Blok 42 |
| City | Ankara |
| State/Region | N/A |
| Postcode | 06510 |
| Country | Turkey |
| Telephone | +90 312 514 63 63 |
| E-mail | gte@gte.com.tr |
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# APPENDIX 3- LUF ADDITIONAL INFORMATION

| | |
|---|---|
| Risk of change to the Project Area during Project Certification Period: | N/A |
| Risk of change to the Project activities during Project Certification Period: | N/A |
| Land-use history and current status of Project Area: | N/A |
| Socio-Economic history: | N/A |
| Forest management applied (past and future) | N/A |
| Forest characteristics (including main tree species planted) | N/A |
| Main social impacts (risks and benefits) | N/A |
| Main environmental impacts (risks and benefits) | N/A |
| Financial structure | N/A |
| Infrastructure (roads/houses etc): | N/A |
| Water bodies: | N/A |
| Sites with special significance for indigenous people and local communities - resulting from the Stakeholder Consultation: | N/A |
| Where indigenous people and local communities are situated: | N/A |

| | |
|---|---|
| Where indigenous people and local communities have legal rights, customary rights or sites with special cultural, ecological, economic, religious or spiritual significance: | N/A |

# APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

**There is no approved design changes for the project activity.**