Gold Standard for the Global Goals

TEMPLATE

Key Project Information & project Design Document (PDD)

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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

0 – Outcome of Stakeholder Consultations

Appendix 1 – Safeguarding Principles Assessment (mandatory)

0 - Contact information of Project participants (mandatory)

0 - LUF Additional Information (project specific)

This template has been revised to aid a consistent interpretation and to better support project developers submitting documentation for certification. Please read the accompanying guide to understand how to complete this template accurately.
TEMPLATE GUIDE Key Project Information & Project Design Document v.1.2

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KEY PROJECT INFORMATION

GS ID of Project	GS 4817
Title of Project	SUTAS Tire Biogas Plant
Time of First Submission Date	
Date of Design Certification	21/06/2022
Version number of the PDD	08
Completion date of version	18/04/2024
Project Developer	GTE KARBON SUSTAINABLE ENERJI EGITIM DANISMANLIK VE TICARET A.S.
Project Representative	GTE KARBON SUSTAINABLE ENERJI EGITIM DANISMANLIK VE TICARET A.S.
Project Participants and any communities involved	ENFAŞ ENERJİ ELEKTRİK ÜRETİM A.Ş. (Project Owner, Private Entity)
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	

Methodology (ies) applied and version number	The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reduction from Manure Management Systems and Municipal Solid Waste[1]
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 contributes to CO2e reduction, which represent direct and quantifiable impact on climate security. Moreover, the project is also expected to reduce SO2 and NOx emissions	The project contributes to 114,851tonnes/year of CO2e reduction as GS VERs, which represent direct and quantifiable impact on climate security.	
7 Affordable and Clean Energy	Annual average estimated renewable electricity generation	29.876 GWh.	
8 Decent Work and Economic Growth	Project provides job opportunities for 22 employees	22 employees will gather H&S and other related trainings.	
12.Responsible Production and Consumption	The project provides better management option for wastes (	The project provides better management option for wastes as around 95 tonne/day	

	cattle and poultry manure) via anaerobic treatment

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

The owner of the proposed project is ENFAS Enerji Elektrik Üretim A.Ş. which is a subsidiary of SUTAS Group. SUTAS Group is one of the major companies in dairy products sector in Turkey and has several cattle farms for supply of milk to their production plants. There exist several cattle farms near the plant. Manure from these farms will be used in biogas plant to generate electricity and output from digesters will be used as fertilizer in nearby agricultural land.

The proposed project activity is a biogas-to-energy and generates renewable energy by capturing biogas from cattle manure, chicken manure and agricultural wastes -via anaerobic digestion- and utilising it to produce thermal and electric energy through cogeneration systems. The project was implemented by Sütaş A.Ş. in İzmir province and aims to provide an environmentally friendly solution to this manure management problem. Prior to the project activity, baseline situation, cattle, chicken manure generated at farms managed by lagoons and agricultural wastes left in agricultural lands. Hence.

- The situation of cattle and chichken manure is simply with the applied methodology which states "This methodology is applicable to manure management on one or multiple livestock farms where the existing anaerobic manure treatment system, within the project boundary, is replaced by one or a combination of more than one animal waste management systems (AWMSs) that result in less GHG emissions compared to the existing system"
- The situation of agricultural waste is comply with the applied methodology which states "In case of co-digestion, for one or more sources of substrates, it cannot be demonstrated that the organic matter would otherwise have been left to decay anaerobically, baseline emissions related to such organic matter shall be accounted for as zero,"

In addition, there was no any biogas plant in the region before this project and there was no anaerobic biogas generation activity too. Hence the project became a Greenfield Project activity in terms of biogas generation within the region. In terms of quantum of waste handled within project activity, SÜTAS Tire Biogas Plant project operates with a daily organic flow of 95 tons/day and 30-40% of this amount is belonged to cattle manure, 10-20 of this amount is belonged to chicken manure and rest of it belonged to agricultural wastes as per the information given in EIA report of the project (page 8). In addition, in the baseline situation, there is no renewable electricity generation and export to national grid via a biogas plant in the region. In relation to this, project increase the renewable capacity of Turkey as host party via electricity generation using biogas produced by using wastes indicated above. This renewable electricity generation strongly related with Sustainable Development Goal 7 which is mentioned on renewable energy generation and increasing capacity on that manner. Electricity generated by the project increased the renewable energy generation of Turkey. Moreover, project owner employed 22 employees for the present situation which contributes to the SDG 8 "Decent Work and Economic Growth "since project creates job opportunities. Also, as detailed situation given in paragraph above, project managed 95 tonnes of waste daily which contributes to the sustainable development pathway of Turkey related with SDG 12.

The biogas released during the biodegradation of organic wastes will be used for electricity and heat production in cogeneration unit. Installed capacity of the project is 4.380 MWm / 4.268 (with four gas motors, 4 x 1.067 MWe, license date is 01/09/2016) with 29.876 GWh annual expected electricity generation and 7,262.39 MWh of heat (as per capacity report of the project). Corresponding estimated emission reduction for the whole crediting period (1^{nd} CP) is 574,257 tCO2 which is 114,851tCO2 as annuall average. This situation contributes to the sustainable development pathway of Turkey related with SDG 13 since the project provided GHG emission reduction via electricity generation capacity of Turkey.

Main goals of the project are;

- Waste collected from the animal shelters will be decomposed and turned in to more stable state fertilizer, which is environmentally favorable and odorless,
- Heat demand of the facility will be met
- Biogas from cattle excrement will be used to produce clean electrical energy,
- The obtained fertilizer will have less odor compared to present fertilizers and will contain more free nitrogen (N)

Prior to the start of the project activity manure from the farms were being washed out from underneath the animal barns and stored in anaerobic lagoons which allowed the manure to decay and emit methane to the atmosphere along with several other toxic gases. Such applications also bear the risk of lagoon overflow due to increased rainfalls, strong winds or improper construction.

In the baseline scenario manure from the farms were being left to decay in anaerobic lagoons or spread over the fields.

By the implementation of the project, the unattended manure is now collected daily and treated in a way that it no longer emits excessive amounts of methane. Methane potential of the manure is harnessed in the biogas plant and the captured methane is used to generate electricity through combustion in a co-generation unit. The produced electricity contributes to reduction of GHG emissions through fossil fuel combustion and also the produced heat will be utilized in the project owner's dairy facility, replacing some of the natural gas which was being used for heating in the baseline scenario.

Table 1. Milestones for SüTAS Tire Biogas Plant

Milestone	Date
Construction Agreement	02/12/2014
Gas Engine Agreement	29/12/2015
LSC Meeting	19/01/2016
Lincense Approvement	01/09/2016
Provisional Acceptance Protocol (all gas engines and heat boilers)	14/10/2016
EIA Report	23/08/2017

Expected Start Date of First Crediting Period	01/06/2022

Estimated emission reduction for the whole crediting period (1nd CP) is 574,257 tCO2 which is 114,851 tCO2 annually. This situation contributes to the sustainable development pathway of Turkey related with SDG 13.

In addition, there are three FARs raised by GS Team during LSC Reviews of the project which are indicated with relevant explanations below.

Forward Action Request #1: The PP shall include trainings of employees for occupational health and safety trainings and use of relevant safety protocols along with safety equipment to the monitoring plan.

Response: Project provided related documents to DOE during validation progress

Forward Action Request #2: The validating DOE shall make sure that the project emissions and leakage emissions (if any) are taken into account in accordance with the applicable methodology related with the composting process. The PP shall further include management of wastewater (as an output of the digester) into the monitoring plan.

Response: As indicated in leakage emissions part of this document the proposed project activity does not involve composting, LEComp,y shall be accounted as zero. Moreover, the solid and liquid digestate (output of the digester) used as fertilizer in nearby agricultural land as free

Forward Action Request #3: The EIA and associated references in the LSC report shall be checked by the DOE during validation and provide their opinion in datail.
Response: EIA Report of the Project and other necessary documentations/online references such as IPCC related with both calculations and baseline situation provided to DOE during validation progress.

A.1.1. Eligibility of the project under Gold Standard

The project consist of electricity generation, heat generation and corresponding emission reduction values. Section 3.1.1 (titled as 'Eligible Project Types') of the document of Gold Standard for the Global Goals (GS4GG) Principles & Requirements[2] (Version 1.1.) 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 manure management via anaerobic digestion through biogas capturing and utilizing, shall be considered as a Renewable Energy Activity. Hence, the document of "GS4GG Renewable Energy Activity Requirements[3] (Version 1)" 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

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

[2] https://globalgoals.goldstandard.org/wp-content/uploads/2018/02/100-GS4GG-Principles-Requirements-v1.1.pdf

[3] https://globalgoals.goldstandard.org/wp-content/uploads/2017/06/200-GS4GG-Renewable-Energy-Activity-Requirements-v1.1.pdf

- 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 untreated cattle manure mainly. 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.

Project is in compliance with applicable Host Country's (Turkey) legal, environmental, ecological and social regulations. The project has approved finalized EIA Report, electricity generation license, provisional acceptance protocol which proves the compliance. Otherwise, these permissions could not get from the government.

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

As per the pre-license issued by Energy Market Regulatory Authority (EMRA), all legal rights of the project is given to ENFAŞ Enerji Elektrik Üretim Sanayi ve Ticaret A.Ş. The owner of the license is responsible for the construction of the facility, commissioning, production and sale of the electricity produced. Please see Appendix for legal ownership license.

A.2 Location of project

Tire District, Organize Sanayi Bölgesi Mah. Tosbi Yol 4 Sokak No:6/8 TİRE / İZMİR

Figure 1. Project Site

	E	N
1	562734.98	4219688.01
2	562756.87	4219688.04
3	562756,84	4219706.63
4	562734.95	4219706.60

The Project's coordinates can be seen on the Table above (Ref: License of the project)

A.3 Technologies and/or measures

Technology applied will involve use of cattle manure, chicken manure and agricultural wastes. "Mesophilic" technology will be applied according to the operating temperature in the planned biogas plant. The optimal operating temperatures of these bacteria are 37ºC. Manure is mixed and hydrolysed here to break the bonds and generate biogas. Biogas obtained will be fed to the cogeneration unit to generate heat and electricity whereas final product will be stored and used as fertilizer. Electricity generated will be fed to the national grid and heat will be used in the dairy plant processes.

Anaerobic digesters with steel or lined concrete or fiberglass digesters and a gas holding system and monolithic construction are using in this project activity. Moreover, Anaerobic digesters hermetically sealed closed reinforced concrete pool was designed. The gas tank to be placed at the top of the pool during the reaction and stores the gas formed. The reactor contents is kept in a mixture with submersible mixers. Mixers operated intermittently for the purpose of energy saving. Parts that come into contact with biogas in digesters, and all interior surfaces coated with epoxy paint against corrosion. In addition, against heat losses to the reactor and there is thermal insulation on the surface (Project EIA Report, page 14)

The transport of the collected manure from the farms will be achieved by totally confined trucks. The transported manure will be directly transferred to the raw material pond without any storage time. Collected manure then fed to the fermenters via leakage proof pipes and biogas capture in the fermenters. Captured biogas is sent to the cogeneration units where it is utilized to generate electricity and heat at the same time. Generated electricity is fed to the national grid and the produced heat is used by the project owner's diary facility. On the other hand, remaining sludge after the biogas extraction is sent to the separator and drier units to produce biologically enriched fertilizer and then stored on a specific parcel reserved for this process near the project site. Remaining sludge after the biogas extraction is sent to the separator and drier units to produce biologically enriched fertilizer.

The system consists of following units:

- Waste collection unit: Weigh bridge and data control/storage system
- Waste preparation / feed unit: Equalization tank, vegetative waste stock area, central pumping system
- Anaerobic Digestion Unit: Digestors, gas storage unit, desulfurization unit, early warning system, temperature control system
- Cogeneration Unit: Cogeneration, gas treatment system, flare
- Fertilizer Dewatering / Hygenization Unit: Post-digestion tanks, hygenization unit, separator
- Automation system
- Product Storage Area: Liquid fermented storage area, solid fermented storage area

The project became a Greenfield Project activity in terms of biogas generation within the region and use waste (cattle manure, chicken manure and agricultural wastes from nearby region farms) to generate biogas, electricity and heat energy. Prior to the project activity, baseline situation, cattle, chicken manure generated at farms managed by lagoons and agricultural wastes left in agricultural lands. Applicability of this baseline situation argued detail in Section A.1
Prior to the project activity, baseline situation, cattle, chicken manure generated at farms commonly released to natural water bodies or lagoons and agricultural wastes left in agricultural lands commonly. There was no any biogas plant in the region before this project and there was no anaerobic biogas generation activity too. Hence the project became a Greenfield Project activity in terms of biogas generation within the region. In terms of quantum of waste handled within project activity, SÜTAS Tire Biogas Plant project operates with a daily organic flow of 95 tons/day and 30-40% of this amount is belonged to cattle manure, 10-20 of this amount is belonged to chicken manure and rest of it belonged to agricultural wastes as per the information given in EIA report of the project (page 8).

There exist several cattle farms near the plant. Manure from these farms will be used in biogas plant to generate electricity and output from digesters will be used as fertilizer in nearby agricultural land as free. Before the project activity farm owners bought the inorganic fertilizer from related market which is costly. Hence project activities provide a great service which is not present in baseline situation. In fact, there is no any service (?) in baseline situation which could be beneficiary for nearby farms and agricultural lands. That is why the local stakeholders are very pleasant within the project activity as they clearly stated in online site visit/interview.

For the present situation with 4,268 MWe there is no composting operation and treated manure is separated into liquid and solid phases with separator unit. Then both solid phase and liquid phase are shared with farmers near to project site (within Tire District of İzmir Province) to be used as fertilizer. As discussed in remote site visit with local stakeholder, these fertilizers provided efficiency in agricultural activities.

Hydrogen sulfide (H2S) in biogas will be reduced to 150 ppm and lower by biological internal desulfurization. In addition, the condensate path in the biogas line and condensate collection systems will remove saturated gas from the coarse water through a cooling unit and remove it from the moisture up to the saturation point. In this way, the moisture in the biogas will be reduced to the desired level.

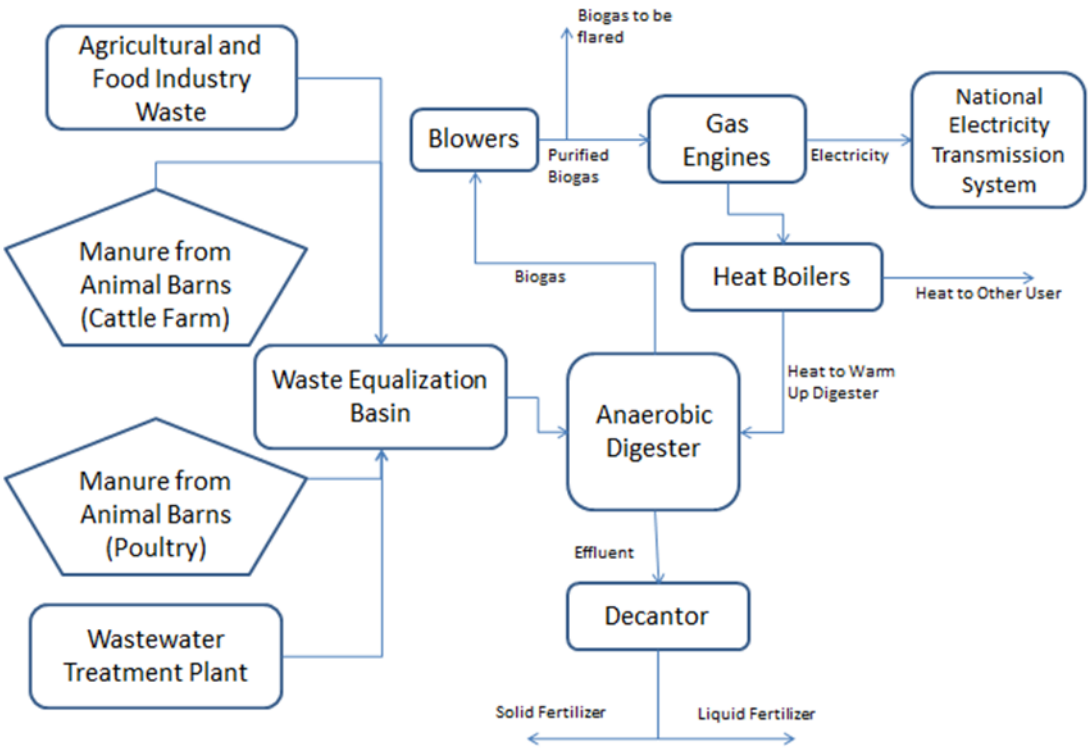

Figure 2: Schematic View of the Process_1

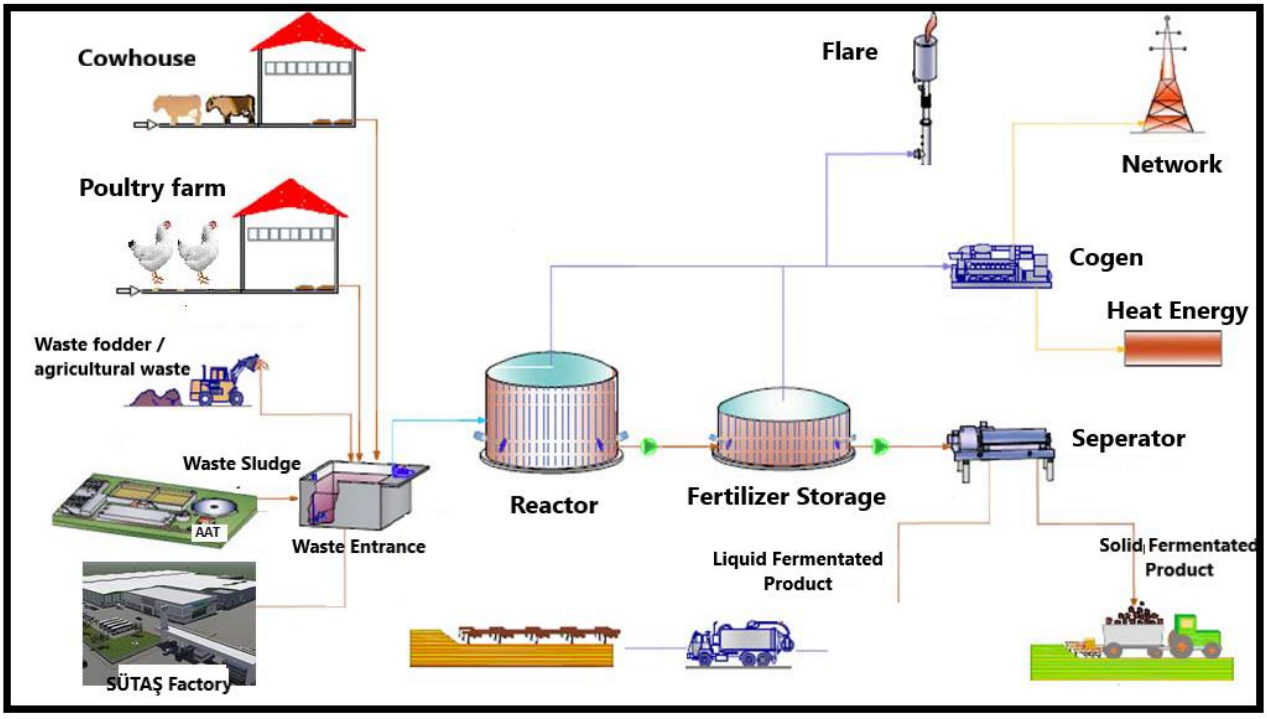

Figure 3: Schematic View of the Process_2

Heat usage divided into two; first usage point is to warm up the digesters and second usage point is to provide heat energy to dairy factory of Sütaş A.Ş. which is near to biogas plant (in the same project site). That is why heat usage is also considered in emission reduction calculations since dairy factory does not use any fossil fuel to generate heat energy for the production operation. Heat energy need of dairy factory is provided by heat boilers of biogas plant. This situation is referred as "heat to other user" in flow diagram above.

As seen in the Project Operation Scheme, the key equipments of the project are;

- Gas engines
- Heat Boilers
- Biogas meters
- Electricity meters

The technical specifications of these key equipments are indicated as follows.

Gas Engine 1, 2, 3 and 4

Supplier Company: Jenbacher Gas Engines
Type: JMS 320 GS
Production Year: 2016
Fuel Gas Type: Biogas

Electricity Output: 1067 kW (full load)
ISO Standard Power (Mechanical Output): 1095 kW (full load)
Speed: 1500 rpm/min
Gas Volume: 443 Nm3/h (full load)
Electrical Efficiency: 40.2% (full load)
Thermal Efficiency: 27.2% (full load)
Total efficiency: 67.4(%) (full load)

Heat Boiler 1, 2, 3 and 4

Supplier Company: MNK Energy Waste Heat boiler
Type: Smoke Tube Type Waste Heat Boiler
Production Year: 2016
Test Pressure: 22.6 Bar

Operation Pressure: 10 Bar
Design Pressure : 14 Bar
Max. Heat Power: 412 kw
Volume: 2,700 liter
Standard: EN 12953

Biogas Meters

The device consists of a transmitter and a sensor. The device is available as a compact version: The transmitter and sensor form a mechanical unit. These meter are located at the top of anaerobic digesters.

Transmitter Unit:

• Compact, aluminum coated:
Aluminum, AlSi10Mg, coated
• Compact, stainless:
For maximum corrosion resistance: stainless steel 1.4404 (316L)
Configuration:
• External operation via four-line, illuminated local display with touch control and guided menus ("Make-it-run" wizards) for applications
• Via operating tools (e.g. FieldCare)

Sensor:

Designed exclusively to measure:
– Biogas
– Firedamp
– Air
– Methane
– Nitrogen
– Gas with a very high methane fraction
• Range of nominal diameter: DN 50 to 200 (2 to 8")
• Materials:
– Sensor:
Stainless steel 1.4404 (316L), cold worked
Stainless steel 1.4435 (316L), cold worked
– Process connections:

Stainless steel 1.4301 (304),
Stainless steel 1.4306 (304L),
Stainless steel 1.4404 (316L),
Steel S235JR,
Carbon steel A105
Details of electricity meters is given in monitoring parameters (under the parameter $EG_{PJ,facility,y}$) part of this document.

Flare Unit

Model and Brand: C-nox environmental engineering
Year of manufacture: 2016
Flare Type: NTV 3,6 S
Firing capacity: 3600 kW
Volume flow max: 550 Nm3/h
Biogas heating value: 6,4 kWh/m3
Max flow pressure in front of flare: 120 mbar
Min flow pressure in front of flare: 50 mbar
Biogas temperature: < 140 Celcius
Combustion temperature (approximately): 850 Celcius

Fuel gas admission pressure min, and max: 5 mbar and 30 mbar
Fuel gas temperature: 35 Celcius
Exhaust gas temperature, max: 800 Celcius

Operational lifetime is estimated as 11 years stating with 01/09/2016 based on the date given in license till 31/08/2026. License amendments will be made in the future periods in order for the project to continue its operation after this date. Related explanation is also added to Section C of revised PDD.

In addition, project contribution to SDGs given below briefly;

Sustainable Development Goals	Project Contribution

13 Climate Action (mandatory)	The project contributes to 114,851 tonnes of CO2e reduction, which represent direct and quantifiable impact on climate security.
7 Affordable and Clean Energy	29.876 GWh.
8 Decent Work and Economic Growth	22 employees will be gather H&S and other related trainings.
12.Ensure Sustainable Consumption and Production Patterns	The project provides better management option for wastes as around 95 tonne/day

A.4 Scale of the project

The CDM Methodology Booklet[4] (tenth edition) states that the Type (iii) project activities "that result in emission reductions of more than 60 kt CO_2 equivalent per year"(pg. 41) shall be considered as "Large-scale" project activities. Since the total estimated emission reduction of the proposed project activity is 114,851tCO2 equivalent per year, the Project's scale shall be defined as "large-scale".

A.5 Funding sources of project

Neither public funding nor bank loan is used for the project activity.

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

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

B.1. Reference of approved methodology (ies)

The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste[5].

Referred tools

"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", Version 03.0[6]

"Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation", Version 03.0[7]

"Project emissions from flaring", Version 03.0[8]

"Project and leakage emissions from anaerobic digesters", Version 02.0[9]

"Project and leakage emissions from biomass", Version 04.0[10]

"Tool to calculate the emission factor for an electricity system", Version 07.0[11]

"Tool to determine the remaining lifetime of equipment", Version 01[12]

"Combined tool to identify the baseline scenario and demonstrate additionality", Version 07.0[13],

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[5] https://globalgoals.goldstandard.org/421-wm-ghg-emission-reductions-from-manure-management-systems-and-municipal-solid-waste/

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

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

[8] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v3.0.pdf

[9] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-14-v2.pdf

[10] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-16-v4.pdf

[11] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

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

[13] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf

"Emissions from solid waste disposal sites", Version 08.0[14]

B.2. Applicability of methodology (ies)

The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste is chosen for this project.

This consolidated baseline methodology[15] is based on elements from the following methodologies:

- AM0006: "GHG emission reductions from manure management systems";
- AM0016: "Greenhouse gas mitigation from approved Animal Waste Management Systems in confined animal feeding operations";
- ACM0022: "Alternative waste treatment processes";
- AM0073: "GHG emission reductions through multi-site manure collection and treatment in a central plant".

The justification of the choice of this methodology is presented in the Table below. In addition, the methodology is also applicable to the activities that involve co-digestion and/or co-composting of multiple organic matters that would have otherwise been left to decay anaerobically-.

The methodology criteria	Applicability justification of the proposed project activity
This methodology is applicable to manure management on one or multiple livestock farms where the existing	The proposed project activity provided a centralized anaerobic treatment plant which replaced the lagoons of nearby

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

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

anaerobic manure treatment system, within the project boundary, is replaced by one or a combination of more than one animal waste management systems (AWMSs) that result in less GHG emissions compared to the existing system. The project activities where manure is collected by tank trucks, canalized and/or pumped from multiple livestock farms and the collected material is subsequently treated in a single central treatment plant may also claim emission reductions … The methodology is applicable to both Greenfield and existing facilities.	farms to manage animal manure (cattle and poultry manure) by collecting these waste with confined truck to achieve biogas and so methane which is used to gainfully generate electricity, as noted in the Section A.1. of the PDD also. Therefore, this consolidated baseline methodology shall be applied to the proposed project activity.
Farms where livestock populations, comprising of cattle, buffalo, swine, sheep, goats, and/or poultry, is managed under confined conditions	The Project's primary feedstock, cattle-manure, is supplied mainly by farms of members of the Cooperative. The Cooperative, along with its members' farms, functions under the control of the Ministry of Agriculture and Forestry. The Cooperative's members manage the livestock population in their farms in accordance with the relevant Turkish laws and regulations confining conditions, especially regarding animal health, such as Law No. 5996[16], Law No.

[16] https://www.tarimorman.gov.tr/Belgeler/ENG/Legislation/law_veterinary_services.pdf

	3285[17] and Regulation on Livestock Farms[18].
Manure or the streams obtained after treatment are not discharged into natural water resources (e.g. river or estuaries) & Farms where manure is not discharged into natural water resources (e.g. rivers or estuaries)	As shown in the Section A.3. of the PDD (flow scheme), the waste streams after the treatment will not be discharged into natural water resources. The refined and processed fermented product will be sent to the separator and decanter (dehydration unit) to be separated (please see the Section A.5. of the PDD). Both the liquid and solid parts of the residual waste from the digestion will be further used as organic fertilizers. In the baseline scenario, as noted above, the farms where manure is collected for the Project are managed in accordance with the relevant laws and regulations which prohibit manure to directly discharge into natural water resources. Hence, the proposed project activity complies with this criteria/condition.
In case of anaerobic lagoons treatments systems, the depth of the lagoons used for manure management under the baseline scenario should be at least 1 m	In the baseline scenario, cattle manure generated at farms is stored generally in tanks in anaerobic conditions. Tanks' depths, when applicable, are more than 1 m. Therefore, this criteria/condition is complied by the proposed project activity.

[17] http://www.zmo.org.tr/mevzuat/mevzuat_detay.php?kod=55

[18] http://www.resmigazete.gov.tr/eskiler/2006/08/20060809-4.htm

The annual average ambient temperature at the site where the anaerobic manure treatment facility in the baseline existed is higher than 5°C	The annual average temperature of baseline site where manure is collected from multiple farms, as members of the Cooperative, is 17,8°C[19]. Hence, the proposed project activity complies with this criteria/condition.
In the baseline case, the minimum retention time of manure waste in the anaerobic treatment system is greater than 1 month	The retention time of manure waste is greater than one month in the baseline scenario. Therefore, this criteria/condition is complied by the proposed project activity.
The AWMS(s) in the project case results in no leakage of manure waste into ground water, e.g. the lagoon should have a non-permeable layer at the lagoon bottom	No leakage of manure waste into ground water occurs in the project case, since the lagoons have a non-permeable layer at the lagoon bottom. Hence, the proposed project activity complies with this criteria/condition.
If residues are stored in between collection activities, storage tanks shall comprise outdoor open equipments	Not applicable. Since residues collected from the farms are immediately fed into the digesters, this criteria/condition is not applicable to the proposed project activity.
If the manure/treated residue is used as fertilizer in the baseline, project proponents must ensure that this end	Liquid and solid fertilizers gathered after the anaerobic digestion are provided to all the farmers around who is willing to use. This issue is also covered during the

[19] https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?m=IZMIR

use remains the same throughout the project activity	remote site visit under validation progress and local stakeholders clearly stated that the solid and liquid fertilizers provided by this facility (the Project) contributed significantly to the production in their agricultural activities. At this point, the project owner only demands that the fertilizer receiving farms bear the cost of carrying the fertilizer, but does not earn any other financial income in this process.
In case residual waste from the digestion is handled aerobically and/or submitted to soil application, the proper conditions and procedures (not resulting in methane emissions) for storage and transportation and soil application must be ensured	Not applicable. Both the liquid and solid parts of the residual waste from the digestion will be further used as organic fertilizers. Residual wastes from biological treatment are separated into liquid and solid phases with separator unit. Then both solid phase and liquid phase are shared with farmers near to project site (within Tire District of İzmir Province) to be used as fertilizer. As discussed in remote site visit with local stakeholder, these fertilizers provided efficiency in agricultural activities in the region and farmers are satisfied with this situation.
In the case of co-digestion, for one or more sources of substrates, it cannot be demonstrated that the organic matter would otherwise have been left to decay anaerobically, baseline emissions related to such organic matter shall be accounted for as zero, whereas project	Proposed project activity involves co-digestion of multiple source of biomass substrates, mainly cattle manure and plantal waste. Since it cannot be demonstrated that these feedstocks would otherwise been left to decay anaerobically, no emission reduction will

emissions shall be calculated according to the procedures presented in this methodology for all co-digested substrates	be claimed for digestion of these secondary substrates. Under the baseline emission calculations agricultural wastes is not taken into account as per methodological criteria; however, project emissions due to these wastes are taken into consideration for the project such as emissions caused due transportation of these wastes to the project site. Additionally, MSW is not used as co-substrate in this project and as understood from the methodological statements, The project has an option to not use MSW in the operation of the project and so there is no need to apply ACM022 for applicability condition of MSW perspective.
CERs shall be claimed by the Central Treatment Plant managing person/entity, only. Other parties involved must sign a legally binding declaration that they will not claim CERs from the improved animal waste treatment practices. The DOE shall check such declaration during the validation (during verification if new parties added after project registration) and these documents shall be valid throughout the whole crediting period	Declaration is shared with DOE declaration which mentions the VERs shall be claimed by ENFAŞ (project owner) only.

B.3. Project boundary

The project boundary includes the physical, geographical sites of:

(a) The livestock (farms where the cattle and poultry manure gathered);

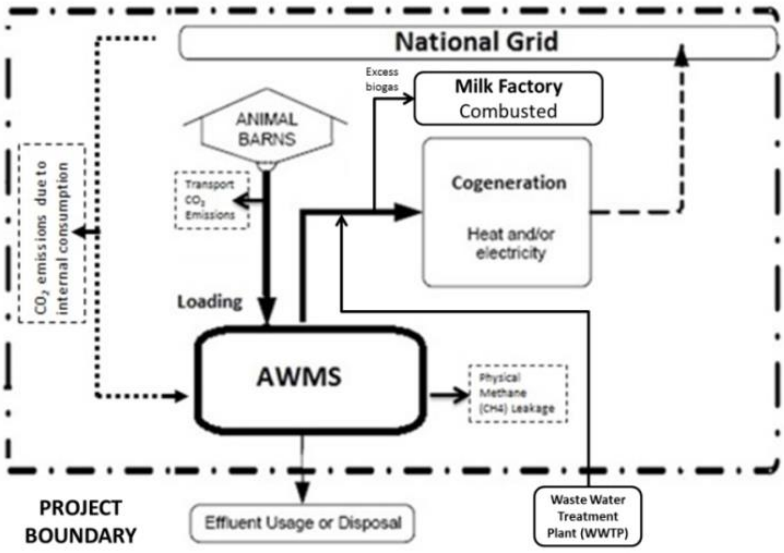
(b) Animal manure management system (This project site)(c) Facilities which recover and combust or use methane. For the proposed project, biogas, electricity generation and waste heat boiler units will be located within own land of project owner near their existing farms. As it could be seen in the figure below, project has three main components of emission reduction;

- manure management
- electricity generation
- heat generation

(d) All power plants connected physically to the electricity system (grid) that the project plant is connected to.

e) Farms and facilities where the solid and liquid fraction(slurry) of the organic fertilizers transferred and road routes between the farms and project site.

f) Road routes where manure collected (between manure collection points and project site)



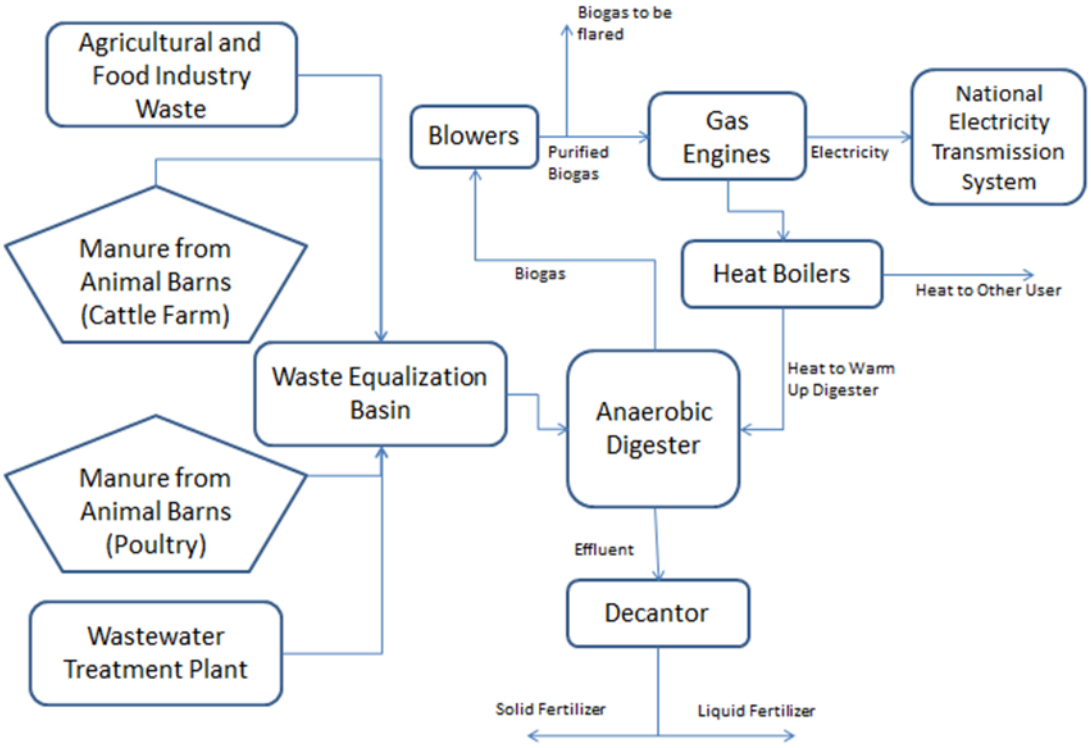


Figure. Physical diagram of project activity

Manure Supplier Farms with Name, Location and Distance to the SÜTAS Tire Biogas Plant Project Site Which Have Agreements Between Project With Annual Animal Number Detail

Name of the Farm	Animal Type	Annual Average Number of Animals
Hatice Güler Cattle Farm	Dairy Cattle	1,650
Şerif Demir Cattle Farm	Dairy Cattle	3,250
Ataköy Cattle Farm	Dairy Cattle	190
Bontoro Cattle Farm	Dairy Cattle	390
Dabesaa Cattle Farm	Dairy Cattle	350
Ragyu Cattle Farm	Dairy Cattle	250
Cactus Cattle Farm	Dairy Cattle	1,500
Aziz Güner Cattle Farm	Dairy Cattle	350
Total Cattle Number		7,930

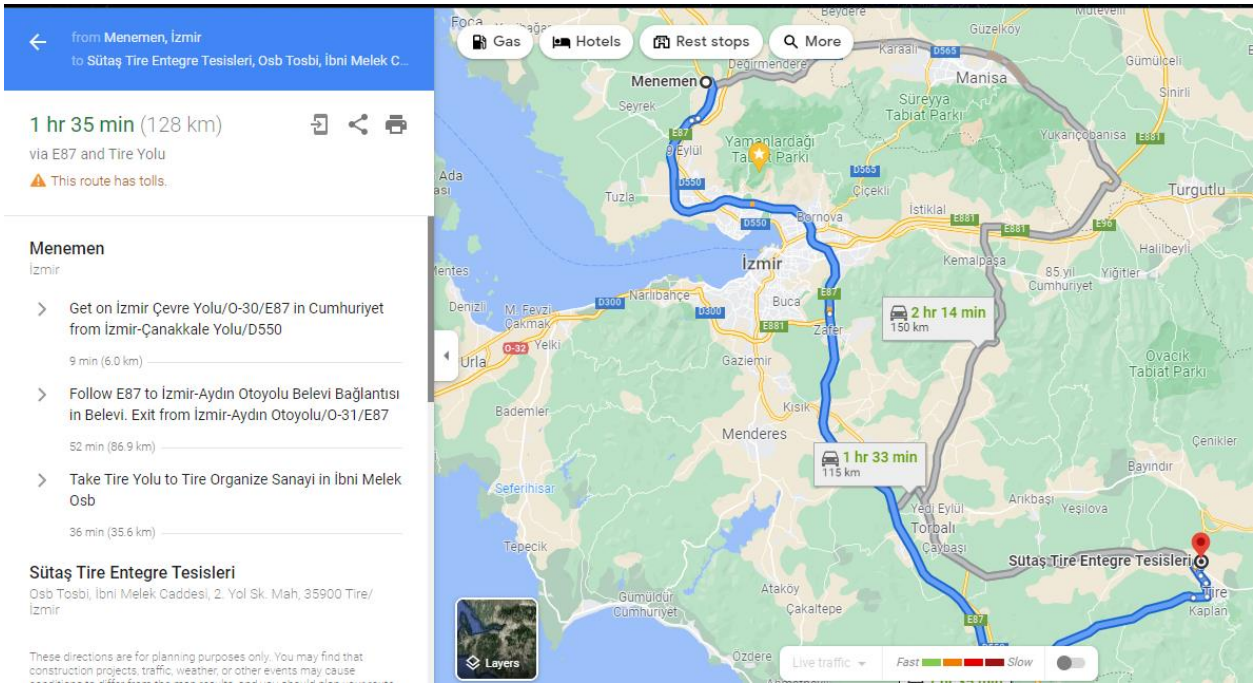
Ercanlar Poultry Farm	Poultry	1,300,000
Volkan Güner Poultry Farm	Poultry	160,000
Muzaffer Doydu Hayvancılık	Poultry	115.000
Total Poultry Number		1,575,000

Address Information and Coordinates of Manure Supplier Farms Which Have Agreements Between Project With Annual Animal Number Details

Name of the Farm	Address	Coordinates	Distance to project site
Hatice Güler Cattle Farm	Center OF Ödemiş District, Izmir Province	38.228330685432056 27.975387313888252	44
Şerif Demir Cattle Farm	Işikli Mahallesi Tire Izmir	38°05'03.8"N 27°44'30.9"E	5.4
Ataköy Cattle Farm	Kalabak Küme Evleri No:31/ 2 Ataköy Mahallesi Menderes Izmir	38.07792446783403 27.181441645375063	76.5
Bontoro Cattle Farm	Laklak Mevkii Menderes Izmir	38.07792446783403 27.181441645375063	
Dabesaa Cattle Farm	Inişdibi Mevkii 5602 Sokak No:18 Ataköy Mahallesi Menderes Izmir	38.07792446783403 27.181441645375063	76.5
Ragyu Cattle Farm	Çakaltepe Mahallesi Menderes Izmir	38.071320603313104, 27.21118153533317	82.4
Cactus Cattle Farm	Çakaltepe Mahallesi 7300 Sokak No:31 Menderes Izmir	38.071320603313104, 27.21118153533317	82.4
Aziz Güner Cattle Farm	Ayrancilar Mahallesi 73 Sk.No.2 / 1 Torbali Izmir	38.2451115991037, 27.26592337485689	56.6

Ercanlar Poultry Farm	Yahşelli Mahallesi 6332 Sokak No:7/1-1 Menemen Izmir	38.61639410806327, 27.107098027792627	129
Volkan Güner Poultry Farm	Uluönder Caddesi No:81 / 1-A Yeşilyut Izmir	38.398263779622, 27.115012997143147	
Muzaffer Doydu Hayvancılık	Eşrefpaşa Mahallesi Binbaşi Sokak No:10/2 Menemen Izmir	38.60579358312266, 27.074215997151196	129

The furthest farm to the project site is as it could be checked from the coordinates given above. To be on the safe side the longest distance used for the project emissions due to transportation of all wastes. In fact, agricultural wastes are collected from nearby farms (in Tire district) however, to simplify the calculations and safe calculations the longest root value is also used for the transportation of agricultural wastes and related project emissions. Details could be checked via excel document of the project. As it could be checked the furthest points that waste gathered to project site is Menemen District and the distance to the project site is 128 km (to be on the safe side taken as 129 km in excel calc. doc. Also please check the figure below). Moreover the distances of each farm to project site are given in table above. To be conservative the farthest point of each district is chosen on map to the project site for each farm where located in.



Manure Supplier Farms with Name, Location and Distance to the SÜTAS Tire Biogas Plant Project Site Which Have Agreements Between Project But Could Not Provide Annual Animal Number.

Some of the farms in the region that provide animal manure to the project are small-scale farms. The small scale of these farms creates difficulties in terms of making detailed professional contracts. Therefore, although the farms listed in the table below provide animal manure to the project, they are not willing to update the contract based on the number of animals per year. For this reason, the amount of animal waste from the farms listed below is not included in the emission reduction calculations of this project for now. If the contract with these farms on the basis of the number of animals can be renewed in the future, then they can be included in the calculations, and their information is already shared.

Name of Supplier Animal Farm	Manure Type	Adress	Coordinate
BY TOPRAK İNŞ.TAR.HAY.GIDA SAN.TİC.	Cattle Manure	AYDIN CADDESİ NO:128/5 TORBALI İZMİR	
BY TOPRAK İNŞ.TAR.HAY.GIDA SAN.TİC.	Cattle Manure	AYDIN CADDESİ NO:128/5 TORBALI İZMİR	
ÇETİNEL KARDEŞLER TAR.HAY.NAK.TİC.A	Cattle Manure	ATALAN MAHALLESİ TİRE CADDESİ NO:22 TORBALI İZMİR	
DEFNE TARIM HAYVANCILIK GIDA ÜR.TİC	Cattle Manure	AKKOYUNLU KÖYÜ TİRE İZMİR	
HAFIZ MEHMET ŞENDİL	Cattle Manure	YUSUFLU KÖYÜ BAYINDIR İZMİR	
İZMİR İLİ DAMIZLIK SIĞIR YETİŞTİRİC	Cattle Manure	TURGUTLU,TURGUTLU YOLU 35900 TİRE İZMİR	
KAMİL DOĞAN	Cattle Manure	YEĞENLİ MAHALLESİ TİRE İZMİR	
NAYMAN TARIM VE HAYVANCILIK A.Ş.	Cattle Manure	ADNAN MENDERES KAZANTEPE MEVKİİ NO:3/1 35900 TİRE İZMİR	
TİTAR HAY. GIDA İTH.İHR.SAN.TİC.LTD	Cattle Manure	YENİOBA MAHALLESİ TİRE İZMİR	
BAŞKA YUMURTA GIDA SAN.TİC.LTD.ŞTİ.	Poultry Manure	75.YIL CUMHURİYET MAHALLESİ İNCİRLİPINAR CADDESİ NO:58 KEMALPAŞA İZMİR	
ESEN YUMURTA TARIM HAY.NAK.TİC.LTD.	Poultry Manure	KURTULUŞ MAHALLESİ ADİOBA CADDESİ NO:18/A SARUHANLI İZMİR	
IŞIK YUMURTA GIDA SAN TİC.A.Ş.	Poultry Manure	YENİ MAHALLE İZMİR ANKARA CADDESİ NO:11/2 KEMALPAŞA İZMİR	
KARPUZCULAR TARIM ÜRÜNLERİ HAY.LTD.	Poultry Manure	ÇALTILI MAHALLESİ ÇALTILI SOKAK NO:115 SALİHLİ MANİSA	

The manure coming to the project site is fed up to reactors within 24 hours. Hence it is thought that there is no loss of volatile solid fraction.

	Source	GHGs	Included?	Justification/Explanation
Baseline scenario	Source 1: Emissions from waste treatment process	CO_2	No	CO_2 emissions from the decomposition of organic waste are not accounted.
		CH_4	Yes	The major source of emissions in the baseline.
		N_2O	Yes	Direct and indirect N_2O emissions are accounted.
	Source 2: Emissions from electricity generation	CO_2	Yes	CO_2 emissions from the electricity generation is accounted since project use renewable energy source instead fossil fuel source.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Source 3: Emissions from thermal energy generation	CO_2	Yes	CO_2 emissions from the electricity generation is accounted since project use renewable energy source instead fossil fuel source
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
Project scenario	Source 1: Emissions from waste treatment process	CO_2	No	CO_2 emissions from the decomposition of organic waste are not accounted.
		CH_4	Yes	The emission from anaerobic digesters and aerobic treatment
		N_2O	Yes	. Direct and indirect N_2O emissions are accounted.

Source 2: Emissions from electricity consumption	CO_2	Yes	These emissions are counted for, since the Project will consume electricity from the National Grid.
	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.
Source 3: Emissions from thermal energy use	CO_2	No	There is no project emissions while heat generation since the heat gathered from the cooling activities of gas engines.
	CH_4	No	
	N_2O	No	

B.4. Establishment and description of baseline scenario

Baseline scenario for managing the manure

Identify the baseline scenario and demonstrate additionality using the "Combined tool to identify the baseline scenario and demonstrate additionality", following the requirements below

(ii) For Greenfield facilities

Baseline scenario for manure management was detail explained in following part "(ii) for greenfield facility", but still in addition to that, the same reference document is also mentioned here for the baseline scenario as "uncovered manure management". In the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 4, Chapter 10, Table 10.17), uncovered anaerobic lagoon system and related data to use for baseline consideration and calculations are given in table below. By looking at this table, MFC value of the baseline situation was taken as 76% corresponded to 17.8 Celcius temperature value which is average yearly temperature of the project location.

TABLE 10.17 (CONTINUED)
MCF VALUES BY TEMPERATURE FOR MANURE MANAGEMENT SYSTEMS

System[a]		MCFs by average annual temperature (°C)																			Source and comments
		Cool					Temperate												Warm		
		≤ 10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	≥ 28	
Uncovered anaerobic lagoon		66%	68%	70%	71%	73%	74%	75%	76%	77%	77%	78%	78%	78%	79%	79%	79%	79%	80%	80%	Judgement of IPCC Expert Group in combination with Mangino *et al.* (2001). Uncovered lagoon MCFs vary based on several factors, including temperature, retention time, and loss of volatile solids from the system (through removal of lagoon effluent and/or solids).
Pit storage below animal confinements	< 1 month	3%					3%											30%			Judgement of IPCC Expert Group in combination with Moller *et al.* (2004) and Zeeman (1994). Note that the ambient temperature, not the stable temperature is to be used for determining the climatic conditions. When pits used as fed-batch storage/digesters, MCF should be calculated according to Formula 1.
	> 1 month	17%	19%	20%	22%	25%	27%	29%	32%	35%	39%	42%	46%	50%	55%	60%	65%	71%	78%	80%	Judgement of IPCC Expert Group in combination with Mangino *et al.* (2001). Note that the ambient temperature, not the stable temperature is to be used for determining the climatic conditions. When pits used as fed-batch storage/digesters, MCF should be calculated according to Formula 1.

By implementing anaerobic digesters manure will be digested whilst capturing and utilizing GHGs from them, the proposed project activity will reduce the release to air of methane sourced from uncovered anaerobic animal manure management systems in livestock farms within the region and minimize the adverse impacts of manure on human health and the environment.

The consolidated baseline methodology prescribes the baseline scenario for Greenfield facilities as the situation where, in the absence of the project activity, animal manure is left to decay in uncovered anaerobic lagoons within the project boundary and methane is emitted to the atmosphere.

The Methodology states that, where the baseline scenario is an uncovered anaerobic lagoon, the baseline scenario for managing the manure for Greenfield facilities can be defined by applying the following two steps:

a) "Define several anaerobic lagoon design options for the particular manure stream that meet the relevant regulations and take into consideration local conditions (e.g. environmental legislation, ground water table, land requirement, temperature). Design specifications shall include average depth and surface area of the anaerobic lagoon, residence time of the organic matter, as well as any other key parameters. Document the different design options in a transparent manner and provide transparent and documented evidence of key assumptions and data used, and offer conservative interpretations of this evidence;

b) Carry out an economic assessment of the identified lagoon design option, as per step 3 (investment analysis) of the latest approved version of the "Combined tool to identify the baseline scenario and demonstrate additionality" and additional guidance given below. Choose the least cost anaerobic lagoon design option from the options identified through step (a)

above. If several options with comparably low cost exist, choose the one with the lowest lagoon depth as the baseline lagoon design" (pg. 4).

The common practice for the livestock farm owners is to have uncovered anaerobic lagoons/ponds at their farms in Turkey[2021]. In terms of the residence time of the manure at the lagoons, it is possible to say that since the uncovered lagoons are also fed by rain waters, the lagoons are reaching their full capacities faster than usual in rainy seasons. Nevertheless, the minimum retention time of manure waste in the uncovered anaerobic lagoons is greater than one and half and/or two months through the implementation of the proposed project activity, the manure collected at these lagoons/ponds will be collected daily via special manure trucks and fed into the digesters at the biogas plants.

For step a, proposed project activity meets relevant regulations and take into consideration local conditions since it already has gathered EIA approval/permissions. Moreover pre-project situation is defined above which has negative impact on human health and environment.

For step b, investment analysis is revised due to capacity extension and given in following parts.

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 2019[22].

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*	*TOTAL INSTALLED CAPACITIY (MW)*

[20] Türkiye'de Biyogaz Yatırımları için Gerekli Koşulların ve Potansiyelin Değerlendirilmesi. Yazar: DBFZ - Deutsches Biomasse Forschungs Zentrum gemeinnützige GmbH, Torgauer StraBe 116, 04347 Leipzig. Çeviri: Funda Cansu Ertem. Aralık, 2011

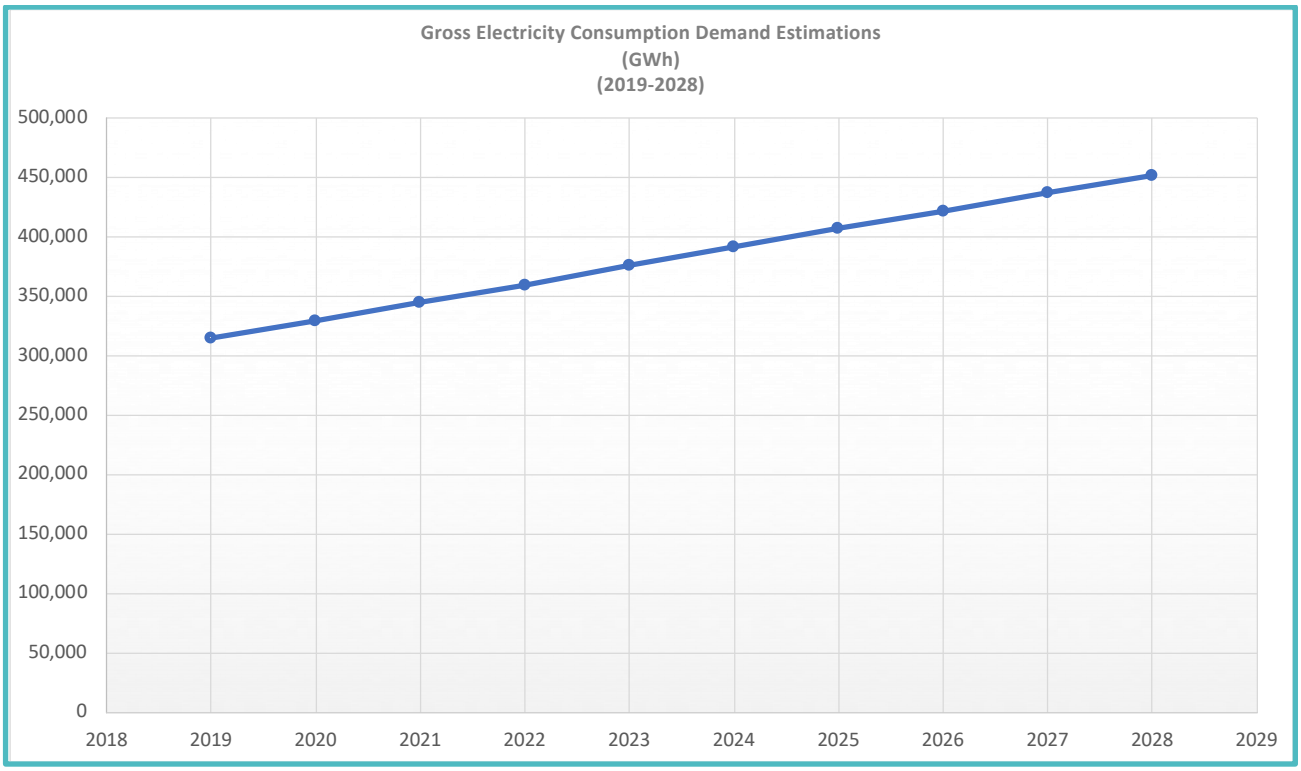
[21] https://www.yatirimadestek.gov.tr/pdf/assets/upload/fizibiliteler/elazig-ili-biyogaz-tesisi-on-fizibilite-raporu2020.pdf

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

						CAPACITY (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%

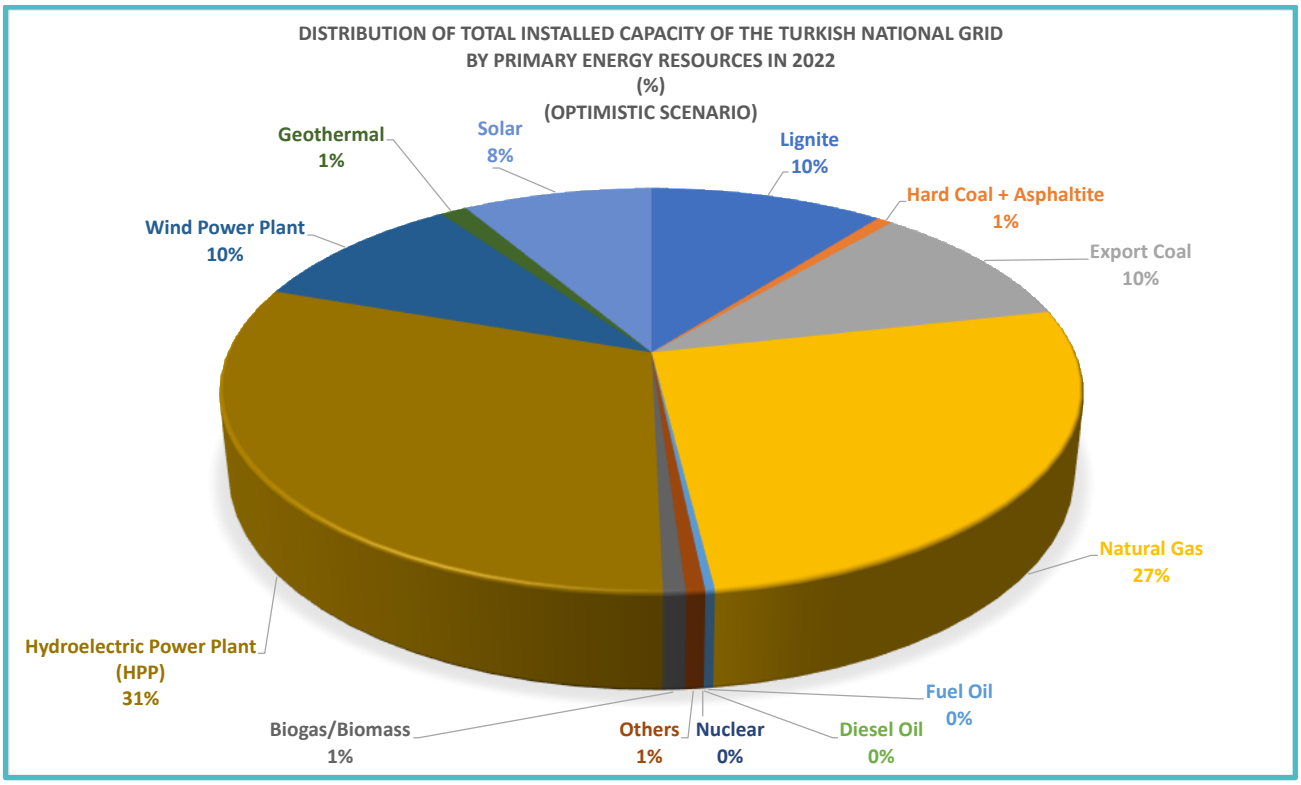
Moreover, Turkey's energy demand is rapidly increasing in line mainly with the increases in its population and its economy. TEİAŞ's estimations on the demand of gross electricity consumption in Turkey between 2019 and 2028 can be seen in the Chart below[23].

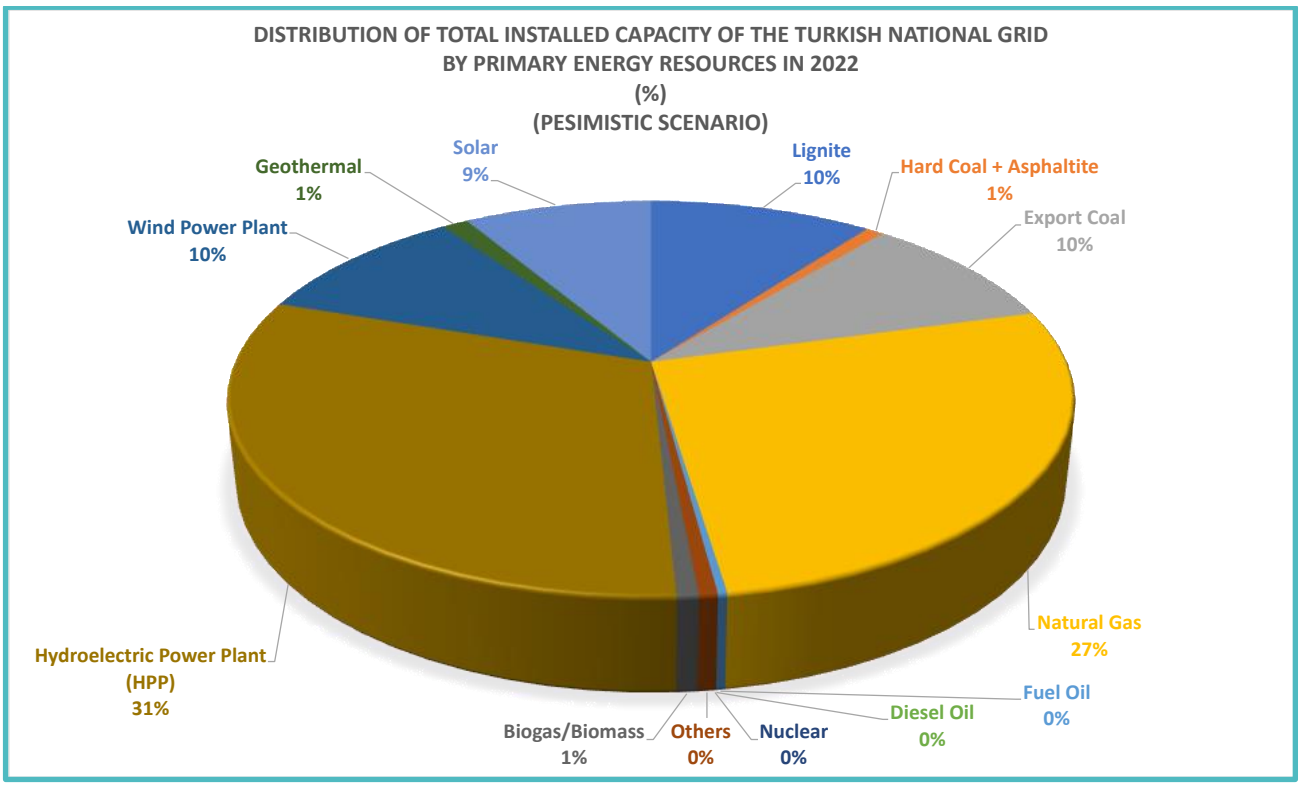
[23] TEİAŞ Report on Demand Estimations in 10 Years, Table 71, pg. 56
https://www.teias.gov.tr/sites/default/files/2019-06/taleprapor_2019-2028.pdf



Moreover, TEİAŞ, in its report on "The Projections on Capacity Generation[24]", 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 2022 both in optimistic and pessimistic scenarios can be seen on the two charts below, respectively.

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





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[25]' 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.

B.5. Demonstration of additionality

Demonstration of additionality is carried as per the methodological tool: "Combined tool to identify the baseline scenario and demonstrate additionality", Version 07.0[26], as given below.

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations

***Sub-step 1a* - Define alternatives to the project activity:**

The most realistic and reliable alternatives to the project activity are:

1. Proposed project is not undertaken as a VER project activity

2. Continuation of the current situation-supply of equal amount of electricity by the newly built grid connected power plants

The first alternative, which is the implementation of the project without carbon revenue is not financially attractive as discussed in investment analysis section below. The Second alternative (Scenario 2) is the baseline scenario and implementation of the proposed project as a VER activity would be additional to this scenario. Continuation of the current situation is not considered as a realistic alternative due to increasing electricity demand therefore new power plants should be constructed which includes mainly thermal power plants. Implementation of the project is additional to the baseline scenario which is alternative 2 above and therefore reduces the emissions.

If it is necessary to follow the steps of the relevant methodology;

Baseline scenario for MSW disposal

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

[26] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf

To identify baseline alternatives for the treatment of the fresh waste, the following alternatives or combinations of these alternatives shall, inter alia, be considered:

M1: The project activity without being registered as a CDM project activity (i.e. any (combination) of the waste treatment options; Composting, Co-composting or anaerobic digestion);

M2: Disposal of the fresh waste in a SWDS with a partial capture of the LFG and flaring of the captured LFG;

M3: Disposal of the fresh waste in a SWDS without a LFG capture system;

M4: Part of the fresh fraction of the solid waste is recycled and not disposed in the SWDS;

M5: Part of the fresh fraction of the solid waste is treated aerobically and not disposed in the SWDS;

M6: Part of the organic fraction of the solid waste is incinerated and not disposed in the SWDS;

M7: Part of the organic fraction of the solid waste is gasified and not disposed in the SWDS;

M8: Part of the organic fraction of the solid waste is treated in an anaerobic digester and not disposed in the SWDS;

M9: Part of the organic fraction of the solid waste is mechanically or thermally treated to produce RDF/SB and not disposed in the SWDS.

In used methodology it is indicated that:

*"This methodology **is applicable to manure management** on one or multiple livestock farms where the existing anaerobic manure treatment system, within the project boundary, is replaced by one or a combination of more than one animal waste management systems (AWMSs) that result in less GHG emissions compared to the existing system….. In addition, the methodology **is also applicable** to the activities that involve co-digestion and/or co-composting of multiple organic matters that would have otherwise been left to decay anaerobically in an animal waste management system (AWMS) or a solid waste disposal site (SWDS).*

- ***"In case of co-digestion**, for one or more sources of substrates, it cannot be demonstrated that the organic matter would otherwise have been left to decay anaerobically, baseline emissions related to such organic matter shall be accounted for as zero, whereas project emissions shall be calculated according to the procedures presented in this methodology for all co-digested substrates"*

Hence, to return our project, MSW is not used in this project as indicated before and as understood from the methodological statements, we have an option (in case of…) to not

use MSW in the operation of the project and so there is no need to apply ACM022 for applicability condition of MSW perspective.

Since the project does not use municipal solid waste (MSW), the alternatives given above is not related with this project.

Baseline scenario for electricity and heat generation

In addition to the alternative baseline scenarios identified for managing the manure, alternative scenarios for the use of gas generated from an anaerobic digester (biogas) shall also be identified if this is an aspect of the project activity:

For electricity generation, alternative(s) shall include, inter alia:

E1: Electricity generation from biogas, undertaken without being registered as CDM project activity;

E2: Electricity generation in existing or new renewable based captive power plant(s);

E3: Electricity generation in existing and/or new grid-connected power plant;

E4: Electricity generation in an off-grid fossil fuel fired captive power plant;

E5: Electricity generation in existing and/or new grid-connected power plant and fossil fuel fired

captive power plant(s).

Methodology indicates that baseline emissions due to electricity generation can be accounted for **only** if the baseline scenario is E3, In terms of this project baseline scenario E3 is valid since project provides electricity generation via biogas production from manure management instead of electricity generated from fossil fuels which supplied to national grid. Biogas only use for electricity generation in this project.

For heat generation, alternative(s) shall include, inter alia:

H1: Heat generation from biogas undertaken without being registered as CDM project activity;

H2: Heat generation in existing or new fossil fuel fired cogeneration plant(s);

H3: Heat generation in existing or new renewable based cogeneration plant(s);

H4: Heat generation in existing or new on-site or off-site fossil fuel based boiler(s) or air heater(s);

H5: Heat generation in existing or new on-site or off-site renewable energy based boiler(s) or air

heater(s);

H6: Any other source, such as district heat; and

H7: Other heat generation technologies (e.g. heat pumps or solar energy).

As per applied methodology, baseline emissions due to heat generation can be accounted for only if the baseline scenario is H4. In terms of this project baseline scenario H4 is valid since project provides heat generation after biogas production and electricity generation depending on methane in biogas which is used instead of heat generated from coal or natural gas in existing or new on-site or off-site fossil fuel based boiler(s) or air heater(s)

Sub-Step 1a: Define alternative scenarios to the proposed CDM project activity

Step 1a: Define alternatives to the project activity

The alternatives to the project activity are defined as per of the applied additionality tool:

a) The tool suggests taking into account the implementation of the Project without being registered as a CDM Project activity.

S1: The proposed project activity undertaken without being registered as a CDM project activity;

b) As per paragraph 20-b of the applied tool, other realistic and credible scenarios which deliver comparable output services should be considered.

S2: Where applicable, no investment is undertaken by the project participants but third party(ies) undertake(s) investments or actions which provide the same output to users of the project activity, for example

- In the case of a Greenfield power project, an alternative scenario may be that the project participants would not invest in another power plant but that power would be generated in existing and/or new power plants in the electricity grid. Since there is no common practice for profitable commercial activity in waste management, only comparable parameter is the building and operation of a power plant for energy generation.

c) Continuation of the current situation (no project activity or other alternatives undertaken)

S3: Where applicable, the continuation of the current situation, not requiring any investment or expenses to maintain the current situation, such as, inter alia:

- The continued venting of methane from lagoons

d) Other plausible scenarios

S4: Where applicable, the continuation of the current situation, requiring an investment or expenses to maintain the current situation.

S5: Other plausible and credible alternative scenarios to the project activity scenario, including the common practices in the relevant sector, which deliver the same output, taking into account, where relevant, examples of scenarios identified in the underlying methodology.

- The common practice in the sector is the collection of waste in anaerobic lagoons, which leads to higher methane emissions and fails to deliver the same outputs.

S6: Where applicable, the "proposed project activity undertaken without being registered as a CDM project activity" to be implemented at a later point in time (e.g. due to existing regulations, end-of-life of existing equipment, financing aspects)

Scenarios 4, 5 and 6 are not applicable as there is no requirement for investment for continuation of the current situation or no reason expected for change in regulations etc. S1, which is the implementation of the project without carbon revenue is not financially attractive as discussed in investment analysis section below. S2 is not also realistic as the energy demand is increasing and the need for new power plant investment is a must for Turkey. The second and third scenarios partially and jointly form the baseline scenario and implementation of the proposed project as a VER activity would be additional to this scenario in terms of reducing methane venting and meeting increasing energy demand.

Sub-step 1b. Consistency with mandatory laws and regulation

The following applicable mandatory laws and regulations have been identified:

1. Electricity Market Law[27]

2. Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy[28]

3. Energy Efficiency Law [29]

4. Forest Law[30]

5. Environment Law[31]

6. Waste Management Regulation[32]

27 Law number 6446, Published in official gazette No. 28603 on 30/03/2013 http://www.mevzuat.gov.tr/MevzuatMetin/1.5.6446.pdf

28 Law number 5346, Published in official gazette No. 25819 on 18/05/2005 http://www.mevzuat.gov.tr/MevzuatMetin/1.5.5346.pdf

29 Law number 5627, Published in official gazette No. 26510 on 02/05/2007 http://www.mevzuat.gov.tr/MevzuatMetin/1.5.5627.pdf

30 Law number 6831, Published in official gazette No. 9402 on 08/09/1956 http://www.mevzuat.gov.tr/MevzuatMetin/1.3.6831.pdf

31 Law number 2872. Published in official gazette No. 18132 on 11/08/1983 http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf

32 https://www.resmigazete.gov.tr/eskiler/2015/04/20150402-2.htm

Outcome of Step 1b

Mandatory legislation and regulations for each alternative are taken into account in sub-step 1b. The resultant alternatives to the project as outlined in Step (1a) are in compliance with the applicable laws and regulations.

B.5.1 Prior Consideration

Project considers VER claims in 2016 and listed in GS system in 2016 also which could be checked via milestone table in Section A.1. The date of LSC meeting of the project and listing date is before the actual project operation started and this situation is proven with provincial acceptance protocol dates.

Step 2 - Investment analysis

The investment analysis has been done in order to make an economic and financial evaluation of the project. No public funding or ODA are available in Turkey for finance of this type of projects. For investment analysis, loan conditions have been determined considering the average market rates/term sheets signed with the banks. In this document, investment analysis follows the recommendations of "Am-tool 27,v.10.0: Investment analysis"[33]

***Sub-step 2a* - Determine appropriate analysis method**

There are three options for the determination of analysis method which are:

- Simple Cost Analysis
- Investment Comparison Analysis and
- Benchmark Analysis

Since Project generates economic benefits from sales of electricity, the simple cost analysis is not applicable. Also, since the baseline of the project is generation of

[33] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v10.0.pdf

electricity by the grid, no alternative investment is considered at issue. So, it has been decided to use benchmark analysis for evaluation of the project investment.

Sub-step 2b: Option III. Apply benchmark analysis

For benchmark analysis, figure defined by OECD for similar project types have been used which has been given as 12% in the "The Role of Institutional Investors in Financing Clean Energy", OECD Working Papers on Finance (page 23 of document)[34]. For the proposed project, in order to reach this equity IRR (after taxes) values, average electricity tariff must be above 13.5 $c/kWh in the absence of carbon revenue and assuming that initial investment figures are realized so that the investment will become reasonable.

Sub-step 2c. Calculation and comparison of financial indicators

Parameters	Unit	Data Value
Installed Capacity	MWe	4,268[35]
Grid Connected output	GWh	29,876 [38]
Capital Investment	Million $	~9,467,000
O&M Cost (including annual rental fee of land)	1000 $	2,582 [36]
Income tax rate	%	22
Feedi n Tariiff/Market price after 10th years	$ Cents/kWh	13.3
Expected VERs price[37]	$/ tCO_2e	3

[34] Kaminker, Ch., Stewart, F. (2012), "The Role of Institutional Investors in Financing Clean Energy", *OECD Working Papers on Finance, Insurance and Private Pensions*, No.23, OECD Publishing.

[35] Generation licence

[36] IRR calculation sheet of the Project

[37] State of Voluntary Carbon Markets Report 2017 (as the average voluntary offset price of 2017

Table 7. Main financial parameters used for investment analysis

Internal Rate of Return (IRR) of the proposed project has been calculated as 10.94% based on the parameters given above without considering the carbon revenue. Project does not use any ODA or government incentive and bank loan is not intended to be used. Electricity tariff has been used as $13.3. Annual generation has been taken as 29.876 GWh as indicated in generation licence. Although detailed analysis show that actual generation will be lower. Considering carbon revenue and the carbon price same (3$/t CO_2e) as during the first crediting period, IRR increases to 11.41 % and becomes more feasible with the expectation that electricity tariff will increase due to increasing electricity demand of Turkey and project will benefit from increasing price at the market.

Acceptable IRR values for energy investments in Turkey are, given the present economic uncertainty, are expected at yields in excess of 15% per annum. Even if we include the carbon revenue in the cash flow (which is, equity IRR increases to 11.41% which is still lower than the accepted benchmark rates. Considering the market price risk, it can be concluded the extension will make the investment more feasible however, it will still be below the benchmark IRR.

Sub-step 2d - Sensitivity Analysis

Sensitivity analysis had been carried out for three main parameters identified for the first phase of the project. However, since the investment cost for extension is based on signed agreements and operating cost is not changed after extension, which is a conservative approach, only impact of change in tariff has been included in sensitivity analysis.

- Investment Cost
- Operating Cost
- Electricity Sales revenue

For a range of ± 15% fluctuations in parameters	**-15**	**-10**	**-5**	**0**	**+5**	**+10**

above, table below has been obtained.						
% Fluctuation						
Investment Cost	13.26	12.41	11.65	10.94%	10.30	9.70
Operating Cost	14.30	13.19	12.07	10.94%	9.81	8.68
Electricity Income	5.83	7.55	9.26	10.94%	12.62	14.28

Table 8. Sensitivity analysis for SÜTAS Tire Biogas Plant Project (without carbon revenue)

Outcome of Step 2:

The investment and sensitivity analysis shows that the VER revenues will improve the financial indicators of the Project remarkably. Considering that figures above are based on a higher price rather than the government guaranteed floor price, optimistic estimations for yearly generation and that those figures do not reflect the risk for investment, role of carbon income is a most significant number to enable the project to proceed.

Another important parameter affecting equity IRR is investment cost. However, since the agreements have been made and costs are realized as given in financial model, there is no chance to expect a decrease in the investment cost. Operating costs can also affect the equity IRR however, its impact is not significant and does not cause any significant change in equity IRR and the fluctuation percentage to reach the benchmark is very high and not likely. Based on the above information, it is seen that project is not the most attractive option. Therefore project is considered as additional to the baseline scenario.

Step 3. Barrier analysis

This step is not applied as per the tool.

Step 4. Common Practice Analysis**Sub-step 4a. Analysis of other activities similar to the proposed project activity**

According to the "Tool for the demonstration and assessment of additionality", Version 07.0.0", the common practice (Tool 24 - Common Practice version 03.1 has been followed[38]) shall provide an analysis of any other activities that are similar to the Project Activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing etc.

This project stated commercial operation in 2016 (and also listed in GS 2016 when the local stakeholder report was sumitted to GS and approved after two review round in the same year) and stakeholder consultation was also originated in 2016. Since tool 24 states *"The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity 2015* projects are taken into consideration for common practice analysis.

According to the latest capacity projection report published by General Directorate of Energy Affairs [39], there are 206 renewable energy plants started to operational in Turkey for the investment year 2016 (till now) and 19 of them are belonged to biomass energy and 6 of them has the similar technology with SÜTAS Tire Biogas Plant (details are present in common practice excel sheet of SÜTAS Tire Biogas Plant Project). List of the plants that have similar technology with SÜTAS Tire Biogas Plant is given below. Other details are present in common practice excel document.

[38] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf

[39] https://www.eigm.gov.tr/File/?path=ROOT%2f4%2fDocuments%2fSayfalar%2f2016+Y%c4%b1l%c4%b1+Enerji+Yat%c4%b1r%c4%b1mlar%c4%b1.xlsx

No	Name of plant
1	ITC-KA BİYOKÜTLE GAZLAŞTIRMA TESİSİ
2	TİRE OSB BİYOGAZ SANTRALİ
3	KARACABEY-2 BİYOGAZ TESİSİ
4	ODAYERİ BİYOGAZ
5	AFYON-I BİYOGAZ SANTRALİ
6	ITC-KA ÇARŞAMBA ÜRETİM TESİSİ
7	SİVAS ÇÖP GAZ ELEKTRİK ÜRETİM TESİSİ
8	AREL YENİLENEBİLİR ENERJİ ISPARTA BİYOKÜTLE TESİSİ
9	TİRE BİYOGAZ TESİSİ
10	AFYONKARAHİSAR SANDIKLI BİYOKÜTLE ÜRETİM TESİSİ
11	MARAŞ BİYOKÜTLE TESİSİ
12	ZEUS BİYOKÜTLE ENERJİSİNE DAYALI ELK. ÜRT. TESİSİ
13	MAS 1 YENİLENEBİLİR ENERJİ ÜRETİM TESİSİ
14	HATAY GÖKÇEGÖZ ÇÖP SANTRALİ
15	MALATYA-1 ÇÖP GAZ ELEKTRİK ÜRETİM TESİSİ
16	MUTLULAR BES
17	ATLAS İNŞAAT OSMANİYE ÇÖP GAZI ELEKTRİK ÜRETİM TESİSİ

18	SENKRON EFELER BİYOGAZ SANTRALİ
19	KOCAELİ ÇÖP BİYOGAZ SANTRALİ

Plants started to operation in Turkey, 2016 (based on biomass energy)

As per Tool:

Sub-Step 4.1:Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The design capacity of the proposed project is 4.268 MWe. Therefore, the applicable output range is from 2.134 MWe-6.40 MWe. The plants within this range are given below.

Sub-Step 4. **2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:**

(a) The projects are located in the applicable geographical area;
(b) The projects apply the same measure as the proposed project activity;
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity

The 8 plants listed below meets the conditions of "a", "b", "d" and "e". All of them in Turkey (2016 investments, within the applicable range of output/capacity and producing goods within same measure.

No	Name of plant	Capacity (MWe)
1	TİRE OSB BİYOGAZ SANTRALİ	2,2
2	KARACABEY-2 BİYOGAZ TESİSİ	2,134
3	ODAYERİ BİYOGAZ	3,134
4	AREL YENİLENEBİLİR ENERJİ ISPARTA BİYOKÜTLE TESİSİ	2,83
5	HATAY GÖKÇEGÖZ ÇÖP SANTRALİ	4,24
6	ATLAS İNŞAAT OSMANİYE ÇÖP GAZI ELEKTRİK ÜRETİM TESİSİ	3,12
7	ITC-KA BİYOKÜTLE GAZLAŞTIRMA TESİSİ	5,425

However, in terms of conditions "c"; "Odayeri", "ITC Biykütle Gazlaştırma", "Hatay Gökçegöz Çöp Santrali" , "Atlas İnşaat Elektrik Üretim Tesisi" and "Arel Yenilenebilir Enerji Santrali" are biomass sourced in terms of fuel but different process technology since do not use manure as raw material (these plants use municipial solid waste and forestry waste as raw material/fuel). Moreover, "Hatay Gökçegöz Çöp Santrali" , "Atlas İnşaat Elektrik Üretim Tesisi" started to commercial operation after then SÜTAS Tire Biogas Plant (in other words, before the start date of proposed project activity) which does not comply with condition "f". Therefore, only two plants remains which are Tire and Karacabey Biogas Plants.

Sub-Step 4. **3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number Nall.**

No	Name of plant	Capacity (MWe)	VER Reference and Explanation
1	TİRE OSB BİYOGAZ SANTRALİ	2,2	https://registry.goldstandard.org/projects/details/129 (in applicable design capacity range but has VER reference already)
2	KARACABEY-2 BİYOGAZ TESİSİ	2,134	https://registry.goldstandard.org/projects/details/135 (in applicable design capacity range but has VER reference already)

Since Karacabey Biogas Plants is VER project (registered and even Karacabey Biogas Plant Project issued) with given references. Therefore:

$N_{all}=1$

*Sub-Step 4.3: W*ithin similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number Ndiff.

SÜTAS Tire and Karacabey Biogas Plants projects have the same technology (used manure as main fuel source) and even belonged to same company with SÜTAS Tire Biogas Plant Project. Therefore:

$N_{diff} = 0$

Sub-Step 4.4: Calculate factor $F=1-N_{diff}/N_{all}$ *representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity*

$F=1-N_{diff}/N_{all}=1-(0/1) = 1$ (< 0.2)

$N_{all}-N_{diff}= 1 - 0 = 1$ (≤ 3)

According to the guidelines on common practice version 02.0, if the factor F is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3, then the proposed project is a "common practice".

For the proposed project, $F=1$ (greater than 0.2) but $N_{all}-N_{diff}=1$ (smaller than 3), therefore, the proposed project is not common practice within the region. Hence, the proposed project is additional.

Outcome of Step 4

Given the fact that there are no registered plants similar to the proposed project and built without carbon revenue, the proposed type of project should not be considered as a common practice in Turkey.

Brief Outcome of Step 1,2,3 and 4

Based on the above analysis, the proposed VER project activity is considered as additional.

B.5.2 Ongoing Financial Need

As it is discussed in Step 2 in detail, project needs carbon revenue to become more attractive.

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)	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	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
8 Decent Work and Economic	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities
		8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status
	8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status
12 Affordable and Clean Energy	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	Waste treated via anaerobic digestion such as cattle and poultry manure
7 Affordable and Clean Energy	By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption

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

SDG 7: Affordable and Clean Energy

Relevant Target of SDG 7

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

Relevant Indicator of SDG 7

7.2.1 Renewable energy share in the total final energy consumption

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel and this is one of the methodological reason for choosing simple OM method to calculate emission factor. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 29.876 GWh of 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.

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

Relevant Target of SDG 8

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

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

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

The project promotes job opportunities for 22employees. Social security documents of employees are the certain prove of that issue.

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

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

Training (including H&S) & Other Certification processes required by certain necessary professions will be provided to employees to protect human health&rights and develop. Hence, project contributes 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.

"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":

SDG 12: Responsible Consumption and Production: Ensure sustainable consumption and production patterns.

Relevant SDG Target 12.4: "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment".

Relevant Indicator of SDG 12

Proposed indicator: Waste treated via anaerobic digestion such as cattle and poultry manure

By implementing anaerobic digesters manure will be digested whilst capturing and utilising GHGs from them, the proposed project activity will reduce the release to air of methane sourced from uncovered anaerobic animal manure management systems in livestock farms within the region and minimize the adverse impacts of cattle manures on human health and the environment. Indicator 12.4.1 may imply increase of waste management in line with international multilateral environmental aggrements in which Turkey has already been one of the parties to the international conventions[40].

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

Relevant Target of SDG 13

[40] 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

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Relevant Indicator of SDG 13

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

The project leads to mitigation of 114,851 tCO_2 per annum. It is also expected to reduce SO_2 and NOx emissions by 174.3 tonnes/ yr and 35.2 tonnes / yr, respectively. The project contributes to the target of SDG 13 which could be expressed via following indicator:

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

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. According to that reference, the combined margin for biogas project could be taken as 0.5706 tCO_2/MWh

B.6.2 Data and parameters fixed ex ante

SDG13

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

Data/parameter	MCF_j
Unit	N/A
Description	Methane conversion factor
Source of data	2019 IPCC Refinement, Table 10.17, p. 10.74 refered 76% for the uncovered anaerobic lagoon and this data used by doing corrections as explained in "any comment raw"
Value(s) applied	0.71
Choice of data or Measurement methods and procedures	Uncovered anaerobic lagoon, Value for 17.9°C.
Purpose of data	Used in project emission/baseline calculations.
Additional comment	As per the methodology, A conservativeness factor applied by multiplying MCF with a value of 0.94, to account for the 20% uncertainty in the MCF

Data/parameter	$EF_{CH4,default}$
Unit	Fraction
Description	Default emission factor for the fraction of CH4 produced that leaks from the anaerobic digester.
Source of data	Project and leakage emissions from anaerobic digesters", Version 02.0[41], pg. 11-12
Value(s) applied	0.028

[41] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-14-v2.pdf

Choice of data or Measurement methods and procedures	Digesters with steel or lined concrete or fiberglass digesters and a gas holding system and monolithic construction.
Purpose of data	Used in project emission calculation.
Additional comment	-

Data/parameter	D_{CH4}
Unit	t/m^3
Description	Density of CH_4
Source of data	The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure

	Management Systems and Municipal Solid Waste[42], pg. 25.
Value(s) applied	0.00067
Choice of data or Measurement methods and procedures	0.00067 t/m^3 at room temperature (20 °C) and 1 atm pressure
Purpose of data	Used in project emission/baseline calculations.
Additional comment	-

Data/parameter	Wdefault
Unit	kg
Description	Default average animal weight of a defined population
Source of data	IPCC 2006[43]
Measurement procedures (if any)	
Purpose of data	Used in baseline calculations.
Additional comment	Default value from IPCC is used as per the applied methodology (550 kg for Eastern Europe)

Data/parameter	VS_{LT}
Unit	kg dm/animal/year
Description	Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis

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

[43] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_10_Ch10_Livestock.pdf, page 10.72

Source of data	IPCC 2006 vol.4, chapter 10, Table10A-9(Chicken-layer) (0.02 kg/hd/day)
Value(s) applied	7.30 (for chicken manure)
Measurement methods (if any)	-
Purpose of data	Used in baseline calculations.
Additional comment	For the calculation of $VS_{LT,y}$ Option 4 is chosen and default and regional IPCC data is used.

Data/parameter	VS_{LT}
Unit	kg dm/animal/year
Description	Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis
Source of data	IPCC 2006 vol.4, chapter 10, Table10A-4(Dairy Cows eastern Europe) (4.5 kg/hd/day)
Value(s) applied	1,642.5 (for cattle manure)
Measurement methods (if any)	-
Purpose of data	Used in baseline calculations.
Additional comment	For the calculation of $VS_{LT,y}$ Option 4 is chosen and default and regional IPCC data is used.

Data/parameter	EFgrid
Unit	ton CO2/MWh
Description	Grid emission factor
Source of data	Country specific data

Value(s) applied	0.5706
Measurement methods (if any)	-
Purpose of data	Used in emission reduction calculations
Additional comment	Latest official emission factor of Turkey used in the projects depending on the project type published by the Ministry of Energy and Natural Resources. As per this reference; OM is 0.7258 and BM is 0.4153 tCO2/MWh for Turkey National Grid. During CM calculation as per related tool, these values were taken into considedration. Details are present in "CM" tab of project excel ER calculation file.

Data/parameter	fCH4,default
Unit	m3 CH4 / m3
Description	Default value for the fraction of methane in the biogas (m3 CH4 / m3 biogas)
Source of data	Project and leakage emissions from anaerobic digesters https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-14-v2.pdf
Value(s) applied	0.6
Measurement methods (if any)	Default value
Purpose of data	To calculate project and leakage emissions
Additional comment	fCH4,default

Data/parameter	$\eta_{flare,m}$
Unit	%
Description	Flare efficiency

Source of data	Tool to determine project emissions from flaring gases containing methane
Value(s) applied	%50
Choice of data or Measurement methods and procedures	Used in project emission calculations

Purpose of data	Default value for open flare provided that it can be demonstrated that the flare is operational.[44]
Additional comment	

Data/parameter	$\eta_{BL,thermal}$
Unit	%
Description	The efficiency of boilers
Source of data	TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems, Version 03.
Value(s) applied	92
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Baseline emission calculation
Additional comment	-

Data/parameter	$B_{0,LT}$ for Dairy Cow Manure
Unit	m^3CH_4/kg_dm
Description	Maximum methane producing potential of the volatile solid generated by animal type LT
Source of data	IPCC 2019 Refinement, Chapter 10, Volume 4 Table 10.16, Eastern Europe Data is taken[45]
Value(s) Applied	0.24

[44] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v1.pdf (footnote 3)

[45] https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch10_Livestock.pdf

Choice of data or Measurement methods and procedures	-
Purpose of data	- Used in project emission/baseline calculations.
Any comment	The value is taken from published sources. The parameter value should be updated on latest available public data source

Data/parameter	$B_{0,LT}$ for Poultry manure
Unit	m^3CH_4/kg_dm
Description	Maximum methane producing potential of the volatile solid generated by animal type LT
Source of data	IPCC 2019 Refinement, Chapter 10, Volume 4 Table 10.16, Eastern Europe Data is taken[46]
Value(s) Applied	0.39
Choice of data or Measurement methods and procedures	-
Purpose of data	Used in project emission/baseline calculations.
Any comment	The value is taken from published sources. The parameter value should be updated on latest available public data source

B.6.3 Ex ante estimation of SDG Impact

1 – Affordable and Clean Energy (SDG 7):

The project is expected to generate 29.876 GWh of clean energy per annum and contributes to share of low-cost / must-run sources.

[46] https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch10_Livestock.pdf

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

The project promotes job opportunities for 22 employees. 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.

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

3- Responsible Consumption and Production: Ensure sustainable consumption and production patterns (SDG 12)

The project provides better management option for wastes as around 95 tonne/day (Project EIA Report, page 8)

4 – Climate Action (SDG 13):

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

The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste[47] (pg. 21) states that the emission reduction ER_y by the project activity during a given year y is the difference between the baseline emissions (BE_y) and the sum of project emissions (PE_y) and leakage, as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

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

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

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

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

LE_y = Leakage emissions in year y (tCO_2/yr)

Accordingly,

ER_y =120,508 tCO_2/yr –5,656 tCO_2/yr **ER_y** **= 114,851 tCO_2/yr**

As per applied methodology;

The emission reductions achieved in any year are the lowest value of the following:

ERy,ex post = min [(BEy,ex post – PEy,ex post – LEy,ex post), (MDy – PE,y,ex post– LEy,ex post)] (Equation 34 of applied methodology)

Where:

ERy,ex post = Emission reductions achieved by the project activity based on monitored values in year *y* (tCO*2*/a)
BEy,ex post = Baseline emissions calculated using equations provided by ACM0010 and ACM0022 with *ex post* monitored values in year *y* (tCO*2*/a)

PEy,ex post = Project emissions calculated using equations provided with *ex post* monitored values in year *y* (tCO*2*/a)

LEy,ex post = Leakage emissions calculated with ex post monitored values in year *y* (tCO*2*/a)

MDy = Methane captured and destroyed or used gainfully by the project activity in year *y* (tCO*2*e/a)

This project does not used methane for any other purpose apart from electricity generation via gas motors. Therefore; Euation 34 could be simplified for this project as follows

ERy,ex post = min [(BEy,ex post – PEy,ex post – LEy,ex post)

In detail:

Baseline Emissions from Animal Waste Treatment

As stated and justified earlier in the PDD, the Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste[48] is applied to the proposed project activity via followed formula (equation 1 in applied methodology);

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

$$BE_y = BE_{MSW,y} + BE_{manure,y}$$

Since project does not use municipal solid waste the baseline emission calculations could be on-going as follows.

$$BE_{Manure} = BE_{CH4,y} + BE_{N2O,y} + BE_{elec/heat,y}$$

(**Equation 2** from The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste, December 2013)

Where:

$BE_{manure,y}$ = Baseline emissions in year y (tCO_2/yr)

$BE_{CH4,y}$ = Baseline CH_4 emissions in year y (tCO_2/yr)

$BE_{N2O,y}$ = Baseline N_2O emissions in year y (tCO_2/yr)

$BE_{elec/heat,y}$ = Baseline CO_2 emissions from electricity and/or heat used in the baseline (tCO_2/yr)

NOTE: $E_{N2O,D,y}$ and $E_{N2O,ID,y}$ emissions equations for the baseline emissions ($BE_{N2O,y}$ page 11 of The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste, December 2013) and project emissions ($PE_{N2O,y}$ page 15 of The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste, December 2013) calculation equations are given same in the Gold Standard's consolidated baseline methodology. Same situation is present in CDM Methodology ACM0010 (ver.08) that consolidated GS Methodology is based on. This would led emission calculations as zero since baseline and project emissions become equal within this calculation pathway.

Throught note stated above $BE_{Manure,y}$ becomes:

$BE_{Manure,\ y} = BE_{CH4,\ y} + BE_{elec\ /\ heat,\ y}$

Baseline CH_4 emissions from manure treatment ($BE_{CH4,y}$):

The manure management system in the baseline could be based on different livestock, treatment systems and on one or more stages. Therefore:

$$BE_{CH4,y} = GWP_{CH4} \times D_{CH4} \times \sum_{j,LT} (MCF_j \times B_{0,LT} \times N_{LT,y} \times VS_{LT,y} \times MS\%_{Bl,j})$$

(**Equation 3,** from The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste, December 2013)

Where:

$BE_{CH4,y}$ = Baseline emissions in year y (t CO_2)

GWP_{CH4} = Global Warming Potential (GWP) of CH_4 applicable to the crediting period (t CO_2e/t CH_4)

D_{CH4} = CH_4 density (0.00067 t/m^3 at room temperature (20 °C) and 1 atm pressure)

$N_{LT,y}$ = Annual average number of animals of type LT for the year y (number)

$VS_{LT,y}$ = Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)

LT = Index for all types of livestock

j = Index for animal manure management system

MCF_j = Annual methane conversion factor (MCF) for the baseline Animal Manure Management System (AWMS) j

$B_{0,LT}$ = Maximum methane producing potential of the volatile solid generated for animal type LT (m^3CH_4/kg-dm)

$MS\%_{BI,y}$ = Fraction of manure handled in system j in the baseline

For the calculation of $N_{LT,y}$ Option 2 is chosen from applied methodology. Project has signed aggrements with annual average live animal number with farms. Hence these data used for $N_{LT,y}$ calculation. Details of animal number are given in Section B.3 and emission reduction calculation excel document.

For the calculation of $VS_{LT,y}$ Option 4 is chosen and default and regional IPCC data is used (both for cattle manure and chicken layer).

As a result of explained calculation pathway (details given in ER calculation sheet):

$BE_{CH4,y}$ = 101,991 tonnes CO2/year (with GWP 28; after 31/12/2020)

$BE_{CH4,y}$ = 91,063 tonnes CO2/year (with GWP 25; before 31/12/2020)

Baseline emissions associated with electricity generation (BEEC,y)

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

$$BE_{EG} = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where:

BE_{EG}	= Baseline emissions associated with electricity generation in year *y* (t CO_2)
$EG_{BL,y}$	= Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{CO2,grid,y}$	= CO_2 emission factor of the grid in year *y* (t CO_2/MWh)

BE_{EG} = 29.876 GWh x 0.5706 tonnes CO2/GWh

BE_{EG} = **17,046 tCO2e** (details are present in ER calculation sheet of the project)

Baseline emissions associated with heat generation (BEEC,y)

The baseline emissions associated with heat generation in year *y* (*BEHG,y*) are determined based on the amount of biogas which is sent to the heat generation equipment in the project activity (boiler or air heater), as follows:

$$BE_{HG,y} = \sum_{k=1}^{n} \frac{HG_{PJ,k,y} \times EF_{CO2,BL,HG,k}}{\eta_{HG,BL,k}} \quad (11)$$

Where:

$BE_{HG,y}$	=	Baseline emissions associated with heat generation in year *y* (tCO_2/yr)
$HG_{PJ,k,y}$	=	Net quantity of heat generated with biogas by equipment type k in the project in year *y* (TJ/yr)
$EF_{CO2,BL,HG,k}$	=	CO_2 emission factor of the fossil fuel type used for heat generation by equipment type *k* in the baseline (t CO_2/TJ)
$\eta_{HG,BL,k}$	=	Efficiency of the heat generation equipment type *k* used in the baseline
k	=	Heat generation equipment (boiler or air heater or kiln)

BE_{EG} = **2,753 tCO2e** (details are present in ER calculation sheet of the project)

Total of Baseline Emissions

$$BE_{Manure} = BE_{CH4,y} + BE_{elec/heat,y}$$

$BE_{Manure} = 72{,}403 + 17{,}046 + 2{,}753 = \mathbf{121{,}789\ tonnes\ CO2/year}$ **(with GWP 28; after 31/12/2020)**

$BE_{Manure} = 64{,}645 + 17{,}046 + 2{,}753 = \mathbf{110{,}861\ tonnes\ CO2/year}$ **(with GWP 25; before 31/12/2020)**

Project Emissions

The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste[49] states that project emissions in year y are calculated for alternative waste treatment option implemented in the project activity as follows:

$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{Comp,y} + PE_{N2O,y} + PE_{EC/FC,y} + PE_{Tran,y} + PE_{Storage,y}$

Where:

PE_y = Project emission in year y (t CO_2)

$PE_{AD,y}$ = Project emissions associated with the anaerobic digester / co-digestion in year t (tCO_2e/yr)

$PE_{Aer,y}$ = Project CH_4 emissions from aerobic AWMS treatment (tCO_2e/yr)

$PE_{Comp,y}$ = Project CH_4 emissions from composting/ co-composting (tCO_2e/yr)

$PE_{N2O,y}$= Project N_2O emissions in year y (tCO_2/yr)

$PE_{EC/FC,y}$ = Project emissions from electricity consumption and fossil fuel combustion (tCO_2/yr)

$PE_{Tran,y}$ = Project emissions from manure transportation in the year y (tCO_2/yr)

$PE_{Storage,\ y}$ = Project emissions from manure storage (tCO_2e/yr)

Since the proposed project activity does not consist of aerobic AWMS treatment, $PE_{Aer,y}$ shall be accounted as zero. In addition, for the Project does not involve composting, $PE_{Comp,y}$ shall be accounted as zero too. Moreover, the proposed project activity does

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

not consume fossil fuel for heat purposes, since the heat power generated as a by-product is used within the Project site. Thus, $PE_{FC,y}$ shall be accounted as zero. Furthermore, since the manure is not stored in outdoor open storage tanks more than 24 hours, $PE_{Storage,y}$ shall be accounted as zero. Moreover, since $E_{N2O,D,y}$ and $E_{N2O,ID,y}$ emissions equations for the baseline emissions ($BE_{N2O,y}$ page 11 of The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste, December 2013) and project emissions ($PE_{N2O,y}$ page 15 of The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste, December 2013) calculation equations are given same in the Gold Standard's consolidated baseline methodology, this would led emission calculations net emissions based on N2O as zero as also explained in baseline emissions calculation part of this document. Hence, the project emission equation could be simplified as;

$$PE_y = PE_{AD,y} + PE_{EC,y} + PE_{Tran,y}$$

Project emissions associated with the anaerobic digester in year y (PEAD,y)

The consolidated baseline methodology states that $PE_{AD,y}$ is determined using the methodological tool 'Project and leakage emissions from anaerobic digesters' (pg. 13). As per this, the methodological tool, Version 02.0[50], as its latest approved version, shall apply to the proposed project activity.

The paragraph 13 of the Tool determines $PE_{AD,y}$ as follows:

$$PE_{AD,y} = PE_{EC,y} + PE_{FC,y} + PE_{CH4,y} + PE_{flare,y}$$

Where:

$PE_{AD,y}$ = *Project emissions associated with the anaerobic digester in year y (tCO_2e)*

$PE_{EC,y}$ = *Project emissions from electricity consumption associated with the anaerobic digester in year y (tCO_2e)*

$PE_{FC,y}$ = *Project emissions from fossil fuel consumption associated with the anaerobic digester in year y (tCO_2e)*

$PE_{CH4,y}$ = *Project emissions of methane from the anaerobic digester in year y (tCO_2e)*

$PE_{flare,y}$ = *Project emissions from flaring of biogas in year y (tCO_2e)*

[50] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-14-v2.pdf

Although, energy requirement for the plant will be supplied from national grid, possible emissions caused by the generator could be calculated and added to the project emission in related year when it is needed. There are two ways to calculate $PE_{FC,y}$ which are Option A and Option B stated in "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion version 03. Option A should be the preferred approach, if the necessary data is available. In addition, the emissions are negligible when the emission reductions from the Diesel Generator are lower than 1% of the total emission reductions; otherwise, the emissions will be calculated. But for now, since the anaerobic digester facility does not use fossil fuels, $PE_{FC,y}$ shall be accounted as zero for estimated calculations.

Moreover, In this equation, $PE_{EC,y}$ shall be accounted as zero since project emissions from electricity consumption associated with the anaerobic digester is going to be accounted separately. For the proposed project activity will consume electricity from the national grid for internal consumption of electricity at the plant, including the digesters, $PE_{EC,y}$ in this equation shall be regarded as zero since the calculation of project emissions from electricity consumption and fossil fuel combustion ($PE_{EC/FC,y}$) that will be made below is going to consist of $PE_{EC,y}$. This action is taken by the project developer in order to avoid double-counting.

Moreover, since the anaerobic digester facility does not use fossil fuels, $PE_{FC,y}$ shall be accounted as zero.

In addition, since the flare deviceis equipped for emergency situations only, $PE_{flare,y}$ shall also be accounted as zero.

Accordingly, project emissions associated with the anaerobic digester in year y ($PE_{AD,y}$) is equivalent to project emissions of methane from the anaerobic digester in year y ($PE_{CH4,y}$) as follows:

$$\boldsymbol{PE_{AD,y} = PE_{CH4,y}}$$

As per the paragraph 23 of the Tool, $PE_{CH4,y}$ is calculates as follows:

$$\boldsymbol{PE_{CH4,y} = Q_{CH4,y} \times EF_{CH4,default} \times GWP_{CH4}}$$

Where:

$PE_{CH4,y}$ = Project emissions of methane from the anaerobic digester in year y (tCO_2e)

$Q_{CH4,y}$ = Quantity of methane produced in the anaerobic digester in year y (tCH_4)

$EF_{CH4,default}$ = Default emission factor for the fraction of CH_4 produced that leaks from the anaerobic digester (fraction)

GWP_{CH4} = Global warming potential of CH_4 (28 tCO_2/tCH_4) (IPCC Fifth Assessment Report)

$PE_{CH4,y}$ = 2,856 tonnes CO2/year (details are present in ER calculation sheet of the Project)

Hence, $PE_{AD,y}$ = 2,856 tonnes CO2/year

Project emissions from use of electricity (PEelec,y)

In accordance with the Gold Standard's consolidated baseline methodology, the project emissions from electricity consumption will be calculated following the latest version of ' Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation ver.03.0[51]' (pg. 17). Accordingly, the methodological tool 'Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity'[52], Version 03.0, is applied to the proposed project activity to calculate $PE_{elec,y}$.

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

Where:

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (tCO_2/yr)

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr) (29,876 MWh/year as assumed %10 of yearly electricity generation)

$EF_{EF,j,y}$ = Emission factor for electricity generation for source j in year y (tCO_2/MWh) (Combined Margin = 0.5706 tCO2/MWh)

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

Accordingly,

$PE_{EC,y}$ = 1,705 tCO_2/year (details are present in ER calculation sheet of the Project)

Project emissions from waste transportation ($PE_{Tran,y}$)

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

The Gold Standard consolidated baseline methodology states that the project emissions from manure transportation from collection points to the central treatment plant shall be calculated according to the Methodological tool "Project and leakage emissions from transportation of freight" Accordingly the methodological tool 'Project and leakage emissions from road transportation of freight', Version 01.1.0[53], is applied to the proposed project activity.

As per the paragraph 20 of the Tool, $PE_{Tran,y}$,

$$\left.\begin{matrix} PE_{TR,m} \\ LE_{TR,m} \end{matrix}\right\} = \sum_{f} D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6} \qquad \text{Equation (1)}$$

Where:

$PE_{TR,m}$	=	Project emissions from transportation of freight monitoring period *m* (t CO_2)
$LE_{TR,m}$	=	Leakage emissions from transportation of freight monitoring period *m* (t CO_2)
$D_{f,m}$	=	Return trip distance between the origin and destination of freight transportation activity *f* in monitoring period *m* (km)
$FR_{f,m}$	=	Total mass of freight transported in freight transportation activity *f* in monitoring period *m* (t)
$EF_{CO2,f}$	=	Default CO_2 emission factor for freight transportation activity *f* (g CO_2/t km)
f	=	Freight transportation activities conducted in the project activity in monitoring period *m*

For this project; average return distance between the origin and the destination is taken as 129 km which is the distance to farthest farm to project site.By taking this distance the most conservative approach is taken for the emission due to transportation of wastes.Daly waste amount taken by project is 95tonne/day (total of manure and agricultural wastes)according to finalized EIA (Reference: Project Approved EIA Report, page 8) Hence yearly amount of total waste becomes 34,675 tonne. Emissions due to agricultural waste is also taken into account

[53] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-12-v1.1.0.pdf

Default CO_2 emission factor for freight transportation is chosen as 245 g CO2/t.km since light trucks will be used which could carry 20 tonnes in a round (each).

Hence;

$PE_{Tran,y}$ = 1,096 tCO_2/year (details are given in ER calculation sheet)

Accordingly, The Total of Project Emissions

$PE_y = PE_{AD,y} + PE_{EC/FC,y} + PE_{Tran,y}$

PE_y *= 2,856 tCO_2/yr + 1,705 tCO_2/yr + 1,096 tCO_2/yr* = ***5,656 tonnes CO2/year***

Leakage emissions

The Gold Standard Revised Consolidated Baseline Methodology for GHG Emission Reductions from Manure Management Systems and Municipal Solid Waste[54] calculates leakage emissions, as follows

$$LE_y = \left(LE_{PJ,N2O,y} - LE_{BL,N2O,y}\right) + \left(LE_{PJ,CH4,y} - LE_{BL,CH4,y}\right) + LE_{Comp,y} + LE_{AD,y} + LE_{Trans,y}$$

Where:

$LE_{PJ,N2O,y}$ = Leakage N_2O emissions released during project activity from land application of the treated manure in year y (tCO_2e/yr)

$LE_{BL,N2O,y}$ = Leakage N_2O emissions released during baseline scenario from land application of the treated manure in year y (tCO_2e/yr)

$LE_{PJ,CH4,y}$ = Leakage CH_4 emissions released during project activity from land application of the treated manure in year y (tCO_2e/yr)

$LE_{BL,CH4,y}$ = Leakage CH_4 emissions released during baseline scenario from land application of the treated manure in year y (tCO_2e/yr)

$LE_{Comp,y}$ = Leakage emissions associated with the storage and disposal of compost in year y (tCO_2e)

$LE_{AD,y}$ = Leakage emissions associated with the anaerobic digester in year y (tCO_2e)

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

$LE_{Trans,y}$ = Emissions from incremental distance travelled for waste/final compost/residue transportation in tCO_2e/yr

As noted earlier, since the proposed project activity does not involve composting, $LE_{Comp,y}$ shall be accounted as zero. Moreover, the solid and liquid digestate used as fertilizer in nearby agricultural land as free and this materials are not used/stored in any other conditions on land. Hence, $LE_{PJ,N2O,y}$, $LE_{PJ,CH4,y}$ shall be zero. Before the project activity farm owners bought the inorganic fertilizer from related market which is costly.

In addition, as per the statement made by the Gold Standard consolidated baseline methodology as "leakage covers the emissions from land application of treated manure as well as the emissions related to anaerobic digestion in a digester, occurring outside the project boundary" (pg. 18), leakage emissions associated with the anaerobic digester ($LE_{AD,y}$) and emissions from incremental distance travelled for waste/final compost/residue transportation ($LE_{Trans,y}$) shall also be accounted as zero since these emissions are occurring within the project boundary and already accounted as project emissions.

Accordingly, net leakage shall be negative. As per the statement made by the Gold Standard consolidated baseline methodology as "net leakage are only considered if they are positive" (pg. 18), LE_y shall be accounted as zero.

LE_y = 0 tCO_2/yr

Emission Reduction

In accordance with the Gold Standard consolidated baseline methodology, the emission reduction ER_y by the project activity during a given year y is the difference between the baseline emissions (BE_y) and the sum of project emissions (PE_y) and leakage, as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Accordingly,

ER_y = 120,508 tCO_2/yr – 5,656 tCO_2/yr

ER_y = 114,851 tonne CO2/year

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

Year	Baseline estimate	Project estimate	Net benefit
01/06/2022 - 31/12/2022	64,998	3,316	61,682
2023	121,789	5,656	116,133
2024	121,789	5,656	116,133
2025	121,789	5,656	116,133

2026	121,789	5,656	116,133
01/01/2027 - 31/05/2027	50,384	2,340	48,044
Total	**602,538**	**28,281**	**574,257**
Total number of crediting years			
Annual average over the crediting period	120,508	5,656	114,851

1 – Affordable and Clean Energy (SDG 7):

The project is expected to generate 29.876 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 for 22 employees. 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- Responsible Consumption and Production: Ensure sustainable consumption and production patterns (SDG 12)

The project provides better management option for wastes as around 95 tonne/day (Project EIA Report, page 8)4- Take urgent action to combat climate change and its impacts (SDG 13)

The project contributes to 114,851tonnes/year of CO2e reduction, which represent direct and quantifiable impact on climate security. Moreover, the project is also expected to reduce SO2 and NOx emissions by 173.4 tonnes/ yr and 35.2 tonnes / yr, respectively

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 13 and SDG 7

Data / Parameter	$EG_{d,y}$
Unit	MWh
Description	Electricity generated using biogas in year y
Source of data	Project proponent
Value(s) Applied	29,876
Measurement procedures (if any):	Archive electronically during project plus five years
Monitoring frequency	Annual
QA/QC procedures	Two calibrated meters backup each other. Maintenance and calibration of the metering devices are made by TEIAS. If there is a significant difference between the readings of two devices, maintenance and tests of the metering devices and the associated equipment are done before waiting for the periodical maintenance. The meters should comply with EPDK regulations which define the accuracy class of the meters as 0.2 or 0.5 depending on the capacity of the circuit as given in document in link (http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44). Generation of the plant is cross checked from TEIAS – EPIAS web site which is accessible using a password provided to electricity generation companies. 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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5 Calibration information of the meters will be shared.

Additional comment	Estimated annual generation forming the basis for emission reduction calculation is 29,876 MWh as indicated in electricity generation license.

Data / Parameter	HGpj,k,y
Unit	TJ/y
Description	Net quantity of heat with biogas by equipment type *k* in the project t in year *y*
Source of data	*Steam provided To Dairy Factory By Project (Between 01/09/2020 and 31/08/2021 for 12 months period* The measurement was done with calibrated steam meter on site. Calculated on the basis of measurement of the volume of biogas captured and used for heat generation by each heat generation equipment type k multiplied by the methane content of the gas, net calorific value of methane, and the efficiency of heat generation equipment type k during the project (i.e. with biogas). 15.55 TJ/y value is calculated for the estimated emission reduction calculations.
Value(s) Applied	46.64
Measurement procedures (if any):	Amount of methane in the biogas is determined using the "Tool to determine the mass flow of a greenhouse gas in gaseous stream". For the gaseous stream the tool shall be applied to is the biogas delivery pipeline to each item of heat generation equipment k.
Monitoring frequency	Monitored daily.
QA/QC procedures	Project owners will use the heat in their own dairy facility, therefore the heat used will be measured in the facility inlet. Amount of heat energy transferred to the dairy facility is monitored via a steam meter and computerized system which is connected to the CHP unit. Temperature or pressure does not needed to be monitored as the system gives a normalised measurement After the first calibration of steam meter , calibration of meter is valid for ten years due to related legislation. Link of related regulation given below.

	"ÖLÇÜ VE ÖLÇÜ ALETLERİ MUAYENE YÖNETMELİĞİ" / Article 9 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5
Any comment	Measurement results will be cross checked with operation records (Plant records). Enthalpies are determined based on the mass (or volume) flows, the temperatures and the pressure. Steam tables or appropriate thermodynamic equations will be used to calculate the enthalpy as a function of temperature and pressure. Data is monitored daily. Heat generation is determined as the difference of the enthalpy of the steam or hot fluid and/or gases generated by the heat generation equipment and the sum of the enthalpies of the feed-fluid and condensate returns.

SDG 13

Data / Parameter	Emissions Reductions in tCO_2
Unit	tCO_2
Description	Reduction of CO_2 emissions due to the proposed project activity's implementation.
Source of data	Project proponent. Annual baseline and project emissions, along with relevant parameters, such as combined margin (CM), will be used as reference in calculation of the emission reduction.
Value(s) Applied	
Measurement procedures (if any):	-
Monitoring frequency	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 (0.5706 tCO_2/MWh).
QA/QC procedures	-

Any comment	- Estimated annual emission reduction is 89.442tonnes of CO2eq.

Data / Parameter	Vf (coming from wastewater treatment plant)
Unit	m^3
Description	Biogas flow
Source of data	Project proponents.
Value(s) Applied	Project owner will provide during monitoring
Measurement procedures (if any):	Project has monitoring equipments "a biogas meter" on wwtp line. The biogas records of this meter and related electricity generation is to be excluded from the emission reduction calculations.
Monitoring frequency	Continuously by flow meter and reported cumulatively on weekly basis
QA/QC procedures	The system should be built and operated to ensure that there is no air ingress into the biogas pipeline. Data will be archived electronically during the crediting period plus 2 years. Computerized monitoring for the whole system is available in order to keep track of pressure and temperature of the gas, gas meters will be calibrated as per the relevant industry standard. Equipment will be subject to regular maintenance. 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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5 Accuracy class of meters will be +/-1.5% of reading (gas & steam)
Purpose of data	Monitoring net biogas recovery from manure digesters.

Additional comment	Volumetric flow meters will be used for measuring the volume from WWTP. Flow meter(a biogas meter) located at the exit of the digesters of WWTP. This data will be understood after project starts to operation phase. In fact biogas volume recovered from wwtp will be excluded from baseline emission calculations. Briefly, this value will be monitored with calibrated gas meters on site and does not included in emission reduction calculations above (excluded) Since the Project will monitor the total biogas amount and corresponding electricity and heat generation, the ratio of "Biogas from wwtp/total biogas" could multiply the total electricity and heat generation data to find out and exclude the electricity and heat generated belonged to biogas from wwtp line and corresponding CO2 amount.

Data / Parameter	Vf
Unit	m3
Description	Biogas (total biogas goes to gas engines)
Source of data	Project proponent.
Value(s) Applied	Project owner will provide during monitoring
Measurement procedures (if any):	
Monitoring frequency	Continuously by flow meter and reported cumulatively on weekly basis
QA/QC procedures	The system should be built and operated to ensure that there is no air ingress into the biogas pipeline. Data will be archived electronically during the crediting period plus 2 years. Computerized monitoring for the whole system is available in order to keep track of pressure and

	temperature of the gas, gas meters will be calibrated as per the relevant industry standard. Equipment will be subject to regular maintenance. 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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5 Accuracy class of meters will be +/-1.5% of reading (gas & steam)
Any comment	Flow meters located at the exit of the digesters. Calibrated flow meters will be used during operation phase. For this stage, the estimated value could be given by regarding waste handled for anaerobic digesters. 8.657.937 m3/year (site records) biogas value is that estimated value stated in plant capacity report.

Data / Parameter	$F_{RG,m}$
Unit	m^3
Description	the flow rate of the residual gas to the flare
Source of data	Project owner
Value(s) Applied	Project owner will provide during monitoring if the flare unit is used
Measurement procedures (if any):	Calibrated meter of flare equipment
Monitoring frequency	Continiously
QA/QC procedures	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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

	Calibration document is to be provided in first monitoring period.
Any comment	Option A is selected via Methodological tool "Project emissions from flaring Version 03.0"

Data / Parameter	Status of biogas destruction device
Unit	-
Description	Operational status of biogas destruction devices
Source of data	Project owner
Value(s) Applied	-
Measurement procedures (if any):	Monitoring and documenting is to be undertaken by recording the energy production from methane captured by gas engines on project site
Monitoring frequency	Continious
QA/QC procedures	-
Any comment	Project owner is to be report if there is any operational period the gas engines is not under operation for biogas/methane destruction for electricity generation. As per, Methodological tool Tool to determine the mass flow of a greenhouse gas in a gaseous stream Version 03.0

Data / Parameter	Vi, t, db
Unit	m^3 gas i/m^3 dry gas

Description	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis
Source of data	Project and leakage emissions from anaerobic digesters https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-14-v2.pdf
Value(s) Applied	60%
Measurement procedures (if any):	-
Monitoring frequency	Continuously
QA/QC procedures	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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5 calibration document is to be provided in first monitoring period.
Any comment	Details are present in "baseline emission" tab of ER excel calculation document

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
Source of data	Flare manufacturer
Value(s) Applied	Project proponent will provide during monitoring if the flare unit is used

Values to be applied	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
Monitoring frequency	Continuously by flow meter and reported cumulatively on weekly basis
Any comment	Option A is selected via Methodological tool Project emissions from flaring Version 03.0

Data / Parameter	Air Quality
Unit	tons
Description	Reduction of SO2 and NOx emissions due to implementation of project activity that would otherwise be emitted by thermal power plants
Source of data	Project proponent.
Value(s) Applied	SO2 emission reduction is 173.4 tonnes. NOx emission reduction is 35.2 tonnes.
Measurement procedures (if any):	
Monitoring frequency	Annually.
QA/QC procedures	-
Any comment	Total SO2 emission related to electricity generation is about 8 Gg for 2018 according to National Inventory of Turkey. Considering that electricity generation in 2017 is 297,277.5 GWh, SO2 emission per MWh is calculated as 5.83 kg/MWh. Considering the annual expected

	electricity generation of this project as stated in licence (29.876 GWh) annual expected SO2 emission reduction is 173.4 tonnes. Total NOx emission related to electricity generation is about 358.88 Gg for 2018 according to National Inventory of Turkey. Considering that electricity generation in 2018 is 304,801.9 GWh NOx emission per MWh is calculated as 1.18 kg/MWh. Considering the annual expected electricity generation of this project as stated in licence (29.876 GWh) annual expected NOx emission reduction is 35.2 tonnes.

Data / Parameter	FCi,j,y
Unit	liter/yr
Description	Quantity of fuel type i combusted in process j during the year y
Source of data	Recording on the amount of diesel oil consumed by sewage trucks whilst transporting manure from farms to the plant
Value(s) applied	Annual consumption of diesel
Measurement methods and procedures	It will be yearly measured as per the applied Gold Standard's consolidated baseline methodology by recording the amount of diesel oil consumed throughout manure transportation via sewage trucks.
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	To calculate PETran,y, as Project and leakage emissions from transportation of freight, as well as to calculate the project emission value and to monitor the contribution of the proposed Project's contribution to SDG 13.

Additional comment	The trucks used for transporting manure are all run by diesel oil. If any changes in the type of fuel used in them, PETran,y equation, along with the parameters in it, is going to change accordingly. In this regard, PP commits herself/himself to inform DoE and GS immediately if any changes occur.

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	At present situation there are 22 staff working in the project and all of the is to be have H&S training.
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	Quantitative employment and income generation
Unit	Number of personnel employed
Description	Personnel working in the project are employed in accordance with the legal regulations and that the social security insurance fees are paid
Source of data	Social security list of the project gathered from official governmental records.
Value(s) applied	At present situation there are 22 staff working in the project.
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	To monitor the contribution to SDG 8 and Principle 3.6.1.
Additional comment	-

SDG 12

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock.

Value(s) Applied	1,650 cattle
Measurement procedures (if any):	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Hatice Güler a cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project. This farm has 1,650 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock.
Value(s) Applied	23,250 cattle
Measurement procedures (if any):	-
Monitoring frequency	Daily

QA/QC procedures	-
Any comment	Şerif Demir cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project. This farm has 23,250 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	1,500 cattle
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Cactus cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project

	This farm has 1,500 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	190 cattle
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Ataköy cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project This farm has 190 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	390 cattle
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Bontoro this project and farm provides animal number with signed document to the project This farm has 390 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals

Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	350 cattle
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Dabase cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project This farm has 350 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	250 cattle
Measurement procedures (if any)	-
Monitoring frequency	Daily

QA/QC procedures	-
Any comment	Ragyu cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project This farm has 250 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	350 cattle
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Aziz Güner cattle farm which has manure supply agreement with this project and farm provides animal number with signed document to the project This farm has 350 cattle/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive

	process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	1,300,000 poultry
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Ercanlar poultry farm which has manure supply agreement with this project and farm provides animal number with signed document to the project. This farm has 1,300,000 poultry/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$

Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock
Value(s) Applied	115,000 poultry
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Muzaffer Doydu poultry farm which has manure supply agreement with this project and farm provides animal number with signed document to the project. This farm has 115,000 poultry/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	$N_{AA,LT}$
Unit	number
Description	Daily stock of animals in the farm, discounting dead and discarded animals
Source of data	Daily counting of alive animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock

Value(s) Applied	160,000 poultry
Measurement procedures (if any)	-
Monitoring frequency	Daily
QA/QC procedures	-
Any comment	Volkan Güner poultry farm which has manure supply agreement with this project and farm provides animal number with signed document to the project This farm has 160,000 poultry/year in average which gathered via daily monitored animal number discounting dead animals and animals discarded from the productive process and the resultant animal number provided with signed document to the project

Data / Parameter	ndy
Unit	number
Description	Number of days treatment plant was operational in year y
Source of data	Project proponent. Project is operated 365 days in a year
Value(s) Applied	365
Measurement procedures (if any):	-
Monitoring frequency	daily
QA/QC procedures	-
Any comment	-

Data / Parameter	MS%j

Unit	fraction
Description	Fraction of manure handled in system j in the project activity
Source of data	Project proponent. %100 is taken for estimated emission reduction calculations
Value(s) Applied	100%
Measurement procedures (if any):	-
Monitoring frequency	Annually
QA/QC procedures	-
Any comment	-

Data / Parameter	T
Unit	Celcius
Description	Annual Average ambient temperature at project site
Source of data	Turkish State Meteorological Service. The value "12[55] Celcius" is taken for this project estimated emission reduction calculations.
Value(s) Applied	17.9
Measurement procedures (if any):	-
Monitoring frequency	Annually
QA/QC procedures	-
Any comment	-

Data/parameter	$B_{0,LT}$ for Dairy Cow Manure

[55] https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?m=IZMIR

Unit	m^3CH_4/kg_dm
Description	Maximum methane producing potential of the volatile solid generated by animal type LT
Source of data	IPCC 2019 Refinement, Chapter 10, Volume 4 Table 10.16, Eastern Europe Data is taken[56]
Value(s) Applied	0.24
Measurement procedures (if any):	-
QA/QC procedures	-
Any comment	The value is taken from published sources. The parameter value should be updated on latest available public data source

Data/parameter	$B_{0,LT}$ for Poultry manure
Unit	m^3CH_4/kg_dm
Description	Maximum methane producing potential of the volatile solid generated by animal type LT
Source of data	IPCC 2019 Refinement, Chapter 10, Volume 4 Table 10.16, Eastern Europe Data is taken[57]
Value(s) Applied	0.36
Measurement procedures (if any):	-
Monitoring frequency	Annually
QA/QC procedures	Used in project emission/baseline calculations.
Any comment	The value is taken from published sources. The parameter value should be updated on latest available public data source

[56] https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch10_Livestock.pdf
[57] https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch10_Livestock.pdf

Data/parameter	N
Unit	-
Description	Total number of farms
Source of data	Project proponent
Value(s) Applied	11
Measurement procedures (if any):	-
Monitoring frequency	Annually
QA/QC procedures	-
Any comment	-

Data/parameter	FRf,m
Unit	tonnes
Description	Total mass of freight transported in freight transportation activity f in monitoring period m
Source of data	Project owner
Value(s) Applied	38 (Transportation of cattle manure)
Measurement procedures (if any):	Calibrated weightbridge
Monitoring frequency	Continuously
QA/QC procedures	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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5

	calibration document is to be provided in first monitoring period.
Any comment	Transportation of cattle manure SÜTAS Tire Biogas Plant project operates with a daily organic flow of 95 tons/day and 30-40% of this amount is belonged to cattle manure, 10-20 of this amount is belonged to chicken manure and rest of it belonged to agricultural wastes as per the information given in EIA report of the project (page 8). Hence, project 38 tonne/day cattle manure and 19 tonne/day poultry manure and rest of it is agricultural waste (38 tonne/day)

Data/parameter	FRf,m
Unit	tonnes
Description	Total mass of freight transported in freight transportation activity f in monitoring period m
Source of data	Project owner
Value(s) Applied	19 (Transportation of poultry manure)
Measurement procedures (if any):	Calibrated weightbridge
Monitoring frequency	Continuously
QA/QC procedures	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 https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5 calibration document is to be provided in first monitoring period.
Any comment	Transportation of poultry manure SÜTAS Tire Biogas Plant project operates with a daily organic flow of 95 tons/day and 30-40% of this amount is belonged to cattle manure, 10-20 of

	this amount is belonged to chicken manure and rest of it belonged to agricultural wastes as per the information given in EIA report of the project (page 8). Hence, project 38 tonne/day cattle manure and 19 tonne/day poultry manure and rest of it is agricultural waste (38 tonne/day)

Data/parameter	Qdm
Unit	kg
Description	Mass of manure disposed outside project boundary
Source of data	Project proponent (owner).
Value(s) Applied	0
Measurement procedures (if any):	-
Monitoring frequency	Annually
QA/QC procedures	-
Any comment	No manure disposal to outside the project boundary since all the manure transported to project site is source of energy for the project owner. Hence there is no such disposal on project site. Moreover, the solid and liquid digestate (outputs of anaerobic digesters) provided to farmers as free who has agricultural lands near to project site. These materials are not used/stored in any other conditions on land by project owner. Hence there is no need to monitor treated manure for this project.

Data / Parameter	Organic fertilizer
Unit	tonne/year
Description	Digestate of anaerobic digestors
Source of data	Project owner,

Value(s) applied	-
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	Amount of digestate will be calculated by using the yearly feedstock data of digesters. Digestate are transported with confined trucks to prevent any leakage. Moreover the comment on the future situation of local stakeholders will be a prove.
Purpose of data	To be in compliance with principle 9.6
Additional comment	Digestate of anaerobic digestors are provided to nearby farmers to be used as fertilizer on agricultural lands.

B.7.2 Sampling plan

N/A

B.7.3 Other elements of monitoring plan

Net electricity generation is being measured and recorded by both TEIAS and project owners for billing purposes for monitoring emission reduction. Plant Manager, is responsible for the electricity generated, gathering all relevant data and keeping the records. Calibration of the electricity metering devices are made by TEIAS and sealed before the commissioning of the power plant. As per the local regulations, meters should not require calibration at least ten years. The meters were be calibrated by TEIAS when there is an inconsistency between two devices.

Manure transported to project site arrived at the point of waste equalization basin. However, just before the equalization basin there is a weightbridge to measure the weight of the manure. Dry matter content of the manure is analyzed periodically to monitor the efficiency of digesters by plant personnel.

Data stored in excel documents (biogas production, electricity site records, and heat generation records) by plant manager more than 2 years.

Project owners use the heat generated in their own dairy facility instead of using fossil fuel; therefore the used heat measured in the facility inlet. Amount of heat energy transferred to the dairy facility is monitored via computerized system which is connected to the heat boilers. Data stored in excel documents by plant manager more than 2 years.
In addition, biogas optained from wastewater treatment plant is to be excluded while calculation of baseline emission for this project. Project has monitoring equipments "a biogas meter" on wwtp line. The biogas records of this meter and related electricity generation is to be excluded from the emission reduction calculations. In detail, since the Project will monitor the total biogas amount and corresponding electricity and heat generation, the ratio of "Biogas from wwtp/total biogas" could multiply the total electricity and heat generation data to find out and exclude the electricity and heat generated belonged to biogas from wwtp line and corresponding CO2 amount.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project
The Project Start Date for the proposed project activity is 02/12/2014 which is date of construction agreement.

C.1.2 Expected operational lifetime of project
Operational lifetime is estimated as 10 years based on the commissioning date and remaining license period till 01/09/2026. License amendments will be made in the future periods in order for the project to continue its operation after this date.

C.2. Crediting period of project

C.2.1 Start date of crediting period

The start day of the first crediting period is 01/06/2022.

C.2.2 Total length of crediting period

The total length of the first crediting period is 5 years (01/06/2022-31/05/2027).

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 summarized below.

Principles	Mitigation Measures added to the Monitoring Plan
Principle 9.4 Release of Pollutants	Air Quality - Reduction of SO2 and NOx emissions due to implementation of project activity that would otherwise be emitted by thermal power plants There is no wastewater disposal from the digestion. After digestion there is a de-watering unit and effluent of digesters seperated into solid and liquid parts which are called solid and liquid digestates. In fact, these digestates are kind of organic fertilizers and distributed to nearby farmers to use in agricultural lands. On the other hand, odor was a problem of baseline situation not the project since manure/waste collected from the animal shelters/farms decomposed and turned in to more stable state fertilizer, which is environmentally favorable and odorless than the lagoon storage. In addition, this project is within the boundary of "organized industrial zone" not in public areas where problems such as odor are likely to occur
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 6.1: Labour Rights	Fair wage, working hours and occupational Injuries Within the framework of the project activities, compliance with national and international labor rights is demonstrated. As stated in Appendix 1, these rights are within the framework of regulations/applications that must be complied with within the borders of Turkey.
Principle 9.5 Hazardous	Other Pollutants - Proper management of waste oil

and Non-hazardous Waste	
Principle 9.6: Pesticides & Fertilisers	One of the project outputs is organic fertilizer as liquid and solid digestate. This fertilizer supplied/distributed to the nearby farmers for use on agricultural lands.

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?	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[58]. It also shows parallelism with national strategies prepared for women employment by creating opportunities for all.
Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[59]. It also shows parallelism with national strategies prepared for women employment by creating opportunities for all. Hence, all project in Turkey belonged to ratified convention. It is not possible for national laws/regulations to act by distinguishing projects
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[60]. It also shows parallelism with national strategies prepared for

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

	women employment by creating opportunities for all. Hence there is no need for an expert on that.
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[61]. It also shows parallelism with national strategies prepared for women employment by creating opportunities for all. Hence there is no need for an expert on that.

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The below is a summary of the 2 step GS4GG Consultation for monitoring purposes. Please refer to the separate Stakeholder Consultation Report for a complete report on the initial consultation and stakeholder feedback round.

E.1 Summary of stakeholder mitigation measures

During the remote site local stakeholders clearly stated that the solid and liquid fertilizers provided by this facility (the Project) contributed significantly to the production in their agricultural activities. Moreover, stakeholder has no negative comment on project activities. Remote site visit was held in 04 November 2021.

Before the remote site visit on validation progress, LSC progress were held and details given as follow.

Summary of Local Stakeholder Meeting

Local Stakeholder Meeting for SÜTAS Tire Biogas Plant Project was organized at 14:00 on 19/01/2016 in Tire Industrial Zone Meeting Hall. The stakeholders and the list of invitation are identified accordingly.

The meeting covered all agenda items recommended by the Gold Standard.

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

Agenda

14:00-14:20 Opening and Introduction of the project

14:20- 14:30 Climate Change and Certification Process

14:30-14:45 Sustainability Assessment

14:45-15:00 Question and Answers

15:00-15:15 Evaluation and feedback session

15:30 Closure

District Department of Ministry of Environment and Urbanization and Directorate of Provincial Food Agriculture and Livestock have been invited as relevant Government Authority. Directorate General for Renewable Energy of Ministry of Energy and Natural Resources has also been included as relevant Government Authorities. When possible, participation of the invitees was confirmed in order to make necessary arrangements for the meeting.

Local and national government institutions and other identified stakeholders have been informed through invitation letters in Turkish along with non-technical summary sent by registered mail and facsimile messages.

Since the project area is an organized industrial zone, the other companies working within the boundary of Tire Organized Industrial Zone are identified as locals and invited to the meeting. Additionally local people were informed about the meeting by the project owner orally and newspaper invitation, who live in the village around industrial zone.

Moment of Meeting

Meeting was started with the speech of Muharrem Yılmaz (Chairman of the executive board of Sütaş A.Ş.). During his speech, Mr. Yılmaz gave information about the brief history and future investment plans of Sütaş A.Ş. Then, Mr. Yılmaz gave the floor to Mustafa Toprak (Head Governor of İzmir) and Mehmet Demirezer (Head Official of Tire) respectively. Both Mr. Toprak and and Mr. Demirezer emphasized the importance of the Sütaş A.Ş. investment in Tire in terms of economic development of the organized industrial zone and nearer related regions dealing with milk and milk products. After Mr. Demirezer, Ahmet Güldal (İzmir Directorate of Provincial Food Agriculture and Livestock) delivered his presentation about the importance of the quality standardises and production efficiency of agricultural products. Finally, Ekrem Demirtaş (chamber of commerce of İzmir) and Kosat Gürler (Tire Organized Industrial Zone) expressed institutional support for the project and took attentions to the growing economyl impact factor of the region within this investment.

After the speeches of protocol, R&D department officer Murat Arat represented their presentation on the importance of biogas plant implementation to deal with manure wastes and wastewater in the Tire Organized Industrial Zone in terms of both waste management and GHG emission reduction. Additionally, brief and non-technical information were given in this speech.

The officer of Sütaş A.Ş. emphasized that within this biogas facility, wastes belonged to agricultural activities and food production will be decomposed under anaerobic conditions and biogas will be produced. Generated biogas will be used for electrical energy production. By this way, both waste elimination and renewable energy generation will be provided. In addition, methane (CH4) and carbon dioxide (CO2) emissions will be reduced which are the one of the most important greenhouse gases which causes climate change.

After these speeches, GTE Carbon Director Kemal Demirkol took the floor and delivered his presentation for “Local Stakeholder Consultation Meeting”. Mr. Demirkol briefly mentioned about

climate change and carbon certification process, including the purpose of the meeting within that framework. He stressed that the purpose of the meeting was to collect their ideas about the project and how they would be followed-up in future. He introduced also introduced the grievance mechanism and the sustainability criteria to the participants and opened the floor to discussions and questions. In the questionnaire part of the meeting, there was no question asked by the participants about any speech.

The level and the quality of participation were satisfactory. There were more than 90 participants according to the camera records and most of them signed attendance sheet. Thus, no other consultations were carried out.

1975 yılından beri sadece süt ve süt ürünlerine odaklı olarak faaliyet gösteren ve son 11 yıldır sektörünün lider kuruluşu olan Sütaş, 2016 yılı itibari ile de yatırımlarına devam etmektedir. Sütaş tarafından planlanan yeni yatırımlar kapsamında, Tire Organize Sanayi Bölgesi'nde (TOSBİ) Süt İşleme Entegre Tesisi ve Biyogaz tesisi yatırımı planlanmaktadır.

Yatırım planı kapsamında yer alan biyogaz tesisi ile bölgedeki tarımsal ve gıda üretiminden kaynaklanan atıklar bertaraf edilirken aynı zamanda enerji üretimi sağlanması planlanmaktadır. Söz konusu yatırım kapsamında, iklim değişikliğine neden olan önemli gazlardan birisi olan metan (CH_4) ve karbondioksit (CO_2) gazlarının salımı azaltılmış olacaktır.

Firmamız, yukarıda belirtilen sera gazı azaltımının belgelendirilmesi amacı ile karbon sertifikasyonu sürecini başlatmış bulunmaktadır.

Bu kapsamda düzenleyeceğimiz "Bilgilendirme Toplantısı"nda sizleri aramızda görmekten memnunluk duyacağımızı belirtmek isteriz.

Toplantımız 19 Ocak 2016 tarihinde, saat 14:00'da Tire Organize Bölgesi Toplantı Salonu'nda gerçekleştirilecektir.

Kıymetli katılımlarınızın firmamız için önemli olduğunu tekrar belirtir, konu ile ilgili olarak bilgi ve gereğini arz ederiz.

Saygılarımızla,

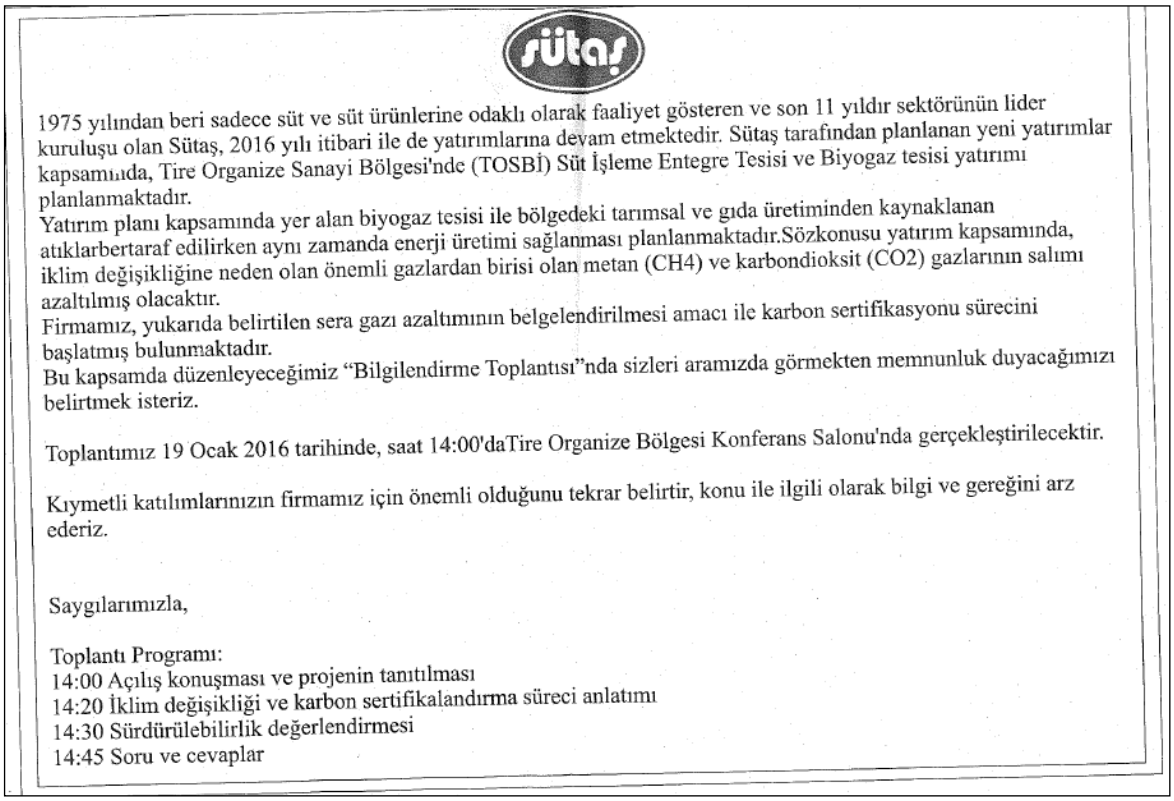
Toplantı Programı:

14:00 Açılış konuşması ve projenin tanıtılması

14:20 İklim değişikliği ve karbon sertifikalandırması

14:30 Sürdürülebilirlik değerlendirmesi

14:45 Soru ve cevaplar



1975 yılından beri sadece süt ve süt ürünlerine odaklı olarak faaliyet gösteren ve son 11 yıldır sektörünün lider kuruluşu olan Sütaş, 2016 yılı itibari ile de yatırımlarına devam etmektedir. Sütaş tarafından planlanan yeni yatırımlar kapsamında, Tire Organize Sanayi Bölgesi'nde (TOSBİ) Süt İşleme Entegre Tesisi ve Biyogaz tesisi yatırımı planlanmaktadır.
Yatırım planı kapsamında yer alan biyogaz tesisi ile bölgedeki tarımsal ve gıda üretiminden kaynaklanan atıklarbertaraf edilirken aynı zamanda enerji üretimi sağlanması planlanmaktadır.Sözkonusu yatırım kapsamında, iklim değişikliğine neden olan önemli gazlardan birisi olan metan (CH_4) ve karbondioksit (CO_2) gazlarının salımı azaltılmış olacaktır.
Firmamız, yukarıda belirtilen sera gazı azaltımının belgelendirilmesi amacı ile karbon sertifikasyonu sürecini başlatmış bulunmaktadır.
Bu kapsamda düzenleyeceğimiz "Bilgilendirme Toplantısı"nda sizleri aramızda görmekten memnunluk duyacağımızı belirtmek isteriz.

Toplantımız 19 Ocak 2016 tarihinde, saat 14:00'daTire Organize Bölgesi Konferans Salonu'nda gerçekleştirilecektir.

Kıymetli katılımlarınızın firmamız için önemli olduğunu tekrar belirtir, konu ile ilgili olarak bilgi ve gereğini arz ederiz.

Saygılarımızla,

Toplantı Programı:
14:00 Açılış konuşması ve projenin tanıtılması
14:20 İklim değişikliği ve karbon sertifikalandırma süreci anlatımı
14:30 Sürdürülebilirlik değerlendirmesi
14:45 Soru ve cevaplar

In addition, there is no negative comment taken during the SFR of the Project. The LSC document dated as (03/04/2017) which was reviewed and approved contained the details of the SFR outputs.

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 /	There is a process book on site and local stakeholders could write their opinion on it. However, local stakeholders and project owner has good

Grievance Expression Process Book (mandatory)	relationship and stakeholders could easily reach to project owner if they had any problem with the project. This situation is mentioned by directly stakeholders during the online site interview
GS Contact (mandatory)	help@goldstandard.org
Other	Local stakeholders have easy access to project owner (Serkan Anacak) via phone (+90 216 573 4541) on site. This situation proved by local stakeholders during remote site visit interviews at validation progress. Additionally, if stakeholders want to reach via mail sanacak@sutas.com.tr is the mail of the responsible person.

Figure. Text of public invitations

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 2. The Project shall not discriminate with	Yes	Turkey has ratified European Convention on Human Right on 10/03/1954[62]. Therefore, the project is not expected to violate the rules regarding human rights.	No mitigation measure is required for this indicator.

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

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 commitment to aid in assessing gender risks 4. (where required) Summary of opinions	Yes	Turkey has ratified ILO convention 100, 111, 122 and 142, which provides gender equality and promotes women's employment[63]. 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.

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

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	Yes	Turkey has ratified ILO convention 155 and about work safety and precautions[64]	No mitigation is required for this indicator.
Principle 4.1 Sites of Cultural and Historical Heritage			
Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture?	No	(a) No sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture were observed in the project area Project area is in an organized industrial	
>>			

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

		zone areaInstitutional opinion was asked to Provincial Directorate of Food, Agriculture and Livestock. In the letter of 19.04.2016 and numbered 67970180/16757, within the scope of Soil Conservation and Land Use Law No.5403 of the 1271 island parcel no.14 It was stated that there is no problem in the implementation of the project (See EIA Report / Annex-12.8).[65]	

[65] Tire Biogas Plant EIA Report, page 125-130

		Considering that the closest settlement to the project site is the Bahçesaray Quarter located at 3,500 meters north-west, it will not be affected by negative noise conditions. The planned project area is located within the borders of Tire Organized Industrial Zone and related analysis were done.[66]	
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	The planned project area is located within the borders of Tire Organized Industrial Zone. There were no settlement on project site on baseline scenario[67].	Land acquisition was done according to the Turkish Expropriation Laws and Regulations. No mitigation is needed for this indicator.
Principle 4.3 Land Tenure and Other Rights			
a. Does the Project require any change, or have any	No		

[66] Tire Biogas Plant EIA Report, page 1, 2, Appendix 10.9
[67] Tire Biogas Plant EIA Report, page 1, 2, Appendix 10.9

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 uncertainties with regards to land tenure, access rights, usage rights or land ownership?		The planned project area is located within the borders of Tire Organized Industrial Zone. There were no settlement on project site on baseline scenario or not any private ownership.[68]	No mitigation is needed for this indicator.
>>			
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 [69]. Details of analysis given in EIA report of the project.	No mitigation is needed for this indicator.
>>			
Principle 5. Corruption			

[68] Tire Biogas Plant EIA Report, page 1, 2, Appendix 10.9
[69] Tire Biogas Plant EIA Report, page 1, 2, Appendix 10.9

1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	Yes	Turkey has ratified several conventions on bribery and corruption including OECD and UN conventions[70]	No mitigation is needed for this indicator.
Principle 6.1 Labour Rights			
1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions 2. Workers shall be able to establish and join labour organisations	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. As per related regulations[71].	Staff will be trained for HSE during operation phases. As per related regulations. This issue is also mentioned as monitoring parameter in Section B. Related trainings records are to be provided in each monitoring period. In addition, social security list of the project which includes all the employees will be provided for the fair wage prove; however, details will

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

[71] Tire Biogas Plant EIA Report, page 54-139

3. Working agreements with all individual workers shall be documented and implemented and include: 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		- Turkey is a party of IPEC[72],[73] since 1992 and ratified ILO convention 138 and 182[74]. - All employee are to be recruited according to the national legislations[75].	be censored as per personal information protection law[76].

[72] http://www.ilo.org/ipec/programme/lang--en/index.htm
[73] http://www.ilo.org/ipec/Regionsandcountries/lang--en/index.htm
[74] http://www.ilo.org/public/turkish/region/eurpro/ankara/about/sozlesmeler.htm
[75] Tire Biogas Plant EIA Report, page 23
[76] https://www.mevzuat.gov.tr/mevzuatmetin/1.5.6698.pdf

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 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	No	The investment is capital intensive but operating as low cost plant. VER revenues help	No mitigation needed for this indicator.

and after project implementation? >>		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.	
Principle 7.1 Emissions			
Will the Project increase greenhouse gas emissions over the Baseline Scenario? >>	Yes	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: 114,851tonnes/year (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 27.876 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 variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project does not have any expected effects on the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) since there is no underground or other kind of water source on project site[77]	No mitigation measure is required for this indicator.
>>			
Principle 8.2 Erosion and/or Water Body Instability			
a. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? 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	No mitigation measure is required for this indicator.
>>			

[77] Tire Biogas Plant EIA Report, pages 14-24-36-36

		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[78]. The planned project area is located within the borders of Tire Organized Industrial Zone. There were no settlement or agricultural activities on project site on baseline scenario or not any private ownership.[79]	
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	The planned project area is located within the borders of Tire Organized Industrial Zone. There were no	No mitigation measure is required for this indicator.

[78] Tire Biogas Plant EIA Report, page 35
[79] Tire Biogas Plant EIA Report, Appendix 10.8

>>		settlement or agricultural activities on project site on baseline scenario or not any private ownership.[80]	
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? >>		Tire province and the project site are in the 4th 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[81].	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	No	The project is not relevant since it is a renewable energy project.	No mitigation measure is required for this indicator.

[80] Tire Biogas Plant EIA Report, Appendix 10.8
[81] Tire Biogas Plant EIA Report, page 141-145, Appendix 2, Appendix 4

take place in facilities or farms 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?	No	There is no pollutant release from the project to the environment. Instead, project prevent the environment from biological pollutants by its origin. In case of waste oil, etc. explanation is given in Principle 9.5 On the other hand, odor was a problem of baseline situation not the project since manure/waste collected from the animal shelters/farms decomposed and turned in to more stable state fertilizer, which is environmentally favorable and odorless than the lagoon storage. Also, to remember, this project is within the boundary	No mitigation measure is required for this indicator.
>>			

		of "organized industrial zone" not in public area. Domestic wastewater of the project transferred to the treatment plant in organized industrial zone. Hence there is no domestic wastewater release to the environment.	
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[82].	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?	Yes	One of the project output is organic fertilizer as liquid and solid digestate. These fertilizer supplied to the	Organic fertilizer is provided to farmers to be used on agricultural land of nearby region. For transportation,
>>			

[82] Tire Biogas Plant EIA Report, page 114

		nearby farmers for use on agricultural lands.	confined trucks are used to prevent leakage.
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.[83] 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.

[83] Tire Biogas Plant EIA Report, page 5, 125, 131

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. [84]	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. [85]	No mitigation measure is required for this indicator.

[84] Tire Biogas Plant EIA Report, page 5, 125, 131
[85] Tire Biogas Plant EIA Report, page 5, 125, 131

>>			

APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

Organization name	ENFAŞ Enerji Elektrik Üretim A.Ş (Project Owner)
Registration number with relevant authority	-
Street/P.O. Box	Uluabat, No:370 Uluabat Sok, 16700 Karacabey/Bursa
Building	ENFAŞ Enerji Elektrik Üretim A.Ş. Management Building.
City	Bursa
State/Region	Uluabat Region
Postcode	16700
Country	TURKEY
Telephone	+90 216 573 45 41
E-mail	sanacak@sutas.com.tr
Website	http://www.sutas.com/tr/
Contact person	Serkan Anacak
Title	Manager
Salutation	Mr
Last name	Anacak
Middle name	-
First name	Serkan
Department	Management
Mobile	-
Direct tel.	+90 216 573 45 41
Personal e-mail	sanacak@sutas.com.tr

Organization name	
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

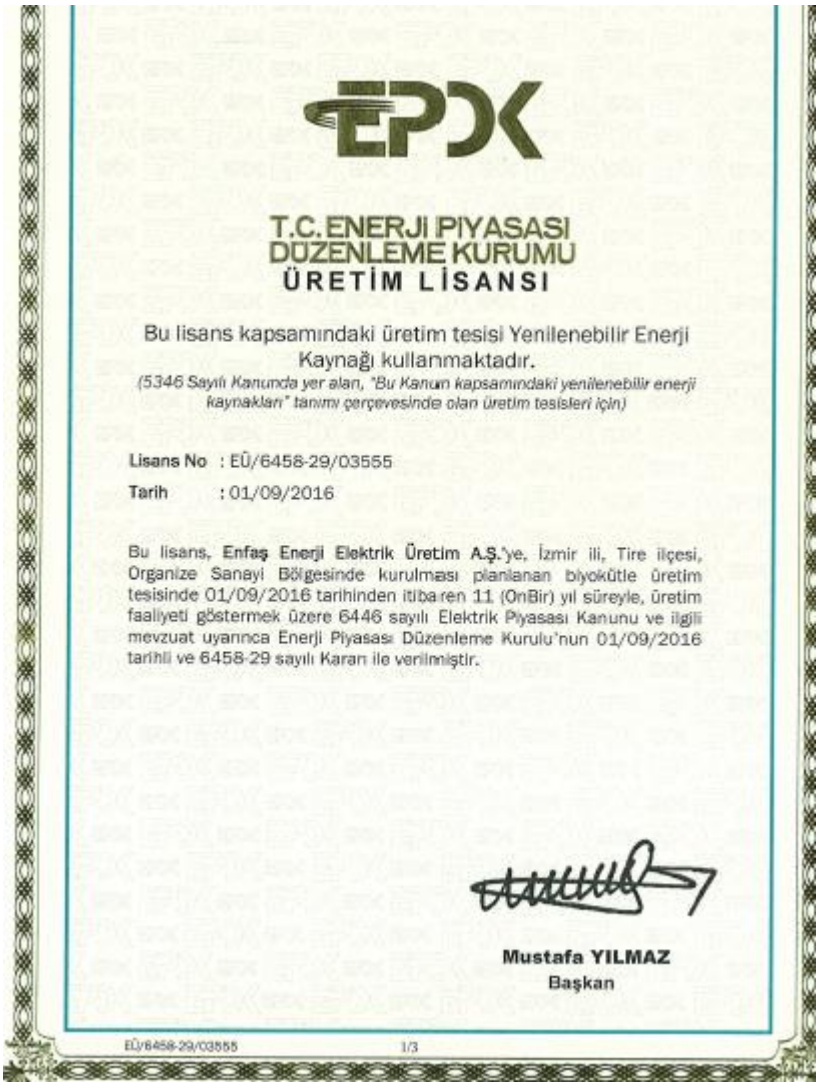
APPENDIX 3-SUMMARY OF APPROVED DESIGN CHANGES

N/A

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

APPENDIX 5-LICENSE OF THE PROJECT



T.C. ENERJİ PİYASASI
DÜZENLEME KURUMU
ÜRETİM LİSANSI

Bu lisans kapsamındaki üretim tesisi Yenilenebilir Enerji Kaynağı kullanmaktadır.
(5346 Sayılı Kanunda yer alan, "Bu Kanun kapsamındaki yenilenebilir enerji kaynakları" tanımı çerçevesinde olan üretim tesisleri için)

Lisans No : EÜ/6458-29/03555
Tarih : 01/09/2016

Bu lisans, **Enfaş Enerji Elektrik Üretim A.Ş.**'ye, İzmir ili, Tire ilçesi, Organize Sanayi Bölgesinde kurulması planlanan biyokütle üretim tesisinde 01/09/2016 tarihinden itibaren 11 (OnBir) yıl süreyle, üretim faaliyeti göstermek üzere 6446 sayılı Elektrik Piyasası Kanunu ve ilgili mevzuat uyarınca Enerji Piyasası Düzenleme Kurulu'nun 01/09/2016 tarihli ve 6458-29 sayılı Kararı ile verilmiştir.

Mustafa YILMAZ
Başkan

EÜ/6458-29/03555 1/3

ÖZEL HÜKÜMLER

Bu lisans Enfaş Enerji Elektrik Üretim A.Ş.'ye aşağıda bilgileri verilen üretim tesisi için aşağıda belirtilen koşullarda verilmiştir.

1- Üretim tesisine ilişkin bilgiler

Proje/Tesis Adı	: Tire Biyogaz Tesisi
İli	: İzmir
İlçesi	: Tire
Mevkii	: Organize Sanayi Bölgesi
Tesis tipi	: Biyokütle
Ünite sayısı	: 4 adet
Ünite kurulu güçleri	: 1,095 MWm /1,067 MWe
Tesis toplam kurulu gücü	: 4,380 MWm /4,268 MWe
Kaynak/Yakıt türü veya türleri	: Bitkisel ve hayvansal atık
Yıllık elektrik enerjisi üretim miktarı	: 29.876.000 kWh
Sisteme bağlantı noktası ve gerilim seviyeleri	: 154/34,5 kV Tire TM 50 MVA TR/B OG barası
Tesis tamamlanma tarihi	: 01/09/2018 01/09/2016 tarihinden itibaren inşaat süresi: 24 ay

2- Bildirim adresi

Uluabat Köyü, 16700 Karacabey/BURSA

3- Lisansın yürürlüğe girmesi ve süresi

Bu lisans, 01/09/2016 tarihinde yürürlüğe girer ve lisans sahibinin bu lisans kapsamındaki hak ve yükümlülükleri, lisansın yürürlük tarihinden itibaren geçerlilik kazanır. Bu lisans, yürürlük tarihinden itibaren 11 (OnBir) yıl süreyle geçerlidir.

4- Tüzel kişilikte yüzde on (halka açık şirketlerde yüzde beş) ve üzerinde doğrudan veya dolaylı pay sahibi olan gerçek ve tüzel kişiler

Doğrudan Pay Sahibi Ortaklar	Hisse Oranı (%)
Muharrem YILMAZ	72

5- Tesis yerine ait köşe koordinatları *(1272 ada, 2 no'lu parsel)*

	E	N
1	562734.98	4219688.01
2	562756.87	4219688.04
3	562756.84	4219706.63
4	562734.95	4219706.60

6- Mevzuata uyma yükümlülüğü

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