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

0 – Summary of Safeguarding Principles and Gender Sensitive Assessment

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Appendix 1 – Safeguarding Principles Assessment

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KEY PROJECT INFORMATION

GS ID of Project	GS11341
Title of Project	ADIYAMAN LANDFILL PLANT
Time of First Submission Date	28/08/2021
Date of Design Certification	-
Version number of the PDD	09
Completion date of version	31/10/2023
Project Developer	4B Adıyaman Enerji Atık Toplama Geri Dönüşüm San. Tic. A.Ş.
Project Representative	4B Adıyaman Enerji Atık Toplama Geri Dönüşüm San. Tic. A.Ş.
Project Participants and any communities involved	GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık ve Ticaret A.Ş.
Host Country (ies)	TURKEY
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☐ Small Scale ☒ Large Scale
Other Requirements applied	N/A
Methodology (ies) applied and version number	ACM0001 v.19.0 (Flaring or use of landfill gas)
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ 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)	The project would lead to reduction of approximately 102,530 tCO2 per annum	102,530	tCO_2
7 Affordable and Clean Energy	The electricity generation is predominantly composed by fossil fuel fired power plants in Turkey. The project is expected to generate 35,100 MWh of clean energy per annum.	35,100	MWh
8 Decent Work and Economic Growth	The project provides employment to between 10 and 20 people	10-20	People who are employed
12 Ensure Sustainable Consumption and Production Patterns	The project provides better management option for wastes (municipal solid waste).	146,000	ton

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

Adıyaman Landfill Plant project was invested by "4B Adıyaman Enerji Atık Toplama Geri Dönüşüm San. Tic. A.Ş.". The landfill site of the project is in Adıyaman province of Turkey.

The purpose of the project activity is to contribute to increasing energy demand of Türkiye by utilizing the LFG from municipal solid waste of Adıyaman Province.

Project constructed pipe system to collect landfill gas through solid waste management and use it for electricity generation which is connected to Turkish National Grid. The proposed activity involves the collection and utilization of the LFG with an electricity component with an installed capacity 4.68 MWe (1.56 x 3 MWe). Currently, 1 gas engine with an installed capacity of 1.56MWe is operational. Gas Engine 2 and 3 will be commissioned as the LFG generation increases.

Expected solid waste excepted by project site is 146,000 tonnes/year according to waste agreement with local municipality. Estimated electricity generation and corresponding annual estimated emission reduction values are 35,100 MWh and 102,530 tCO2 respectively. The starting date of the project activity shall be considered as 01/09/2020 due to first gas engine agreement. Commissioning date of the first gas engine is 05/06/2021.

Prior to the proposed project activity, the wastes are left to decay within Adıyaman 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 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.

Exact timing and installed power of this expansion work depends on the actual LFG generation on site, the Project design as of commissioning phases;

Gas engine 1: Capacity 1.56 MWe – 05/06/2021
Gas engine 2: Capacity 1.56 MWe – will be commissioned (Commissioning expected on 08/08/2025)

Gas engine 3: Capacity 1.56 MWe – will be commissioned (Commissioning expected on 08/08/2025)

The Project activity has been located within a new landfill site, where the waste is transported from the city and the leachate is collected and stored. The landfill is open and continues to receive waste. 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.

Figure 1. The project site (satellite view)

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 estimated electricity generation is 35,100 MWh[1] per year by the project activity.

The project has supply the Turkish National Grid with zero emission energy, generated by the LFG. Electricity currently generated by the grid is relatively carbon intensive, with a combined margin emission factor of 0.5552 tCO2 tCO2/MWh. The connection point of the project activity is 31,5 KV TM-39 TRA-DM. Through the estimated electricity generation and methane capture total emission reduction will be 102,530 tCO2 per year and 512,648 tCO2e for the first crediting period. The project operational lifetime is is 28 years, 8 months and 8 days from 17/12/2020 as stated in the generation license of the project.

The project activity has been exempted from EIA on 24/09/2020 since the installed capacity of the project is below the threshold value stated in EIA regulation. EIA is positive decision of SWDS (SWDS was built within the scope of the integrated solid waste management project of the Adıyaman Municipalities Association) where the project activity is located was made on 17/09/2020.

The Project is started operation on 05/06/2021 with the commissioning of the first gas engine. This electricity amount has contributed to the following goals:

- Reduction in fossil fuel use (imported or local) by using renewable energy resources.
- Displacement of ecologically unsound and climate unfriendly power generation
- Extension of nationally sourced power generation.
- Improvement of environmental conditions (GHG and odour) and safety in the landfill area
- Reduce the greenhouse gas emissions

[1] Adıyaman Landfill Plant generation license

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 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;

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

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.

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. For the proposed project, though the projects documents submitted (28/08/2021) within one year of project start date (01/09/2020), reviewed by GS and listed.

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

The project participant 4B Adıyaman Enerji Atık Toplama Geri Dönüşüm San. Tic. A.Ş. is the legal owner of the project and has the legal rights for the credits.

GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık ve Ticaret A.Ş. acts as carbon consultant for the Project. Contact details are provided in Appendix 2.

[5] The e-mail dated on 04/03/2020

A.2 Location of project

The project is located in Adıyaman Province of Turkey. The closest settlement is Kayaönü District in Adıyaman Province.

The GPS coordinates of the Project activity are as the following:

- Latitude: 37.800362˚N
- Longitude: 38.214418˚E

Please see below the maps showing the location of the project activity in Turkey and the locations of the project area:

Figure 2. The location of the project activity[6]

[6] Feasibility Report 02/11/2009

A.3 Technologies and/or measures

The proposed activity is a greenfield project located in a new landfill site and involves the collection and utilization of the LFG with an electricity component with an installed capacity 4.68 MWe (1.56 x 3 MWe). Currently, one gas engine is operational with an installed capacity of 1.56 MWe. Expected solid waste excepted by project site is 146,000 tonnes/year according to waste agreement with local municipality. Estimated electricity generation and corresponding annual estimated emission reduction values are 35,100 MWh and 102,530 tCO2 respectively.

The Project mainly consists of the following components:

- LFG collection system
- Flaring unit
- Electricity generation unit
- Switchgear station
- Controlling / measurement equipment

Technical details of the equipment and flow diagram of the plant are presented below.

Gas Blower:
Brand: Conveco
Type: HE 1500x2 F500 FDM
Flowrate: 1500 m^3/h

Gas Analyzer:
Brand: MRU
Model: SWG100biogas
Serial Number: 081300
CH_4, CO_2 O_2 H_2S H_2 measurement
Accuracy: For CH_4, CO_2 O_2, ±0.3 Vol%
For H_2S ± 5 ppm
For H_2 ±10 ppm

Gas Flowmeter:
Brand: Endress+Hauser
Model: Deltabar S PMD75
Number: 3
Serial numbers:

- R-902740109-D
- R-9025F0109-D
- R-902730109-D

Thermocouple:
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)

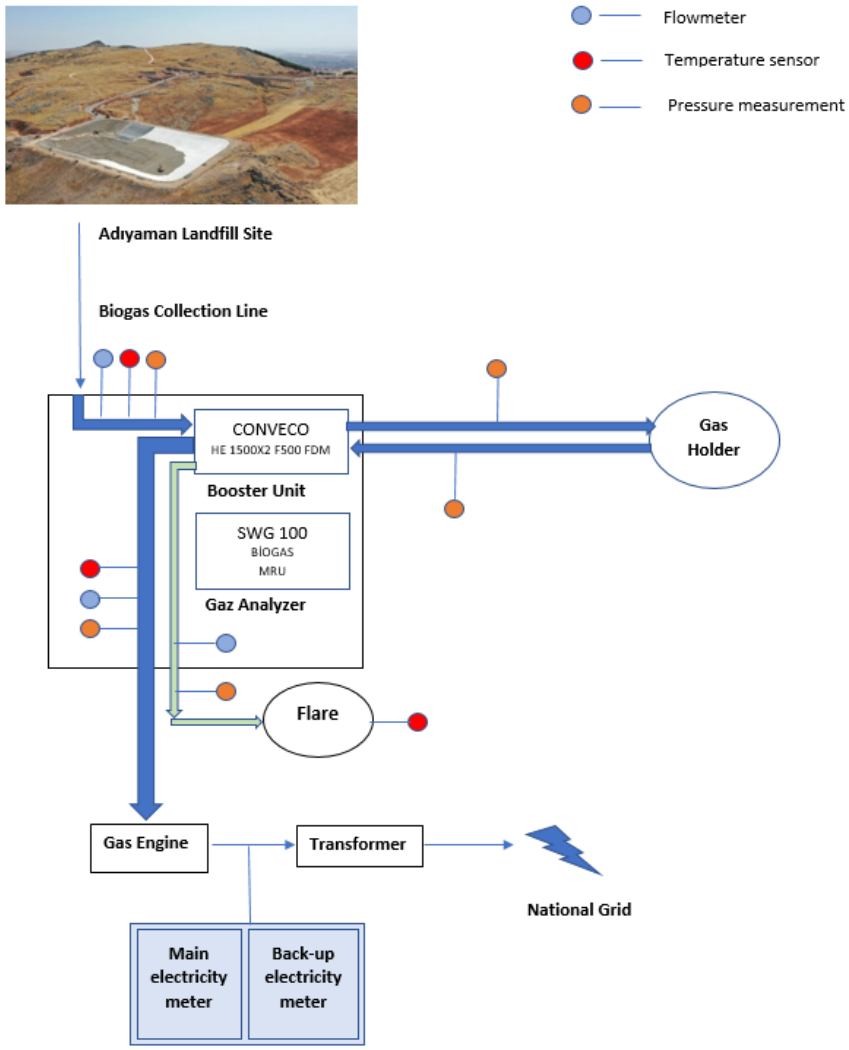
Gas Engine:
Brand/Model: CAT/ CG170-16
Electrical power: 1,560 kW

Flare:
Capacity: 2000 m^3/h
Efficiency: 95%

Main Meter:
Brand: MAKEL
Type: C520AMT2556
Class: 0.5
Production year: 2021
Serial number: 80303777

Back-up Meter:
Brand: MAKEL
Type: C520AMT2556
Class: 1
Production year: 2021
Serial number: 80303901

A flow diagram for the project is presented below.



The waste is covered with soil to block methane emissions to the atmosphere to provide sufficient containment and prevent air or rainwater to get into the waste. The Project aims at efficiently collecting LFG generated at the landfill site by using wells. The vertical and horizontal pipes have been installed to collect the LFG efficiently and generate power from collected LFG. Collected biogas is transmitted to the booster unit and sent to gas engine to generate electricity. Project owner also has installed a flare. This ensure that the LFG, which could not be combusted in the power generation units, is destroyed. The flare unit provides conditions for high temperature combustion to effectively destroy methane with other combustible LFG components and end up with low GHG emissions. Finally, the generated electricity is supplied to the National Grid.

The Project include monitoring instrumentation that allow for the accurate measurement of captured and destroyed LFG, including the following components:

- Flow meters have installed to measure and monitor accurately the flow of the LFG through the system. The measurement points are the main delivery pipe, the pipe going to the flare and the pipes going to each of the generation units. These flow meters are able to accurately measure various parameters such as pressure, temperature and the gas contents (e.g. methane) at normal conditions (0°, 1 Atm).

- The measurement system is able to store the measured data electronically. The control and monitoring system allows these readings to be obtained remotely.

Project technical lifetime is determined through "Tool to determine the remaining lifetime of equipment" (Version 01). The project option is selected as (a) as below;

(a) Use manufacturer's information on the technical lifetime of equipment and compare to the date of first commissioning;

The amount of annual estimated electricity generation is 35,100 MWh. The project is planned to connect to Adıyaman TM that has 31,5 kV medium voltage. The annual average over the crediting period of estimated emission reductions will result 102,530 tonnes of CO2e/year and total emission reduction will be 512,648 tonnes of CO2e for the first crediting period.

The Project prevents methane emissions to the atmosphere and produce electricity which will reduce fossil fuel consumption and associated CO2 emissions. The generation will depend on the quantity of the LFG. The Project is expected to generate 35,100 MWh of electricity per year without emitting GHGs.

The project operational lifetime is is 28 years, 8 months and 8 days from 17/12/2020 as stated in the generation license of the project.

The contribution of the project activity to sustainable development goals are summarized below.

1 – Affordable and Clean Energy (SDG 7):

The project is expected to generate 35.100 GWh of clean energy per annum and contributes to share of low-cost / must-run sources.

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

The project promotes job opportunities to 10-20 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- Ensure sustainable consumption and production patterns (SDG 12)

The project provides better management option for wastes as around 146,000 ton/year.

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

The project contributes to 102,530 tonnes of CO2e/year reduction, which represent direct and quantifiable impact on climate security.

A.4 Scale of the project

The CDM Methodology Booklet[7] (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

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

estimated emission reduction of the proposed project activity is 102,530 tCO_2 equivalent per year, the Project's scale shall be defined as "Large-scale".

A.5 Funding sources of project

The project activity does not have any public funding or Official Development Assistance (ODA) funding.

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

B.1. Reference of approved methodology (ies)

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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.[8] was applied for the project activity. Following tools have been used:

[8] https://cdm.unfccc.int/methodologies/DB/JPYB4DYQUXQPZLBDVPHA87479EMY9M?gclid=CjwKCAiAioifBhAXEiwApzCztuKT_NAwtf1aEUvj89h3KjjNVkm_ZuC1Oq9r_5JKUPdwm_133SiLwxoCr4oQAvD_BwE

- Tool 03 Methodological Tool – Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (version 03.0)[9]
- Tool 04 Methodological Tool - Emissions from solid waste disposal sites. (version 08.0)[10]
- Tool 05 Methodological Tool - Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)[11]
- Tool 08 Methodological Tool - Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0)[12]
- Tool 07 Methodological Tool - Tool to calculate the emission factor for an electricity system (version 07.0)[13]
- Tool to determine the remaining lifetime of equipment" (Version 01)[14]
- Tool 32 Methodological Tool - Positive lists of technologies (version 04.0)[15]

B.2. Applicability of methodology (ies)

ACM0001 Applicability

Methodology applicability	The proposed project

[9] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf

[10] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v8.0.pdf

[11] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf

[12] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v3.0.pdf

[13] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
[14] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf
[15] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-32-v4.0.pdf

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: (i) The captured LFG was vented or flared and not used prior to the implementation of the project activity; and (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;	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.[16] According to the description above, (b) is not applicable.
(c) Flare the LFG and/or use the captured LFG in any (combination) of the following ways: (i) Generating electricity;	(i)The project activity utilizes the captured LFG to generate electricity.

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

(ii) Generating heat in a boiler, air heater or kiln (brick firing only) or glass melting furnace; and/or (iii) Supplying the LFG to consumers through a natural gas distribution network; (iv) Supplying compressed/liquefied LFG to consumers using trucks; (v) Supplying the LFG to consumers through a dedicated pipeline;	
(d) Do not reduce the amount of organic waste that would be recycled in the absence of the project activity. 1. When demonstrating compliance with requirement (d) above, the PP may: (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); (b) Identify any facility(ies) that recycle the organic fraction of the waste in the area identified in (a) above.; and (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. (d) If the facility(ies) identified in (c) above is(are) not operating at its maximum capacity, explain, with	(d) (a)Before the Adıyaman Landfill 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 reasonable proximity of the project. The area served by the landfill has been clearly stated with corner coordinates in Section 1.12. The project activity generates electricity through LFG and do not reduce the amount of organic waste that would be recycled. According to the description above, (b), (c), (d) and 2 are not applicable.

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). 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.	
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: (i) For electricity generation: that electricity would be generated in the grid or in captive fossil fuel fired power plants; and/or (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	(d) The project activity involves already existing SWDS.

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.	
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 efficiency measures at a kiln or glass melting furnace;	a) The methodology is not applied with other approved methodologies. .
(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 Adıyaman Municipality. The project proponent does not have any control over SWDS management which is under management of Adıyaman 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: 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 amount of methane captured from the SWDS);	It is easily identified that the project activity meets the tool’s applicability conditions Application A. The proposed activity involves the collection and utilization of the LFG with an electricity component. Expected disposed waste amount is 146,000 tonnes/years.

Application B: the CDM project activity avoids or involves the disposal of waste at a SWDS. 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 monitoring of electricity generation (Version 03.0)	
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:	

(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; (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 (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	(a) The project activity does not consume electricity from grid. 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.
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:	

(a) Scenario I: Electricity is supplied to the grid; (b) Scenario II: Electricity is supplied to consumers/electricity consuming facilities; or (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. 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 IIb. If option IIa is chosen, the conditions specified in “Appendix 1: Procedures related to off-grid power	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 the Ministry of Energy and Natural Resources of Türkiye is used in calculations.

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.	
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[17].
The underlying methodology should specify: (a) The gaseous stream the tool should be applied to; (b) For which greenhouse gases the mass flow should be determined; (c) In which time intervals the flow of the gaseous stream should be measured; and (d) Situations where the simplification offered for calculating the molecular mass of the gaseous stream (equations (3) or (17)) is not valid (such as the gaseous stream is predominantly composed of a gas other than N_2).	(a) ACM0001: Flaring or use of landfill gas --- Version 19.0 refers to the tool and specifies (a), (b), (c) and (d).
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	The project activity supplies electricity to the national grid.

[17] Gas Analysis Report

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).	
Tool 06 Methodological tool Project emissions from flaring (version 04.0)	
This tool is applicable to the flaring of flammable greenhouse gases where: (a) Methane is the component with the highest concentration in the flammable residual gas; and (b) The source of the residual gas is coal mine methane or a gas from a biogenic source (e.g. biogas, landfill gas or wastewater treatment gas).	LFG does not contain any combustible gases other than methane, carbon monoxide and hydrogen. According to the waste analysis report of the project 55% of the biogas produced composed of methane[18] LFG is obtained from the decomposition of organic material in landfill.
The tool is not applicable to the use of auxiliary fuels and therefore the residual gas must have sufficient flammable gas present to sustain combustion. In the case of an enclosed flare, there shall be operating specifications provided by the manufacturer of the flare and these shall be followed by the project participant	There is no use of auxiliary fuels, the capacity of the plant has been calculated considering the amount and content of biogas produced.
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	The applied methodology ACM0001: Flaring or use of landfill gas --- Version 19.0 refers to Tool 32.

[18] Waste Analysis report

or large-scale methodology which refers to this tool.	

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. Outside of the project boundary there exists biogas collection and the collected biogas is also fed to the electricity generation engine. Both LFG and Biogas sides have their own flowmeters. 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:

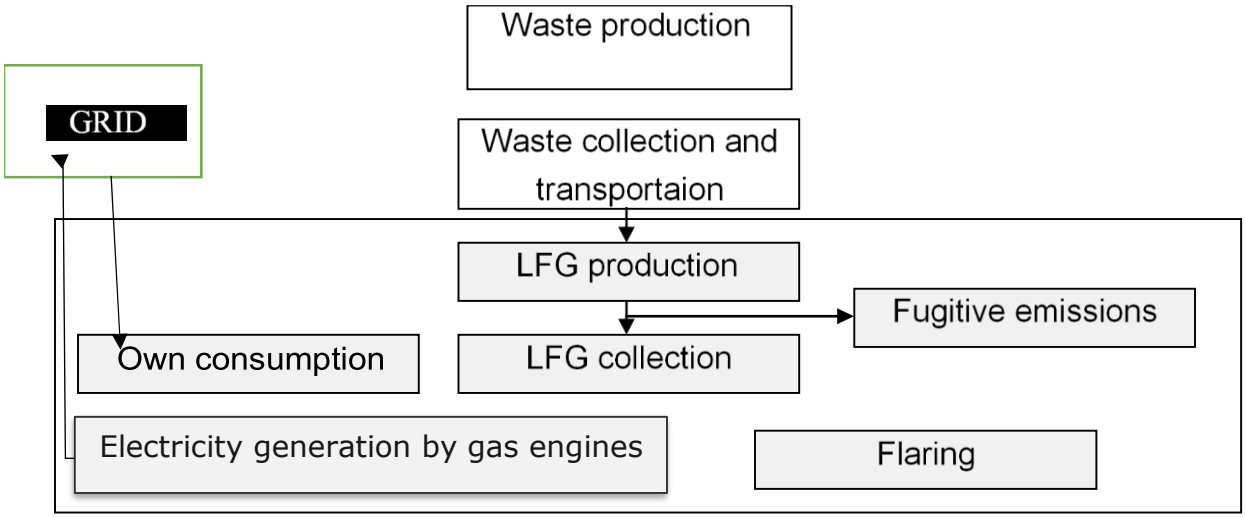


Figure 3. Project boundary

ACM0001 Version 19.0

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Emissions from decomposition of waste at the SWDS site	CO_2	Yes	The major source of emissions in the baseline
		CH_4	No	N2O emissions are small compared to CH4 emissions from SWDS. This is conservative
		N_2O	No	CO2 emissions from decomposition of organic waste are not accounted since the CO2 is also released under the project activity
		…		
	Emissions from electricity generation	CO_2	Yes	Major emission source if power generation is included in the project activity
		CH_4	No	Excluded for simplification. This is conservative
		N_2O	No	Excluded for simplification. This is conservative
		…		
Project scenario	Emissions from fossil fuel consumption for purposes other than electricity generation	CO_2	No	Excluded, there is no equipment consuming fossil fuel in the plant and the transportation of waste is not due to 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	CO_2	Yes	This is an important source of emissions in the project activity

electricity consumption due to 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
	CH_4	Yes	May be an important emission source
	N_2O	No	Emissions are considered negligible

The following figure represents the line diagram of the project activity, including metering points:

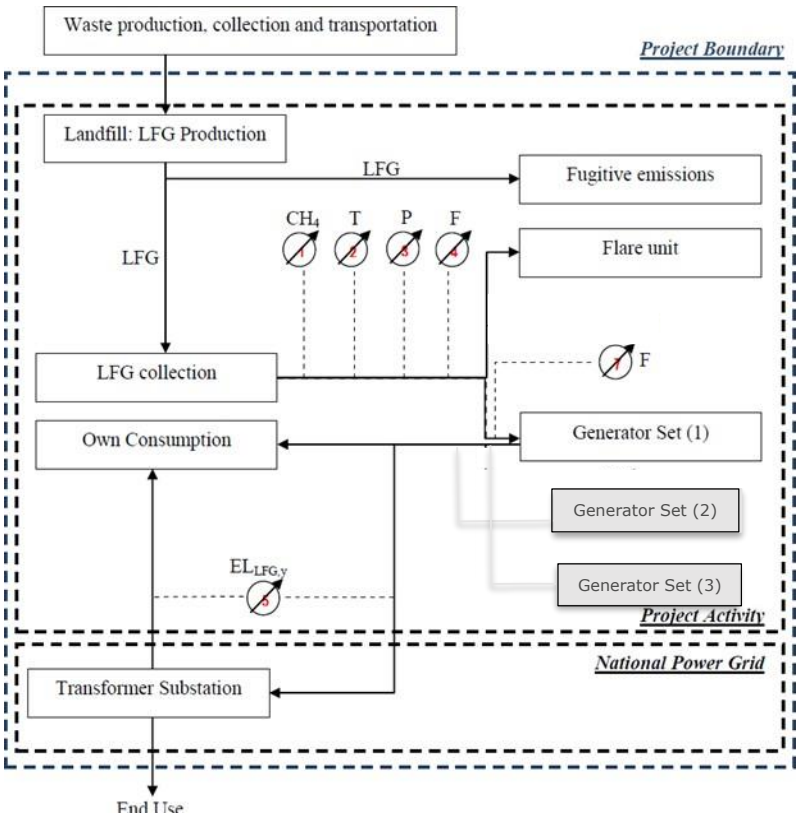


Figure 4. Single line diagram

Generator sets 2 and 3 will be commissioned as the LFG produced increases. The scheme shows the connection points of Adıyaman Landfill Plant Project with the national grid. The Adıyaman Landfill Plant has to be connected to the national grid via 31.5 kV Medium Voltage overhead transmission line. Two electricity meters have been installed at Adıyaman Landfill Plant Project. These meters are working in parallel. System has been connected to the meters through a step-up transformer 154/31.5 kV

B.4. Establishment and description of baseline scenario

As the ACM0001 suggests, the baseline scenarios shall be identified and assessed according to the Additionality Tool. The ACM0001 further requires certain scenarios to be included among alternatives. These default scenarios are included in Section B.5.

There is no incentive to utilise the LFG to produce thermal energy, since there is no demand for thermal energy in the surroundings of the Project site. The Project is a green field investment, which does not modify or retrofit any existing facility. There is no national regulation which would require the recovery or flaring of the LFG emitted from landfill sites. The relevant environmental legislation does not force municipalities to effectively control LFG emissions from landfills; hence, it is rather a tender for the rights to use the site for power generation purposes. The LFG is not being flared.

According to the "Baseline Methodology Procedure" in "Tool to calculate the emission factor for an electricity system, Version 07.0.0" baseline emissions are calculated under Section B.6.3.

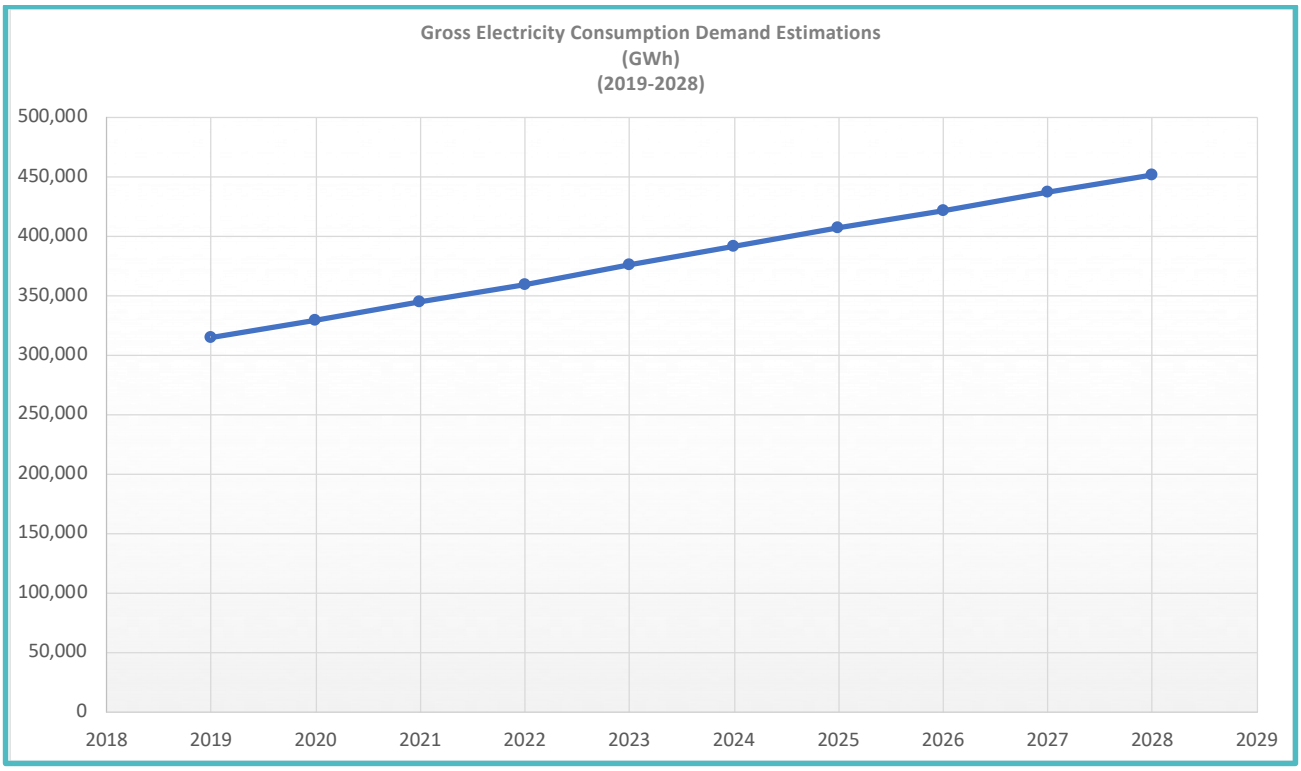
Since the proposed project activity is "The installation of a new grid-connected renewable power plant ", the baseline scenario is defined as the consolidation of electricity delivered to the grid by the project activity and electricity generated by the operation of grid- connected power plants in Turkey and electricity produced by the new generation sources.

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.

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[19].

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%

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 2019 and 2028 can be seen in the Chart below[20].



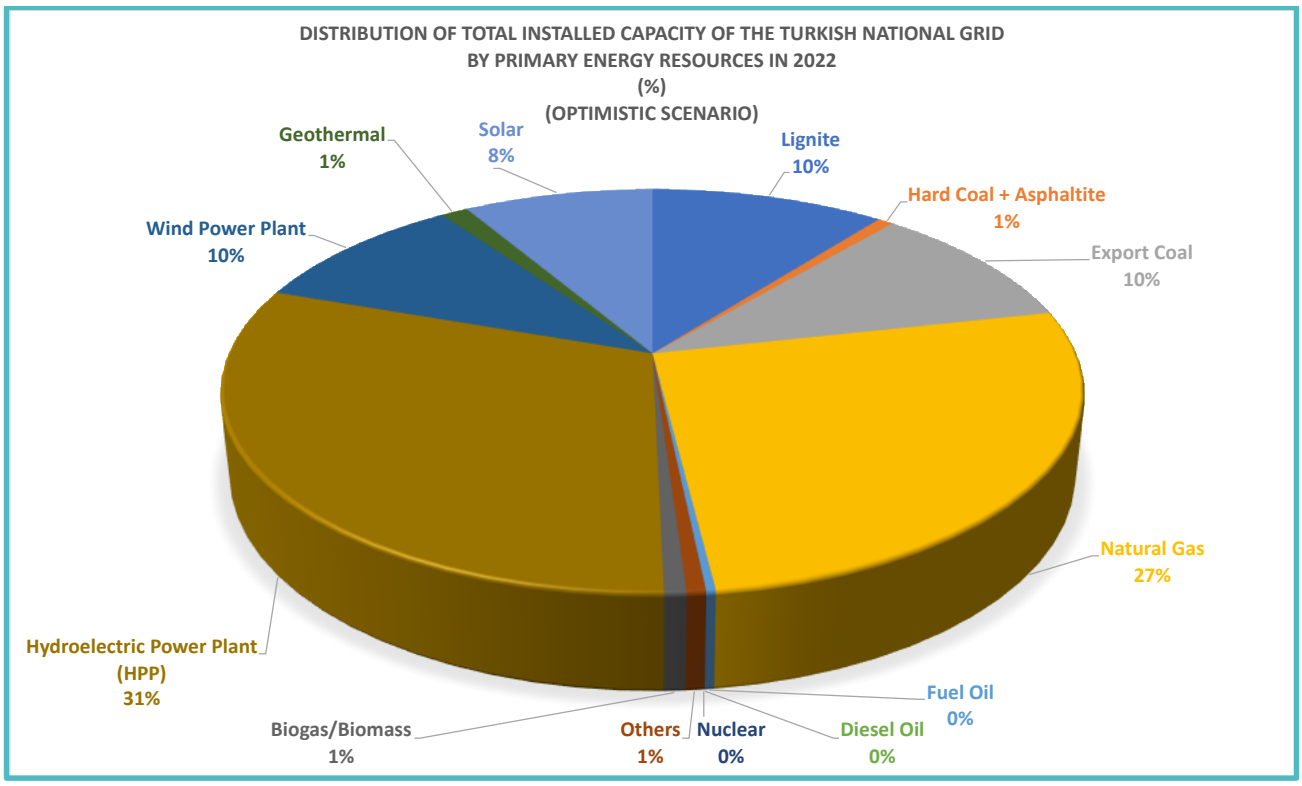
Moreover, TEİAŞ, in its report on "The Projections on Capacity Generation[21]", analyses the estimations on changes in electricity generation capacities in Turkey between 2018 and 2022, based on two main scenarios, 'optimistic' and 'pesimistic' . The distribution of total installed capacity of the Turkish national grid by primary energy resources in

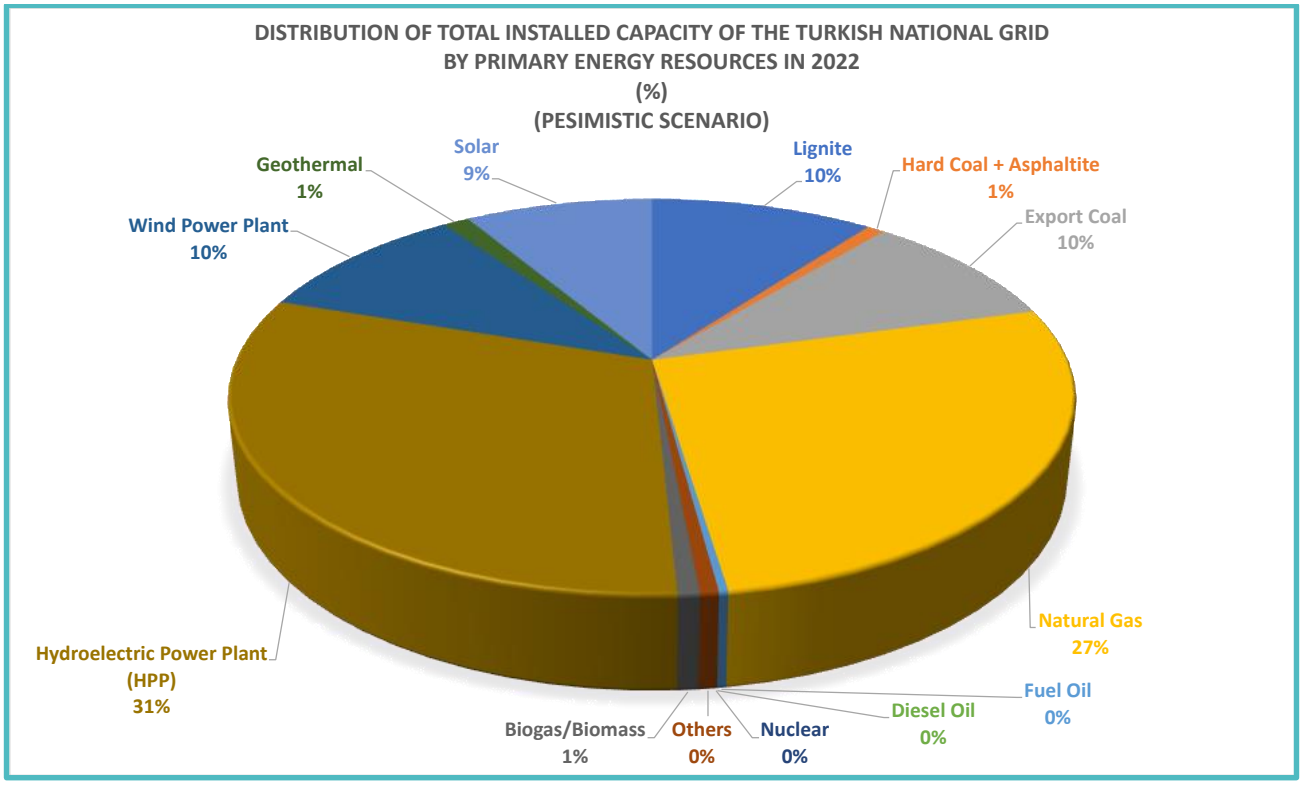
[19] https://webapi.teias.gov.tr/file/3b6826b3-a880-4b42-8ba3-e5915a2281ea?download

[20] TEİAŞ Report on Demand Estimations in 10 Years, Table 71, pg. 56
https://www.teias.gov.tr/sites/default/files/2019-06/taleprapor_2019-2028.pdf

[21] https://www.teias.gov.tr/sites/default/files/2018-09/Kapasite_Projeksiyonu_2018_2022.pdf

2022 both in optimistic and pessimistic scenarios can be seen on the two charts below, respectively.





As seen in these two charts, although it is estimated that the share of renewable energy sources in the total installed capacity of the Turkish national grid would reach almost 50% by 2022, the share of biogas and biomass energy sources would remain the same, only 1%, combined. 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 2017 to 2022, despite their potential pointed out by the 'Bioenergy and Food Security (BEFS) Assessment for Turkey: Sustainable bioenergy options from crop and livestock residues[22]' published by Food and Agriculture Organization of the United Nations (FAO) and European Bank for Reconstruction and Development (EBRD) in 2016.

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 the same as only 1%, combined, by 2022, 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.

"Simplified procedures to identify the baseline scenario and demonstrate additionality" are followed. Since they are valid from the date of entry into force of Version 19.0 of ACM0001 on 14 June 2019; and any update of the simplified procedures does not affect the projects that request registration as a CDM project activity or a programme of activities by 4 May 2020 and apply the simplified procedures contained in Version 19.0 of ACM0001.

Adıyaman Landfill Plant project fulfils the condition of (a) from the conditions given below (para

5.3.1 of Large-scale Consolidated Methodology Flaring or use of landfill gas Version 19.0)

"The following types of project activities at new or existing landfills (greenfield or brownfield) are deemed automatically additional, if prior to the implementation of the

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

project activity the LFG was or would have been only vented and/or flared but not utilized for energy generation:

(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."

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

Simplified procedures to identify the baseline scenario and demonstrate additionality" are followed. Since they are valid for from the date of entry into force of Version 19.0 of ACM0001 on 14 June 2019. Adıyaman Landfill Plant project is eligible for the above condition, "Combined tool to identify the baseline scenario and demonstrate additionality" is also applied under the section B.5.

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. The project activity does not involve generation of heat for internal or external consumption. Also, the LFG is not flared unless there is an emergency. Currently, 1 engine is operational with an installed capacity 1.56 MWe, according to the generation license the installed capacity is 4.68 MW (3 x 1.56 MWe) and it is planned to reach licensed capacity in the future. Since the full capacity is also less than 10 MW, in the case of reaching the licensed capacity, the project still will be automatically additional.

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 (28/08/2021) within one year of project start date (01/09/2020) (Please see Appendix 6), reviewed by GS and listed on 17/08/2022.

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 Indicator (Proposed or SDG Indicator)
13 Climate Action (mandatory)	Target 13.3. Improve education, awareness-raising and human and institutional capacity on	Indicator 13.3.2 Number of countries that have communicated the strengthening

	climate change mitigation, adaptation, impact reduction and early warning	of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions
7 Affordable and Clean Energy	Target: 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	Indicator: 7.2.1 "Renewable energy share in the total final energy consumption
8 Decent Work and Economic Growth	Target: 8.5 By 2030 achieve full and productive employment and decent work for all women and men Target: 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	Indicator: 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities. The project promotes job opportunities for 10-20 employees. Social security documents of employees are the certain prove of that issue. Indicator: 8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status Indicator 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
12 Responsible Consumption and Production	Target 12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP

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

SDG 7: Affordable and Clean Energy

The project contributes to the following indicators 7.2.1 "Renewable energy share in the total final energy consumption" and following target: 7.2 ''By 2030, increase substantially the share of renewable energy in the global energy mix."

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 35,100 MWh clean energy per annum 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. The net generation and internal consumption identified and approved by authorized electricity company (EPIAS).

Year	Baseline Value	Project Value	Difference
01/10/2021-31/12/2021	0	8,847	8,847
2022	0	35,100	35,100
2023	0	35,100	35,100
2024	0	35,100	35,100
2025	0	35,100	35,100
01/01/2026-30/09/2026	0	26,253	26,253
Total	0	175,500	175,500
Net Impact per year	0	35,100	35,100

SDG 8: Decent Work and Economic Growth

The project leads to employment opportunities which would not have been possible in the baseline scenario. The project provides employment to between 10-20 people during the operation phase.

The project contributes to the following indicators:

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

The project promotes job opportunities for 10-20 employees. 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 & human 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":

The project's contribution to SDG 8 is presented in the table below.

Year	Baseline Value	Project Value	Difference
01/10/2021-31/12/2021	0	10-20	10-20
2022	0	10-20	10-20
2023	0	10-20	10-20
2024	0	10-20	10-20
2025	0	10-20	10-20
01/01/2026-30/09/2026	0	10-20	10-20
Total	0	10-20	10-20
Net Impact per year	0	10-20	10-20

Relevant Indicator of SDG 12

Proposed indicator: The amount of municipal solid waste received

By capturing and utilizing GHGs from municipal solid waste, the proposed project activity will reduce the release to air of methane sourced from uncovered solid waste management systems and minimize the adverse impacts on human health and the environment. Indicator 12.4.1 may imply increase of waste management in line with

international multilateral environmental agreements in which Turkey has already been one of the parties to the international conventions[23].

The project provides better management option for wastes as around 146,000 ton/year.

Year	Baseline Value	Project Value	Difference
01/10/2021-31/12/2021	0	36,800	36,800
2022	0	146,000	146,000
2023	0	146,000	146,000
2024	0	146,000	146,000
2025	0	146,000	146,000
01/01/2026-30/09/2026	0	109,200	109,200
Total	0	730,000	730,000
Net Impact per year	0	146,000	146,000

SDG13 : Climate Action :

Prior to the proposed project activity, the wastes are left to decay within Adıyaman landfill site and methane is emitted to the atmosphere without any control or utilization. The baseline scenario is the same as the existing scenario, i.e. atmospheric release of the landfill gas and power supply by the grid. With the proposed project, LFG generated in the involved landfill site will be captured by newly constructed LFG collection and utilization system.

The project contributes to the following indicators 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" following target 13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

[23] http://www.vivis.de/phocadownload/Download/2015_wm/2015_WM_79-84_Oeztuerk.pdf & https://www.sayistay.gov.tr/En/Upload/files/4-TCA_Waste_Management_Report.pdf

The project will collect the wastes regularly. During the first crediting period waste amount was 146,000 tonnes/year. Correspondingly, the project leads to mitigation of 102,530 tCO2 per annum.

In addition, 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.

As per "Tool to calculate the emission factor of an electricity system" version 07.0.0, project could use the operation and built margin calculated specifically for the country by authorized organizations. Hence, the grid emission factor revised as latest official emission factor of Turkey that can be used in the projects depending on the project type published by the Ministry of Energy and Natural Resources which is released in 03/09/2020.

The default weights for the operating margin and build margin emission factors for landfill gas power plant generation is defined as due to first crediting period application

wOM=0.5wBM=0.5

BM: 0.3680 (published by the Ministry of Energy and Natural Resources which is released in 20/09/2022)

OM: 0.7424 (published by the Ministry of Energy and Natural Resources which is released in 20/09/2022)

According to these reference, the combined margin for biogas project could be taken as 0.5552 tCO2/MWh.

Emission Reductions

The emission reductions are calculated based on the below formula:

$$ER_y = BE_y - PE_y - LE_Y \qquad (1)$$

Where:

ERy = Emission reductions in year y (tCO2e/yr)

BEy = Baseline emissions in year y (tCO2/yr)

PE y= Project emissions in year y (tCO2e/yr)

LEy = Leakage emissions in year y (t CO2/y)

Project Emissions

Large-scale Consolidated Methodology flaring or use of landfill gas[24] 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 activity does not involve LFG distribution using trucks or through a pipeline; therefore, $PE_{DT,y}$ and $PE_{SP,y}$ are zero. Also, the transportation of waste to the landfill site where the project activity is located is not due to the project activity. The SWDS was built within the scope of the integrated solid waste management project of the Adıyaman Municipalities Association. Thus, $PE_{FC,y}$ also equals to zero.

The project emissions from consumption of electricity by the project activity ($PE_{EC,y}$) 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

(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

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

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

$PE_{EC,y}$ = 3510*0.5552*(1+0.14) = 2,222 t CO_2 / yr

Leakage Emissions

No leakage effects are accounted for under the applied methodology[25]

Baseline Emissions

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

[25] https://cdm.unfccc.int/methodologies/DB/JPYB4DYQUXQPZLBDVPHA87479EMY9M?gclid=CjwKCAiAioifBhAXEiwApzCztuKT_NAwtf1aEUvj89h3KjjNVkm_ZuC1Og9r_5JKUPdwm_133SiLwxoCr4oQAvD_BwE

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

$$BE_{CH4,y} = ((1 - OX_{top\text{-}layer}) \times F_{CH4,PJ,y} - F_{CH4,BL,y}) \times GWP_{CH4}$$ (Equation 2 in methodology)

Where:

$BE_{CH4,y}$ Baseline emissions of LFG from the SWDS in year *y* (t CO2e/yr)

$OX_{top\text{-}layer}$ Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)

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

$F_{CH4,\ BL,y}$ Amount of methane in the LFG that would be flared in the baseline in year *y* (t CH4/yr)

GWP_{CH4} Global warming potential of CH4 (t CO2e/t CH4)

- Within the project activity there is no LFG flared if there are no operational problems belonged to facilitation and critical equipment such as gas engines. Hence, flaring part of $F_{CH4,PJ,Y}$ is equal to zero; however, in case any flaring operation the calculation method of $F_{CH4,PJ,Y}$ is given in following parts of this report to be considered. Project used LFG for electricity generation in total. Therefore, $F_{CH4,PJ,Y}$ indicates LFG which is used in the project

- There is also no LFG flared without the project activity, therefore $F_{CH4,BL,y}$ is equal zero.

- Global warming potential of CH4 (t CO2e/t CH4) is taken as "28", since the project activity/operation/electricity generation started after 31/12/2020.

- $OX_{top\text{-}layer}$ is taken as 0.1 (parameter which is not to monitor) as per The methodology ACM0001 version 19.0

Determination of FCH4, PJ,y

Step A.1: Ex post determination of FCH4, PJ,y

During the crediting period, $F_{CH4,PJ,y}$ is determined as the sum of the quantities of methane flared and used in power plant(s), boiler(s), air heater(s), kiln(s) and natural gas distribution network, as follows:

$$F_{CH4,PJ,y} = F_{CH4flared,y} + F_{CH+,EL,y} + F_{CH4,HG,y} + F_{CH4,NG,y} \quad (3)$$

Where:

$F_{CH4,PJ,y}$ Amount of methane in the LFG which is flared and/or used in the project activity

in year *y* (t CH4/yr)

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

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

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

(t CH4/yr)

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

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

Thus, $F_{CH4,PJ,y}$ will be calculated as follow:

$$F_{CH4,PJ,y} = F_{C4+,flared,y} + F_{CH4,EL,y} \quad (4)$$

Determination of $F_{CH4,flared,y}$ and $F_{CH4,EL,y}$

The sum of the quantities fed to the flares ($F_{CH4,flared,y}$) and to the power plant ($F_{CH4,EL,y}$)will be summed up annually be adopted as FCH4,PJ,y

- $F_{CH4,PJ,y}$ is determined using the "Methodological Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 03.0.0. The following requirements apply: The gaseous stream the tool shall be applied to is the LFG delivery pipeline to electricity.
- $F_{CH4,PJ,y}$ is then calculated as the sum of mass flows to electricity generation.
- CH_4 is the greenhouse gases for which the mass flow should be determined;
- The flow of the gaseous stream should be measured on continuous basis;

- The simplification offered for calculating the molecular mass of the gaseous stream is valid (equations 3 or 17 in the tool); and
- The mass flow should be summed to a yearly unit basis (t CH_4/yr).

$F_{CH4,\ sent\_flare,n}$ and $F_{CH4,EL,y}$ are determined directly using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", applying the requirements described above where the gaseous stream the tool will be applied to is the LFG delivery pipeline to the flares.

According to the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 03.0.0) the mass flow of greenhouse gas I (CH4) in the gaseous stream in time interval t (FCH4, t) is calculated based on measurements of

a) the total volume flow or mass flow of the gas stream and

b) the volumetric fraction of the gas in the gaseous stream and

c) the water content and gas composition.

Option C:

The tool covers possible measurement options, providing six different calculation options to determine the volume or mass flow of a particular greenhouse gas (A-F). Furthermore, the tool provides several options for the determination of the moisture content of the gaseous stream. Option C is applied for determination of mass flow of the gas stream.

The mass flow of greenhouse gas i ($_{FCH4,t}$) is determined as follows:

$$F_{CH4,t} = V_{t,db} \times v_{CH4,wb,t} \times \rho_{CH4,n} \qquad (5)$$

With

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

FCH4,t Mass flow of greenhouse gas (CH4) in the gaseous stream in time interval t

(kg gas/h)

Vt,wb Volumetric flow of the gaseous stream in time interval t on a wet basis (m^3 dry gas/h)

vCH4,t,wb Volumetric fraction of greenhouse gas CH4 in the gaseous stream in a time interval t on a

wet basis (m³ gas i/m³ dry gas)

$\rho_{CH\,4,n:}$ Density of greenhouse gas CH4 in the gaseous stream at normal conditions (kg gas *i*/m³ gas *i*)

Pn Absolute pressure of the gaseous stream at normal conditions (Pa) MMi Molecular mass of greenhouse gas i (kg/kmol)

Ru Universal ideal gases constant (Pa.m3/kmol.K)

Tn Temperature of the gaseous stream at normal conditions (K)

The hourly values are then aggregated for the duration of the monitoring period n, as follows:

$$F_{CH4,n} = \sum_{h=1}^{h=hm} F_{CH4,t} \qquad (7)$$

Amount of methane destroyed by flaring ($F_{CH4,flared,y}$)

$F_{CH4,flared,y}$ is determined as the difference between the amount of methane supplied to the flare(s) and any methane emissions from the flare(s), as follows:

$$F_{CH4,flared,y} = F_{CH4,sent_{flare},y} - \left(PE_{flare,7}/GWP_{CH4}\right) \qquad (8)$$

Where:

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

$F_{CH4,\ sent\_flare,y}$ Amount of methane in the LFG which is sent to the flare in year y (t CH4/yr) $PE_{flare,y}$ Project emissions from flaring of the residual gas stream in year y (t CO2e/yr)

GWP_{CH4} Global warming potential of CH4 (t CO2e/t CH4)

$F_{CH4,sent\_flare,n}$ is determined directly using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", applying the requirements described above

where the gaseous stream the tool will be applied to is the LFG delivery pipeline to the flares. Thus as in formula below.

$PE_{flare,n}$ will be determined using the "Tool to determine project emissions from flaring gases containing methane".
Application of "Tool to determine project emissions from flaring"

According to "Project emission from flaring" Version 03.0.0", the project emissions from flaring of the residual gas stream $PE_{flare,y}$ are determined considering the following steps:

STEP 1: Determination of the mass flow rate of the residual gas
STEP 2: Determination of the hourly flare efficiency
STEP 3: Calculation of project emissions from flaring

The calculation procedure in this tool determines the flow rate of methane before and after the destruction in the flare, taking into account the amount of air supplied to the combustion reaction and the exhaust gas composition (oxygen and methane).

The calculation procedure in this tool determines the project emissions from flaring the residual gas (PEflare,y) based on the flare efficiency (ηflare,m) and the mass flow of methane to the flare (FCH4,RG,m). The flare efficiency is determined for each minute m of year y based either on monitored data or default values.

The project activity applies an enclosed flare. The temperature in the exhaust gas of the flare is measured to determine whether the flare is operating or not.

STEP 1. Determination of the mass flow rate of the residual gas
This step calculates the residual gas mass flow rate in each hour h, based on the volumetric flow rate and the density of the residual gas. The density of the residual gas is determined based on the volumetric fraction of all components in the gas.

The following requirements apply:

- The gaseous stream tool shall be applied to the residual gas;
- The flow of the gaseous stream shall be measured continuously;
- CH4 is the greenhouse gas i for which the mass flow should be determined;
- The simplification offered for calculating the molecular mass of the gaseous stream is valid (equation 3 and 17 in the tool); and
- The time interval t for which mass flow should be calculated is every minute m FCH4,m which is measured as the mass flow during minute m,shall then be used to determine the mass of

methane in kilograms fed to the flare in minute m (FCH4, RG, m). FCH4, m is determined on w et basis due to difficulties to demonstrate that the temperature is above 60 Celcius.

The calculation follows the procedure as described by the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream". Option C is applied: Same basis (wet basis) is considered for the measurement of the volumetric flow rate of the residual gas and the measurement of the volumetric fraction of methane in the residual gas.

In order to determine the mass flow of CH4, the equations (5) to (6) mentioned above in the present document shall be used.
The mass flow of greenhouse gas i (FCH4,t) is determined as follows:

$$F_{CH4,RG,t} = V_{t,db} \times v_{CH4,wb,t} \times \rho_{CH4,n}$$

With

$$\rho_{CH4,n} = \frac{P_n \times MM_{CH4}}{Ru \times T_n}$$

Where:
$F_{CH4,t}$ Mass flow of greenhouse gas (CH4) in the gaseous stream in time interval t (kg gas/h)
$V_{t,wb}$ Volumetric flow of the gaseous stream in time interval t on a wet basis (m³ dry gas/h)
$v_{CH4,t,wb}$ Volumetric fraction of greenhouse gas CH4 in the gaseous stream in a time interval t on a wet basis (m³ gas i/m³ dry gas)

$\rho_{CH4,n}$ Density of greenhouse gas CH4 in the gaseous stream at normal conditions t (kg gas i/m³ gas i)

Pn Absolute pressure of the gaseous stream at normal conditions (Pa)

MMi Molecular mass of greenhouse gas i (kg/kmol)

Ru Universal ideal gases constant (Pa.m3/kmol.K)

Tn Temperature of the gaseous stream at normal conditions (K)

STEP 2. Determination of flare efficiency

The determination of the hourly flare efficiency depends on the operation of flare (e.g. temperature), the type of flare used (open or enclosed) and, in case of enclosed flares, the

approach selected by project participants to determine the flare efficiency (default value or continuous monitoring).

In the case of Adıyaman Landfill Plant Project, an enclosed flare is used and the flare efficiency is determined by default value, thus Option A. For enclosed flares that are defined as low height flares, the flare efficiency in the minute m (□flare,m) shall be adjusted, as a conservative approach, by subtracting 0.1 from the efficiency as determined in Options A or B

Option A: Default value

In case of enclosed flares and use of the default value for the flare efficiency, the flare efficiency in the minute m (ηflare,m) is 90% when the following two conditions are met to demonstrate that the flare is operating:

- • the temperature of the flare (TEG, m) and the flow rate of the residual gas to the flare (FRG,m) is with in the manufacturer's specifications fort he flare (SPECflare) in minute m; and
- • the flame is detected in minute m (Flamem)

Otherwise, ($\eta_{flare,m}$) is 0 %

STEP 3. Calculation of project emissions from flaring

Project emission from flaring are calculated as the sum of emission from each minute m, based on the methane mass flow in the residual gas ($F_{CH4,RG,m}$) and the flare efficiency ($\eta_{flare,m}$), as follows:

$$PE_{flare,y} = GWP_{CH4} \times \sum_{m=1}^{525600} F_{CH4,RG,m} \times \left(1 - \eta_{flare,m}\right) \times 10^{-3} \qquad (9)$$

Where

$PE_{flare,y}$ Project emissions from flaring of the residual gas in year y (tCO2 e)

$F_{CH4,RG,m}$ Mass flow of methane in the residual gas in the minute m (kg)

$\eta_{flare,m}$ Flare efficiency in minute m

Step A.1.1: 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 PDD. It is determined as follows:

$$F_{CH4,PJ,y} = \eta_{PJ} \times BE_{CH4,SWDS,y} / GWP_{CH4} \qquad (10)$$

Where

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

$BE_{CH4,SWDS,y}$ Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y (t CO2e/yr)

η_{PJ} Efficiency of the LFG capture system that will be installed in the project activity (%)

GWP_{CH4} Global warming potential of CH4 (t CO2e/t CH4)

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

- fy in the tool shall be assigned a value of 0 because the amount of LFG that would have been captured and destroyed is already accounted for in equation 2 of this methodology;
- In the tool, x begins with the year that the SWDS started receiving wastes (e.g. the first year of SWDS operation); and
- Sampling to determine the fractions of different waste types is not necessary because the waste composition can be obtained from previous studies.

The project will capture only a fraction of the whole LFG due to following reasons:

- The degassing system has its own efficiency
- The enclosed flares have their destruction efficiency

Efficiency of gas collection system is taken as 50%, default value stated in the applied methodology.

According the methodological tool “Emissions from solid waste disposal sites” version 08.0, ex-ante calculation of $BE_{CH4,SWDS,y}$ based on the formulation below:

$$BE_{CH4,SEDS,y} = \varphi \times (1-f) \times GWP_{CH4} \times (1-OX) \times \frac{16}{12} \times F \times DOC_f \times MCF \times \sum_{x=1}^{y} \sum W_{j,x} \times DOC_j \times e^{-k_j(y-x)} \times \left(1-e^{-k_j}\right)$$

Where

φ model correction factor to account for model uncertainties (0.75)

f fraction of methane captured at SWDS and flared, combusted or used in another manner (default value as per ACM 0001 is zero)

OX oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or another material covering waste)

F fraction of methane in the SWDS gas (volume fraction (0.1))DOC_f fraction of degradable organic carbon (DOC) that can decompose MCF methane correction factor

$W_{j,x}$ amount of organic waste type j prevented from disposal in the SWDS in the year x [t]

DOC_j fraction of degradable organic carbon (by weight) in the waste type j k_j decay rate for waste type j

j waste type category (index)

x year of receiving wastes at the landfill site: x runs from the first year of landfill operation x=1 to the year for which avoided emissions are calculated (x = y)
y year for which methane emissions are calculated

Step A.2: Determination of $F_{CH4,BL,y}$

This steps 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, or to address safety and odour concerns (collectively referred to as requirement in this step). The motholdogy ACM0001 version 19.0 provide for cases to determine the amount, while there is “no requirement to destroy methane exists and no existing LFG capture system” for Adıyaman Landfill Plant , as in the case 1,

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

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants; (b) retrofits and replacements and; (c) capacity additions. Since the proposed project activity falls under the description greenfield plants, the following method has been adopted:

Greenfield renewable energy power plants

$$EG_{PJ,y} = EG_{facility,y} \qquad (13)$$

Where:
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

B.6.2 Data and parameters fixed ex ante

a. SDG 7: Affordable and Clean Energy:

The project contributes to the following indicators 7.2.1 "Renewable energy share in the total final energy consumption" and following target: 7.2 ''By 2030, increase substantially the share of renewable energy in the global energy mix."

The project is expected to generate 35,100 MWh clean energy per annum 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. The net generation and internal consumption identified and approved by authorized electricity company (EPIAS).

b. SDG 8: Decent Work and Economic Growth:

The project leads to employment opportunities which would not have been possible in the baseline scenario. The project provides employment to between 10-20 people during the operation phase.

The project contributes to the following indicators:

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

The project promotes job opportunities for 10-20 employees. 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 & human 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"

c. SDG13: Climate Action: Prior to the proposed project activity, the wastes are left to decay within Adıyaman landfill site and methane is emitted to the atmosphere without any control or utilization. The baseline scenario is the same as the existing scenario, i.e. atmospheric release of the landfill gas and power supply by the grid. With the proposed project, LFG generated in the involved landfill site will be captured by newly constructed LFG collection and utilization system.

The project contributes to the following indicators 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target 13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

d. SDG12: Responsible Consumption and Production:

By capturing and utilizing GHGs from municipal solid waste, the proposed project activity will reduce the release to air of methane sourced from uncovered solid waste management systems and minimize the adverse impacts on human health and the environment. Indicator 12.4.1 may imply increase of waste management in line with international multilateral environmental agreements in which Turkey has already been one of the parties to the international conventions[26].

The project will collect the wastes regularly. During the first crediting period waste amount was 146,000 tonnes /year.

[26] http://www.vivis.de/phocadownload/Download/2015_wm/2015_WM_79-84_Oeztuerk.pdf & https://www.sayistay.gov.tr/En/Upload/files/4-TCA_Waste_Management_Report.pdf

SDG13 (13.3.2)

Data/parameter	**GWP_{CH4}**
Unit	tCO2e/tCH4
Description	Global warming potential of CH4
Source of data	IPCC Fifth Assessment Report
Value(s) applied	28
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**D_{CH4}**
Unit	tCH_4/ m^3tCH_4
Description	Methane Density
Source of data	https://cdm.unfccc.int/methodologies/inputsconsmeth/MGM_methane.pdf
Value(s) applied	0.00067 tCH4/ m^3tCH4
Choice of data or Measurement methods and procedures	At 20 degree Celsius the density of methane is 0.00067 tCH4/m3 CH4

Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	$\varphi_{default}$
Unit	-
Description	Default value for the model correction factor to account for model uncertainties
Source of data	Tool 04 Emissions from solid waste disposal sites version 08.0.
Value(s) applied	For project or leakage emissions: φdefault = 1. 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. 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.
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions

	Humid/wet Conditions	Dry Conditions
Application A	0.75	0.75
Application B	0.85	0.80

Additional comment	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.

Data/parameter	**OX**
Unit	-
Description	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 3.2.
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	As the landfill was covered by soil, the default value for oxidation could be applied.
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**F**
Unit	-
Description	Fraction of methane in the SWDS gas (volume fraction)
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste,
Value(s) applied	0.5

Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

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	The PP is applied in Application A and DOCf,y is given as a default value (DOCf,y = DOCf,default).
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**MCF**

Unit	-
Description	Methane correction factor
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 3.1
Value(s) applied	1
Choice of data or Measurement methods and procedures	The methane correction factor (MCF) accounts for the fact that managed SWDS produces more methane than unmanaged SWDS. Based on the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site", IPPC default value for anaerobic managed SWDS is applied.
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

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

Waste type j	DOCj (% wet waste)
Wood and wood products	43
Pulp, paper and cardboard (other than sludge)	40

	Food, food waste, beverages and tobacco (other than sludge) — 15 Textiles — 24 Garden, yard and park waste — 20 Glass, plastic, metal, other — 0
Choice of data or Measurement methods and procedures	"Emissions from solid waste disposal sites" version 8 and 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**kj**
Unit	-
Description	Decay rate for the waste type j
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 3.3.
Value(s) applied	Dry: 0.04 for Pulp, paper, cardboard (other than sludge, textiles), 0.02 for Wood, wood products and straw, 0.05 for Other (non-food) organic putrescible garden and park waste, 0.06 for food waste, sewage sludge, beverages and tobacco

Waste type j		Boreal and Temperate (MAT ≤ 20°C)		Tropical (MAT ≥ 20°C)	
		Dry ®MAP/PET < 1)	Wet (MAP/PET > 1)	Dry (MAP < 1000 mm)	Wet MAP > 1000)
Slowly Degrading	Pulp, paper, cardboard (other than sludge, textiles)	0.04	0.06	0.045	0.07

		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 Degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06	0.185	0.085	0.40
Choice of data or Measurement methods and procedures	The selection of appropriate kj values are made according to a "boreal and temperate" and "wet" climate.					
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning					
Additional comment	-					

Data/parameter	ηPJ
Unit	%
Description	Efficiency of the LFG capture system that will be installed in the project activity
Source of data	default value indicated in the applied methodology
Value(s) applied	50%

Choice of data or Measurement methods and procedures	The collection system which will be installed on the Project site will be able to collect a certain fraction of the total LFG generation. This collection ratio is affected principally by the Project's technical design, therefore the value suggested in the feasibility study is used.
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**Ru**
Unit	Pa.m3/kmol.K
Description	Universal ideal gas constant
Source of data	Methodological Tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 03.0
Value(s) applied	8,314
Choice of data or Measurement methods and procedures	
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**MM_{CH4}**
Unit	kg/kmol
Description	Molecular mass of greenhouse gas (CH4)
Source of data	Methodological Tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 03.0
Value(s) applied	16.04
Choice of data or Measurement methods and procedures	
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	

Data/parameter	**Pn**
Unit	Pa
Description	Total pressure at normal conditions
Source of data	Methodological Tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 03.0
Value(s) applied	101,325 Pa
Choice of data or Measurement methods and procedures	-

Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	

Data/parameter	**Tn**
Unit	K
Description	Temperature at normal conditions
Source of data	Methodological Tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" Version 02.0.0
Value(s) applied	298 K (273 Celcius + 25 Celcius which is project design)
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	-

Data/parameter	**SPECflare**
Unit	Temperature -°C Flow rate or heat flux -kg/h or m3/h Maintenance schedule -number of days

Description	Manufacturer's flare specifications for temperature, flow rate and maintenance schedule. Specflare will be monitored through Flow Meter. Temperature, flow rate or heat flux and maintenance schedule will be monitored.
Source of data	Flow meter
Value(s) applied	The values will be provided if the flare unit is used.
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	Document in the CDM-PDD the flare specifications set by the manufacturer for the correct operation of the flare for the following parameters: (a) Minimum and maximum inlet flow rate, if necessary converted to flow rate at reference conditions or heat flux; (b) Minimum and maximum operating temperature; and (c)Maximum duration in days between maintenance events

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[27]
Value(s) applied	0.5552
Choice of data or Measurement methods and procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Principle 9.4

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

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

QA/QC procedures	N/A
Purpose of data	To monitor the contribution to Principle 9.4
Additional comment	-

B.6.3 Ex ante estimation of SDG Impact

Calculation of the combined margin emission factor

Calculating the combined margin emission factor

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (20)$$

Where w_{OM} is 0.5 and w_{BM} is 0.5

The combined margin emission factor $EF_{grid,CM,y}$ calculated through equation is

$EF_{grid,\,CM,\,y}$ = 0.5 * 0.7424+ 0.5 * 0.3680= 0.5552 tCO_2/MWh

Baseline emissions

According to ACM0001 Version 19.0

Baseline emissions are determined according to equation and comprise the following sources:

(a) Methane emissions from the SWDS in the absence of the project activity;

(b) Electricity generation using fossil fuels or supplied by the grid in the absence of the project activity;

(c) Heat generation using fossil fuels in the absence of the project activity; and

(d) Natural gas used from the natural gas network in the absence of the project activity.

$$BEy = BECH4,y + BEEC,y + BEHG,y + BENG,y$$

Where:

BEy = Baseline emissions in year y (t CO2e/yr)
$BECH4,y$ = Baseline emissions of methane from the SWDS in year y (t CO2e/yr)
$BEEC,y$ = Baseline emissions associated with electricity generation in year y (t CO2/yr)
$BEHG,y$ = Baseline emissions associated with heat generation in year y (t CO2/yr)
$BENG,y$ = Baseline emissions associated with natural gas use in year y (t CO2/yr)

Since the project activity does not have a heat generation and natural gas components, BE_y calculation simplifies as:

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

$BE_y = 82,537 + 22,215 = 104,752\ tCO_2/year$

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

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

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} = ((1-0.1)*3,275-0)*28 =82,537 t CO_2e/yr

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 the applied methodology) 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_2e/yr)

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

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

- There is no LFG flared without the project activity, therefore $F_{CH4,BL,y}$ is equal zero.
- Global warming potential of CH_4 (t CO_2e/t CH_4) is taken as “28”
- $OX_{top\text{-}layer}$ is taken as “0.1” (parameter which is not to monitor) as per the methodology ACM0001 version 19.0

$F_{CH4,PJ,y}$ = 0.5*183,417/28 =3,275 t CH_4/yr

According the methodological tool “Emissions from solid waste disposal sites” version 08.0, ex-ante calculation of $BE_{CH4,SWDS,y}$ based on the formulation below:

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

Where

φ model correction factor to account for model uncertainties (1)

f fraction of methane captured at SWDS and flared, combusted or used in another manner (default value as per ACM 0001 is zero) (0)

OX oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or another material covering waste) (0.1)

F fraction of methane in the SWDS gas (volume fraction (0.5)

DOCf fraction of degradable organic carbon (DOC) that can decompose MCF methane correction factor

Wj,x amount of organic waste type j prevented from disposal in the SWDS in the year x [t]

DOCj fraction of degradable organic carbon (by weight) in the waste type j kj decay rate for waste type j

j waste type category (index)

x year of receiving wastes at the landfill site: x runs from the first year of landfill operation x=1 to the year for which avoided emissions are calculated (x = y)

y year for which methane emissions are calculated

For instance, BE_{CH4} for food, food waste, beverages and tobacco (other than sludge) is calculated as follows:

$BE_{CH4,\ food,\ food\ waste,\ beverages\ and\ tobacco\ (other\ than\ sludge)}$ = 0.75 * (1-0) * 28*(1-0.1) * (16/12)* 0.5 * 0.5 * 1* (80,300* 0.15* 1*(1-(-0.94176))

$BE_{CH4,\ food,\ food\ waste,\ beverages\ and\ tobacco\ (other\ than\ sludge)}$ = 147,347 tCO_2/ year

BE_{CH4} = $BE_{CH4,\ Pulp,\ paper\ and\ cardboard\ (other\ than\ sludge)}$ + $BE_{CH4,\ food,\ food\ waste,\ beverages\ and\ tobacco\ (other\ than\ sludge)}$ + $BE_{CH4,\ Garden,\ yard\ and\ park\ waste}$ + $BE_{CH4,\ Glass,\ plastic,\ metal,\ other\ inert\ waste}$ + $BE_{CH4,\ Wood\ and\ wood\ products}$ + $BE_{CH4,\ Textiles}$

BE_{CH4} = 36,070+ 147,347+0+0+0+0

BE_{CH4} = 183,417 tCO_2/ year

According to Tool 05 Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, $BE_{EC,y}$ is calculated as follows:

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

$BE_{EC,y}$ = 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

$BE_{EC,y}$= 35,100* 0,5552* (1+0.14)

$BE_{EC,y}$= 22,215 tCO_2/ year

BE_y= $BE_{CH4,y}$+ $BE_{EC,y}$ = 82,537+ 22,215 = 104,752 tCO_2/ year

Project emissions

According to ACM0001 Version 19.0 project emissions are calculated as follows;

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

Where:
PEy = Project emissions in year y (t CO2/yr)

$PE_{EC,y}$ = Emissions from consumption of electricity due to the project activity in year y (t CO2/yr)
$PE_{FC,y}$ = Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year y (t CO2/yr)
$PE_{DT,y}$ = Emissions from the distribution of compressed/liquefied LFG using trucks, in year y (t CO2/yr)
$PE_{SP,y}$ = Emissions from the supply of LFG to consumers through a dedicated pipeline, in year y (t CO2/yr)

$$PE_y = PE_{EC,y} + PE_{FC,y} \qquad (20)$$

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 CO2/yr)

$PE_{FC,y}$ Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year y (t CO_2/yr)

The project activity does not involve LFG distribution using trucks or through a pipeline; therefore, $PE_{DT,y}$ and $PE_{SP,y}$ are zero. Also, the transportation of waste to the landfill site where the project activity is located is not due to the project activity. The SWDS was

built within the scope of the integrated solid waste management project of the Adıyaman Municipalities Association. Thus, $PE_{FC,y}$ also equals to zero.

The project emissions from consumption of electricity by the project activity ($PE_{EC,y}$) is calculated using the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". When applying the tool:

- Electricity sources j in the tool corresponds to the sources of electricity consumed due to the project activity. This includes, where applicable, electricity consumed for the operation of the LFG capture system,

$$PE_{EC,Y} = \sum_k EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y}) \qquad (21)$$

Where

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

$EC_{PJ,j,y}$ Quantity of electricity consumed by the project electricity consumption sources j in y (MWh/yr)

$FE_{EL,j,,y}$Emission factor for electricity generation for source j in year y (tCO2/MWh)

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

j Sources of electricity consumption in the project

$PE_{EC,y}$ = 3510*0.5552*(1+0.14)= 2222 tCO_2/yr

For ex-post calculation, this emission sources will be taken into account.

The project emissions from fossil fuel combustion ($PE_{FC,j,y}$) will be calculated following the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion". For this purpose, the processes j in the tool corresponds to all fossil fuel combustion in the landfill, as well as any other on-site fuel combustion needed for the project activity.

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \qquad (22)$$

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

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

The CO2 emission coefficient is calculated following Option B as fuel combust chemical composition of the fuel.

The CO2 emission coefficient is calculated following Option B based on net calorific value and CO2 emission factor of the fuel type I as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y} \qquad (23)$$

Where

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

$NCV_{i,y}$ the weighted average net calorific value of the fuel type I in year y

$EF_{CO2,y}$ the weighted average CO_2 emission factor of fuel type I in year y

i are the fuel types combusted in process j during the year y

For the simplicity of emission reduction calculation, project emission from fossil fuel combustion is assumed to be "0". For ex-post calculation, this emission sources will be taken into account.

Calculation of project emissions from flaring

Project emissions from flaring are calculated as the sum of emissions for each minute m in year y, based on the methane mass flow in the residual gas ($F_{CH4,RG,m}$) and the flare efficiency (ηflare,m)

$$PEflare,y = GWPCH4 \times \sum_{m=1}^{525600} FCH4,RG,m \times (1 - \eta flare,m) \times 10^{-3}$$

Where:

$PEflare,y$ = Project emissions from flaring of the residual gas in year y (tCO2e)
$GWPCH4$ = Global warming potential of methane valid for the commitment period (tCO2e/tCH4)
$FCH4,RG,m$ = Mass flow of methane in the residual gas in the minute m (kg)
$\eta flare,m$ = Flare efficiency in minute m

The estimated Project emissions from flaring is 0 tCOe.

PEy = 2,222 tCO2/year

Leakage

No leakage effects need to be accounted under the approved consolidated methodology ACM0001, version 19.0.

LEy = 0 tCO2/year

Emission reductions

ERy = BEy – PEy

ERy = 104,752– 2,222 =

102,530 tCO2 (ERy = BEy)

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

SDG 7 Affordable and Clean Energy

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. 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 35,100 MWh of clean energy per annum.

Year	Baseline estimate (MWh)	Project estimate (MWh)	Net benefit (MWh)
01/10/2021-31/12/2021	0	8,847	8,847
2022	0	35,100	35,100
2023	0	35,100	35,100
2024	0	35,100	35,100
2025	0	35,100	35,100
01/01/2026 - 30/09/2026	0	26,253	26,253
Total	**0**	**175,500**	**175,500**

Total number of crediting years	**5 years**		
Annual average over the crediting period	**0**	**35,100**	**35,100**

SDG 8 Decent Work and Economic Growth

The project leads to employment opportunities which would not have been possible in the baseline scenario. The project has provided employment to between 10-20 people.

This will help to achieve SDG 8 with indicators 8.5.2 "Unemployment rate, by sex, age and persons with disabilities" and following target: 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" There is no opportunity to employ woman. So "equal pay for work of equal value" does not apply.

This will also help to achieve "the project labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment." Training records or certificates will be provided during each monitoring period.

SDG 12 Responsible Consumption and Production

By capturing and utilizing GHGs from municipal solid waste, the proposed project activity will reduce the release to air of methane sourced from uncovered solid waste management systems and minimize the adverse impacts on human health and the environment. Indicator 12.4.1 may imply increase of waste management in line with

international multilateral environmental agreements in which Turkey has already been one of the parties to the international conventions[28].

The project will collect the wastes regularly. During the first crediting period waste amount was 146,000 tonnes /year.

SDG 13 Climate Action

The project contributes to the following indicators 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions" and following target 13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. Waste amount estimated to be 146,000 tonnes/year and corresponding 102,530 ton CO_2/annum emission reduction.

Year	Baseline estimate	Project estimate	Net benefit
01/10/2021-31/12/2021	26,403	561	25,842
2022	104,752	2,222	102,530
2023	104,752	2,222	102,530
2024	104,752	2,222	102,530
2025	104,752	2,222	102,530
01/01/2026 - 30/09/2026	78,348	1,662	76,686
Total	**523,759**	**11,111**	**512,648**
Total number of crediting years	**5 years**		

[28] http://www.vivis.de/phocadownload/Download/2015_wm/2015_WM_79-84_Oeztuerk.pdf & https://www.sayistay.gov.tr/En/Upload/files/4-TCA_Waste_Management_Report.pdf

Annual average over the crediting period	**104,752**	**2,222**	**102,530**

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 7

Data / Parameter	EGpj,y
Unit	MWh/yr
Description	Quantity of net electricity supplied to the grid in year y
Source of data	Project feasibility study
Value(s) applied	35,100 MWh
Measurement methods and procedures	The net electricity generation supplied to the grid will be measured continuously by meters (both main and spare) and records could be read by EPIAS website (these records on billing purposes officially)
Monitoring frequency	
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,

	Main Meter	Back-up Meter
Brand	Makel	Makel
Type	C520AMT2556	C520AMT2556
Class	0.5	1
Serial No	80303777	80303901
Installation date	04/06/2021	04/06/2021
Calibration due dates	03/06/2031	03/06/2031

	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 provided to electricity generation companies. The values will be cross-checked with the electricity meter readings from the site. EPIAS records will be taken in consideration while calculating EGfacility, y. After the first calibration of meters , calibration of meters are 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	Calculation of baseline emissions
Additional comment	-

SDG 13

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	55%[30]
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. "ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[31]

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

	<table><tr><th></th><th>Gas Analyzer</th></tr><tr><td>Brand</td><td>MRU</td></tr><tr><td>Type</td><td>SWG100biogas</td></tr><tr><td>Serial Number</td><td>081300</td></tr><tr><td>Date of Calibration</td><td>22/09/2020</td></tr><tr><td>Calibration due dates</td><td>21/09/2030</td></tr></table>
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	**$V_{,t,db}$**
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	594.2
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	**fy**

Unit	%
Description	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y
Source of data	Tool 04 Emissions from solid waste disposal sites Version 08.1
Value(s) applied	The value will be provided by the project owner if the flare unit is used.
Choice of data or Measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions-to demonstrate contribution to SDG13- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Additional comment	Captured methane/landfill is sent to gas engines as 100%. There is no flare operation apart from emergency cases in project design.

Data / Parameter	$F_{CH4,EG,t}$
Unit	kg
Description	Mass flow of methane in the residual gas in the minute m
Source of data	Flow Meter Data provided by project owner
Value(s) applied	The value will be provided by the project owner if the flare unit is used.
Measurement methods and procedures	The flow rate of the residual landfill gas is automatically converted to dry basis and normal conditions by the PLC system without any intervention by the Project owner. This parameter is calculated by multiplying LFGflare, density of methane and w_{CH4} (percentage of methane measured by the gas analyzer).

<table>
<tr><td></td><td>This is in compliance with the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", v.03.0.0.
For conversion, volumetric flow rate data will be collected from the flow meter

Flowmeter Specification;

<table>
<tr><th>Brand/Model</th><th>Serial Number</th><th>Calibration Date</th><th>The date of the next calibration</th></tr>
<tr><td rowspan="3">Endress+Hauser / Deltabar S PMD75</td><td>R902740109D</td><td rowspan="3">03/11/2021</td><td rowspan="3">02/11/2031</td></tr>
<tr><td>R9025F0109D</td></tr>
<tr><td>R902730109D</td></tr>
</table>
</td></tr>
<tr><td>Monitoring frequency</td><td>Measured continuously in real-time and recorded</td></tr>
<tr><td>QA/QC procedures</td><td>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[32]</td></tr>
<tr><td>Purpose of data</td><td>This parameter will be used to check with the SPECflare parameter.
This parameter will be used to calculate PEflare,y.</td></tr>
<tr><td>Additional comment</td><td>N/A</td></tr>
</table>

Data / Parameter	P_t
Unit	Pa

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

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. Brand: Testo Type: 440 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[33]
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	298

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

Measurement methods and procedures	Measured by thermocouple
Monitoring frequency	Continuous
QA/QC procedures	The details regarding the thermocouple is given below. **Brand**: Testo **Type**: 440 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[34]
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	$EC_{PJ,j,y}$; $EC_{LE,l,y}$
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

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

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). 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. "ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9[35]
Purpose of data	Baseline emission calculations
Additional comment	-

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

Data / Parameter	**T**
Unit	Celcius
Description	Annual Average ambient temperature at project site
Source of data	Turkish State Meteorological Service. The value "17.4 Celcius" is taken for this project estimated emission reduction calculations.
Value(s) applied	17.4
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
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	**$TDL_{j,y}$ 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%[36] for 2020 actual most recent data will be used at the time of monitoring and verification
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	The most recent annual value published by TEİAŞ will be used.
Purpose of data	Project and baseline emission calculations
Additional comment	-

Data / Parameter	Tn
Unit	K
Description	Temperature of the gaseous stream
Source of data	Temperature Gauge
Value(s) applied	276.35
Measurement methods and procedures	Equipment Specifications Calibration results: Uncertainty 1.05°C, standard deviation < 1°C.
Monitoring frequency	Manual reading and recording, continuously
QA/QC procedures	The data is manually read and recorded.

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

	The temperature measurement device is calibrated, indicating a small error margin and small fluctuations.
Purpose of data	FCH4,RG,m, mass flow of methane in the residual gas in the minute m, is calculated based on the dry basis assumption, which requires the temperature of the landfill gas to be below 60 °C. This data is used to verify that this requirement is fulfilled. It should also be noted that the landfill gas is dehumidified before the booster intake.
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 **Gas Analyzer** **Brand**: MRU **Type**: SWG100biogas **Serial No**: 081300 **Date of Calibration**: 22/09/2020 (Date of calibration certificate) **Calibration due dates**: 21/09/2030 **Tolerance value**: ±1.8% (for CH_4)
Monitoring frequency	Measured continuously
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 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. 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[37]
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	PEflare,y
Unit	tCO2-eq
Description	Project emissions from flaring of the residual gas in year y
Source of data	Project owner
Value(s) applied	Project owner will provide the value if the flare unit is used.
Measurement methods and procedures	$PE_{flare,y} = \sum F_{CH4,RG,m}*(1-\eta_{flare,m})*GWP_{CH4}*10^{-3}$ $F_{CH4,RG,m}$ and $\eta_{flare,m}$ parameters are read continuously but recorded at regular intervals. Therefore, the formula above has

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

	been applied to 10- minutes and 30- minutes data, instead of 1-minute data. GWP_{CH4} is a fixed ex ante parameter.
Monitoring frequency	N/A
QA/QC procedures	Calculations are carried out with a spreadsheet to minimize the risk errors.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data / Parameter	TEG,m
Unit	°C
Description	Temperature in the exhaust gas of the enclosed flare in minute m
Source of data	Thermocouple
Value(s) applied	The value will be provided if the flare unit is used.
Measurement methods and procedures	Equipment Specifications **Thermocouple** **Brand**: Testo **Type**: 440
Monitoring frequency	Measured continuously in real-time and recorded
QA/QC procedures	If more than one temperature port is fitted to the flare, the flare manufacturer must provide written instructions detailing the conditions under which each location shall be used and the port most suitable for monitoring the operation of the flare according to manufacturer's specifications for temperature. Temperature measurement equipment should be replaced or calibrated in accordance with their maintenance schedule.

	Unexpected changes such as a sudden increase/drop in temperature can occur for different reasons. These events should be noted in the site records along with any corrective action that was implemented to correct the issue.
Purpose of data	Calculation of project emissions
Additional comment	-

Data / Parameter	ηflare,m
Unit	%
Description	Flare efficiency in minute m
Source of data	TOOL06 Project emissions from flaring, version 04.0
Value(s) applied	90%
Measurement methods and procedures	A calculation spreadsheet is used to check the requirements defined above, which minimizes the risk of manual errors. The flare efficiency for the minute m (ηflare,m) is 90% when the following conditions are met to demonstrate that the flare is operating: The temperature of the flare (TEG.m), minimum methane content and the flow rate of the residual gas to the flare (FRG,m) is within the manufacturer's specification for the flare (SPECflare) in minute m; and Otherwise ηflare,m is 0%.
Monitoring frequency	Measured continuously in real-time and recorded every 30 minutes.
QA/QC procedures	-
Purpose of data	Calculation of project emissions
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 fails, the system automatically shuts down and an alarm appears on the system. Therefore, the data availability also implies flame 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	-

SDG 8

Data / Parameter	**Number of employment generation**
Unit	Number
Description	Number of people employed directly due to the project activity
Source of data	Social Security Records provided by Project Owner

Value(s) applied	The project provides between 10-20 employment
Measurement methods and procedures	The total number of persons working in the plant would be calculated based on the Social Security Records
Monitoring frequency	Once for each monitoring period
QA/QC procedures	Social insurance registries of employees will be provided annually. After first verification, only changes in employees will be reported.
Purpose of data	To monitor the contribution to SDG 8
Additional comment	-

SDG 8

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	10-20
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	**Management of SWDS**
Unit	-
Description	Management of SWDS
Source of data	Use different sources of data: (a) Original design of the landfill; (b) Technical specifications for the management of the SWDS; (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
Additional comment	ACM0001 Large-scale Consolidated Methodology Flaring or use of landfill gas version 19.0 is used.

SDG 13

Data / Parameter	Emission Reductions in tCO_2
Unit	tCO_2
Description	Reduction of CO_2 emissions due to the proposed project activity's implementation.
Source of data	Ministry of Natural Resources and Energy of Turkey
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)[38].
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	To monitor the contribution to SDG 13
Additional comment	- Estimated annual emission reduction is 102,530 tonnes of CO_2eq.

SDG 12

Data / Parameter	**Quantity of Waste**
Unit	Ton
Description	Quantity of MSW
Source of data	Landfill gas power generation report of Adıyaman Landfill Plant project

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

Value(s) applied	146,000 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-to demonstrate contribution to SDG 12
Additional comment	-

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	-

B.7.2 Sampling plan

Not applicable

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 2. Technical information of flow meter and gas analyzer

	Flow Meter			**Gas Analyzer**
Brand	Endress+Hauser			MRU
Type	Deltabar S PMD75			SWG100biogas
Serial No	R902740109D	R9025F0109D	R902730109D	081300
Date of Calibration	03/11/2021 (Calibration document)			22/09/2020 (Date of calibration certificate)
Calibration due dates	02/11/2031			21/09/2030

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 4B Adıyaman Enerji Atık Toplama Geri Dönüşüm San. Tic. 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.

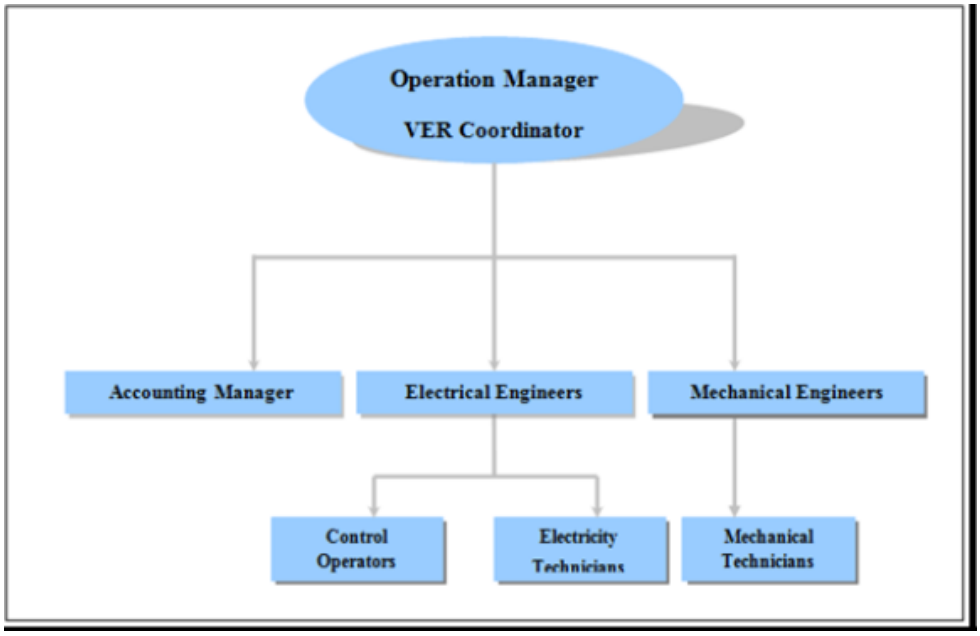


Figure 5. Site organizational chart

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 3. Current technical information of the electricity meters

	Main Meter	Back-up Meter
Brand	Makel	Makel
Type	C520AMT2556	C520AMT2556
Class	0.5	1
Serial No	80303777	80303901
Installation date	04/06/2021	04/06/2021
Calibration due dates	03/06/2031	03/06/2031

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.

Responses to Likely CARs and FARs from preliminary review are presented below.

		Jusitification
Likely CAR # 1:	GS VVB shall check the start date evidence during the validation stage.	Evidence regarding the project start date has been provided to VVB
Likely CAR # 2:	GS VVB shall check whether AR5 Global Warming Potentials Is used in ER calculations. AR5 GWP summary: CH4 - 25 to 28, N2O - 298 to 265	GWPCH4 has been taken as 28 in the emission reduction calculations
Likely CAR # 3:	PP shall provide the opinions of an expert stakeholder been provided for the following: Principle 4.1 Sites of Cultural and Historical Heritage Principle 4.2 Forced Eviction and Displacement Principle 4.3 Land Tenure and Other Rights Principle 4.4 Indigenous Peoples Principle 8.1 Impact on Natural Water Patterns/Flows	EIA positive decision of the landfill site where the project activity is located was made on 17/09/2020. There is no cultural, conservation etc area or people living in the project site. All principles are assessed in Appendix 1 of the PDD as requested.

	Principle 8.2 - Erosion and/or Water Body Instability Principle 9.10 - High Conservation Value Areas and Critical Habitats Principle 9.11 - Endangered Species	
Likely CAR # 4:	Section B.2: PD shall have detailed assessment of the applicability criteria as described in applied methodologies and associated tools separately. Validating GS VVB shall verify and assess the same in Its validation report.	The applicability criteria of both applied methodology and tools has been presented in detail in Section B.2.
Likely CAR # 5:	Section B.3 of the GS PDD shall include the project boundary diagram i.e., waste treatment process, on-site electricity and/or heat generation and use, on-site fuel use and the wastewater treatment plant. While doing so PD shall refer to applied methodology. Validating GS VVB shall verify and assess the same in detail in its validation report.	The revised project boundary diagram is in Section B.3.

Likely CAR # 6:	Section B.4 of the GS PDD shall include the detailed justifications for the selected baseline fuel as required by the applied methodology. Validating GS VVB shall verify and assess the same.	Required information has been presented in Section B.4.
Likely CAR # 7:	Section B.5 of the GS PDD shall update the additionality section as per Combined tool to identify the baseline scenario and demonstrate additionality. Validating GS VVB shall verify and assess the same.	Section B.5 has been revised.

FAR # 1:	GS VVB shall check the evidence of the start date of the project as stated in section C.1 of the GS PDD as per applicable GS4GG requirement and provide its detailed assessment in validation report. Kindly note for retroactive projects, time of first GS submission must take place within one year of the project start date as	Evidence for start date has been provided to VVB.

	per GS4GG requirement. PD and GS VVB shall refer to GS4GG Rule update ("RU 2022 Notification of delay for preliminary review during covid-19 period") while addressing the above requirement.	
FAR # 2:	PD to supply supporting data for all parameters in time for validation/design review, or allocation may be delayed. This includes and is not limited to: ER, IRR spreadsheets, individual study calculations, survey results, study reports etc.	All necessary supporting data has been provided to VVB
FAR # 3:	A Continuous Input and Grievance Mechanism must be set up prior to starting validation and a note added to the PDD that full GS consultation will be carried out as soon as the situation allows.	Required information is presented in Section E.1.
FAR # 4:	Stakeholder Consultation: The VVB shall check and confirm that the inputs from women and marginalised groups were	Documents regarding stakeholder consultation has been provided to VVB

	undertaken as part of the Consultation.	
FAR # 5:	As the project is retroactive, hence the physical meeting shall be incorporated into the SFR. The VVB shall confirm the same at the time of validation.	SFR was conducted, details are presented in Section E.1.
FAR # 6:	The PD shall confirm that if any such risk of double counting exists, the project developer shall commit to retiring eligible units equal to the quantity of Gold Standard VERs. The GS VVB shall confirm and provide its opinion in validation report.	A declaration regarding this issue has been provided to VVB.
FAR # 7:	Section A.1.1 of the GS PDD, PD shall demonstrate the eligibility criteria fulfillment claims of the project activity as per GS4GG and other applied methodological requirement with proper detailed justification and supporting evidence. Validating GS VVB shall assess the evidence and	Eligibility of the project has been demonstrated and related evidences have been provided to VVB.

	provide it in its validation report	

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

The starting date of a project activity is 01/09/2020 which is the date of gas engine purchase agreement.

C.1.2 Expected operational lifetime of project

The lifetime stated in the generation license of the project is 28 years, 8 months and 8 days from 17/12/2020.

C.2. Crediting period of project

1st CP

C.2.1 Start date of crediting period

Starting date of the first crediting period: 01/10/2021 – 30/09/2026

C.2.2 Total length of crediting period

5 years and 0 months, which is planned to be renewed third times. (15 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 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 9.2 Vulnerability to Natural Disaster	All the design and construction works was performed in accordance with relevant regulation
Principle 9.4 Release of Pollutants	Leachate management- Proper management of leachate
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 certificiation" 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[39] and discrimination based on gender is illegal in Turkey. The project try to align with the national gender strategy. So,	

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

	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.[40] In this action plan regarding the years 2018 – 2023, economy and employment-oriented 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%[41] and it is aimed that this percentage will be 41% in	

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

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

	2023.[42] Accordingly, the project shows parallelism with the national strategies developed for women.	
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	No	
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	No separate gender expert is required.	

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. In addition, SCR will be initiated and e-mail evidences of this process will be attached to self-assessed stakeholder consultation report.

E.1 Summary of stakeholder mitigation measures

A remote local stakeholder consultation was conducted as per the covid-19 interim measures. The evaluation forms with the below project information notes were filled by the stakeholders.
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
- Odor control provided

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

- Eliminating the risk of explosion and fires by better waste management
- 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.

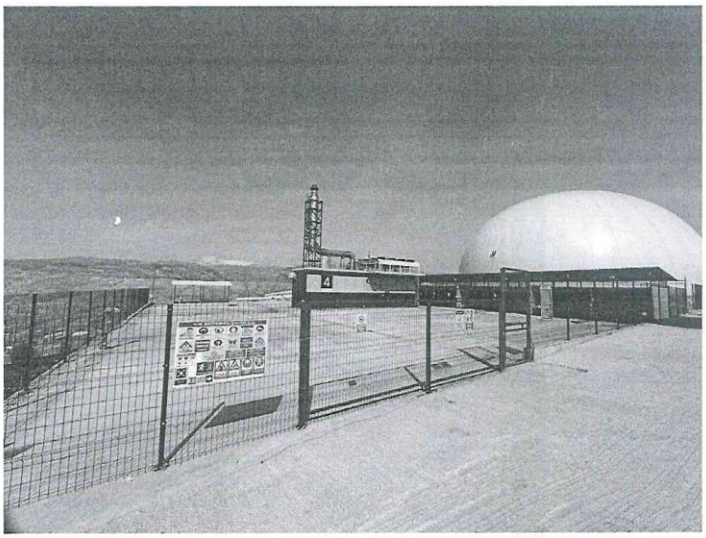
4B ADIYAMAN BİYOKÜTLE ELEKTRİK SANTRALİ

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.

4B Adıyaman Biyokütle Elektrik Santrali Projesi, Adıyaman İli, Merkez İlçesi'nde olup, mevcut kentsel katı atıkların oluşturduğu metan gazını elektrik enerjisine dönüştürmek üzere planlanmış bir biyokütle enerji santralidir. Projenin toplam kapasitesi 4,680 MW'tır.



Figür 1. 4B Adıyaman Biyokütle Elektrik 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 35,100 GWh olarak belirlenmiştir. Bu miktar yaklaşık olarak 12.000 nüfuslu bir yerleşim biriminin elektrik ihtiyacını karşılayacak seviyededir.

Tablo 1. Tesis özellikleri

	Kurulu Gücü (MW)	Elektrik Üretimi (MWh/yıl)	Karbon dioksit Azaltımı (tCO_2)
4B Adıyaman Biyokütle Elektrik Santrali	4,680	35.100	198.117

Söz konusu elektrik üretimi baz alınarak yapılan hesaplamalara göre, yenilenebilir kaynakların kullanımı nedeniyle yılda yaklaşık olarak 198.117 ton karbon dioksit (CO_2) azaltımı sağlayarak çevreye, hava kalitesine ve özellikle de iklim değişikliğine neden olan sera gazlarının azaltımına önemli ölçüde katkıda bulunacaktır.

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 / Grievance Expression Process Book (mandatory)	A grievance notebook is placed at the nearest Mukhtar's office (Kayaönü Village). Local stakeholders can fill in 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 they have an input. Address: Tel: + Email:
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 human rights abuses of any kind as defined in the Universal Declaration of Human Rights	No	Turkey has ratified European Convention on Human Right on 10/03/1954[43]. Therefore, the project is not expected to violate the rules regarding human rights.	No mitigation measure is required for this indicator.

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

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 2. Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work 3. The Project shall refer to the country's national gender strategy or equivalent national	No	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[44]. It also shows parallelism with national strategies prepared for women employment by creating opportunities for all. Moreover, the project outputs serve everyone without regarding gender. It provides electricity for all.	No mitigation measure is required for this indicator.

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

commitment to aid in assessing gender risks 4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)			
Principle 3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	No	Turkey has ratified ILO convention 155 and about work safety and precautions[45] Kayaönü Village is the closest settlement to the project area. No complaints received so far regarding the odor and pest problem.	A grievance notebook is placed at Mukhtar' office in Kayaönü Village. Local stakeholders can fill in 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			

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

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 observed in the project area.	No mitigation is required for this indicator.
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.	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 access rights, usage rights or land ownership? b. For Projects involving land use tenure, are there any	No	There were no settlement on project site on baseline scenario or not any private ownership.	No mitigation is needed for this indicator.

uncertainties with regards to land tenure, access rights, usage rights or land ownership?			
>>			
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.	No mitigation is needed for this indicator.
>>			
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.

[46] http://www.masak.gov.tr/en/LaunderingProceedsofCrime/Chronology.htm

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 in the ILO fundamental conventions 2. Workers shall be able to establish and join labour organisations 3. Working agreements with all individual workers shall be documented and implemented and include:	Yes	- Turkey has ratified ILO 87 and 98 conventions. - Turkey has ratified ILO convention 155 and about work safety and precautions. Staff will be trained for HSE during operation phases. - Turkey is a party of IPEC[47],[48] since 1992 and ratified ILO convention 138 and 182[49].	Staff will be trained for HSE during operation phases. As per related regulations. 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

a) Working hours (must not exceed 48 hours per week on a regular basis), AND b) Duties and tasks, AND c) Remuneration (must include provision for payment of overtime), AND d) Modalities on health insurance, AND e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. No child labour is allowed (Exceptions for children working on their families' property		- All employee are to be recruited according to the national legislations.	

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? >>	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: 102,530 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? >>	No	Project does not use any local fuel resource. It is connected to the national grid and supply 35.100 GWh additional energy to the grid (as indicated in genetration licence of the project).	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	No	The project does not have any expected effects on the natural or pre-existing pattern of watercourses, ground-water and/or the	No mitigation measure is required for this indicator.

variability, flooding potential, lack of aquatic connectivity or water scarcity? >>		watershed(s) since there is no underground or other kind of water source on project site	
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? b. Is the Project's area of influence susceptible to excessive erosion and/or water body instability? >>	No	The project does not directly or indirectly cause harm on soil and water. During the operation phase of the project, wastewater 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.	No mitigation measure is required for this indicator.

Principle 9.1 Landscape Modification and Soil			
Does the Project involve the use of land and soil for production of crops or other products? >>	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? >>	Yes	Adıyaman and the project site are in the 2nd Degree Seismic Zone 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.

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.
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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? >>	No	There is no forest area in and in the close vicinity of the project area. Project area is in an organized industrial zone	No mitigation measure is required for this indicator.
Principle 9.8 Food			
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, landscapes, key biodiversity areas or sites identified?	No	No endemic, endangered and or threatened flora and fauna species were identified in the project site and its vicinity.	No mitigation measure is required for this indicator.

>>			
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)? 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.	No mitigation measure is required for this indicator.
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Assessments regarding Safeguarding Principles and Requirements paragraph 4.3.7 to 4.3.11 are briefly given below. PID also addresses the following items as mandated by Turkish law and regulations.[50]

[50] Enviromental Assestment Report has already provided to the GS

APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

Organization name	4B Adıyaman Enerji Atık Toplama Geri Dönüşüm San. Tic. A.Ş.
Registration number with relevant authority	
Street/P.O. Box	Süleyman Seba Cad.
Building	BJK Plaza, A Blok, No:77 Beşiktaş
City	Istanbul
State/Region	N/A
Postcode	
Country	Turkey
Telephone	+90 212 258 18 20
E-mail	
Website	
Contact person	
Title	General Manager
Salutation	Mr.
Last name	İren
Middle name	-
First name	Erol
Department	
Mobile	
Direct tel.	
Personal e-mail	erol@arier.com.tr

Organization name	GTE Karbon Sürdürülebilir Enerji Eğitim Danışmanlık ve Ticaret A.Ş.
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
Website	www.gte.com.tr
Contact person	M. Kemal Demirkol
Title	Director
Salutation	Mr
Last name	Demirkol
Middle name	Kemal
First name	Mehmet
Department	Management
Mobile	-
Direct tel.	+90 312 514 63 63
Personal e-mail	kemal@gte.com.tr

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

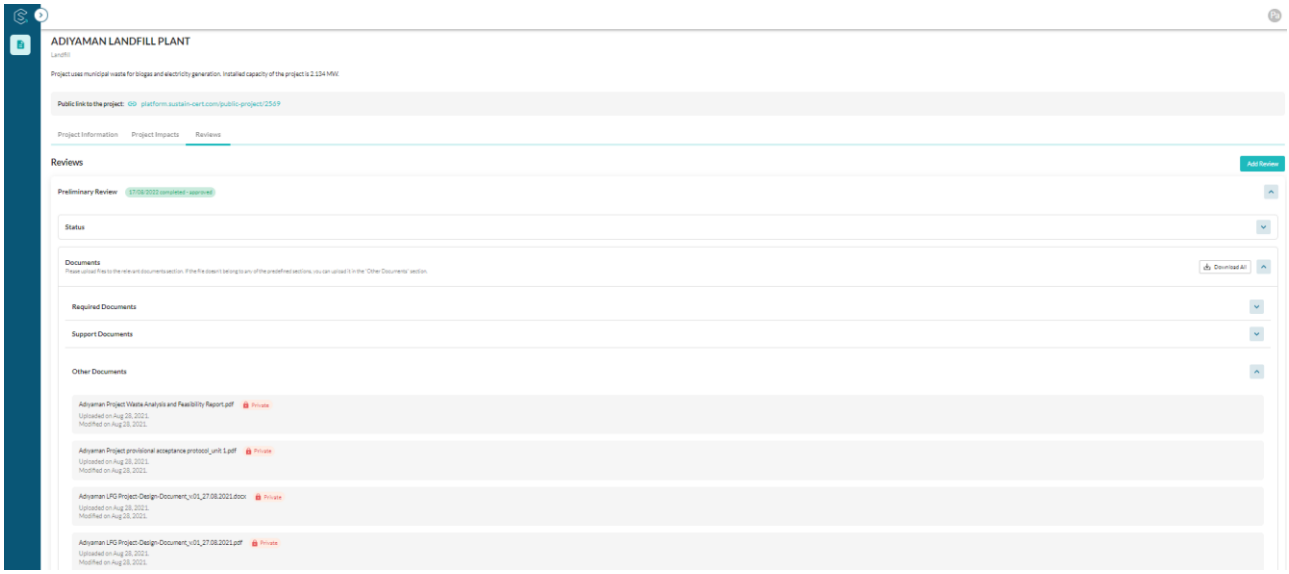
APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

N/A

APPENDIX 5-SET SAMPLE LIST

N/A

APPENDIX 6-SUBMISSION FOR PRELIMINARY REVIEW



Revision History

Version	Date	Remarks

1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption