



**Project design document form
(Version 10.1)**

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

BASIC INFORMATION

Title of the project activity	Gaziantep Landfill Gas to Energy Project, Turkey
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	Version 9
Completion date of the PDD	11/12//2017
Project participants	CEV Enerji Üretim San. Ve Tic. Ltd. Şti.
Host Party	Turkey
Applied methodologies and standardized baselines	Large Scale Consolidated Methodology ACM0001 "Flaring or use of landfill gas" version 18.0
Sectoral scopes linked to the applied methodologies	Sectoral Scope 13, Waste Handling and Disposal Sectoral Scope 1, Energy Industries
Estimated amount of annual average GHG emission reductions	82,116 tCO ₂ eq/year

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Document History:

On 21/06/2011, the project activity has been registered as a Gold Standard Voluntary Emission Reduction (GS VER) Project Activity under with the ID GS745 and has been issuing GS VER credits since 20.01.2010. In line with the requirements of Gold Standard, the Project Participant wishes to renew the crediting period. The following sections of this PDD is based on the PDD version 5, which was registered by Gold Standard on 21/06/2011, with revised information on baseline, the evaluation of emission reductions and the monitoring plan. Also, revisions due to upgrade of methodology, tool or format version does apply.

Project Summary:

The Gaziantep Landfill Gas to Energy Project, developed and operated by CEV Enerji Üretim San. Ve Tic. Ltd. Şti. (hereafter referred to as the “project participant”), which is the regional office of the Korea-based company CEV Clean Energy & Vehicle. The proposed activity involves the collection and utilization of the LFG with an electricity component with a maximum installed capacity reaching 5.655 MWe. The location of the proposed activity is the Gaziantep landfill site, Turkey. The Gaziantep landfill is the main landfill of the Gaziantep city, which is the 6th largest city in Turkey with its 1.2 million inhabitants. It started operations in 1996 and currently holds more than 3.2 million tons of waste. In 2008, the disposed waste amount reached 354,620 tones, corresponding to 1000 t/day on average. The landfill is a managed landfill with no landfill gas extraction or utilization.

In 2008, the Gaziantep Metropolitan Municipality opened a tender for managing its solid waste at the landfill. The Project owner has acquired the right to commercially operate the landfill in 2008. The Project is expected to operate until 2038 and will have two phases; in the initial phase the capacity will be 1.131 MW. In the second phase, the capacity will be expanded up to 5.655 MW:

Phase	Generation Units Installed	Total Installed Capacity	Commissioning Date
Phase 1	1 generation unit of 1.131 MW _e	1.131 MW _e	20/01/2010
Phase 2	4 generation units of 1.131 MW _e each	5.655 MW _e	12/08/2011

The important milestones of the project activity could be summarized as follows.

Date	Milestone
21/10/2008	Gaziantep Metropolitan Municipality organizes a tender for managing the waste on its landfill.
28/10/2008	The Project owner wins the tender and concludes a contract with the Municipality.
22/12/2008	Technical experts from Korea make a site visit to carry out various gas tests and measurements.
12/2008	Feasibility study contract
25/02/2009	Two construction companies are subcontracted for the preparation of the site (soil cover, piping etc.)
26/02/2009	The turbine contract is signed with the equipment supplier.
13/03/2009	Start day of site preparations (mobilisation)
17/03/2009	License application to EMRA

17/06/2009	Completion of site preparations
20/01/2010	Commissioning of 1 st generation unit
20/01/2010	Start of first crediting period
12/08/2011	Commissioning of 2 nd , 3 rd , 4 th and 5 th generation unit
21/06/2016	Registration of project activity under Gold Standard

As of now the project activity is operational with a total of 5 gas engines with a total installed capacity of 5.655 MW. The activity generates approximately 21 GWh/year of energy and delivered to the national grid¹. The Project activity have resulted in 76,194 tCO₂eq actual emission reductions throughout the monitoring period between 20/03/2010 – 31/07/2016 and is estimated to reduce 574,814 tCO₂eq emission reductions during the second crediting period.

The expected social and environmental impacts of the proposed Project are:

- It will promote integration of environmental infrastructure (e.g. after-care for landfill sites, etc.)
- The active LFG collection and flaring system will minimize off-site LFG migration and thus prevent potential explosions resulting from subsurface gas migration
- LFG flaring and combusting will dispose of the hazardous constituents safely. At the same time, it will reduce odor nuisance and health risks
- It will promote sustainable development by reducing greenhouse gas emissions and their impact on climate change

The Project Activity is expected to continue to provide contribution in the above areas also in the second crediting period.

A.2. Location of project activity

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Republic of Turkey

A.3. Technologies/measures

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South East Anatolia Region / Gaziantep Province. The Project site is located near the boundary between southeast region of Turkey and Syria.

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Turkey (host)	CEV Enerji Üretim San. Ve Tic. Ltd. Şti.	No

A.5. Public funding of project activity

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No public funding is obtained for the project.

¹ Based on the latest verified monitoring report, the project activity has generated 21,171 MWh electricity within year 2015.

A.6. History of project activity

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Document History:

On 21/06/2011, the project activity has been registered as a Gold Standard Voluntary Emission Reduction (GS VER) Project Activity under with the ID GS745 and has been issuing GS VER credits since 20.01.2010. In line with the requirements of Gold Standard, the Project Participant wishes to renew the crediting period. The following sections of this PDD is based on the PDD version 5, which was registered by Gold Standard on 21/06/2011, with revised information on baseline, the evaluation of emission reductions and the monitoring plan. Also, revisions due to upgrade of methodology, tool or format version does apply.

A.7. Debundling

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SECTION B. Application of selected methodologies and standardized baselines**B.1. Reference to methodologies and standardized baselines**

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Applied approved baseline and monitoring methodologies:

- Large scale consolidated baseline methodology ACM0001 “Flaring or use of landfill gas” version 18;

Used tools:

- “Gold Standard Procedures for the renewal of a crediting Period”;
- “Emissions from solid waste disposal sites” version 08;
- “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 02.0
- “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” version 03.0;
- “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period” version 03.0.1;
- “Tool to calculate the emission factor for an electricity system” version 05.0

For more information regarding the methodology please refer to <https://cdm.unfccc.int/Reference/tools/index.html>

B.2. Applicability of methodologies and standardized baselines

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The project activity involves several waste management technologies including LFG extraction, and utilization of the produced LFG for electricity generation. The applicability of the methodology and tools has been discussed in the guidance of the document “Gold Standard Procedures for the renewal of a crediting Period”. According to the referred document the Project participants shall update all sections of the project documentation using the latest approved baseline and monitoring methodology, applied in the original PDD of the registered GS project.

A side by side comparison of the used methodology and tools between the registered version and renewed versions are presented as follows:

Applicable methodology and tools for 1st and 2nd crediting periods.

Methodology applied in the registered original PDD (applicable to 1 st crediting period)	Methodology applied in the revised PDD (applicable to 2 nd crediting period)	Explanation
ACM0001 “Consolidated methodology for landfill gas project activities” version 11	ACM0001 “Flaring or use of landfill gas” version 18.0	At EB 65, the name of the methodology “Consolidated methodology for landfill gas

		project activities” is revised to “Flaring or use of landfill gas”. The methodology is still applicable to the project activity.
Tools applied in the registered original PDD (applicable to 1 st crediting period)	Tools applied in the revised PDD (applicable to 2 nd Crediting Period)	Explanation
“Tool for the demonstration and assessment of additionality” version 5.2	“Gold Standard Procedures for the renewal of a crediting Period”, and; “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period”	ACM0001 v18.0 now refers to “Combined tool to identify the baseline scenario and demonstrate additionality” tool for demonstration of additionality and identification of the baseline scenario. The tool is applicable to the project activity. However, according to “Gold Standard Procedures for the renewal of a crediting Period” the project participants have provided an assessment on the validity of the original baseline or update through and assessment carried out as per the “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period”. In line with the requirements, there is no need to update the current baseline or additionality therefore “Combined tool to identify the baseline scenario and demonstrate additionality” has not been applied during the renewal of crediting period.
“Tool to determine project emissions from flaring gases containing methane” version 01.	n.a.	The flare system has not been used during the first crediting period and will not be used during the second monitoring period. The PP will not claim any emission reduction credits due from flaring and therefore methodological tools related with flaring have been excluded from the PDD.
“Tool to determine methane emission avoided from disposal of waste at a solid waste disposal site” version 04	“Emissions from solid waste disposal sites” version 08	At EB 65, the title of the tool changed from “Tool to determine project emissions from flaring gases containing methane” to “Emissions from solid waste disposal sites”.

		The tool is applicable to the project activity.
"Tool to calculate the emission factor for an electricity system" version 02	"Tool to calculate the emission factor for an electricity system" version 04.0	The tool is still applicable to the project activity.
"Tool to calculate the baseline, project and/or leakage emissions from electricity consumption" version 01	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" version 01	There has been no change to the tool. The tool is still applicable to the project activity.
	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" version 03	ACM0001 v17.0 refers to the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream". The tool is applicable to the project activity.
	"Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period" version 03.0.1	Since the project is at the renewal process, "Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period" is applicable to the project activity.

The applicability of the methodologies and tools has been discussed below.

Applicability of ACM0001 "Flaring or use of landfill gas" version 18.0

The emission reductions resulting from the capture and utilization of landfill gas are calculated using ACM0001 "Flaring or Use of Landfill Gas". The applicability of ACM0001 "Flaring or Use of Landfill Gas" version 18.0 is discussed as follows:

Ref.	Applicability Criteria	Justification
The methodology is applicable under the following conditions:		
a	Install a new LFG capture system in a new or existing SWDS where no LFG capture system installed prior to the implementation of the project activity	The proposed project activity was installed to an existing SWDS where no LFG capture system installed prior to the implementation of the project activity.
b	Make an investment into an existing LFG capture system to increase the recovery rate or change the use of captured LFG, providing that; i) The captured LFG was vented or flared and not used prior to the implementation of the project activity; and ii) In the case of an existing active LFG capture system for which the amount of LFG cannot be collected separately from the project system after the implementation of the project activity and its efficiency is not impacted on by the project system: historical data on the amount of LFG capture and	Not applicable since the situation prior to the proposed project activity is wild landfilling where there is no LFG ventilation, capture or flaring.

	flare is available.	
c	Flare the LFG and/or use the captured LFG in any (combination) of the following ways: i) Generating electricity ii) Generating heat in a boiler, air heater or kiln (brick firing only) or glass melting furnace; and/or iii) Supplying the LFG to consumers through a natural gas distribution network. iv) Supplying compressed / liquefied LFG to consumers using trucks.	The proposed project activity is designed in a way to make use of the LFG recovered for the delivery of electricity. There will be no heat generation or supply of LFG to consumers through distribution network or trucks.
d	Do not reduce the amount of organic waste that would be recycled in the absence of the project activity.	There is no recycling of organic materials in the baseline situation or project activity.
The methodology is only applicable if the application of the procedure to identify the baseline scenario confirms that the most plausible baseline scenario is		
e	Atmospheric release of the LFG or capture of LFG and destruction through flaring to comply with regulations or contractual requirements, to address safety and odor concerns, or for other reasons.	The most plausible baseline scenario is the total release of the LFG from the SWDS.
f	In the case that the LFG is used in the project activity for generating electricity and/or generating heat in a boiler, air heater, glass melting furnace or kiln; i) For electricity generation: that electricity would be generated in the grid or in captive fossil fuel fired power plants; and/or ii) For heat generation: that heat would be generated using fossil fuels in on-site equipment.	The most plausible baseline scenario for electricity generation is that electricity would be generated in the grid.
The methodology is not applicable:		
g	In combination with other approved methodologies. For instance, ACM0001 cannot be used to claim emission reductions for the displacement of fossil fuels in a kiln, or glass melting furnace where the purpose of the CDM project activity is to implement energy efficiency measures at a kiln or glass melting furnace;	The project activity only developed in accordance with ACM0001.
h	If the management of the SWDS in the project activity is deliberately changed to increase methane generation compared to the situation prior to the implementation of the project activity.	No changes or intervene has been made deliberately to increase generation compared to situation prior to the implementation of the project activity.

According to “Gold Standard Procedures for the renewal of a crediting Period” the project participants have provided an assessment on the validity of the original baseline or update through and assessment carried out as per the “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period”. In line with the requirements, there is no need to update the current baseline or additionality therefore “Combined tool to identify the baseline scenario and demonstrate additionality” version 07 has not been applied during the renewal of crediting period.

Applicability of “Emissions from solid waste disposal sites”:

This tool provides procedures to calculate baseline, project or leakage emissions of the methane from solid waste disposed or prevented from disposal at a SWDS. The applicability of the tool “Emissions from solid waste disposal sites” is discussed as follows:

Ref	Applicability Criteria	Justification
The tool can be used to determine emissions for the following types of applications:		
Application A	The CDM project activity mitigates methane emissions from a specific existing SWDS.	Since the methane emissions are mitigated by capturing and combusting the methane, “Application A” implies to the proposed project activity. The methane is generated from waste disposed in the past, including prior to the start of the project activity. In line with the requirements, this tool is only applied for an <i>ex-ante</i> estimation of emissions in the PDD. The emissions will be monitored during the crediting period using the applicable approaches in the relevant methodologies (ACM0001 in this case).
Application B	The CDM project activity avoids or involves the disposal of waste at a SWDS.	Application B does not define the situation of the project activity. The Project Activity does not avoid the disposal of waste at the SWDS.

The tool “Emissions from solid waste disposal sites” is applicable since the proposed project activity mitigates methane emissions from a specific existing SWDS.

Applicability of “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” version 02:

This tool provides procedures to estimate the baseline, project and/or leakage emissions associated with the consumption of electricity. The tool is only applicable if certain scenario applies to the sources of electricity consumption. Three possible scenarios have been discussed as follows:

Ref	Applicability Criteria	Justification
a	Electricity consumption from the grid. The electricity is purchased from the grid only. Either no captive power plant is installed at the site of electricity consumption or, if any on-site captive power plant exists, it is not operating or it can physically not provide electricity to the source of electricity consumption.	In the proposed project activity, the electricity is purchased from the grid only and no captive power plant is installed at the site of electricity consumption.

b	Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants are installed at the site of electricity consumption source and supply the source with electricity. The captive power plant(s) is/are not connected to the electricity grid.	Not relevant to the project activity since there are no captive power plants installed at the site of electricity consumption source.
c	Electricity consumption from the grid and (a) fossil fired captive power plant(s). One or more fossil fuel fired captive power plants operate at the site of electricity consumption source. The captive power plant(s) is/are also connected to the electricity grid. Hence, the electricity consumption source can be provided with electricity from the captive power plant(s) and the grid.	Not relevant to the project activity since there are no captive power plants installed at the site of electricity consumption source.

Based on the above arguments it can be concluded that the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption’ v 02 is applicable to the project activity.

Applicability of “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” version 03.0:

This tool provides procedures to determine the mass flow of CH₄ in the LFG in time interval t. As referred in methodology ACM0001, the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” version 03.0 is applicable for the proposed project activity.

Applicability of “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period” version 03.0.1:

This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.

As referred in methodology ACM0001, the “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period” is applicable for the proposed project activity.

Applicability of “Tool to calculate the emission factor for an electricity system” version 05.0:

This methodological tool determines the CO₂ emission factor for displacement of electricity generated by power plants in an electricity system, by calculating the “combined margin” emission factor (CM) of the electricity system. This tool maybe applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity. As the proposed project activity supplies electricity to the national grid, the “Tool to calculate the emission factor for an electricity system” is applicable to the project activity.

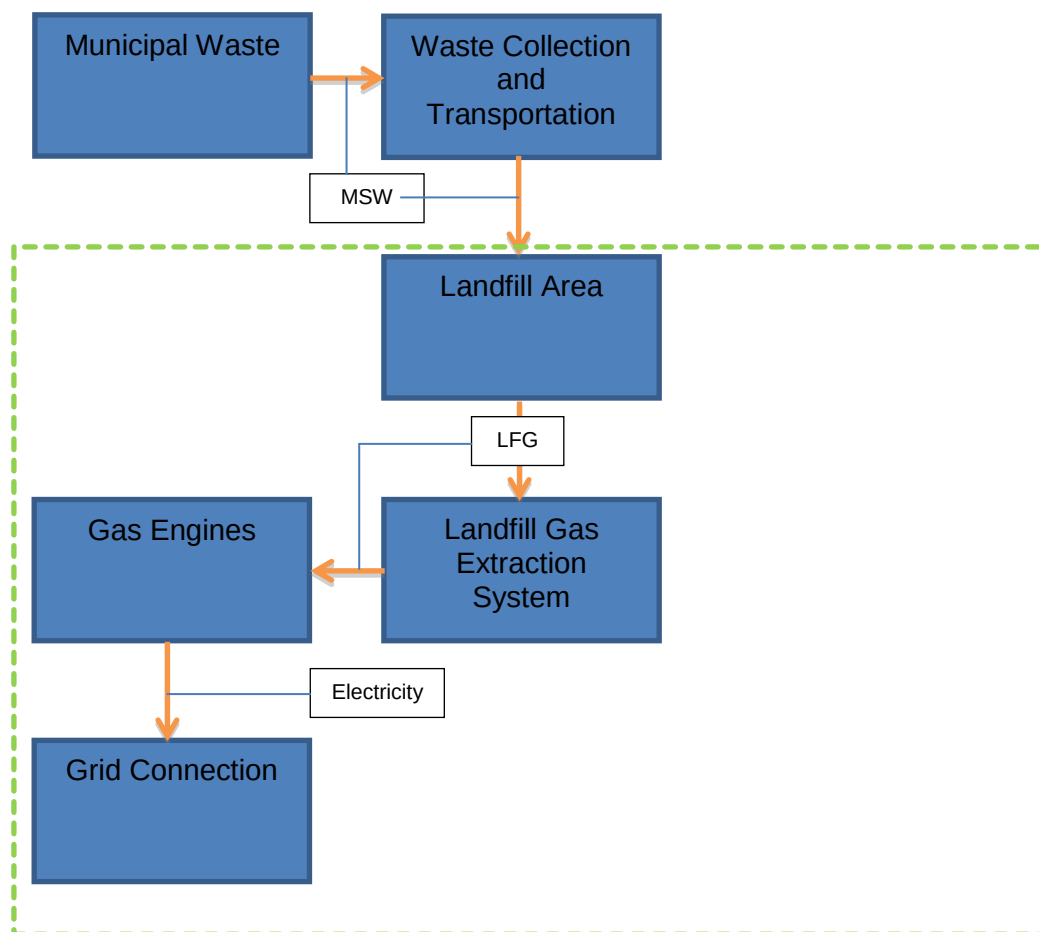
B.3. Project boundary, sources and greenhouse gases (GHGs)

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The spatial extent of the project boundary is the site of the project activity where the waste is treated, LFG is used and include power plants connected to the energy system, which is the national grid system. This is consistent with;

ACM0001 “Flaring or use of landfill gas”, which defines the project boundary as the site of the project activity where the LFG is flared or used. The gases and sources relevant to the proposed VER project are listed in the below table

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Emissions from decomposition of waste at the SWDS	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 ₂ O	No	N ₂ O emissions are small compared to CH ₄ emissions from landfills. Exclusion of this gas is conservative.
		...		
	Emissions from electricity generation	CO ₂	Yes	Major emission source
		CH ₄	No	Excluded for simplification. This is conservative
		N ₂ O	No	Excluded for simplification. This is conservative
		...		
Project scenario	Emissions from electricity consumption due to the project activity	CO ₂	Yes	This may be an important source of emissions in the project activity
		CH ₄	No	Excluded for simplification. This emission source is assumed to be very small
		N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small
		...		



There are no flaring activities within the project activity.

B.4. Establishment and description of baseline scenario

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The establishment and description of the baseline scenario is discussed the guidance of the document “Gold Standard Procedures for the renewal of a crediting Period”. According to the referred document the Project participants shall provide an assessment on the validity of the original baseline or update through and assessment carried out as per the “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period”.

The “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period” version 03.0.1 provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism.

The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.

Step 1. Assess the validity of the current baseline for the next crediting period

The procedures for the renewal of the crediting period of a registered CDM project activity approved by the CDM Executive Board require assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline.

The validity of the current baseline is assessed using the following Sub-steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.

An assessment on whether the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation and if they are applicable at the time of requesting renewal of the crediting period must be provided.

A side by side comparison of relevant mandatory national and/or sectoral policies between the registered version and renewed versions are presented as follows:

Relevant mandatory national and/or regional sectoral policies applicable to the registered original PDD (applicable to 1 st crediting period)	Relevant mandatory national and/or regional sectoral policies applicable to the revised PDD (applicable to 2 nd crediting period)	Explanation
"Environmental Law" ² [Law Number: 2827 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983]	"Environmental Law" [Law Number: 2827 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983]	This law outlines Turkey's environmental policy in general terms. It aims to protect the environment and Turkey's natural resources for the benefit of future generations. It includes the polluter pays principle. Regulations have been issued on air quality protection, water pollution control, environmental impact assessment, waste control, noise control, and the control of hazardous materials. The Environmental Law is one of the main legislations regarding the project activity as it relates to waste management activities. The Law is still valid and applicable to the project activity.
"Electricity Market Law" ³ [Law Number: 4628 Enactment Date: 03.03.2001]	"Electricity Market Law" [Law Number: 4628 Enactment Date: 03.03.2001]	The purpose of this Law is to ensure the development of financially sound and transparent electricity market

² Reference: The official web page of the Ministry of Environment and Forestry; <http://www2.cevreorman.gov.tr/yasa/k/2872.doc>

³ Reference: The official web page of EMRA; <http://www.epdk.gov.tr/documents/10157/351a7a0c-52a9-40d5-8e12-f8e61afe7247>

		operating in a competitive environment under provisions of civil law and the delivery of sufficient, good quality, low cost and environment-friendly electricity to consumers and to ensure the autonomous regulation and supervision of this market. Among others, the scope of the law also covers generation of electricity. As one of the important aspects of the proposed project activity is electricity generation, the Electricity Market Law is one of the regulating legislations regarding the project activity. The Law is still valid and applicable to the project activity.
“Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy”⁴ [Law Number: 5346; Enactment Date: 18.05.2005]	“Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy” [Law Number: 5346; Enactment Date: 18.05.2005]	The purpose of this Law is to expand the utilization of renewable energy resources for generating electrical energy, to benefit from these resources in secure, economic and qualified manner, to increase the diversification of energy resources, to reduce greenhouse gas emissions, to assess waste products, to protect the environment and to develop the related manufacturing sector for realizing these objectives. As one of the important aspects of the proposed project activity is electricity generation from renewable energy sources the “Renewable Energy Law” is one of the regulating legislations regarding the project activity. The Regulation is still valid and applicable to the project activity.

⁴ Reference: The official web page of EMRA; <http://www.epdk.gov.tr/documents/10157/4b360128-53aa-4174-8104-a6c10434ac9c>

“Regulation on Solid Waste Management/Control”⁵ [Regulation number: 20814 Enactment Date: 14/03/1991]	“Regulation on Solid Waste Management/Control” [Regulation number: 20814 Enactment Date: 14/03/1991]	The regulation mentions the obligation of the party undertaking the solid waste management to respect the human health and welfare of the society. However, it doesn't prescribe any technology to achieve this (article 5 and article 27) nor does it mention any sanction or penalty if solid waste management projects are implemented otherwise. As such the regulation is instructive on the issue of solid waste management rather than normative. It does not mandate the destruction of methane. Although semi-controlled release of landfill gas to the air (a.k.a. 'venting') occurs at several landfills, the law and regulations does not mandate the destruction of methane. The Regulation is still valid and applicable to the project activity.
n.a.	Regulation on Managed Waste Land Filling⁶ [Regulation number 27533 Enactment Date: 26.03.2010]	The newly enacted regulation (26.03.2010) on sanitary waste landfilling aims to (1) minimize the impact of leachate and LFG on soil, air and water quality; (2) regulate waste acceptance to the landfill area; and (3) provide procedures for opening and closure of a landfill area. In summary: although solid waste management regulation is being implemented in Turkey, it is neither compiled to nor enforced. The regulations don't define sanctions or penalties. In practice, none of the landfill areas comply with these regulations, as indicated in statistics on landfill areas. Most landfill areas in Turkey

⁵ Reference: The official web page of the Ministry of Environment and Forestry;
<http://www.cygm.gov.tr/CYGM/Files/mevzuat/yonetmelik/kaky.doc>

⁶ Reference: The official web page of the Ministry of Environment and Forestry;
http://www.cygm.gov.tr/CYGM/Files/mevzuat/yonetmelik/Duzenli_Depolama.doc

		are actually 'waste dumps' where no waste management (including covering of the landfill) implemented. This regulation was enacted after the registration of the original PDD, however does not include any enforcement towards destruction or utilization of the LFG that would have an impact on the baseline scenario of the project activity.
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The current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period.

Step 1.2: Assess the impact of circumstances

In accordance with the "Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period" version 03.0.1, the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions should be assessed, without reassessing the baseline scenario.

At the time of registration, the baseline scenario has been defined as;

- P2: Generation of grid-connected power, which would have otherwise been generated by the operation of already existing grid-connected power plants and by the addition of new generation sources; and,
- LFG2: Maintaining the status quo, where LFG is emitted into the atmosphere without conducting any management, collection or utilization on the landfill site.

In other words; "Disposal of the waste at a landfill without the capture of landfill gas. The electricity is generated by existing grid connected power plants".

There has been no identified circumstance that has an impact on the validity of the baseline scenario.

There are 2,950 municipalities in Turkey, out of which 2,879 have a municipal waste service, covering 83% of the total population of Turkey. The amount of waste collected in 2010 was 25,277,000 tonnes. Out of 2,879 municipalities providing landfill services, only 52 of these landfills are classified as "controlled landfills". From these controlled landfills only 5 have a composting plant and 2 of them have an incineration plant for medical waste.

	2006	2008	2010
# of municipalities receiving solid waste services	3,115	3,129	2,879
Rate of population receiving solid waste services in total population (%)	81	82	83
Solid waste collected (1000 t/year)	25,280	24,361	25,277
Solid waste per capita (kg/capita-day)	1.21	1.15	1.14
Solid waste disposal plants			

Controlled Landfill	Number	22	37	52
	Capacity	376,974	390,478	423,142
	Solid waste disposed of (1000 t/year)	9,942	10,037	14,377
Composting plant	Number	4	4	5
	Capacity	605	551	556
	Waste received by composting plant (1000 t/year)	268	276	216
Incineration plant	Number	3	2	2
	Capacity	44	44	44
	Medical waste incinerated (1000 t/year)	6	8	6
Rate of population served by solid waste disposal plants in total population		34	39	47

From the above it can be concluded that treatment of waste in controlled landfills is not common practice.

To identify any similar type of activity to the project activity, a survey of existing generation units in the national electricity system database has been conducted⁷.

Based on the survey of generation licenses, the following project activities have been identified, which are involved in landfill gas extraction, biogas generation and utilization of these gases.

Project / Company	Installed Capacity (MW)	Brief notes on the project
ITC KA Enerji Sincan	5.7	GS VER Project Activity (GS 675)
ITC KA Enerji Konya	5.7	GS VER Project Activity (GS 1016)
ITC KA Enerji Adana	11.3	GS VER Project Activity (GS 715)
Cev. En. Gaziantep	5.7	GS VER Project Activity (GS 745)
Ekolojik Enerji (Kemerburgaz)	1.0	Incineration facility for hazardous wastes.
Ortadoğu Enerji (Odayeri)	17.0	GS VER Project Activity (GS 707)
Ortadoğu Enerji (Kömürcüoda)	5.8	GS VER Project Activity (GS 707)
İZAYDAŞ (İzmit Çöp)	5.2	GS VER Project Activity (GS 1013)
Bolu Bel Çöp (CEV Marmara)	1.1	GS VER Project Activity (GS 764)
Kayseri Katı Atık (HER En)	1.6	GS VER Project Activity (GS 1061)

The following definitions have been applied in determining the “similar project activities”;

- The geographical area is considered as the same country (Turkey). This is the most conservative approach
- Project activities rely on LFG extraction and utilization in a landfill area.
- With similar scale. The project activity is a small- project activity with 5.655 MW installed capacity. A conservative range of $\pm 50\%$ capacity have been considered in defining the “similar scale”. Facilities with a range of 2.8-8.4 MW have been included to the analysis.
- Project activities that are operational have been included in the analysis.
- In a comparable environment. Project activities built and/or operated by state owned companies/organizations (such as municipalities) have been excluded since the neither the investment climate nor access to finance shows similarities to the proposed project activity.

⁷ Reference: TEİİŞ Turkish Electrical Energy 10 Years Projection on Generation Capacity 2012-2021, ANNEX 1 “Current System” <http://www.teias.gov.tr/KAPASITEPROJEKSIYONU2012.pdf>

Based on the energy generation portfolio of Turkey, the following project activities show similarities to the project activity;

Project / Company	Installed Capacity (MW)	Brief notes on the project
ITC KA Enerji Sincan	5.7	GS VER Project Activity (GS 675)
ITC KA Enerji Konya	5.7	GS VER Project Activity (GS 1016)
Ortadoğu Enerji (Kömürcüoda)	5.8	GS VER Project Activity (GS 707)
İZAYDAŞ (İzmit Çöp)	5.2	GS VER Project Activity (GS 1013)

However, all these project activities have been developed as GS VER project activities.

As a general outcome, it could be concluded that the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions did not affect the continuity of the validity of the baseline. Therefore, the baseline of the project activity is:

Disposal of the waste at a landfill without the capture of landfill gas and the LFG is released to the atmosphere. The electricity is generated by existing and/or new grid connected power plants. This is also in line with ACM0001 “Flaring or use of landfill gas”. The baseline scenario corresponds to LFG2, E1 of the applicable methodologies.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

This sub step is not applicable to the proposed project activity since the baseline scenario is identified as “Disposal of the waste at a landfill without the capture of landfill gas and the electricity generated by existing grid connected power plants” at the time of validation.

Step 1.4: Assessment of the validity of the data and parameters

In accordance with the “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period” version 03.0.1, an assessment on whether data and parameters that were determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated should be conducted.

Updates should undertake the following cases:

- Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC.
- Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated.

Under the registered PDD the Global Warming Potential (GWP_{CH_4}) has been considered as 21 for ex-ante calculations, which was applicable during the first commitment period of Kyoto. The GWP_{CH_4} value has been revised to 25 for the second commitment period of Kyoto. Therefore, the baseline emission reductions have been revised accordingly.

In line with the requirements of the “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period”, also the emission factor of calculated ex-ante and fixed for the first crediting period have been revised accordingly.

Step 2. Update the current baseline and the data and parameters

Step2.1 Update the current baseline

In line with the requirements of “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period” version 03.0.1, there is no need to update the current baseline. The identified baseline for the second crediting period is “Disposal of the waste at a landfill without the capture of landfill gas. The electricity is generated by existing grid connected power plants.”.

Step2.1 Update the data and parameters.

In line with the requirements of “Tool to assess the validity of the original / current baseline and to update the baseline at the renewal of a crediting period” version 03.0.1, data and parameters that are not monitored during the crediting period have been updated for the second crediting period.

B.5. Demonstration of additionality

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The additionality of the project activity has been demonstrated and validated under the registered original PDD at the start of first crediting period. The additionality has been demonstrated based on barrier analysis. All values, data and information are valid at the time of investment decision. The demonstration of the additionality under the original PDD has been summarized as follows;

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

Realistic and credible alternatives to the project activity(s) are defined through the following Sub-steps;

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

The following realistic and credible alternatives are identified that are available to the project participants or similar project developers that provide outputs or services comparable with the proposed Project activity;

Alternatives to the Landfill Gas Component:

- **LFG1:** The Project activity (capture of landfill gas and its flaring) undertaken without being registered as a VER project activity. This scenario assumes that the Project owner will realize the Project activity even in the lack of revenues stemming from Project's emission reductions. In this scenario, the Project would operate a LFG facility which would capture and reduce methane emissions from the landfill site, without any VER sales. The inclusion of this scenario is required under ACM0001.
- **LFG2:** Atmospheric release of the landfill gas. This scenario corresponds to the current practice on the landfill site by maintaining the status quo, where methane is directly emitted to the atmosphere, without any type of collection, recovery, processing or destruction. The inclusion of this scenario is required under ACM0001.
- **LFG3:** The Project activity is realized using the VER revenues. This scenario corresponds to the Project activity, where the Project only becomes feasible with the use of VERs. Under this alternative, the Project will partially capture the LFG emissions from the landfill site and use it for power generation. The rest will be flared to minimize GHG emissions and safety risks, which were present in the scenario LFG2.

Alternatives to the **Power Generation Component**:

- **P1:** Power generated from landfill gas undertaken without being registered as VER project activity. This scenario assumes that the Project owner would realize the Project activity even in the lack of VER revenues and generate power from the collected LFG to feed it to the national grid. The inclusion of this scenario is required under ACM0001.
- **P2:** Existing and/or new grid-connected power plants. This scenario corresponds to the current practice for electricity generation by maintaining the status quo. Under this scenario, the Project will not be undertaken, the existing and new power plants will generate all the power and the national electricity will remain unaffected. The inclusion of this scenario is required under ACM0001.
- **P3:** The Project activity is realized using the VER revenues. This scenario corresponds to the Project activity, where the Project only becomes feasible with the use of VERs. Under this alternative, the Project will generate power and feed it to the national grid, thereby replacing electricity partially generated by thermal power plants.

The alternative scenario is defined as the combination of both Landfill Gas and Power Generation components, since the Project has both components. Realistic and credible alternative scenarios to the Project activity are identified.

Sub-step 1b: Consistency with mandatory laws and regulations:

The Environment Law does not require a tipping fee for accepting municipal solid waste at the sanitary solid waste disposal sites. There is an “environment tax” and another “waste water surcharge” collected by municipalities from households for waste management activities. The collected taxes are mostly used for maintenance of city parks and gardens and managing waste. Municipalities generally subsidize waste collection and dumping activities from the municipal budgets. Under these circumstances, municipalities or households are not familiar with additional costs of proper waste management. Therefore, waste management is one of the everlasting problems of municipalities and is an unattractive field for private companies.

The “Metropolitan Municipalities Law” sets out the legal framework of solid waste management in metropolises. Accordingly, the Gaziantep Metropolitan Municipality is responsible for the collection, management and proper disposal of municipal waste and shall build and operate the necessary facilities or let 3rd parties do so. In agreement with this law, a tender shall be organized for certain types of goods and services the municipalities purchase. Therefore, the Municipality has organized a tender and the Project owner has won it by offering landfill site management with *no* cost to the Municipality.

The Project is a voluntary investment managed by a special contract between the Gaziantep Metropolitan Municipality and the Project owner. Therefore, the Project has to be in compliance with all relevant legislation. The Project is licensed and permitted by public authorities. All scenarios are valid according to national laws, regulations and communiqués.

For scenario LFG2, the most relevant regulation governing landfill sites is the “Control of Solid Waste Regulation”. According to its Article 27, landfill sites are *not* enforced to capture and/or to destroy LFG emissions. This regulation does not set any obligations or penalties but only suggests the reduction of GHG emissions. Therefore, this alternative reflects current practice and agrees with current laws and regulations.

For scenario P2, maintaining the status quo, without the realization of the Project activity, agrees with the relevant legislation.

As a result, it is shown that these realistic and credible alternative scenarios to the Project activity follow mandatory legislation and regulations.

Step 2: Investment analysis

According to the Additionality Tool, this step involves the determination whether the proposed Project activity is not:

- (a) The most economically or financially attractive; or
- (b) Economically or financially feasible, without the revenue from the sale of emission reductions.

Sub-step 2a: Determine appropriate analysis method

According to the Additionality Tool, one of three options must be selected:

- I. Simple cost analysis (where no benefits other than CDM income exist for the project)
- II. Investment comparison analysis (where comparable alternatives to the project exist)
- III. Benchmark analysis

Because the Project will receive additional revenues other than VERs from electricity sales, and since there are no comparable investment alternatives to the proposed project, option (iii) benchmark analysis is selected. In this case, the most likely alternative to the Project would be simply not to install flaring and electricity generation equipment on the landfill site.

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

The likelihood of the development of this Project will be determined by analyzing its **Project IRR** based on the scenarios with and without the sales of carbon credits.

IRR is a measure of investment profitability. According to the Additionality Tool, the assessment of the financial performance of the Project with and without carbon revenues shall be carried out according to benchmarks. The chosen benchmark for the Project is the discount rate. This means that the Project would be attractive only if the IRR exceeds the discount rate. The "Guidelines on the Assessment of Investment Analysis" v.3, EB51 ("Guidelines") has been followed.

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

The following parameters are used for calculations;

Parameter	Unit	Figure	Sorce	Jusitification
Investment Horizon	Years	20	Assumption	The guidelines suggest a minimum of 10 years and a maximum of 20 years
Corporate Tax	%	20	www.invest.gov.tr	This is the financial corporate tax rate in the host country.
Discount rate	%	11.8	WACC calculations	Pre-tax WACC is suggested by the guidelines
Electricity price	€cent/kWh	6.1	Feasibility study	This figure is used in the

				investment decision
Carbon credit price	€/tCO ₂ eq	4	Feasibility Study	This figure is used in the investment decision
Initial investment	1000 Euro	6,321	Feasibility Study	This figure is used in the investment decision
Operation & maintenance costs	1000 Euros	1,411	Feasibility Study	This figure is used in the investment decision

According to the agreement between the Municipality and the Project owner, the Project owner does not receive any revenues from the Municipality.

Scenario LFG1 & P1: Project without Carbon Credits

Since the Project involves no disposal fee paid by the Municipality, its revenue sources are limited to electricity sales (when VERs are not considered). Based on these data, the Project's IRR is calculated for the case where the Project would have been realized without carbon revenues. This corresponds to the scenario combination LFG1 & P1. The results are the following;

Indicator	Unit	Source	IRR	Benchmark	Result
Results	%	Calculations	6.8%	11.8%	Unfeasible

In this scenario, the Project IRR calculations are carried out *without* considering carbon credit sales. The calculations conservatively assume that the revenues from electricity sales are obtained without delay (which may not reflect the actual case), that there are no major unforeseen malfunctions or other unforeseen expenses, and that the LFG generation occurs as expected.

The results indicate that without carbon credits, the Project is not feasible. Under these circumstances, the Project would not be attractive for a private investor.

Proposed Project Activity: Project with Carbon Credits

The proposed Project is realized with the additional inflow of revenues from carbon credit sales, the Project's profitability improves considerably;

Indicator	Unit	Source	IRR	Benchmark	Result
Results	%	Calculations	16.3%	11.8%	Feasible

In this case, it is observed that the IRR improves considerably with the inclusion of the carbon credit component and thus exceed the benchmarks. The Project IRR reaches investment levels because it exceeds the benchmarks.

Outcome of Sub-step 2c: Financial indicators are calculated and compared.

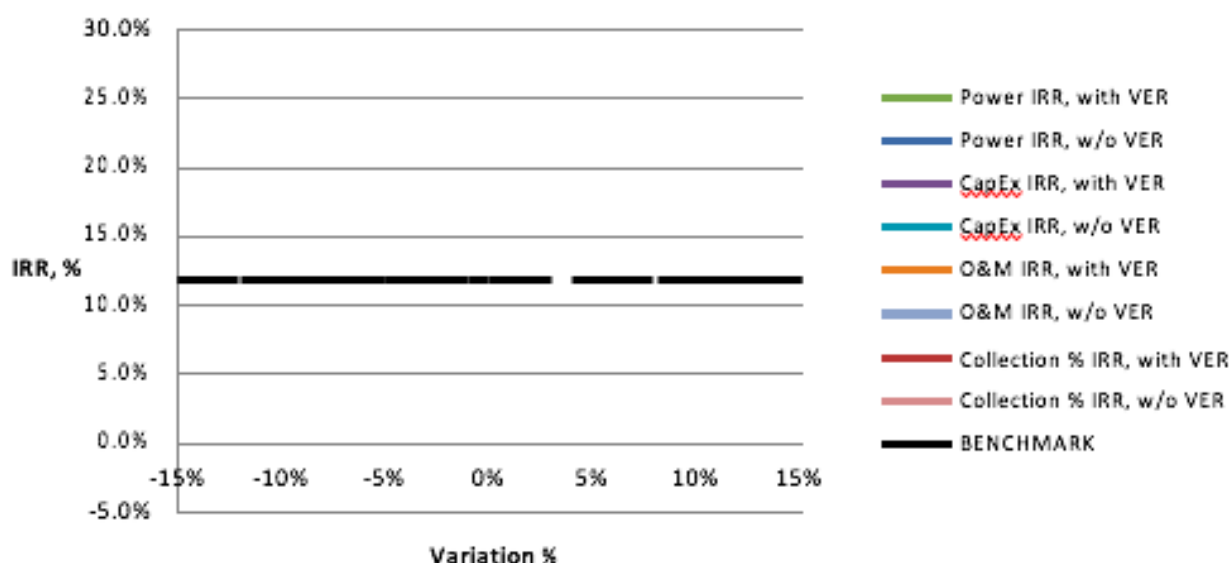
Sub-step 2d: Sensitivity analysis

The purpose of the sensitivity analysis is to check how much the Project's financial performance depends on main variables of the investment analysis. The Additionality Tool requires including those financial parameters in the analysis, that have 20% or more impact on the results. The following parameters are identified which satisfy this condition;

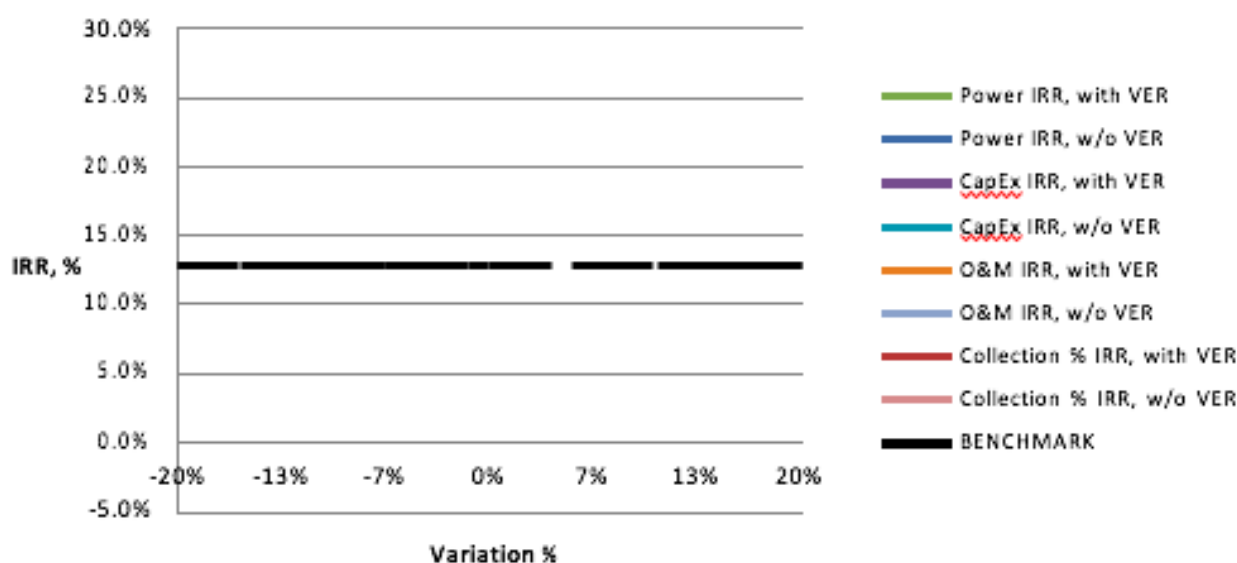
- a) Electricity Prices (impact on revenues)
- b) Capital expenditures (impact on costs)
- c) LFG Collection ratio (impact on revenues)
- d) Operation and Maintenance Costs (impact on costs)

Both parameters are changed in the negative and positive directions to check how far they affect the Project profitability. The Additionality Tool suggests to at least cover an interval from -10% to +10% when varying the chosen input parameters. To assess the behavior of the Project feasibility to a wider range of variations, an interval from -15% to +15% is chosen, with steps of 5% change. The results are as the following;

Sensitivity of IRR



Sensitivity of IRR



The figure above depicts the reaction of the financial viability of the Project to the most important changing input parameters. Accordingly, the following conclusions can be made:

- Impact of electricity prices on Project IRR ("Power IRR"):** There are two Power IRR lines in the Figure 7 above, the lower one representing the baseline scenario (LFG1&P1) without carbon revenues, and the upper line representing the proposed Project activity, including carbon revenues. The figure shows that the Project is quite sensitive to electricity prices. The Project would become feasible only if the electricity price would increase by 15% or higher, which is unlikely considering current market conditions, legal incentives for renewable energy and trends.

- b) **Impact of capital expenditures on Project IRR (“Capex IRR”)**: The figure shows that as Capex increases the IRR decreases (and vice versa) and that it is unlikely the Project becoming feasible even if Capex would drop at significant amounts. Even if capital expenditures would increase by 20%, the IRR would be below the benchmark.
- c) **Impact of Operation and Maintenance Costs (“O&M IRR”)**: The figure shows that as O&M costs increases the IRR decreases (and vice versa) and that it is unlikely the Project becoming feasible even if O&M costs would drop by 15%.

During the registration process of the Project, the construction of the 1st and 2nd stages have been completed and full operation has started. In the meantime, actual realized financial figures (CAPEX, loan interest rate, E/D ratio) have also been finalized. The real figures and a comparative IRR analysis with these real values show that the Project is not feasible and real IRR is considerably below the benchmark.

Conclusion: It is seen that in case the parameters change in positive direction, the Project does not exceed the benchmark threshold.

Outcome of Sub-step 2d: The sensitivity of financial indicators to input parameters is assessed.

Outcome of Step 2: The sensitivity analysis clearly demonstrates that the proposed Project activity is unlikely to be most financially/economically attractive and LFG1 & P1 is not a plausible alternative. According to the Additionality Tool, this satisfies the requirement of Step 2.

Step 3: Barrier analysis

This step is skipped.

Demonstration of additionality

Due to some time constraints, macroeconomic conditions and ongoing talks with the Gaziantep Metropolitan Municipality, there have been some delays in the development of carbon project. Since banks refused to fund the Project, the Project owner had to devote its scarce resources to meeting its deadlines. However, the Project has been designed and planned from the beginning by considering carbon credits. The feasibility study of the Project activity clearly suggests that emission reductions and carbon revenues have been an integral part of the Project from the start. The project owner has considered carbon revenues earlier than project implementation, demonstrating early consideration of VER revenues.

Date	Action
21/10/2008	Gaziantep Metropolitan Municipality organizes a tender for managing the waste on its landfill.
28/10/2008	The Project owner wins the tender and concludes a contract with the Municipality.
22/12/2008	Technical experts from Korea make a site visit to carry out various gas tests and measurements.
12/2008	Feasibility study contract
25/02/2009	Two construction companies are subcontracted for the preparation of the site (soil cover, piping etc.)
26/02/2009	The turbine contract is signed with the equipment supplier.
13/03/2009	Start day of site preparations (mobilisation)
17/03/2009	License application to EMRA
17/06/2009	Completion of site preparations
29/06/2009	Start of talks with carbon consultants
21/08/2009	Contracting carbon consultants
01/02/2010	Actual start date of electricity generation

The identified barriers and results of the investment analysis are sufficient grounds for demonstration of additionality since they prevent potential project proponents from carrying out the proposed project activity undertaken without being registered as a VER project activity. The waste-to-energy concept constitutes a very limited portion of the Turkish electricity market and the Project Activity goes beyond of “business as usual” scenario and cannot be considered as a common practice.

The regulations in the host country regarding landfill gas capture or destruction are not mandatory and there is a distinct lack of policies promoting efficient use of LFG (e.g. production of renewable energy, processing of organic waste etc.). Landfill site operators are not required to capture or destroy LFG; therefore, the Project would have reduced GHG emissions compared to the case where it would not be realized at all. As a result, the Project is additional.

Outcome of Sub-step 4b: Other similar options are discussed and the additionality of the Project is demonstrated.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

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

$$ER_y = BE_y - PE_y$$

Where:

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

Baseline emissions

In accordance with the applicable methodologies the baseline is estimated as follows:

$$BE_y = \left((1 - OX_{top-layer}) * F_{CH4,PJ,y} - F_{CH,BL,y} \right) * GWP_{CH4} + BE_{EC,y}$$

Where:

BE_y	Baseline emissions in year y (tCO ₂ e/yr)
OX	Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline
$F_{CH4,PJ,y}$	Amount of methane in the LFG which is flared and/or used in the project activity in year y (tCH ₄ /yr).
$F_{CH4,BL,y}$	Amount of methane in the LFG which is flared in the baseline in year y (tCH ₄ /yr).
GWP_{CH4}	Global Warming Potential for methane
$BE_{EC,y}$	Baseline emissions associated with the electricity generation in year y (tCO ₂ e/yr).

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

Since the project activity only covers utilization of LFG in power plant the $F_{CH4,PJ,y}$ is equal to $F_{CH4,EL,y}$ where $F_{CH4,EL,y}$ is amount of methane in the LFG which is used for electricity generation in year y (tCO₂e/yr) and is determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”.

$F_{CH_4,EL,y}$ is determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”.

The tool provides procedures to determine the following parameter:

Parameter	SI Unit	Description
$F_{i,t}^8$	kg/h	Mass flow of greenhouse gas i (CO ₂ , CH ₄ , N ₂ O, SF ₆ or a PFC) in the gaseous stream in time interval t.

The mass flow of CH₄ in LFG is determined through measurement of the flow and volumetric fraction of the gaseous stream (LFG). The “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” provides 6 different ways to make these measurements and the corresponding calculation option for $F_{i,t}$.

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

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

Option A:

According to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” version 02.0.0, flow measurement on a dry measurement is not doable for a wet gaseous stream. Therefore it will be demonstrated that the temperature of the gaseous stream (T_t) is less than 60°C (333.15 K) at the flow measurement point.

The mass flow of CH₄ ($F_{CH_4,t}$)⁹ is determined as follows:

$$F_{CH_4,t} = V_{t,db} * v_{CH_4,t,db} * \rho_{CH_4,t}$$

With

$$\rho_{CH_4,t} = \frac{P_t * MM_{CH_4}}{R_u * T_t}$$

Where:

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

⁸ The parameter ($F_{i,t}$) under the “Tool to determine the mass flow of a greenhouse gas in gaseous stream” corresponds to the parameter ($F_{CH_4,EL,y}$) under ACM0001.

⁹ $F_{CH_4,t}$ described under the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” corresponds to $F_{CH_4,EL,y}$ described under ACM0001 “Flaring or use of a landfill gas”.

R_u	Universal ideal gases content (Pa.m ³ /kmol.K)
T_t	Temperature of gaseous stream in time interval t (K)

Ex ante determination of $F_{CH_4,PJ,y}$

An ex-ante estimate of $F_{CH_4,PJ,y}$ is required to estimate baseline emissions of methane from the SWDS in order to estimate the emission reductions of the proposed project activity. it is determined as follows:

$$F_{CH_4,PJ,y} = \eta_{PJ} * BE_{CH_4,SWDS,y} / GWP_{CH_4}$$

Where:

$F_{CH_4,PJ,y}$	Amount of methane in the LFG which is flared and or used in the project activity in year y (tCH ₄ /yr)
$BE_{CH_4,SWDS,y}$	Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y (tCO ₂ e/yr)
η_{PJ}	Efficiency of the LFG capture system that will be installed in the project activity
GWP_{CH_4}	Global Warming Potential of CH ₄ (tCO ₂ e/tCH ₄)

$BE_{CH_4,SWDS,y}$ is determined using the methodological tool “Emissions from solid disposal sites”. The amount of methane generated from disposal of waste at the SWDS is calculated based on a first order decay (FOD) model. The amount of methane generated from disposal of waste at the SWDS is calculated for year y as follows:

$$BE_{CH_4,SWDS,y} = \phi \cdot (1 - f) \cdot GWP_{CH_4} \cdot (1 - OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-k_j \cdot (y-x)} \cdot (1 - e^{-k_j})$$

Where:

$BE_{CH_4, SWDS,y}$	Baseline methane emissions occurring in year y generated from waste disposal at a SWDS during a time period ending in year y (tCO ₂ e/yr)
x	Years in time period in which waste is disposed at the SWDS, extending from the first year in time period (x=1) to year y (x=y)
y	Year of the crediting period for which methane emissions are calculated
$DOC_{f,y}$	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for year y (weight fraction)
$W_{j,x}$	Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x (t)
ϕ_y	Model correction factor to account for model uncertainties for year y
f_y	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y
GWP_{CH_4}	Global Warming Potential of methane
OX	Oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste)
F	Fraction of methane in the SWDS gas (volume fraction)
MCF_y	Methane correction factor for year y
DOC_j	Fraction of degradable organic carbon in the waste type j (weight fraction)
k_j	Decay rate for the waste type j (1/yr)
j	Type of residual waste or types of waste in the MSW

Parameters required to apply the FOD model

The parameters required to apply the FOD model is listed under table below. The parameters are selected according to Application A as defined under the tool “Emissions from solid disposal sites”.

Parameter	Value																			
φ_y	A default value of 0.75																			
OX	A default value of 0.1																			
F	A default value of 0.5																			
DOC _{f,y}	A default value of 0.5																			
MCF _y	A default value of 1.0																			
k _j	The following values for the different waste types have been applied as a default value: <table><tr><th colspan="2">Waste type j</th><th>Boreal and Temperate (MAT < 20⁰C)</th></tr><tr><th colspan="2"></th><th>WET(MAP/PET >1)</th></tr><tr><td rowspan="2">Slowly degrading</td><td>Pulp, paper, cardboard (other than sludge), textiles</td><td>0.04</td></tr><tr><td>Wood, wood products and straw</td><td>0.02</td></tr><tr><td>Moderatly degrading</td><td>Other (non-food) organic putrescible garden and park waste</td><td>0.05</td></tr><tr><td>Rapidly degrading</td><td>Food, food waste, sewage sludge, beverages and tobacco</td><td>0.06</td></tr></table>			Waste type j		Boreal and Temperate (MAT < 20 ⁰ C)			WET(MAP/PET >1)	Slowly degrading	Pulp, paper, cardboard (other than sludge), textiles	0.04	Wood, wood products and straw	0.02	Moderatly degrading	Other (non-food) organic putrescible garden and park waste	0.05	Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06
Waste type j		Boreal and Temperate (MAT < 20 ⁰ C)																		
		WET(MAP/PET >1)																		
Slowly degrading	Pulp, paper, cardboard (other than sludge), textiles	0.04																		
	Wood, wood products and straw	0.02																		
Moderatly degrading	Other (non-food) organic putrescible garden and park waste	0.05																		
Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06																		
W _{j,x}	Estimated once.																			
DOC _j	The following values for the different waste types have been applied as a default value: <table><tr><th>Waste type j</th><th>DOC_j (% wet waste)</th></tr><tr><td>Wood and wood products</td><td>43</td></tr><tr><td>Pulp, paper and cardboard</td><td>40</td></tr><tr><td>Food, food waste, beverages and tobacco</td><td>15</td></tr><tr><td>Textiles</td><td>24</td></tr><tr><td>Garden, yard and park waste</td><td>20</td></tr><tr><td>Glass, plastic, metal, other inert</td><td>0</td></tr></table>			Waste type j	DOC _j (% wet waste)	Wood and wood products	43	Pulp, paper and cardboard	40	Food, food waste, beverages and tobacco	15	Textiles	24	Garden, yard and park waste	20	Glass, plastic, metal, other inert	0			
Waste type j	DOC _j (% wet waste)																			
Wood and wood products	43																			
Pulp, paper and cardboard	40																			
Food, food waste, beverages and tobacco	15																			
Textiles	24																			
Garden, yard and park waste	20																			
Glass, plastic, metal, other inert	0																			
f _v	A default value of 0																			

Determining the model correction factor (ϕ_y)

In line with the requirements of the tool “Emissions from solid disposal sites”, a default value: $\phi_y = \phi_{\text{default}}$ will be used. ϕ_{default} is set as 0.75.

Determining the amounts of waste types j disposed in the SWDS ($W_{j,x}$)

W_x amount is estimated as follows:

Waste Type	Fraction of the waste
------------	-----------------------

	type
Pulp, paper, cardboard (other than sludge)	16%
Wood, wood products and straw	2%
Textiles	2%
Other (non-food) organic putrescible garden and park waste	2%
Food, food waste, sewage sludge, beverages and tobacco	49%
Glass, plastic, metal, other inert	29%

Determining the fraction of DOC that decomposes in the SWDS ($DOC_{f,y}$)

In line with the requirements of the tool “Emissions from solid disposal sites”, a default value: $DOC_{f,y} = DOC_{f,default}$ will be used. $DOC_{f,default}$ is set as 0.5.

Procedure to determine the methane correction factor (MCF_y)

In line with the requirements of the tool “Emissions from solid disposal sites”, a default value: $MCF_y = MCF_{default}$ will be used. $DOC_{f,default}$ is set as 1.0, which corresponds to anaerobic managed solid waste disposal site.

Determination of $F_{CH_4,BL,y}$

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

Situation at the start of the project activity:	Requirement to destroy methane	Existing LFG capture system
Case 1: No requirement to destroy methane exists and no existing LFG capture system	No	No
Case 2: Requirement to destroy methane exists and no existing LFG capture system	Yes	No
Case 3: No requirement to destroy methane exists and a LFG capture system exists	No	Yes
Case4: Requirement to destroy methane exists and LFG capture system exists	Yes	Yes

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

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

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

The baseline emissions associated with electricity generation in year y ($BE_{EC,y}$) is calculated in accordance with the “Tool to calculate baseline, project and leakage emissions from electricity consumption” version 1. The electricity source k in the tool corresponds to the sources of electricity generated by the grid, which is identified as the most plausible baseline scenario. $EC_{BL,k,y}$ in the tool is equivalent to the net amount of electricity generated using LFG in year y.

Generic approach

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

$$BE_{EC,y} = \sum_k EC_{BL,k,y} * EF_{EL,k,y} * (1 + TDL_{k,y})$$

Where:

$BE_{EC,y}$	Baseline emissions from electricity consumption in year y (tCO ₂ e/yr)
$EC_{BL,k,y}$	Net amount of electricity generated using LFG in year y (MWh/yr)
$EF_{EL,k,y}$	Emission factor for electricity generation source k in year y ((tCO ₂ e/MWh)
$TDL_{k,y}$	Average technical and transmission and distribution losses for providing electricity to source k in year y
k	the sources of electricity generated by the grid

Determination of the emission factor for electricity generation ($EF_{EL,k,y}$)

In accordance with the methodological “Tool to calculate the emission factor for an electricity system”, the “combined margin” emission factor is calculated through the following six steps:

- STEP (1): Identify the relevant electricity system;
- STEP (2): Choose whether to include off-grid power plants in the project electricity system (optional);
- STEP (3): Select a method to determine the operating margin (OM);
- STEP (4): Calculate the operating margin emission factor according to the selected method;
- STEP (5): Calculate the build margin (BM) emission factor;
- STEP (6): Calculate the combined margin (CM) emission factor.

STEP 1: Identify the relevant electricity system

According to the applicable methodology, the relevant project electricity system must be identified. A project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints.

Similarly, a **connected electricity system**, e.g. national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint.

The transmission lines in Turkey are operated by TEİAŞ (Turkish Electricity Transmission CO), which is a state-owned company. The grid is 48.871 km long and constitutes of 632 transformer stations with a total transformer capacity of 108,378 MVA and 10 interconnections to neighbour countries¹⁰. The interconnected grid system is operated continuously and there are no electricity

¹⁰ Reference: http://www.turek2012.info/pdf/sunumlar/ercument_ozdemirci.pdf

price differences throughout the regions¹¹. Therefore, the relevant electric power system is defined as the national grid system of Turkey.

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

According to the applicable tool, Project Participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

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

The Project Participant chooses Option I and therefore only grid power plants are included in the calculation.

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

According to the applicable methodological tool, the operating margin emission factor ($EF_{grid, OM, y}$) is based on one of the following methods:

- a) Simple OM; or
- b) Simple adjusted OM; or
- c) Dispatch data analysis OM; or
- d) Average OM.

The project participant has selected option (a) Simple OM method for calculation of the operating margin emission factor. This choice is applicable since

A) Only annual data from each power plant on power generation and fuel type and consumption is available (if available) low-cost/must-run resources constitute less than 50% of total grid generation in average of five most recent years. The low-cost/must-run resources include hydro, geothermal, wind, low-cost biomass, nuclear, and solar power generation.

The share of the installed capacity of renewable energy sources add up to to an average of 26.6% over the five most recent year, which is below the threshold for applicability of the simple OM method. There is no indication that coal is used as a must-run and no nuclear energy plants are in Turkey. Therefore, the requirements for the use of the Simple OM calculations are satisfied.

Years	Total Thermal [GWh]	Total Renewable (hydro, geothermal, wind, low-cost biomass, and solar power) [GWh]	Total [GWh]	Average Share of LCMR
2011	171,638.3	57,756.8	229,395.1	%25.1
2012	174,871.7	64,625.1	239,496.8	%26.9
2013	171,812.5	68,341.5	240,154.0	%28.4
2014	200,416.6	51,546.2	251,962.8	%20.4
2015	179,366.4	82,416.9	261,783.3	%31.4
Average Share of LCMR¹²				%26.44

For the simple OM, the emission factor can be calculated using either of the two following data vintages:

¹¹ Reference: TEİAŞ (Turkish Electricity Transmission Co) official webpage <http://www.teias.gov.tr/>

¹² Calculated in accordance with Approach 1 of par. 37 of Tool to calculate the emission factor for an electricity system

- **Ex ante option:** If the *ex-ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants a 3-year generation-weighted average, based on the most recent data available at the time of submission of the VER-PDD to the DOE for validation.
- **Ex post option:** If the *ex post* option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

For the proposed project activity, the **ex-ante option** is selected.

STEP 4: Calculating the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂e/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

Option A: Based on the net electricity generation and a CO₂ emission factor of each power unit; or

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

As the fuel consumption and the average efficiency data for each power plant / unit is not available Option B is used for simple OM calculation.¹³

Option B: Calculation based on total fuel consumption and electricity generation of the system

As Option B is used, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost/must run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y}$$

Where:

EF _{grid,OMsimple,y}	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
FC _{i,y}	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
NCV _{i,y}	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
EF _{CO₂, i,y}	CO ₂ emission factor of fossil fuel type i in year y (tCO ₂ /GJ)
EG _y	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must run power plants/units, in year y (MWh)
i	All fossil fuel types combusted in power sources in the project electricity system in year y
y	The three most recent years for which data is available at the time of submission of the PDD to the DOE for validation (ex-ante option)

For this approach (simple OM) to calculate the operating margin, subscript m refers to the power plants/units delivering electricity to the grid, not including low-cost/must run power plants/units, and including electricity imports to the grid.

¹³ Only renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known.

STEP 5. Calculation of the build margin emission factor

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

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

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

For the proposed project activity, the Project Participant chooses **Option 1** in terms of vintage of data.

The sample group of power units' m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

- (a) Identify the set of five power units, excluding power units registered as VER project activities, that started to supply electricity to the grid most recently ($SET_{5-units}$) and determine their annual electricity generation ($AEG_{SET_{5-units}}$, in MWh).
- (b) Determine the annual electricity generation of the project electricity system, excluding power units registered as VER project activities (AEG_{total} , in MWh). Identify the set of power units, excluding power units registered as VER project activities, that started to supply electricity to the grid most recently and that comprise 20% of total AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{>20\%}$) and determine their annual electricity generation ($AEG_{SET_{>20\%}}$, in MWh);
- (c) From $SET_{5-units}$ and $SET_{>20\%}$ select the set of power units that comprise the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use the SET_{sample} to calculate the build margin.

The most recent information available belongs to 2015 and based on TEİAŞ statistics which is the official information source for the grid. According to TEİAŞ figure, the annual electricity generation of the project electricity system (AEG_{total}) is 249,899,500 MWh. Based on the AEG_{total} , the set of power units, excluding power units registered as VER project activities, that started to supply electricity to the grid most recently and that comprise 20% of total AEG_{total} , have been defined and the $AEG_{SET_{>20\%}}$ is determined as 49,376,817 MWh and includes over 300 units of power plants under $SET_{>20\%}$. Without the need of any further assessment it can be concluded that the $SET_{5-units} \ll SET_{>20\%}$ and therefore the $SET_{>20\%}$ is selected as SET_{sample} ¹⁴ for the calculation of the build margin (BM). The 20% of AEG_{TOTAL} cover power plants commissioned in year 2009-2012 since there are no plant specific electricity generation data for year 2013 and 2014. Also all power plants

¹⁴ None of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago.

commissioned in 2009 has been included to the SET_{20%} since there was no commissioning date information available.

The built margin (BM) emission factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$	Build margin CO ₂ emissions factor in year y (tCO ₂ /MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO ₂ emission factor of the power unit m in year y (tCO ₂ /MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

As per the “Tool to calculate the emission factor for an electricity system” version 05.0, the CO₂ emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance from the tool in step 4 for simple OM, using options A1, A2 or A3, using for y the most recent historical year for which power generation data is available, where m is the power units included in the build margin.

As plant specific fuel consumption data is not available for Turkey, option A2 has been selected for the calculation of the CO₂ emission factor of each power unit m ($EF_{EL,m,y}$) as follows:

$$EF_{EL,m,y} = \frac{EF_{CO_2,i,y} \cdot 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$	CO ₂ emission factor of the power unit m in year y (tCO ₂ /MWh)
$EF_{CO_2,m,i,y}$	Average CO ₂ emission factor of fuel type i used in power unit m in year y (tCO ₂ /GJ)
$\eta_{m,y}$	Average net energy conversion efficiency of power unit m in year y (ratio)
m	All power units serving the grid in year y except low-cost/must-run power units
y	The most recent year for which power generation data is available at the time of submission of the VER-PDD to the DOE for validation (ex-ante option)

Where several fuel types are used in the power unit, the lowest CO₂ emission factor for $EF_{CO_2,m,i,y}$ has been used.

STEP 6: Calculation of the combined margin emission factor

According to the applicable methodological tool, the calculation of the combined margin (CM) emission factor ($EF_{grid,CM}$) is based on one of the following methods:

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

In line with the requirements of the applicable tool, the Project Participant chooses option (a), weighted average CM.

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \cdot w_{OM} + EF_{grid,BM,y} \cdot w_{BM}$$

Where:

$EF_{grid,CM,y}$	Combined Margin emission factor (tCO ₂ /MWh)
$EF_{grid,OM,y}$	Operating margin emission factor (tCO ₂ /MWh)
$EF_{grid,BM,y}$	Build margin emission factor (tCO ₂ /MWh)
w_{OM}	Weight of the operating margin emission factor
w_{BM}	Weight of the build margin emission factor

As stated in the “Tool to calculate the emission factor for an electricity system”, the default weights for the operating margin and build margin emission factors for wind power generation is defined as:

$$w_{OM}=0.25$$

$$w_{BM}=0.75$$

for the second crediting period and for subsequent crediting periods¹⁵.

Project Emissions

In accordance with ACM0001 “Flaring or Use of Landfill Gas”, the project emissions are calculated as follows:

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

Where:

$PE_{EC,y}$	Emission from consumption of electricity due to the project activity in year y (tCO ₂ e/yr).
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Since there are no consumption of fossil fuels due to the project activity, for the purpose other than electricity generation, there are no emissions from fossil fuel consumption and therefore $PE_{FC,y}$ is equal to “0” and has not been included in equation.

The project emissions from consumption of electricity by the project activity $PE_{EC,y}$ shall be calculated using the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”. When applying the tool, electricity sources j in the tool corresponds to the sources of electricity consumed due to the project activity.

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

$$PE_{EC,y} = \sum_j EC_{PJ,y} * EF_{EL,j,y} * (1 + TDL_{j,y})$$

Where:

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

¹⁵ For the second and third crediting period, $w_{OM}=0.25$ and $w_{BM}=0.75$ will be used unless otherwise specified in the methodology. Project participant may submit alternative weights if the weightage does not reflect their situation.

The combined margin emission factor of the applicable electricity system, has been determined as emission factor for the electricity system ($EF_{EL,j,y}$), in line with Option A1 of scenario A (Electricity consumption from grid) under the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”.

Leakage

In accordance with ACM0001 “Flaring or Use of Landfill Gas”, no leakage effects are accounted.

B.6.2. Data and parameters fixed ex ante

(Copy this table for each piece of data or parameter.)

Data / Parameter	ID.1 / $OX_{top-layer}$
Unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline
Source of data	Consistent with how oxidation is accounted for in the methodological tool “Emissions from solid waste disposal sites”
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	Applicable to Step A defined under ACM0001
Purpose of data	Baseline Emission Calculation
Additional comment	

Data / Parameter	ID.2 / GWP_{CH_4}
Unit	tCO ₂ e/tCH ₄
Description	Global Warming Potential of CH ₄
Source of data	IPCC
Value(s) applied	25 for the second commitment period. Shall be updated accordingly to any future COP/MOP decision.
Choice of data or Measurement methods and procedures	Applicable to Step A defined under ACM0001
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.3 / n_{PJ}
Unit	Dimensionless
Description	Efficiency of the LFG capture system that will be installed in the project activity
Source of data	-
Value(s) applied	Technical specifications of the LFG capture system to be installed (if available) or a default value of 50%

Choice of data or Measurement methods and procedures	Applicable under ACM0001
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.4 / R_u
Unit	Pa.m ³ /kmol.K
Description	Universal ideal gases constant
Source of data	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream"
Value(s) applied	8,314
Choice of data or Measurement methods and procedures	Applicable under "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.5 / MM _{CH4}		
Unit	kg/kmol		
Description	Molecular mass of CH ₄		
Source of data	“Tool to determine the mass flow of a greenhouse gas in a gaseous stream”		
Value(s) applied			
	Compound	Structure	Molecular mass (kg/kmol)
	Methane	CH ₄	16.04
Choice of data or Measurement methods and procedures	Applicable under “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”		
Purpose of data	Baseline emissions		
Additional comment			

Data / Parameter	ID.6 / φ_{default}
Unit	-
Description	Default value for the model correction factor to account for model uncertainties
Source of data	-
Value(s) applied	0.75
Choice of data or Measurement methods and procedures	The proposed project activity falls under Application A
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.7 / OX
Unit	-
Description	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data	Based on extensive review of published literature on this subject, including the IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	Applicable under "Emissions from solid disposal sites"
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.8 / F
Unit	-
Description	Fraction of methane in the SWDS gas (volume fraction)
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.5
Choice of data or Measurement methods and procedures	Applicable under "Emissions from solid disposal sites"
Purpose of data	Baseline emissions
Additional comment	Upon biodegradation, organic material is converted to a mixture of methane and carbon dioxide

Data / Parameter	ID.9 / $DOC_{f,default}$
Unit	Weight fraction
Description	Default value for the fraction of degradable organic carbon (DOC) in MSW that can decompose in the SWDS
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.5
Choice of data or Measurement methods and procedures	Applicable under "Emissions from solid disposal sites"
Purpose of data	Baseline emissions
Additional comment	The proposed project activity falls under Application A

Data / Parameter	ID.10 / $MCF_{default}$
Unit	-
Description	Methane correction factor
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	1
Choice of data or Measurement methods and procedures	Applicable under "Emissions from solid disposal sites"

Purpose of data	Baseline emissions
Additional comment	The baseline falls under the definition “anaerobic managed solid waste disposal site

Data / Parameter	ID.11 / DOC _j														
Unit	-														
Description	Fraction of degradable organic carbon in waste type j (weight fraction)														
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 2.4 and Table 2.5)														
Value(s) applied	The following values for the different waste types have been applied: <table border="1"> <thead> <tr> <th>Waste type j</th><th>DOC_j (% wet waste)</th></tr> </thead> <tbody> <tr> <td>Wood and wood products</td><td>43</td></tr> <tr> <td>Pulp, paper and cardboard</td><td>40</td></tr> <tr> <td>Food, food waste, beverages and tobacco</td><td>15</td></tr> <tr> <td>Textiles</td><td>24</td></tr> <tr> <td>Garden, yard and park waste</td><td>20</td></tr> <tr> <td>Glass, plastic, metal, other inert</td><td>0</td></tr> </tbody> </table>	Waste type j	DOC _j (% wet waste)	Wood and wood products	43	Pulp, paper and cardboard	40	Food, food waste, beverages and tobacco	15	Textiles	24	Garden, yard and park waste	20	Glass, plastic, metal, other inert	0
Waste type j	DOC _j (% wet waste)														
Wood and wood products	43														
Pulp, paper and cardboard	40														
Food, food waste, beverages and tobacco	15														
Textiles	24														
Garden, yard and park waste	20														
Glass, plastic, metal, other inert	0														
Choice of data or Measurement methods and procedures	Applicable under “Emissions from solid disposal sites”														
Purpose of data	Baseline emissions														
Additional comment															

Data / Parameter	ID.12 / k _j		
Unit	1/yr		
Description	Decay rate for the waste type j		
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (Volume 5, Table 3.3)		
Value(s) applied	The following values for the different waste types have been applied:		
	Waste type j		
	Slowly degrading	Pulp, paper, cardboard	0.04
		Wood, wood products and straw	0.02
	Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05
	Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06

Choice of data or Measurement methods and procedures	The “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site” lists decay rates for different waste types. Average temperate in Gaziantep over the year is 15.0 °C and annual precipitation is 553.3 mm. Based on these data, the selection of appropriate kj values are made according to a “boreal and temperate” and “dry” climate. Unclassified SW types of nappies, rubber and leather are covered in the “Pulp, paper and cardboard” classification. Ceramics, soil and sand are covered in the “Glass, plastic, metal, other inert waste” classification.
Purpose of data	Baseline emission
Additional comment	

Data / Parameter	ID.13 / EF _{grid,CM}
Unit	(tCO ₂ /MWh)
Description	Combined Margin emission factor
Source of data	Calculated as per “Tool to calculate the emission factor for an electricity system”
Value(s) applied	0.484 tCO ₂ /MWh
Choice of data or Measurement methods and procedures	Applicable under “Tool to calculate the emission factor for an electricity system”
Purpose of data	Baseline and project emissions
Additional comment	

Data / Parameter	ID.14 / F _{CH4,BL,y}
Unit	tCH ₄
Description	Methane emissions that would be captured and destroyed to comply with national or local safety requirements or legal regulations in the year y
Source of data	National laws and regulations (http://mevzuat.basbakanlik.gov.tr)
Value(s) applied	0
Choice of data or Measurement methods and procedures	Fixed value has been applied
Purpose of data	Calculation of baseline emissions
Additional comment	

B.6.3. Ex ante calculation of emission reductions

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The ex-ante emission reductions are calculated using the formulas as described under section B.6.1. In the following section, the assumptions made and the results from the calculations are presented¹⁶.

Emission Reductions

Emission reductions are calculated as follows:

¹⁶ As a general approach; the startin65,853g date of the crediting period has not been taken into account under this section.

Year	Parameter		
	ER _y (tCO ₂ e/yr)	BE _y (tCO ₂ e/yr)	PE _y (tCO ₂ e/yr)
2017	68,792	68,794	2
2018	77,534	77,536	2
2019	79,902	79,904	2
2020	82,155	82,156	2
2021	84,299	84,300	2
2022	86,339	86,341	2
2023	88,282	88,284	2
2024	7,511	7,511	0

Baseline emissions

Baseline emissions are calculated as follows:

Year	Parameter		
	BE _y (tCO ₂ e/yr)	BE _{CH₄,y} (tCO ₂ e/yr)	BE _{EC,y} (tCO ₂ e/yr)
2017	75,048	64,495	10,553
2018	77,536	66,983	10,553
2019	79,904	69,351	10,553
2020	82,156	71,603	10,553
2021	84,300	73,747	10,553
2022	86,341	75,788	10,553
2023	88,284	77,731	10,553
2024	90,133	79,580	10,553

Baseline emissions of methane from SWDS

Baseline emissions of methane from SWDS are calculated as follows. A default value of 0.1 has been applied for OX_{top-layer} and 25 for GWP_{CH₄} within the calculation.

Year	Parameter		
	BE _{CH₄} (tCO ₂ /yr)	FE _{CH₄,PJ,y} (tCH ₄ /yr)	F _{CH₄,BL,y} (tCH ₄ /yr)
2017	64,495	2,866	0
2018	66,983	2,977	0
2019	69,351	3,082	0
2020	71,603	3,182	0
2021	73,747	3,278	0
2022	75,788	3,368	0
2023	77,731	3,455	0
2024	79,580	3,537	0

Amount of methane in the LFG which is flared and or used in the project activity

Amount of methane in the LFG which is flared and or used in the project activity in year y has been estimated ex-ante through FOD model. The following default values have been applied to the FOD model:

φ _y	0.75
OX	0.1
F	0.5

DOC _{f,y}	0.5																	
MCF _y	1.0																	
k _j	<table border="1"> <tr> <th colspan="2">Waste type j</th><th>Boreal and Temperate (MAT < 20°C)</th></tr> <tr> <th colspan="2"></th><th>WET(MAP/PET >1)</th></tr> <tr> <td rowspan="2">Slowly degrading</td><td>Pulp, paper, cardboard</td><td>0.04</td></tr> <tr> <td>Wood, wood products and straw</td><td>0.02</td></tr> <tr> <td>Moderately degrading</td><td>Other (non-food) organic putrescible garden and park waste</td><td>0.05</td></tr> <tr> <td>Rapidly degrading</td><td>Food, food waste, sewage sludge, beverages and tobacco</td><td>0.06</td></tr> </table>	Waste type j		Boreal and Temperate (MAT < 20°C)			WET(MAP/PET >1)	Slowly degrading	Pulp, paper, cardboard	0.04	Wood, wood products and straw	0.02	Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05	Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06
Waste type j		Boreal and Temperate (MAT < 20°C)																
		WET(MAP/PET >1)																
Slowly degrading	Pulp, paper, cardboard	0.04																
	Wood, wood products and straw	0.02																
Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05																
Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06																
DOC _j	<table border="1"> <tr> <th>Waste type j</th><th>DOC_i (% wet waste)</th></tr> <tr> <td>Wood and wood products</td><td>43</td></tr> <tr> <td>Pulp, paper and cardboard</td><td>40</td></tr> <tr> <td>Food, food waste, beverages and tobacco</td><td>15</td></tr> <tr> <td>Textiles</td><td>24</td></tr> <tr> <td>Garden, yard and park waste</td><td>20</td></tr> <tr> <td>Glass, plastic, metal, other inert</td><td>0</td></tr> </table>	Waste type j	DOC _i (% wet waste)	Wood and wood products	43	Pulp, paper and cardboard	40	Food, food waste, beverages and tobacco	15	Textiles	24	Garden, yard and park waste	20	Glass, plastic, metal, other inert	0			
Waste type j	DOC _i (% wet waste)																	
Wood and wood products	43																	
Pulp, paper and cardboard	40																	
Food, food waste, beverages and tobacco	15																	
Textiles	24																	
Garden, yard and park waste	20																	
Glass, plastic, metal, other inert	0																	
f _y	0																	
n _{PJ}	50%																	

Amount of solid waste type j disposed or prevented from disposal in the SWDS.

Waste Type	Fraction (%)
Pulp, paper, cardboard (other than sludge)	16
Wood, wood products and straw	2%
Textiles	2%
Other (non-food) organic putrescible garden and park waste	2%
Food, food waste, sewage sludge, beverages and tobacco	49%
Glass, plastic, metal, other inert	29%

Based on the above parameters the amount of methane in the LFG used in the project activity in year y has been estimated ex-ante as follows:

Year	FE _{CH₄,PJ,y} (tCH ₄ /yr)
2017	2,866
2018	2,977
2019	3,082
2020	3,182
2021	3,278
2022	3,368
2023	3,455

2024	3,537
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Baseline emissions associated with electricity generation

Baseline emissions associated with electricity generation are calculated as follows. The amount of estimated electricity generation has been based on the technical feasibility study¹⁷.

Year	Parameter			
	$BE_{EL,PJ,y}$ (tCO ₂ /yr)	$EC_{BL,y}$ (MWh)	$EF_{EL,y}$ (tCO ₂ e/MWh)	TDL_y (%)
2017	10,553	21,171	0.484	3%
2018	10,553	21,171	0.484	3%
2019	10,553	21,171	0.484	3%
2020	10,553	21,171	0.484	3%
2021	10,553	21,171	0.484	3%
2022	10,553	21,171	0.484	3%
2023	10,553	21,171	0.484	3%
2024	10,553	21,171	0.484	3%

Calculating the CO₂ emission factor of the grid

The CO₂ emission factor of the grid ($EF_{CO_2,grid,y}$) is calculated as the combined margin emission factor ($EF_{grid,CM,y}$) as followed:

Table 7. Combined margin emission factor

Combined Margin Emission Factor ($EF_{grid,CM,y}$)	Operating Margin Emission Factor ($EF_{grid,OM,y}$)	Build Margin Emission Factor ($EF_{grid,BM,y}$)	Weight of operating margin emission factor (w_{OM})	Weight of build margin emission factor (w_{BM})
tCO ₂ e/MWh	tCO ₂ e/MWh	tCO ₂ e/MWh	%	%
0.484	0.630	0.435	25	75

The operating margin emission factor ($EF_{grid,OM,y}$) is calculated as the simple operating margin as followed:

Simple operating emission factor

Simple Operating Margin Emission Factor ($EF_{grid,OM,y}$)		0.630 tCO ₂ /MWh			
Fuel Type		Amount of Fossil Fuel ($FC_{i,y}$)	Net Calorific Value ($NCV_{i,y}$)	CO ₂ Emission Factor of Fossil Fuel ($EF_{CO_2, i,y}$)	Electricity Generated and Delivered to the Grid (EG_y)
		Tons ¹⁸	GJ/tons ¹⁹	tCO ₂ /GJ	MWh
Natural Gas	2013	22,909,746	37,145	0.0540	100,224,085
	2014	25,426,014	37,488		114,587,465

¹⁷ Technical feasibility study is available to the DOE.

¹⁸ 1000 m³ in case for natural gas.

¹⁹ GJ/1000m³ in case for natural gas.

	2015	20,914,868	37,838		94,714,611
Lignite	2013	47,120,306	7,258	0.0909	28,853,577
	2014	57,696,139	7,106		34,796,857
	2015	49,940,131	7,161		29,913,198
Coal	2013	12,105,930	23,790	0.0928	31,963,761
	2014	14,501,934	23,927		37,678,175
	2015	16,629,492	24,076		42,794,821
Fuel Oil	2013	702,893	42,889	0.0565	1,657,875
	2014	874,271	41,613		2,038,751
	2015	755,299	44,082		2,122,945

Imports to the grid are also considered calculating the electricity generated and delivered to the grid (EG_y). CO_2 emission factor of the net electricity imports from a connected electricity system is determined as 0 tCO_2/MWh .

Electricity imports from a connected electricity system

	Year		
	2013	2014	2015
Electricity Imports (MWh/y)	7,429,400	7,953,300	7,135,500

The build margin emission factor ($EF_{grid,BM,y}$) is calculated as followed:

Build margin emission factor

Build Margin Emission Factor ($EF_{grid,BM,y}$)		0.435 tCO_2/MWh		
Fuel Type		Electricity Generated and delivered to the Grid ($EG_{m,y}$)	Average CO_2 Emission Factor of Fuel ($EF_{CO_2,m,i,y}$)	Average Net Energy Conversion Efficiency ($\eta_{m,y}$)
		MWh	tCO_2/GJ	%
Natural Gas	2009	13,602,509	0.0543	Combined Cycle
	2010	1,063,909		
	2011	12,316,264		60
	2012	9,573,773		
Lignite	2009	3,000	0.0909	PFBS
	2010	0		
	2011	0		41.5
	2012	40000		
Coal	2009	1,923,333	0.0928	PFBS
	2010	8,01,765		
	2011	4,320,000		41.5
	2012	726,784		
Fuel Oil	2009	4,331,777	0.0565	Combined Cycle
	2010	258,824		
	2011	1,026,592		46
	2012	483,753		
Hydro	2009	1,402,961	0	n.a.
	2010	818,760		
	2011	2,879,578		
	2012	4,997,738		
Other Renewable	2009	1,094,986	0	n.a.
	2010	51,000		

	2011	715,474		
	2012	561,315		

Power plants under SET_{20%} are listed under Appendix 4 of this PDD.

Project Emissions

The project emissions of the proposed project activity are calculated as follows. For ex-ante purposes the electricity consumption of the proposed project activity is estimated to be approximately 3 MWh/yr.

Project emissions from electricity consumption

Year	Parameter			
	PE _{EC,y} (tCO ₂ /yr)	EC _{PJ,y} (MWh)	EF _{EL,y} (tCO ₂ e/MWh)	TDL _y (%)
2017	2	3	0.484	20%
2018	2	3	0.484	20%
2019	2	3	0.484	20%
2020	2	3	0.484	20%
2021	2	3	0.484	20%
2022	2	3	0.484	20%
2023	2	3	0.484	20%
2024	2	3	0.484	20%

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
2017	68,794	2	0	68,792
2018	77,536	2	0	77,534
2019	79,904	2	0	79,902
2020	82,156	2	0	82,155
2021	84,300	2	0	84,299
2022	86,341	2	0	86,339
2023	88,284	2	0	88,282
2024	7,511	0	0	7,511
Total	574,826	12	0	574,814
Total number of crediting years	7			
Annual average over the crediting period	82,118	2	0	82,116

B.7. Monitoring plan**B.7.1. Data and parameters to be monitored**

(Copy this table for each piece of data or parameter.)

Data / Parameter	ID.14 / $Op_{j,h}$
Unit	-
Description	Operation of the equipment that consumes the LFG
Source of data	Project participant
Value(s) applied	The operation of the plant h is monitored by: - Products generated (such as electricity generation) $Op_{j,h}=0$ when: - No products are generated in hour h Otherwise $Op_{j,h}=1$
Measurement methods and procedures	-
Monitoring frequency	Hourly
QA/QC procedures	-
Purpose of data	Baseline calculations
Additional comment	-

Data / Parameter	ID.15 / Management of SWDS
Unit	-
Description	Management of SWDS
Source of data	One of the following sources could be used: - Original design of the landfill - Technical specifications for the management of the SWDS Local or national regulations
Value(s) applied	-
Measurement methods and procedures	Project participants will refer to the original design of the landfill to ensure that any practice to increase methane generation have been occurring prior to the implementation of the project activity. Any change in the management of the SWDS after the implementation of the project activity should be justified by referring to technical or regulatory specifications.
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	-
Additional comment	-

Data / Parameter	ID.16 / $V_{t,db,engine}$
Unit	m^3 dry gas/h
Description	Volumetric flow of the gaseous stream in time interval t on a dry basis
Source of data	-

Value(s) applied	-
Measurement methods and procedures	Direct measurement
Monitoring frequency	Continuous
QA/QC procedures	Periodic calibration against a primary device provided by an independent accredited laboratory. Calibration and frequency of calibration is according to manufacturer's specifications.
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.17 / $V_{CH_4,t,db,engine}$
Unit	m^3 gas CH_4 / m^3 dry gas
Description	Volumetric fraction of CH_4 in a time interval t on a dry basis
Source of data	-
Value(s) applied	-
Measurement methods and procedures	Continuous gas analyzer operating in dry-basis.
Monitoring frequency	Continuous
QA/QC procedures	Calibration should include zero verification with an inert gas (e.g. N_2) and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). Calibration and frequency of calibration is according to manufacturer's specifications.
Purpose of data	Baseline emissions
Additional comment	

Data / Parameter	ID.18 / T_t
Unit	K
Description	Temperature of the gaseous stream in time interval t
Source of data	-
Value(s) applied	-
Measurement methods and procedures	Direct measurement
Monitoring frequency	Continuous
QA/QC procedures	Periodic calibration against a primary device provided by an independent accredited laboratory. In accordance with the "Regulation on "Measurement and Measuring Tools", the meters have to be calibrated within a frequency of once per 10 years.
Purpose of data	Since all parameters are converted to normal conditions during the monitoring process, this parameter is only monitored to verify the applicability condition is met related gaseous stream flow temperature being $60^{\circ}C$.
Additional comment	-

Data / Parameter	ID.19 / $EC_{BL,y}$
Unit	MWh
Description	Net amount of electricity generated using LFG
Source of data	Electricity meters
Value(s) applied	-

Measurement methods and procedures	The electricity generated using LFG is measured continuously with a electricity meter
Monitoring frequency	Continuous
QA/QC procedures	In accordance with the “Regulation on “Measurement and Measuring Tools”, the meters have to be calibrated within a frequency of once per 10 years.
Purpose of data	The electricity meters are used to measure the net electricity exported to the grid and used for billing purposes. Therefore, the meters are sealed by TEİAŞ (Turkish Electricity Transmission CO).
Additional comment	-

Data / Parameter	ID.20 / $EC_{PJ,y}$
Unit	MWh
Description	Quantity of electricity consumed by the project activity.
Source of data	Electricity meter
Value(s) applied	-
Measurement methods and procedures	The electricity consumption is measured from electricity meters and aggregated annually.
Monitoring frequency	Continuous
QA/QC procedures	In accordance with the “Regulation on “Measurement and Measuring Tools”, the meters have to be calibrated within a frequency of once per 10 years.
Purpose of data	The electricity consumption will be monitored using the same bi-directional electricity meter, which is used to measure the electricity exported to the grid. The electricity meters are used to measure the electricity consumption are used for billing purposes. Therefore the meters are sealed by TEİAŞ (Turkish Electricity Transmission CO).
Additional comment	-

Data / Parameter	ID.21 / TDL_y
Unit	%
Description	Average technical transmission and distribution losses
Source of data	Default
Value(s) applied	-
Measurement methods and procedures	“Tool to calculate baseline, project and/or leakage emissions from electricity consumption” version 01.
Monitoring frequency	-
QA/QC procedures	$TDL_{j,y}$: 20% (used to calculate PE_{EC}) $TDL_{k,y}$: 3% (used to calculate BE_{EC})
Purpose of data	Baseline and Project emissions
Additional comment	-

B.7.2. Sampling plan

>>

No sampling is required

B.7.3. Other elements of monitoring plan

>>

Monitoring Plan

Monitoring will be carried out following the procedures set by the consolidated baseline methodology

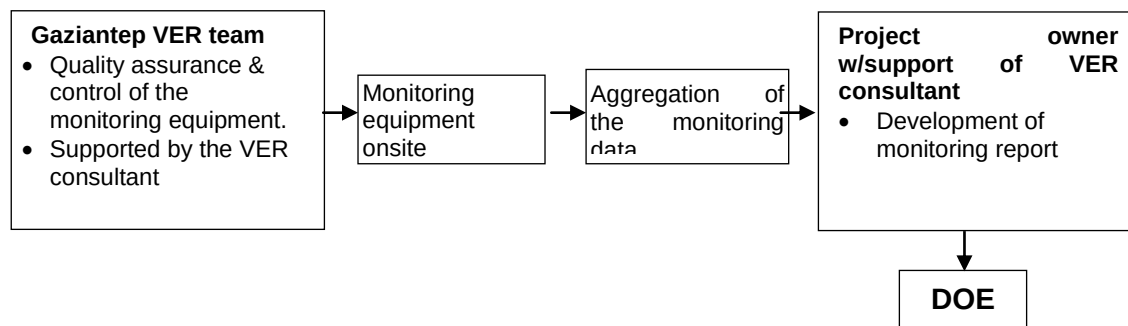
ACM0001 and all applicable tools of the above explained parameters. The monitoring consists of:

- Amount of landfill gas combusted in power generation units
- Temperature of the landfill gas sent to power generation to ensure compliance regarding dry basis for measurement
- Amount of landfill gas flared
- Concentration of methane of the landfill gas
- Total amount of electricity exported to the grid
- Operating hours of power generation units
- Total amount of the electricity imported from the grid

Responsibilities for monitoring

The project owner is responsible for the operation and maintenance of the landfill and the installed equipment²⁰. The project owner is also responsible for the administration of the data, setting up a VER team who will be responsible for monitoring all data required to estimate emission reductions.

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



Registration of the monitored data

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

Corrective actions and emergency preparedness

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

QA/QC procedure

Strong quality assurance and quality control procedure will be taken to monitor the equipment and data

²⁰ Except for the electricity meter that monitors both electricity imports and exports, since the monitoring device is sealed by TEİAŞ (Turkish Electricity Transmission Company) and the Project Participant cannot interfere with the device.

collection. Equipment and facilities will be subject to a regular maintenance and testing regime to ensure accuracy following supplier's manual. In case of data deficiency or in correct data reading, the data will be crosschecked with other parameters and data leading to the most conservative emission reductions will be considered for the calculation of the emission reductions.

Measuring of exported and imported electricity

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

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>

The starting date of a project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. The construction start date of the Project is 13/03/2009. The loan agreement is signed on 02/06/2010. The main equipment order (generator set) is signed on 25/11/2010. The electricity generation has started on 01/02/2010. Therefore, the starting date of the project activity shall be considered as 13/03/2009.

C.2. Expected operational lifetime of project activity

>>

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>

The Project is designed for an operation lifetime of 15 years.

C.3.2. Start date of crediting period

>>

1st crediting period: 01/02/2010

2nd crediting period: 01/02/2017

C.3.3. Duration of crediting period

>>

The project will use a crediting period of 3x7 years. (This PDD covers the second crediting period).

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

The Project activity has been exempted by the Ministry of Forest and Environment from the requirement to carry out an Environmental Impact Assessment. The Project is fully in line with

national laws and regulations, including those involving environment, health and safety. The official document demonstrating that the Project does not need an EIA is attached in the Annex 5.

Current practice on the site is a managed landfill with no methane recovery. The Project has several environmental benefits:

- It will cover the landfill area with soil, reducing the adverse visual impacts.
- The cover and an effective landfill gas collection system will reduce odour from the landfill
- The LFG recovery will reduce GHG emissions and help in tackling with global warming
- It will set a good example for proper waste management with improved health and safety impacts
- It will minimize explosion and fire risks by decreasing gas accumulation
- It will feed clean energy to the grid, thereby reducing emissions from power generation

As one of the sustainable renewable energy generation technologies, the Project poses reduces the environmental impacts of the current practice on the landfill site considerably.

D.2. Environmental impact assessment

>>

N.A.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>

Please refer to GS Passport for more details.

E.2. Summary of comments received

>>

The Project is not required to follow an official stakeholder consultation procedure. Since an EIA report was not required by the Ministry of Environment and Forest, no official EIA meeting was organized. Instead, various unofficial meetings have been carried out between the project owner and local communities.

E.3. Consideration of comments received

>>

The Project was acquired by the Project owner with a tender, which was organized by the Gaziantep Greater Municipality. The Project and its conditions are clearly set with an agreement and the Municipality is satisfied with the Project.

Following the tender, there have been several newspaper announcements about the Project that positively commented on the Project.

A meeting organized by the Project owner on 26.12.2008 has hosted several stakeholders and the opinions declared during that meeting were very positive and encouraging. There have been no negative comments from any stakeholder about the Project.

SECTION F. Approval and authorization

>>

Appendix 1. Contact information of project participants

Organization name	CEV Enerji Üretim San. Ve Tic. Ltd. Şti.
Country	Turkey
Address	Bağlarbaşı mah. 105200 Nolu KM. Evl. Katı atık Deposu 103 1 Şahinbey
Telephone	0342 485 1012
Fax	
E-mail	info@cev-tr.com
Website	www.cev-tr.com
Contact person	Mr. Doomini Ko

Appendix 2. Affirmation regarding public funding

There is no public or ODA finance used for the Project.

Appendix 3. Applicability of methodologies and standardized baselines

Appendix 4. Further background information on ex ante calculation of emission reductions

List of SET_{20%} Power Units

2012					
Plant Name	Fuel Type	Added Installed Capacity MW	Generation MWh	Total Installed Capacity MW	Total Generation MWh
Acarsoy Termik	Natural Gas	50,0	375.000	50,0	375.000
Afyon DGKÇ	Natural Gas	126,1	945.000	126,1	945.000
Age Doğalgaz	Natural Gas	94,0	704.667	141,0	1.057.000
Age Doğalgaz	Natural Gas	47,0	352.333	141,0	1.057.000
Akdeniz Kimya	Natural Gas	2,0	15.000	4,0	30.000
Akdeniz Kimya	Natural Gas	2,0	15.000	4,0	30.000
Ales Doğalgaz	Natural Gas	49,0	370.000	49,0	370.000
Altınıyıldız	Natural Gas	5,5	38.000	5,5	38.000
Asaş Alüminyum	Natural Gas	8,6	65.000	8,6	65.000
BALSUYU MENSUCAT	Natural Gas	9,7	68.000	9,7	68.000

SAN. VE TİC. A.Ş.	Gas		00		
BAMEN KOJENERASYON (BAŞYAZICIOĞLU TEKSTİL)	Natural		14.0		
	Gas	2,1	00	2,1	14.000
	Natural		63.0		
Beypi Beypazarı	Gas	8,6	00	8,6	63.000
	Natural		190.		190.00
Bilecik Doğalgaz	Gas	25,8	000	25,8	0
	Natural		145.		945.00
Bilecik Doğalgaz	Gas	19,4	385	126,1	0
	Natural	107,	801.		945.00
Bilecik Doğalgaz	Gas	0	864	126,1	0
	Natural		14.0		
Bilkur Tekstil	Gas	2,0	00	2,0	14.000
	Natural		13.6		
Binatom Elektrik	Gas	2,1	50	2,0	13.000
	Natural		15.7		
Binatom Elektrik	Gas	2,1	50	10,4	78.000
	Natural		30.0		
Binatom Elektrik	Gas	4,0	00	10,4	78.000
	Natural		15.0		
Binatom Elektrik	Gas	2,0	00	10,4	78.000
	Natural		361.		3.450.
Bis Enerji	Gas	48,0	572	458,0	000
	Natural		210.		1.980.
Bosen Enerji	Gas	28,0	159	263,8	000
	Natural		20.0		
Çıldır	Gas	15,4	00	15,4	20.000
	Natural		10.0		
Dumrazlar Makina	Gas	1,3	00	1,3	10.000
	Natural		29.0		
Durum Gıda Termik	Gas	3,6	00	3,6	29.000
	Natural		90.0		
Ege Seramik	Gas	13,1	00	13,1	90.000
	Natural		7.20		520.00
Enerji Sa Çanakkale	Gas	0,9	0	65,0	0
	Natural	120,	930.		930.00
Enerji Sa Köseköy	Gas	0	000	120,0	0
	Natural		11.8		520.00
Enerji Sa Mersin	Gas	1,5	18	66,0	0
	Natural		5.60		917.00
Ennerji Sa Adana	Gas	0,8	0	131,0	0
	Natural		16.0		
Erzurum Meydan AVM	Gas	2,4	00	2,4	16.000
	Natural		53.0		
Gürteks İplik	Gas	6,7	00	6,7	53.000
	Natural		14.0		
Hatipoğlu Plastik	Gas	2,0	00	2,0	14.000
	Natural		146.		146.00
İşbirliği Enerji	Gas	19,5	000	19,5	0
	Natural		9.00		
İzmir Büyük Efes	Gas	1,2	0	1,2	9.000
	Natural		30.0		
JTI Torbalı	Gas	4,0	00	4,0	30.000
	Natural		44.8		
Keskinoğlu Tavukçuluk	Gas	6,0	42	9,5	71.000
	Natural		5.95		
Kıvanç Tekstil	Gas	1,1	1	6,1	33.000
	Natural		16.0		
MUTLU MAKARNACILIK	Gas	2,0	00	2,0	16.000
	Natural		60.0		
NAKSAN ENERJİ	Gas	8,0	00	8,0	60.000
	Natural		60.0		
NAKSAN ENERJİ	Gas	8,0	00	8,0	60.000
	Natural		414.		966.00
ODAŞ DOĞALGAZ	Gas	55,0	431	128,2	0
	Natural		137.		966.00
ODAŞ DOĞALGAZ	Gas	18,3	892	128,2	0
	Natural		16.0		
OFİM ENERJİ	Gas	2,1	00	2,1	16.000
	Natural		40.0		
ÖZMAYA SAN	Gas	5,4	00	5,4	40.000
	Natural		130.		260.00
PANCAR ELEKTRİK	Gas	17,5	372	34,9	0
	Natural		130.		260.00
PANCAR ELEKTRİK	Gas	17,5	372	34,9	0

PİSA TEKSTİL	Natural Gas	1,0	7.00 0	1,0	7.000
SELÇUK İPLİK	Natural Gas	8,6	65.0 00	8,6	65.000
SELVA GIDA	Natural Gas	1,7	14.0 00	1,7	14.000
SODA SANAYİ	Natural Gas	252,2	1.76 5.00 0	252,2	1.765. 000
ŞANLIURFA OSB	Natural Gas	11,7	81.9 46	128,5	900.00 0
TEKİRDAĞ ÇORLU	Natural Gas	2,0	15.0 00	2,0	15.000
YENİUŞAK ENERJİ	Natural Gas	8,7	63.4 86	18,5	135.00 0
YENİUŞAK ENERJİ	Natural Gas	1,0	7.29 7	18,5	135.00 0
YONGAPAN	Natural Gas	15,0	112. 348	24,7	185.00 0
ZORLU ENERJİ	Natural Gas	25,7	192. 837	148,2	1.112. 000
	Natural Gas 2012 Total	1.30 5,9	9.57 3.77 2,7		
Erdemir	Fuel Oil	53,9	351. 154	127,4	830.00 0
Goodyear	Fuel Oil	5,2	42.7 92	9,6	79.000
MOSB	Fuel Oil	12,0	89.8 08	140,3	1.050. 000
	Fuel Oil 2012 Total	71,1	483. 753, 1		
KÜÇÜKER TEKSTİL	Lignite	5,0	40.0 00	5,0	40.000
	Lignite 2012 Total	5,0	40.0 00,0		
Aksa Akrilik	Coal	75,0	525. 000	100,0	700.00 0
Eren Enerji	Coal	30,0	195. 971	1.390, 0	9.080. 000
Göknur Gıda	Coal	1,6	5.81 3	1,6	6.000
	Coal 2012 Total	106, 6	726. 783, 7		
Akköprü Dalaman	Hydro	57,5	88.0 00	115,0	176.00 0
Akköprü Dalaman	Hydro	57,5	88.0 00	115,0	176.00 0
Akköy II HES	Hydro	114, 8	253. 978	229,7	508.00 0
Akköy II HES	Hydro	114, 8	253. 978	229,7	508.00 0
Akköy Espiye HES	Hydro	8,9	22.0 30	8,9	22.000
Alabalık Rewg	Hydro	13,8	22.0 64	13,8	22.000
Alpaslan	Hydro	80,0	209. 000	160,0	418.00 0
Alpaslan	Hydro	80,0	209. 000	160,0	418.00 0
Anak HES	Hydro	3,8	8.90 5	3,8	9.000
Araklı REG	Hydro	10,2	21.8 08	13,1	28.000

Araklı REG	Hydro	13,1	27.9 29	13,1	28.000
Arca HES	Hydro	5,5	13.2 93	16,4	40.000
Arca HES	Hydro	10,9	26.5 85	16,4	40.000
Arpa REG	Hydro	32,4	44.0 16	32,4	44.000
Ataköy	Hydro	5,5	11.0 50	5,5	11.000
Avcılar HES	Hydro	16,7	28.0 72	16,7	28.000
AYANCIK HES (İLK ELEKTRİK ÜRETİMİ SN.)	Hydro	15,6	37.0 00	15,6	37.000
AYRANCILAR HES (MURADIYE ELEKTRİK ÜRETİM)	Hydro	9,4	21.6 50	41,5	96.000
BAĞIŞTAŞ II HES (AKDENİZLİ ELEKTRİK ÜRETİM)	Hydro	32,4	69.0 00	32,4	69.000
BALKUSAN BARAJI VE HES 1 NOLU SANT. (KAREN)	Hydro	13,0	23.0 00	13,0	23.000
BALKUSAN BARAJI VE HES 2 NOLU SANT. (KAREN)	Hydro	25,0	46.0 00	25,0	46.000
BANGAL REG. VE KUŞLUK HES (KUDRET ENERJİ)	Hydro	17,0	32.0 00	17,0	32.000
BEKTEMUR HES (DİZ-EP ELEKTRİK ÜRETİM LTD.)	Hydro	3,5	10.9 75	3,5	11.000
Beyköy	Hydro	16,8	87.0 00	16,8	87.000
Büyükdüz HES	Hydro	68,9	108. 940	68,9	109.000
Can 1 HES	Hydro	1,8	6.14 7	1,8	6.000
Ceyhna HES	Hydro	12,6	31.3 46	37,8	94.000
Cuniş REG	Hydro	2,9	7.12 5	8,4	21.000
Cuniş REG	Hydro	5,6	14.0 00	8,4	21.000
Çağlayan HES	Hydro	6,0	12.0 00	6,0	12.000
Çarşamba	Hydro	11,3	36.0 32	11,3	36.000
Cınar HES	Hydro	9,3	18.9 18	9,3	19.000
Çukurçayı HES	Hydro	1,8	2.00 0	3,6	4.000
Demirciler HES	Hydro	3,1	7.43 8	8,4	20.000
Demirciler HES	Hydro	5,3	12.6 60	8,4	20.000
Doğankaya HES	Hydro	20,6	55.8 64	20,6	56.000
Dumlu HES	Hydro	4,0	4.97 8	4,0	5.000
Eger HES	Hydro	1,9	6.06 3	1,9	6.000
Erik HES	Hydro	6,5	20.9 35	6,5	21.000
Ermenek	Hydro	151,2	408. 500	302,4	817.000
Ermenek	Hydro	151,2	408. 500	302,4	817.000
Esendurak HES	Hydro	9,3	24.0 77	9,3	24.000
Feke 1 HES	Hydro	29,4	67.0 00	29,4	67.000
Feke 2 Barajı	Hydro	69,3	126. 073	69,3	126.000
Fındık I Hes	Hydro	11,3	26.8 81	11,3	27.000
Gemciler REG	Hydro	8,0	19.9 50	8,0	20.000

GökGedik HES	Hydro	20,5	63.2 41	24,3	75.000
GökGedik HES	Hydro	3,8	11.6 54	24,3	75.000
Güdülk 2 HES	Hydro	4,9	14.9 39	4,9	15.000
Güllübağ Barajı	Hydro	96,0	280. 000	96,0	280.00 0
Günder REG	Hydro	28,2	48.0 34	28,2	48.000
Günder REG	Hydro	0,0	0	28,2	48.000
Horu REG	Hydro	4,2	12.4 71	8,5	25.000
Horu REG	Hydro	4,2	12.4 71	8,5	25.000
Horyan HES	Hydro	5,7	14.9 47	5,7	15.000
İkizdere	Hydro	18,6	100. 000	18,6	100.00 0
Kartalkaya HES	Hydro	8,0	15.0 00	8,0	15.000
Kayaköprü 2 HES	Hydro	10,2	36.0 00	10,2	36.000
Kılavuzlu HES	Hydro	40,5	100. 000	40,5	100.00 0
Kırıkdağ HES	Hydro	16,9	39.9 05	16,9	40.000
Kozdere HES	Hydro	6,1	5.26 5	9,3	8.000
Kökner HES	Hydro	8,0	15.0 45	8,0	15.000
KUZGUN	Hydro	20,9	0	20,9	0
KÜRCE REG	Hydro	12,0	36.1 38	12,0	36.000
Menge Barajı HES	Hydro	44,7	58.0 13	89,4	116.00 0
MERCAN	Hydro	20,4	48.0 00	20,4	48.000
MİDİLLİ REG	Hydro	21,0	44.9 36	21,0	45.000
MURAT I II REG	Hydro	35,6	107. 084	35,6	107.00 0
MURATLI REG	Hydro	11,0	16.0 48	37,7	55.000
MURSAL I HES	Hydro	4,2	12.9 38	4,2	13.000
NİKSAR HES	Hydro	20,1	69.9 30	40,2	140.00 0
NİKSAR HES	Hydro	20,1	69.9 30	40,2	140.00 0
ÖREN REG	Hydro	19,9	11.9 89	26,6	16.000
PAPART HES	Hydro	22,0	66.1 65	26,6	80.000
PAPART HES	Hydro	4,6	13.8 35	26,6	80.000
POLAT HES	Hydro	3,3	9.93 9	6,6	20.000
POLAT HES	Hydro	3,3	9.93 9	6,6	20.000
SANCAR REG	Hydro	0,7	2.11 4	0,7	2.000
SARİHİDR HES	Hydro	6,0	18.0 00	6,0	18.000
SEYRANTEPE HES	Hydro	56,8	161. 113	56,8	161.00 0
SIRAKONAKLAR HES	Hydro	18,0	39.0 00	18,0	39.000
SULUKÖY HES	Hydro	6,9	16.0 56	6,9	16.000
ŞİFRİN REG	Hydro	6,7	10.0 66	6,7	10.000
TELEME REG	Hydro	1,6	5.88 8	1,6	6.000
TELLİ II HES	Hydro	8,7	18.0 41	8,7	18.000

TERCAN	Hydro	15,0	28.0 00	15,0	28.000
TUĞRA REG	Hydro	4,9	10.0 00	4,9	10.000
TUNA HES	Hydro	37,2	51.9 86	37,2	52.000
TUZKÖY HES	Hydro	8,4	38.1 81	8,4	38.000
TUZLAKÖY SERGE	Hydro	7,1	14.0 79	7,1	14.000
UMUT I REG	Hydro	5,8	12.0 00	5,8	12.000
ÜÇKAYA HES	Hydro	1,0	3.12 0	1,0	3.000
VİZARA REG	Hydro	8,6	14.9 62	8,6	15.000
YAĞMUR REG	Hydro	8,9	18.0 93	8,9	18.000
YAMANLI III HES	Hydro	28,5	60.0 84	28,5	60.000
YAMANLI III HES	Hydro	27,0	55.9 59	27,0	56.000
YAVUZ HES	Hydro	5,8	8.00 0	5,8	8.000
YEDİSU HES	Hydro	15,1	27.3 45	22,7	41.000
YEDİSU HES	Hydro	7,6	13.6 73	22,7	41.000
YILDIRIM HES	Hydro	7,1	14.6 35	10,7	22.000
YILDIRIM HES	Hydro	3,6	7.31 8	10,7	22.000
YOKUŞLU KALENDERE HES	Hydro	5,2	12.9 35	40,2	100.00 0
ZEYTİN BENDİ HES	Hydro	5,2	10.0 00	5,2	10.000
ZEYTİNBENDİ HES	Hydro	0,0	0	5,2	10.000
	Hydro	2.15	4.99 7.73		
	2012 Total	6,2	8,2		
Arel Enerji	Biogas	1,2	9.00 0	2,4	18.000
Arel Enerji	Biogas	1,2	9.00 0	2,4	18.000
Bereket Enerji	Biogas	0,6	5.29 2	0,6	5.000
Ekim Biyogaz	Biogas	1,2	10.0 00	1,2	10.000
ES ES Eskişehir	Biogas	2,0	15.3 15	2,0	15.000
ITC Adana	Biogas	4,2	31.8 38	15,6	117.00 0
ITC Bursa	Biogas	7,0	57.1 43	9,8	80.000
ITC Bursa	Biogas	1,4	11.4 29	9,8	80.000
ITC Bursa	Biogas	1,4	11.4 29	9,8	80.000
İzaydaş	Biogas	0,3	2.22 0	5,5	37.000
Kayseri Katı Atık	Biogas	1,3	9.90 0	2,9	22.000
Kocaeli Çöp	Biogas	1,2	9.39 1	2,3	18.000
Kocaeli Çöp	Biogas	1,1	8.31 9	2,3	18.000
ORTADOĞU ENERJİ	Biogas	2,8	22.0 48	8,6	67.000
ORTADOĞU ENERJİ	Biogas	4,1	31.8 80	8,6	67.000
PAMUKOVA YEN	Biogas	1,4	10.0 00	1,4	10.000
SAMSUN KATI ATIK	Biogas	2,4	18.0 00	2,4	18.000

SEZER BİOENERJİ	Biogas	0,5	4.00 0	0,5	4.000
TRAKYA YENİŞEHİR CAM	Biogas	6,0	45.0 00	6,0	45.000
Denizli Jeotermal	Geotherm al	15,0	105. 000	15,0	105.00 0
SİNEM JEOTERMAL	Geotherm al	24,0	191. 000	24,0	191.00 0
Aksu RES	Wind	36,0	72.0 00	72,0	144.00 0
Aksu Res	Wind	30,0	60.0 00	72,0	144.00 0
Aksu RES	Wind	6,0	12.0 00	72,0	144.00 0
BALIKESİR RES (BARES ELEKTRİK ÜRETİM A.Ş.)	Wind	13,8	45.1 02	112,8	370.00 0
BALIKESİR RES (BARES ELEKTRİK ÜRETİM A.Ş.)	Wind	16,5	54.1 22	112,8	370.00 0
BALIKESİR RES (ENERJİSA ENERJİ ÜRETİM A.Ş.)	Wind	24,8	81.1 84	112,8	370.00 0
BALIKESİR RES (ENERJİSA ENERJİ ÜRETİM A.Ş.)	Wind	16,5	54.1 22	112,8	370.00 0
BALIKESİR RES (ENERJİSA ENERJİ ÜRETİM A.Ş.)	Wind	19,3	63.1 43	112,8	370.00 0
BALIKESİR RES (ENERJİSA ENERJİ ÜRETİM A.Ş.)	Wind	22,0	72.1 63	112,8	370.00 0
BANDIRMA RES (YAPISAN ELEKTRİK ÜRETİM A.Ş.)	Wind	5,0	15.0 00	35,0	105.00 0
Bozyaka RES	Wind	12,0	32.0 00	12,0	32.000
Dağpazarı RES	Wind	36,0	94.1 54	39,0	102.00 0
Dağpazarı RES	Wind	3,0	7.84 6	39,0	102.00 0
Dinar RES	Wind	16,1	51.0 00	16,1	51.000
Günaydın RES	Wind	10,0	34.0 00	10,0	34.000
İnnores	Wind	5,0	13.8 26	57,5	159.00 0
Karadağ RES	Wind	10,0	29.0 00	10,0	29.000
Kayadüzü RES	Wind	7,5	21.1 54	39,0	110.00 0
Kayadüzü RES	Wind	25,0	70.5 13	39,0	110.00 0
Kayadüzü RES	Wind	6,5	18.3 33	39,0	110.00 0
Kozbeyli RES	Wind	20,0	60.0 00	20,0	60.000
MATRİSTEPE RES	Wind	27,5	51.4 74	39,0	73.000
MATRİSTEPE RES	Wind	11,5	21.5 26	39,0	73.000
POYRAZ RES	Wind	14,0	54.8 80	50,0	196.00 0
POYRAZ RES	Wind	20,0	78.4 00	50,0	196.00 0
POYRAZ RES	Wind	16,0	62.7 20	50,0	196.00 0
SAMURLU RES	Wind	12,0	32.7 27	22,0	60.000
SAMURLU RES	Wind	10,0	27.2 73	22,0	60.000
SOMA RES	Wind	24,0	66.8 09	140,1	390.00 0
SOÖKE ÇATALBÜK RES	Wind	18,0	55.8 00	30,0	93.000
SÖKE ÇATALBÜK RES	Wind	12,0	37.2 00	30,0	93.000
ŞENKÖY RES	Wind	26,0	74.0 00	26,0	74.000

Renewabl
e 2012
Total164,
6561.
315,
0

2012 TOTAL

3.80
9,416.3
83.3
62,7**2011**

Plant Name	Fuel Type	Add ed Inst alle d Cap acit y MW	Gen erati on MW h	Total Instal led Capac ity MW	Total Gener ation MWh
Akım Enerji Başpınar (Süper Film)	Natural Gas	25,32	177.000	25,32	177.000
Aksa Akrilik	Natural Gas	25,00	189.076	59,50	450.000
Aksa Enerji (Antalya)	Natural Gas	300,00	1.800.000	1.450,00	8.700.000
Aksa Enerji (Antalya) İlave	Natural Gas	300,00	1.800.000	1.450,00	8.700.000
Aldaş Altyapı Yönetim Danışmanlık	Natural Gas	1,95	15.000	1,95	15.000
Aliağa Çakmaktepe Enerji (İlave)	Natural Gas	130,95	985.876	244,40	1.840.000
Aliağa Çakmaktepe Enerji (İlave)	Natural Gas	8,73	65.725	244,40	1.840.000
Bosen Enerji Elektrik Üretim A.Ş.	Natural Gas	93,00	698.092	235,80	1.770.000
Boyteks Tekstil San ve Tic. A.Ş.	Natural Gas	8,60	67.000	8,60	67.000
Cengiz Çift Yakıtlı K.Ç.E.S.	Natural Gas	131,34	985.000	131,34	985.000
Cengiz Enerji San ve Tic A.Ş.	Natural Gas	35,00	281.289	238,90	1.920.000
Fraport IC İçtaş Antalya Havalimanı	Natural Gas	8,00	64.000	8,00	64.000
Global Enerji (Çorlu) (İlave)	Natural Gas	4,00	29.909	24,30	181.700
Gordion AVM (Redevco Üç Emlak)	Natural Gas	2,01	15.030	2,01	15.000
Goren-1 (Gaziantep Organize San)	Natural Gas	48,65	277.000	48,65	277.000
Gülle Enerji (Çorlu) (İlave)	Natural Gas	3,90	17.989	10,20	47.000
Hamitabat (Lisans Tadili)	Natural Gas	36,00	211.889	1.156,00	6.804.000
Hasırcı Tekstil Tic ve San Ltd Şti	Natural Gas	2,00	15.000	2,00	15.000
HG Enerji Elektrik Üret. San. Tic. A.Ş.	Natural Gas	52,38	366.000	52,38	366.000
Isparta Mensucat (Isparta)	Natural Gas	4,30	33.000	4,30	33.000
İstanbul Sabiha Gökçen Ul. Ar. Hav.	Natural Gas	4,00	32.000	4,00	32.000
Knauf İnş. Ve Yapı Elemanlar Sn.	Natural Gas	1,56	12.000	1,56	12.000
Lokman Hekim Engürü Sağ. (Sincan)	Natural Gas	0,51	4.031	0,51	4.000
MOSB Enerji Elektrik Üretim Ltd. Şti (İlave)	Natural Gas	43,50	347.864	128,30	1.026.000
Nuh Enerji El. Ürt. A.Ş. (İlave)	Natural Gas	119,98	900.000	119,98	900.000
ODAŞ Doğalgaz KÇS (Odaş Elektrik)	Natural Gas	54,96	415.000	54,96	415.000
Polypex Europa Polyester Film	Natural Gas	3,90	30.698	11,70	92.000

Samsun Tekeköy En. San. (Aksa En.)	Natural Gas	131,34	979.963	131,34	980.000
Samur Halı A.Ş.	Natural Gas	4,30	33.000	4,30	33.000
Sarah Halı A.Ş.	Natural Gas	4,29	33.000	4,29	33.000
Şanlıurfa OSB (Rasa Enerji Ür. A.Ş.)	Natural Gas	116,76	800.000	116,76	800.000
Tekirdağ - Çorlu Teks. Tes (Nil Örme)	Natural Gas	2,68	20.976	2,68	21.000
Tirenda Tire Enerji Üretim A.Ş.	Natural Gas	58,38	410.000	58,38	410.000
Tüpraş O.A. Rafineri (Kırıkkale) (İlave)	Natural Gas	12,00	84.783	46,00	325.000
Yeni uşak Enerji Elektrik Santrali	Natural Gas	8,73	65.000	8,73	65.000
Zorlu Enerji (B. Karıştırılan)	Natural Gas	7,20	54.073	122,50	920.000
	Natural Gas 2011 Total	1.795,22	12.316.263,87		

Eti Bor (Borik Asit) (Emet)(Düzeltilme)	Fuel Oil	0,60	4.473	11,00	82.000
Karkey (Silopi 1)	Fuel Oil	100,44	701.152	171,90	1.200.000
Mardin-Kızıltepe (Aksa Enerji)	Fuel Oil	32,10	225.000	32,10	225.000
Toros Tarım (Mersin) (Nafta+Doğalgaz)	Fuel Oil	12,14	95.968	12,14	96.000
	Fuel Oil 2011 Total	145,28	1.026.592,93		

Bekirli TES (İçdaş Elektrik En.)	Coal	600,00	4.320.000	600,00	4.320.000
	Coal 2011 Total	600,00	4.320.000		

Çeşmebaşı REG ve HES (Gimac En.)	Hydro	8,20	17.000	8,20	17.000
Çukurçayı HES (Aydemir Elektrik Ür.)	Hydro	1,80	4.000	1,80	4.000
Darca HES (Bükör Elektrik Üretim)	Hydro	8,91	35.000	8,91	35.000
Değirmendere (Kadirli) (KA-FNİH Elek.)	Hydro	0,50	800	0,50	800
Derme (Kayseri ve Civarı Enerji)	Hydro	4,50	7.000	4,50	7.000
Duru 2 REG ve HES (Durucasu Elektrik)	Hydro	4,49	13.000	4,49	13.000
Erenköy REG ve HES (Nehir Enerji)	Hydro	21,46	48.991	21,46	49.000
Erkenek (Kayseri ve Civarı Enerji)	Hydro	0,32	500	0,32	500
Eşen 1 HES (Göлтаş Enerji Elektrik)	Hydro	30,00	65.000	60,00	130.000
Eşen 1 HES (Göлтаş Enerji Elektrik)	Hydro	30,00	65.000	60,00	130.000
Girlevik (Boydak Enerji)	Hydro	3,04	19.000	3,04	19.000
Gökmen REG ve HES (Su-Gücü Elektrik)	Hydro	2,87	7.997	2,87	8.000
Hacıninoğlu HES (Enerji SA Enerji)	Hydro	71,14	101.986	142,30	204.000
Hacıninoğlu HES (Enerji SA Enerji)	Hydro	71,14	101.986	142,30	204.000
Hakkari (Otluca) (NAS Enerji A.Ş.)	Hydro	1,28	8.107	3,00	19.000

Hasanlar	Hydro	9,35	29.6 00	9,35	29.600
Hasanlar HES (Düzce Enerji Birliği)	Hydro	4,68	12.0 00	4,68	12.000
İncirli REG ve HES (Laskar Enerji)	Hydro	25,2 0	71.0 00	25,20	71.000
İnegöl (Cerrah) (Kent Solar Elektrik)	Hydro	0,27	806	0,27	800
İznik (Dereköy) (Kent Solar Elektrik)	Hydro	0,24	900	0,24	900
Kalkandere REG ve Yokuşlu HES	Hydro	23,3 6	61.6 36	37,90	100.00 0
Karaçay (Osmaniye)(KA-FNİH) Elektrik	Hydro	0,40	2.00 0	0,40	2.000
Karasu 4-2 HES (İdeal Enerji Üretim)	Hydro	10,3 5	33.0 00	10,35	33.000
Karasu 4-3 HES (İdeal Enerji Üretim)	Hydro	4,60	12.0 00	4,60	12.000
Karasu 5 HES (İdeal Enerji Üretim)	Hydro	4,10	14.0 00	4,10	14.000
Karasu I HES (İdeal Enerji Üretim)	Hydro	3,84	11.0 00	3,84	11.000
Karasu II HES (İdeal Enerji Üretim)	Hydro	3,08	8.00 0	3,08	8.000
Kayadibi (Bartın) (İvme Elektromek.)	Hydro	0,46	2.01 7	0,46	2.000
Kazankaya REG ve İncesuyu HES (Aksa)	Hydro	15,0 0	27.0 00	15,00	27.000
Kernek (Kayseri ve Civarı Enerji)	Hydro	0,83	6.01 4	0,83	6.000
Kesme REG ve HES (Kıvanç Enerji)	Hydro	2,31	4.51 0	4,60	9.000
Kesme REG ve HES (Kıvanç Enerji)	Hydro	2,31	4.51 0	4,60	9.000
Kıran HES (Arşan Enerji A.Ş.)	Hydro	9,74	23.0 00	9,74	23.000
Koruköy HES (Akar Enerji San ve Tic)	Hydro	3,03	13.0 00	3,03	13.000
Kovada I (Batiçim Enerji Elektrik)	Hydro	8,25	1.60 0	8,25	1.600
Kovada II (Batiçim Enerji Elektrik)	Hydro	51,2 0	24.4 00	51,20	24.400
Kozdere HES (Ado Madencilik Elekt.)	Hydro	3,15	7.98 7	3,15	8.000
Köyobaşı HES (Şirikoğlu Elektrik)	Hydro	1,07	3.00 0	1,07	3.000
Kulp I HES (Yıldızlar Enerji Elk. Ür.)	Hydro	22,9 2	44.0 00	22,92	44.000
Kumköy HES (AES-İC İçtaş Enerji)	Hydro	17,4 9	55.0 00	17,49	55.000
Kuzuculu (Dörtöl) (Ka-FNİH Elektrik)	Hydro	0,27	1.00 7	0,27	1.000
M. Kemalpaşa (Suutçu) (Kent Solar)	Hydro	0,47	1.30 6	0,47	1.300
Malazgirt (Mostar Enerji Elektrik)	Hydro	1,22	2.99 0	1,22	3.000
Adilcevaz(Mostar Enerji Elektrik)	Hydro	0,39	505	0,39	500
Ahlat (Mostar Enerji Elektrik)	Hydro	0,20	503	0,20	500
Aksu REG. Ve HES (Kalen Enerji)	Hydro	5,20	12.0 00	5,20	12.000
Alkumru Barajı ve HES (Limak Hid.)	Hydro	174, 18	311. 368	261,80	468.00 0
Alkumru Barajı ve HES (Limak Hid.)	Hydro	87,0 9	155. 684	261,80	468.00 0
Ayrancılar HES (Muradiye Elektrik)	Hydro	18,7 2	43.7 34	32,10	75.000
Ayrancılar HES (Muradiye Elektrik)	Hydro	13,3 8	31.2 55	32,10	75.000
Balkondu I HES (BTA Elektrik Enerji)	Hydro	9,19	20.0 02	9,19	20.000
Batman	Hydro	0,48	1.07 7	198,50	450.00 0
Bayburt (Boydak Enerji)	Hydro	0,40	1.68 3	0,40	1.700
Bayramhacı Barajı ve HES	Hydro	47,0	95.0	47,00	95.000

		0	00		
Berdan	Hydro	10,2 0	15.0 00	10,20	15.000
Besni (Kayseri ve Civarı Enerji)	Hydro	0,27	201	0,27	200
Boğuntu HES (Beyobası Enerji)	Hydro	3,80	10.0 03	3,80	10.000
Bünyan (Kayseri ve Civarı El. Taş.)	Hydro	1,16	3.20 0	1,16	3.200
Cevheri I II REG ve HES (Özcevh En.)	Hydro	16,3 6	32.0 00	16,36	32.000
Çağ Çağ (NAAS Enerji A.Ş.)	Hydro	14,4 0	22.0 00	14,40	22.000
Çakırman REG ve HES (Yusaka En.)	Hydro	6,98	15.0 00	6,98	15.000
Çamardı (Kayseri ve Civarı Elek. Taş.)	Hydro	0,07	100	0,07	100
Çamlıca III HES (Çamlıca Elektrik)	Hydro	27,6 2	24.9 98	27,62	25.000
Çamlıkaya REG ve HES (Çamlıkaya En)	Hydro	2,82	3.65 5	8,50	11.000
Çanakçı HES (Can Enerji Entegre)	Hydro	4,63	10.9 60	9,30	22.000
Çanakçı HES (Can Enerji Entegre)	Hydro	4,63	10.9 60	9,30	22.000
Çemişkezek (Boydak Enerji)	Hydro	0,12	500	0,12	500
Menge Barajı ve HES (EnerjiSA Enerji)	Hydro	44,7 1	58.0 00	44,71	58.000
Molu Enerji (Zamantı Bahçelik HES)	Hydro	4,17	30.0 00	4,17	30.000
Muratlı REG ve HES (Armahe El.)	Hydro	26,7 0	55.0 00	26,70	55.000
Narinkale REG ve HES (EBD Enerji)	Hydro	30,4 0	55.3 55	33,50	61.000
Otluca I HES (Beyobası Enerji Ür)	Hydro	37,5 4	99.9 97	37,54	100.00 0
Otluca II HES (Beyobası Enerji Ür)	Hydro	6,36	15.0 00	6,36	15.000
Ören REG ve HES (Çelikler Elektrik)	Hydro	6,64	16.0 00	6,64	16.000
Pınarbaşı (Kayseri ve Civarı El. Taş)	Hydro	0,10	297	0,10	300
Poyraz HES (Yeşil Enerji Elektrik)	Hydro	2,66	6.00 0	2,66	6.000
Saraçbendi HES (Çamlıca Elektrik)	Hydro	25,4 8	57.0 00	25,48	57.000
Sarıkavak HES (Eser Enerji Yat. A.Ş.)	Hydro	8,06	24.0 00	8,06	24.000
Sayan HES (Karel Elektrik Üretim)	Hydro	14,9 0	26.9 93	14,90	27.000
Sefaköy HES (Püre Enerji Üretim A.Ş.)	Hydro	33,1 1	68.0 00	33,11	68.000
Daren HES Elektrik (Seyrantepe)	Hydro	49,7 0	140. 875	56,80	161.00 0
Seyrantepe HES (Düzeltilme)	Hydro	7,14	20.2 38	56,80	161.00 0
Sızır (Kayseri ve Civarı Elek. Taş.)	Hydro	5,76	35.0 00	5,76	35.000
Söğütlükaya (Posof III) HES	Hydro	6,13	18.0 00	6,13	18.000
Tefen HES (Aksu Madencilik San.)	Hydro	22,0 0	53.3 33	33,00	80.000
Tefen HES (Aksu Madencilik San.)	Hydro	11,0 0	26.6 67	33,00	80.000
Tektaş (Erkenek)	Hydro	0,51	1.18 6	13,00	30.000
Turunçova (Finike) (Turunçova En.)	Hydro	0,55	80	55,00	8.000
Tuztaşı HES (Gürüz Elek. Üretim)	Hydro	1,61	5.98 1	1,61	6.000
Uluabat Kuv. Tün. Ve HES (Düzeltilme)	Hydro	2,98	6.85 4	100,00	230.00 0
Uludure (Nas Enerji A.Ş.)	Hydro	0,64	2.60 0	0,64	2.600
Üzümlü HES (Akgün Enerji Üretim)	Hydro	11,3 6	22.9 96	11,36	23.000

Varto (Mostar Enerji Elektrik)	Hydro	0,29	604	0,29	600
Yamaç HES (Yamaç Enerji Üretim A.Ş.)	Hydro	5,46	10.00	5,46	10.000
Yapısan (Karıca REG ve Darıca I HES)	Hydro	13,32	24.515	110,30	203.000
Yaprak II HES (Nisan Elektromek)	Hydro	5,40	10.500	10,80	21.000
Yaprak II HES (Nisan Elektromek)	Hydro	5,40	10.500	10,80	21.000
Yaşıl HES (Yaşıl Enerji Elektrik)	Hydro	1,52	3.196	3,80	8.000
Yaşıl HES (Yaşıl Enerji Elektrik)	Hydro	2,28	4.792	3,80	8.000
Yedigöl REG. Ve HES (Yedigöl Hıdr.)	Hydro	21,90	42.000	21,90	42.000
Yedigöze HES (Yedigöze Elek.) (İlave)	Hydro	155,33	133.983	310,70	268.000
	Hydro 2011 Total	1.509,22	2.879.578,98		

Bolu Belediyesi Çöp Top. Tes. Biyogaz	Biogas	1,13	7.500	1,13	7.500
CEV Enerji Üretim (Gaziantep Çöp Biogaz)	Biogas	4,52	29.366	5,70	37.000
ITC Adana Enerji Üretim (İlave)	Biogas	1,42	83.000	1,42	83.000
ITC-Ka En (Aslım Biyokütle) Konya	Biogas	4,25	33.141	5,70	44.500
ITC-Ka En (Aslım Biyokütle) Konya	Biogas	1,42	11.047	5,70	44.500
ITC-Ka Enerji (Sincan) (İlave)	Biogas	1,42	11.055	5,70	44.500
ITC-Ka Enerji Mamak Katı Atık Top.	Biogas	2,83	18.914	25,40	170.000
Kayseri Katı Atık Deponi Sahası	Biogas	1,56	12.000	1,56	12.000
Aydın/Germencik Jeotermal	Geothermal	20,00	150.000	20,00	150.000
Akres (Akhisar Rüzgar En. Elekt.)	Wind	20,00	64.384	43,80	141.000
Akres (Akhisar Rüzgar En. Elekt.)	Wind	20,00	64.384	43,80	141.000
Akres (Akhisar Rüzgar En. Elekt.)	Wind	3,75	12.072	43,80	141.000
Ayvacık RES (Ayres Ayvacık Rüzgar)	Wind	5,00	15.000	5,00	15.000
Baki Elektrik Şamlı Rüzgar (İlave)	Wind	24,00	78.947	114,00	375.000
Bandırma Enerji (Bandırma RES)	Wind	3,00	5.625	24,00	45.000
Çanakkale RES (Enerji-SA Enerji)	Wind	25,30	66.000	29,90	78.000
Çanakkale RES (Enerji-SA Enerji)	Wind	4,60	12.000	29,90	78.000
Çataltepe RES (Alize Enerji Elektrik)	Wind	16,00	44.000	16,00	44.000
Innores Elektrik Yuntdağ Rüzgar	Wind	10,00	27.619	52,50	145.000
Killik RES (Pem Enerji A.Ş.)	Wind	20,00	36.500	40,00	73.000
Killik RES (Pem Enerji A.Ş.)	Wind	15,00	27.375	40,00	73.000
Killik RES (Pem Enerji A.Ş.)	Wind	5,00	9.125	40,00	73.000
Sares RES (Garet Enerji Üretim)	Wind	7,50	17.000	22,50	51.000
Seyitali RES (Doruk Enerji Elektrik)	Wind	30,00	94.000	30,00	94.000
Soma RES (Soma Enerji) (İlave)	Wind	20,00	55.642	116,10	323.000
Soma RES (Soma Enerji) (İlave)	Wind	16,90	47.017	116,10	323.000
Susurluk RES (Alantek Enerji Üret.)	Wind	12,50	26.667	45,00	96.000

Susurluk RES (Alantek Enerji Üret.)	Wind	10,0 0	21.3 33	45,00	96.000
Susurluk RES (Alantek Enerji Üret.)	Wind	12,5 0	26.6 67	45,00	96.000
Susurluk RES (Alantek Enerji Üret.)	Wind	10,0 0	21.3 33	45,00	96.000
Şah RES (Galata Wind Enerji Ltd. Şti)	Wind	63,0 0	231. 000	93,00	341.00 0
Şah RES (Galata Wind Enerji Ltd. Şti)	Wind	27,0 0	99.0 00	93,00	341.00 0
Şah RES (Galata Wind Enerji Ltd. Şti)	Wind	3,00	11.0 00	93,00	341.00 0
Turguttepe RES (Sabaş Elektrik)	Wind	3,00	6.87 5	24,00	55.000
Ziyaret RES (Ziyaret RES Elektrik)	Wind	2,00	6.33 0	57,50	182.00 0
Renewabl e 2011 Total		213,37	715.474,13		

2011 TOTAL		4.263	21.257.910
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2010					
Plant Name	Fuel Type	Add ed Inst alle d Cap acit y MW	Gen erati on MW h	Total Install ed Cap acit y MW	Total Gener ation MWh
Can Tekstil (Çorlu/Tekirdağ)	Natural Gas	7,83 2	60.2 46	13	100.00 0
Altınmarka	Natural Gas	4,6	37.0 24	8,2	66.000
Akbaşlar (İlave)	Natural Gas	1,54	12.0 78	10,2	80.000
Global Enerji (Pelitlik)	Natural Gas	3,54 4	27.0 57	23,8	181.70 0
Rasa Enerji (Van)	Natural Gas	26,1 9	166. 622	114,9	731.00 0
Aksa Enerji (Antalya)	Natural Gas	25	192. 500	850	6.545. 000
Yıldız Entegre Ağaç (Kocaeli)	Natural Gas	12,3 68	79.7 94	18,6	120.00 0
Ataer Enerji Elektrik Üretim A.Ş.	Natural Gas	49	277. 886	119,2	676.00 0
Cengiz Enerji San ve Tic A.Ş. (Tekkeköy)	Natural Gas	101, 95	802. 000	203,9	1.604. 000
Uğur Enerji Üretim San ve Tic A.Ş.	Natural Gas	48,2	405. 136	60,2	506.00 0
Aksa Enerji (Antalya)	Natural Gas	25	192. 500	850	6.545. 000
Altek Alarko Elektrik Santralleri	Natural Gas	60,1	415. 570	164	1.134. 000
Flokser Tekstil (Çerkezköy/Tekirdağ)	Natural Gas	5,2	42.0 00	5,2	42.000
RB Karesi İthalat İhracat Tekstil	Natural Gas	8,6	65.0 00	8,6	65.000
Cengiz Enerji San ve Tic A.Ş. (Tekkeköy)	Natural Gas	101, 95	802. 000	203,9	1.604. 000
Keskinoğlu Tavukçuluk ve Dam. İşl.	Natural Gas	3,5	25.0 00	3,5	25.000
Binatom Elektrik Üretim A.Ş.	Natural Gas	2	13.0 00	2	13.000
Can Enerji Elektrik Üretim A.Ş. (Tekirdağ)	Natural Gas	29,1	203. 000	29,1	203.00 0
Kurtoğlu Bakır Kurşun San ve A.Ş.	Natural Gas	1,6	12.0 00	1,6	12.000
Sönmez Enerji Üretim	Natural	33,2	256.	70,7	545.10

(Uşak)	Gas	42	297		0
Kırka Boraks (Kırka) (Eti Maden İşl) (İlave)	Natural Gas	10	65.9 34	18,2	120.00 0
Enerji SA (Bandırma)	Natural Gas	930,8	7.54 0.00 0	930,8	7.540. 000
Uğur Enerji Üretim San ve Tic A.Ş. (İlave)	Natural Gas	12	100. 864	60,2	506.00 0
Marmara Pamuklu Mensucat (İlave)	Natural Gas	26,1 9	203. 450	69,9	543.00 0
Aliağa Çakmaktepe Enerji (İlave)	Natural Gas	69,8 4	557. 920	104,7	836.40 0
Sönmez Enerji Üretim (Uşak) (İlave)	Natural Gas	2,56 4	19.7 69	70,7	545.10 0
Polyplex Europa Polyester Film	Natural Gas	7,8	61.0 00	7,8	61.000
Altek Alarko Elektrik Santralleri	Natural Gas	21,8 9	151. 361	164	1.134. 000
Rasa Enerji (Van) (İlave)	Natural Gas	10,1 24	64.4 09	114,9	731.00 0
International Hospital İstanbul A.Ş.	Natural Gas	0,8	6.00 0	0,8	6.000
	Natural Gas 2010 Total	139	1.06 3.90 9		

Tüpraş Rafineri (İzmit) (İlave)	Fuel Oil	40	258. 824	85	550.00 0
	Fuel Oil 2010 Total	40	258. 824		

Eti Soda Üre. Paz. Nak. Ve Elek. Üre. San.	Lignite	24	144. 000	24	144.00 0
Konya Şeker San. Ve Tic. A.Ş.	Lignite	6	11.5 93	147,5	285.00 0
	Lignite 2010 Total	0	0		

Eren Enerji Elektrik Üretim A.Ş.	Coal	160	1.06 8.23 5	1360	9.080. 000
Eren Enerji Elektrik Üretim A.Ş. (İlave)	Coal	600	4.00 5.88 2	1360	9.080. 000
Eren Enerji Elektrik Üretim A.Ş. (İlave)	Coal	600	4.00 5.88 2	1360	9.080. 000
	Coal 2010 Total	120 0	8.01 1.76 5		

Kulp IV HES (Yıldızlar En. Elk. Ür. A.Ş.)	Hydro	12,3	23.0 00	12,3	23.000
Cindere Hes (İlave)	Hydro	9,06 5	16.0 73	28,2	50.000
Bayburt HES (Bayburt Enerji Üret.)	Hydro	14,6	24.0 00	14,6	24.000
Uzunçayır HES (Tunceli) (İlave)	Hydro	27,3 3	60.6 59	82	182.00 0
Alakır HES (Yurt Enerji Üretim)	Hydro	2,1	4.00 0	2,1	4.000
Peta Mühendislik En. (Mursal II Hes)	Hydro	4,5	11.0 00	4,5	11.000
Asa Enerji (Kale Reg ve HES)	Hydro	9,6	18.0 00	9,6	18.000
Hetaş Hacısalıhoğlu (Yıldızlı HES)	Hydro	1,2	3.00 0	1,2	3.000
Doğubey Elektrik	Hydro	3,1	6.00	3,1	6.000

(Sarımehmet Hes)			0		
Nuryol Enerji (Defne Reg ve Hes)	Hydro	7,2	13.000	7,2	13.000
Özgür Elektrik (Azmak I Reg. Ve Hes)	Hydro	5,913	12.026	11,8	24.000
Birim Hidr. Üretim. AŞ. (Erfelek Hes)	Hydro	3,225	5.458	6,5	11.000
Beytel Elek. Ür. AŞ. (Çataloluk Hes)	Hydro	9,5	17.000	9,5	17.000
Nisan E. Mekanik. En. (Başak Reg. HES)	Hydro	6,9	12.000	6,9	12.000
Uzunçayır HES (Tunceli) (İlave)	Hydro	27,33	60.659	82	182.000
Fırtına Elektrik Ür. AŞ. (Sümer HES)	Hydro	21,6	39.000	21,6	39.000
Karen Karadeniz El. AŞ. Aralık Hes	Hydro	12,4	32.000	12,4	32.000
Birim Hidr. Üretim. AŞ. (Erfelek Hes)	Hydro	3,225	3.006	11,8	11.000
Karadeniz El. Üretim (Uzundere 1 Hes)	Hydro	31	46.350	62,2	93.000
Akım Enerji (Cevizlik Reg. Ve Hes)	Hydro	91,4	187.000	91,4	187.000
Çakıt HES (Çakıt Enerji AŞ.)	Hydro	20,2	54.000	20,2	54.000
Erenler Reg ve Hes (BME Bir Müt. En)	Hydro	45	48.000	45	48.000
Paşa Reg ve Hes (Özgür Elektrik)	Hydro	8,7	19.000	8,7	19.000
Güzel Çay I HES (İlk Elektrik Enerji)	Hydro	3,14	9.304	8,1	24.000
Kale Reg ve Hes (Kale Enerji Üretim AŞ.)	Hydro	34,1	66.000	34,1	66.000
Erikli Akocak Reg ve Akocak Hes	Hydro	41,25	73.000	82,5	146.000
Çamlıkaya Reg ve Hes	Hydro	5,6	11.000	5,6	11.000
Dinar Hes (Elda Elektrik Üretim)	Hydro	4,4	9.000	4,4	9.000
Damlapınar Hes (Cenay Elektrik Üretim)	Hydro	16,4	52.000	16,4	52.000
Dim Hes (Diler Elektrik Üretim)	Hydro	38,3	70.000	38,3	70.000
Kirpilik Reg. Ve Hes (Özgür Elektrik)	Hydro	6,2	13.000	6,2	13.000
Özgür Elektrik (Azmak I Reg. Ve Hes)	Hydro	5,913	12.026	11,8	24.000
Yavuz Reg. Ve Hes (Masat Enerji)	Hydro	22,5	47.000	22,5	47.000
Kayabükü Reg. Ve Hes (Elite Elek.)	Hydro	14,6	28.000	14,6	28.000
Erikli Akocak Reg ve Akocak Hes	Hydro	41,25	73.000	82,5	146.000
Gök Reg. Ve Hes (Gök Enerji El. San.)	Hydro	10	24.000	10	24.000
Bulam Reg ve Hes (Mem Enerji Elk)	Hydro	7	19.000	7	19.000
Karşıyaka Hes (Akua Enerji Üret)	Hydro	1,6	5.000	1,6	5.000
Ceyhan Hes (Berkman Hes) (Enova En)	Hydro	12,6	29.000	25,2	58.000
Güdü 1 Reg ve Hes (Yaşam Enerji)	Hydro	2,4	8.000	2,4	8.000
Ceyhan Hes (Berkman Hes) (Enova En)	Hydro	12,6	29.000	25,2	58.000
Tektuğ Elektrik (Andırın Hes)	Hydro	40,5	60.000	40,5	60.000
Selen Elektrik (Kepezkaya Hes)	Hydro	28	70.000	28	70.000
Reşadiye 2 Hes (Turkon Mng Elekt)	Hydro	26,1	119.000	26,1	119.000
Kozan Hes (SerEr Enerji)	Hydro	4	5.000	4	5.000
Kahraman Reg ve Hes (Katırcıoğlu)	Hydro	1,4	3.000	1,4	3.000
Narinkale Reg ve HES (EBD	Hydro	3,1	6.000	3,1	6.000

Enerji)			0		
Erenköy Reg ve Hes (Türkerler)	Hydro	21,5	49.000	21,5	49.000
Kahta I Hes (Erdemyıldız Elek. Ürt)	Hydro	7,1	20.000	7,1	20.000
Uluabat Kuvvet Tüneli ve Hes	Hydro	48,5	105.000	97	210.000
Sabunsuyu II Hes (Ang Enerji Elk)	Hydro	7,4	12.000	7,4	12.000
Burç Bendi ve Hes (Akkur Enerji)	Hydro	27,3	64.000	27,3	64.000
Karadeniz El. Üretim (Uzundere 1 Hes) (İlave)	Hydro	31	46.350	62,2	93.000
Murgul Bakı (Ç. Kaya) (İlave)	Hydro	19,6	31.587	24,2	39.000
Güzel Çay II HES (İlk Elektrik Enerji)	Hydro	4,96	14.696	8,1	24.000
Uluabat Kuvvet Tüneli ve Hes (İlave)	Hydro	48,5	105.000	97	210.000
Reşadiye 1 Hes (Turkon Mng Elekt)	Hydro	15,6	71.126	26,1	119.000
Egemen 1 Hes (Enersis Elektrik)	Hydro	8,8	18.131	19,9	41.000
Yedigöze Hes (Yedigöze Elektrik)	Hydro	155,3	268.000	155,3	268.000
Umut III Reg ve Hes (Nisan Elek)	Hydro	12	15.000	12	15.000
Feki 2 Barajı (Akkur Enerji)	Hydro	69,3	126.000	69,3	126.000
Egemen 1B Hes (Enersis Elektrik)	Hydro	11,1	22.869	19,9	41.000
Kalkandere Reg ve Yokuşlu Hes	Hydro	14,5	36.000	14,5	36.000
	Hydro 2010 Total	418	818.760		

CEV Enerji Üretim (Gaziantep Çöp Biyogazı)	Biogas	1,1	8.600	1,1	8.600
Ortadoğu Enerji (Odayeri) (Eyüp İst)	Biogas	4,245	33.357	16,9	132.800
ITC KA Enerji Sincan	Biogas	1,416	11.126	4,2	33.000
ITC Adana Biokütle Sant	Biogas	11,32	91.475	9,9	80.000
Tuzla Jeotermal	Geothermal	7,5	55.000	7,5	55.000
Menderes Geotermal Dora - 2	Geothermal	9,5	73.000	9,5	73.000
Rotor Elektrik (Osmaniye RES)	Wind	20	64.444	135	435.000
Asmakinsan (Bandırma 3 RES)	Wind	20	37.500	24	45.000
Soma Enerji Üretim (Soma RES)	Wind	4,5	11.364	79,2	200.000
Rotor Elektrik (Osmaniye RES)	Wind	17,5	56.389	135	435.000
Deniz Elektrik (Sebanoba RES)	Wind	10	32.000	30	96.000
Akdeniz Elektrik (Mersin RES)	Wind	33	50.000	33	50.000
Asmakinsan (Bandırma 3 RES)	Wind	4	7.500	24	45.000
Boreas Enerji (Boreas I Enez RES)	Wind	15	42.000	15	42.000
Rotor Elektrik (Osmaniye RES)	Wind	17,5	56.389	135	435.000
Bergama RES En. Ür. A.Ş. Aliaga RES	Wind	52,5	176.167	90	302.000
Bakras En. Elkt. Ür. A.Ş. Şenbük RES	Wind	15	40.000	15	40.000
Alize Enerji (Keltepe RES)	Wind	1,8	5.391	20,7	62.000
Rotor Elektrik (Gökçedağ RES)	Wind	20	64.444	135	435.000

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Soma Enerji Üretim (Soma RES)	Wind	7,2	18.1 82	79,2	200.00 0
Bergama RES En. Ür. A.Ş. Aliğa RES	Wind	37	124. 156	90	302.00 0
Mazi 3 RES Elektrik (Mazi 3 RES)	Wind	7,5	20.0 00	30	80.000
Borasko Enerji (Bandırma RES)	Wind	12	30.1 05	57	143.00 0
Ziyaret RES (Ziyaret RES Elektrik)	Wind	12,5	42.5 00	35	119.00 0
Soma Enerji Üretim (Soma RES)	Wind	7,2	18.1 82	79,2	200.00 0
Soma RES (Bilgin Rüzgar San. En. Ür)	Wind	32	92.8 00	90	261.00 0
Soma Enerji Üretim (Soma RES)	Wind	6,3	15.9 09	79,2	200.00 0
Belen Elektrik (Belen RES) (İlave)	Wind	6	11.6 67	36	70.000
Ütopya Elektrik (Düzova RES) (İlave)	Wind	15	30.0 00	30	60.000
Soma RES (Bilgin Rüzgar San. En. Ür) (İlave)	Wind	27,5	79.7 50	90	261.00 0
Soma Enerji Üretim (Soma RES) (İlave)	Wind	9	22.7 27	79,2	200.00 0
Ziyaret RES (Ziyaret RES Elektrik) (İlave)	Wind	22,5	76.5 00	35	119.00 0
Rotor Elektrik (Gökçedağ RES) (İlave)	Wind	2,5	8.05 6	135	435.00 0
Soma RES (Bilgin Rüzgar San) (İlave)	Wind	30	87.0 00	90	261.00 0
Kuyucak RES (Alize Enerji Üret)	Wind	8	29.3 75	25,6	94.000
Kuyucak RES (Alize Enerji Üret) (İlave)	Wind	17,6	64.6 25	25,6	94.000
Sares RES (Garet Enerji Üretim)	Wind	15	51.0 00	15	51.000
Turguttepe RES (Sabaş Elektrik Ür)	Wind	22	55.0 00	22	55.000
Renewabl e 2010 Total		15	51.0 00		

2010 TOTAL		1.81 2	10.2 04.2 57
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2009			
Plant Name	Fuel Type	Added Installed Capacity MW	Generation MWh
Ak Gıda San. Ve Tic. A.Ş. (Pamukova)	Natural Gas	7,50	61.000
Aksa Akrilik Kimya San. A.Ş. (Yalova)	Natural Gas	70,00	539.000
Aksa Enerji (Antalya)	Natural Gas	16,20	124.740
Aksa Enerji (Antalya)	Natural Gas	300,00	2.310.000
Aksa Enerji (Antalya)	Natural Gas	300,00	2.310.000
Aksa Enerji (Manisa)	Natural Gas	10,50	83.144
Antalya Enerji	Natural Gas	41,80	302.096
Arenko Elektrik Üretim A.Ş. (Denizli)	Natural Gas	12,00	84.000
Bil Enerji (DG+M)(Balgat)	Natural Gas	36,60	255.000
Cam İş Elektrik	Natural Gas	126,10	1.008.000
Çelikler Taah. İnş. (Rixox Grand)	Natural Gas	2,00	16.000
Dalsan Alçı San. Ve Tic A.Ş.	Natural Gas	1,20	9.000
Delta Enerji Üretim ve Tic. A.Ş.	Natural Gas	47,00	365.817

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Delta Enerji Üretim ve Tic. A.Ş.	Natural Gas	13,00	101.183
Desa Enerji Elektrik Üretim A.Ş.	Natural Gas	9,80	70.000
E. Şehir. End. Enerji (DG+M)(Eskişehir-2)	Natural Gas	59,00	452.000
Ege Birleşik Enerji (LPG+DG+M)(Aliağa)	Natural Gas	12,80	107.000
Entek Köseköy (İztek)	Natural Gas	0,80	6.366
Entek Köseköy (İztek)	Natural Gas	36,30	288.876
Falez Elektrik Üretim A.Ş.	Natural Gas	11,70	88.000
Global Enerji (Pelitlik)	Natural Gas	8,60	65.665
Gül Enerji Elkt. Üret. Sn. Ve Tic. A.Ş.	Natural Gas	24,30	170.000
Habaş Aliağa	Natural Gas	224,50	1.796.000
Hayat Kağıt	Natural Gas	7,50	56.000
Kasar Dual Tekstil San. A.Ş. (Çorlu)	Natural Gas	5,70	38.000
Ken Kipaş Elektrik Üretim (Karen)	Natural Gas	41,80	180.000
Ken Kipaş Elkt. Ür. (Karen) (K.Maraş)	Natural Gas	17,50	75.359
Maksi Enerji EeLEKTRİK Üretim A.Ş.	Natural Gas	7,70	55.000
Marmara Pamuklu Mens. Sn. Tic. A.Ş.	Natural Gas	34,90	271.533
Mauri Maya San A.Ş.	Natural Gas	0,30	2.478
Mauri Maya San A.Ş.	Natural Gas	2,00	16.522
Modern Enerji (B. Karıştırır)	Natural Gas	96,80	
MOSB Enerji Elektrik Üretim Ltd. Şti.	Natural Gas	84,80	595.702
Nuh Çimento San. Tic. A.Ş.	Natural Gas	47,00	329.000
Rasa Enerji (VAN)	Natural Gas	78,60	500.000
Selkasan Kağıt Paketleme	Natural Gas	9,90	73.000
Sönmez Elektrik (Uşak)	Natural Gas	8,70	67.057
Şahinler Enerji (Çorlu/Tekirdağ)	Natural Gas	26,00	185.000
TAV İstanbul Terminal İşletme A.Ş.	Natural Gas	3,30	27.612
TAV İstanbul Terminal İşletme A.Ş.	Natural Gas	6,50	54.388
Tesko Kipa Kitle Paz. Tic. Ve Gıda A.Ş.	Natural Gas	2,30	18.000
Yurtbay Elektrik Üretim A.Ş.(DG+M)	Natural Gas	6,90	50.000
Zorlu Enerji (B. Karıştırır)	Natural Gas	49,50	394.970
	Natural Gas 2009 Total	1.909,40	13.602.509

Erdemir (Ereğli-Zonguldak)	Fuel Oil	39,20	240.000
Habaş Bilecik Paşalar	Fuel Oil	18,00	144.000
Habaş İzmir Habaş	Fuel Oil	36,00	288.000
Petkim (Aliağa)	Fuel Oil	222,00	1.554.000
Petkim (Aliağa)	Fuel Oil	52,00	364.000
Silopi Elektrik Üretim A.Ş.	Fuel Oil	44,80	315.000
Süper Film (G. Antep)	Fuel Oil	25,30	203.000
Tire Kutsan (Tire)	Fuel Oil	8,00	37.000
Tüpraş Rafineri (Aliağa/İzmir)	Fuel Oil	24,70	171.777
Tüpraş O.A. Rafineri (Kırıkkale)	Fuel Oil	10,00	70.000
Silopi Elektrik Üretim A.Ş.	Fuel Oil	135	945.000
	Fuel Oil 2009 Total	615,00	4.331.777

Alkim Alkali Kimya	Lignite	0,40	3.000
	Lignite 2009 Total	0,40	3.000

İçdaş Çelik	Coal	135,00	961.667
İçdaş Çelik	Coal	135,00	961.667

Coal 2009 Total	270,00	1.923.333
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Akçay Hes Elektrik Üretim (Akçay HES)	Hydro	28,80	45.000
Akua Enerji (Kayalık Reg ve HES)	Hydro	5,80	20.000
Anadolu Elektrik (Çakırlar HES)	Hydro	16,20	28.000
Bağışlı REG ve HES (Ceykar Elekt.)	Hydro	9,90	15.720
Bağışlı REG ve HES (Ceykar Elekt.)	Hydro	19,70	31.280
Bereket Enerji (Koyul Hisar)	Hydro	42,00	155.000
Beyobası En. Ür. A.Ş. (Sırma HES)	Hydro	5,90	11.000
Cindere HES (Denizli)	Hydro	19,10	30.000
Değirmenüstü En (Kahramanmaraş)	Hydro	12,90	17.378
Denizli Elektrik (EGE I HES)	Hydro	0,90	2.000
Elestaş Elektrik (Yaylabel HES)	Hydro	5,10	10.000
Elestaş Elektrik (Yazı HES)	Hydro	1,10	3.000
Erva Enerji (Kabaca Reg ve HES)	Hydro	4,20	7.412
Erva Enerji (Kabaca Reg ve HES)	Hydro	4,20	7.412
Filyos Enerji (Yalnızca Reg ve HES)	Hydro	14,40	33.000
Kalen Enerji (Kalen I II HES)	Hydro	15,70	23.575
Karel Enerji (Pamukova)	Hydro	9,30	40.000
Kayen Alfa Enerji (Kaletepe HES)	Hydro	10,20	17.000
Kısık	Hydro	9,60	20.000
Lamas II IV HES (TGT Enerji Üretim)	Hydro	35,70	71.000
Obruk HES	Hydro	212,40	337.000
Özgür Elektrik (Azmaç II Reg ve HES)	Hydro	24,40	43.000
Öztay Enerji (Günayşe Reg ve HES)	Hydro	8,30	14.000
Özyakut Elek. Ür. A.Ş. (Güneşli HES)	Hydro	0,60	1.333
Özyakut Elek. Ür. A.Ş. (Güneşli HES)	Hydro	1,20	2.667
Reşadiye 3 HES (Turkon MNG Elekt.)	Hydro	22,30	88.000
Sarıtepe HES (Genel Dinamik Sis. El)	Hydro	2,50	4.592
Sarıtepe HES (Genel Dinamik Sis. El)	Hydro	2,50	4.592
Şirikçioğlu El. (Kozak Bendi ve HES)	Hydro	4,40	7.000
Taşova Yenidereköy HES (Hameka A.Ş.)	Hydro	2,00	6.000
Tektuğ (Erkenek)	Hydro	6,00	14.400
Tektuğ (Erkenek)	Hydro	6,50	15.600
Tocak I HES (Yurt Enerji Üretim Sn.)	Hydro	4,80	6.000
Tüm Enerji (Pınar Reg ve HES)	Hydro	30,10	65.000
Uzunçayır HES (Tunceli)	Hydro	27,30	49.000
Yapısan (Karıca Reg ve Darıca HES)	Hydro	48,50	77.000
Yapısan (Karıca Reg ve Darıca HES)	Hydro	48,50	77.000
Yeşilbaş Enerji (Yeşilbaş HES)	Hydro	14,00	26.000
ypm Gölova HES (Suşehri / Sivas)	Hydro	1,10	2.000
YPM Sevindik HES (Suşehri / Sivas)	Hydro	5,70	18.000
Hydro 2009 Total		719,40	1.402.961

Datça RES (Datça)	Wind	0,80	2.270
Datça RES (Datça)	Wind	8,90	25.257
Datça RES (Datça)	Wind	11,80	33.486
Gürmat Elektrik (Gürmat Jeotermal)	Geothermal	47,40	313.000
ITC KA Enerji (Sincan)	Waste	2,80	22.000
ITC KA Enerji Mamak Katı Atık Top. Merk	Waste	2,80	21.062
Kores Kocadağ RES (Urla / İzmir)	Wind	15,00	56.000
Mazı 3 RES Elekt. Ür. A.Ş.(Mazı 3 RES)	Wind	10,00	35.111

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Mazı 3 RES Elekt. Ür. A.Ş.(Mazı 3 RES)	Wind	12,50	43.889
Akenerji (Ayyıldız RES)	Wind	15,00	51.000
Alize Enerji (Çamseki RES)	Wind	20,80	82.000
Alize Enerji (Keltepe RES)	Wind	18,90	65.000
Alize Enerji (Sarıkaya RES) (Şarköy)	Wind	28,80	96.000
Ayen Enerji (Akbük RES)	Wind	16,80	65.600
Ayen Enerji (Akbük RES)	Wind	14,70	57.400
Baki Elektrik (Şamlı Rüzgar)	Wind	36,00	176.000
Baki Elektrik (Şamlı Rüzgar)	Wind	33,00	161.333
Belen Elektrik Belen Rüzgar-Hatay	Wind	15,00	47.500
Belen Elektrik Belen Rüzgar-Hatay	Wind	15,00	47.500
Borasko Enerji (Bandırma RES)	Wind	21,00	83.533
Borasko Enerji (Bandırma RES)	Wind	24,00	95.467
Cargill Tarım ve Gıda San. Tic. A.Ş.	Biogas	0,10	700
Ortadoğu Enerji (Kömürcüoda)	Waste	5,80	45.000
Ortadoğu Enerji (Oda Yeri)	Waste	4,20	33.071
Ortadoğu Enerji (Oda Yeri)	Waste	5,70	44.882
Rotor Elektrik (Osmaniye RES)	Wind	17,50	66.348
Rotor Elektrik (Osmaniye RES)	Wind	17,50	66.348
Rotor Elektrik (Osmaniye RES)	Wind	22,50	85.304
Sayalar Rüzgar (Doğal Enerji)	Wind	3,60	11.368
Soma Enerji Üretim (Soma RES)	Wind	18,00	60.000
Soma Enerji Üretim (Soma RES)	Wind	10,80	36.000
Soma Enerji Üretim (Soma RES)	Wind	16,20	54.000
Ütopya Elektrik (Düzova RES)	Wind	15,00	46.000
	Renewable 2009 Total	221,00	1.094.986,09
2009 Total		3.735,20	22.358.566

Appendix 5. Further background information on monitoring plan

Appendix 6. Summary report of comments received from local stakeholders

Appendix 7. Summary of post-registration changes

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: • Improve consistency with the “CDM project standard for project activities” and with the PoA-DD and CPA-DD forms; • Make editorial improvement.
09.0	24 May 2017	Revision to: • Ensure consistency with the “CDM project standard for project activities” (CDM-EB93-A04-STAN) (version 01.0); • Incorporate the “Project design document form for small-scale CDM project activities” (CDM-SSC-PDD-FORM); • Make editorial improvement.
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.
05.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from F-CDM-PDD to CDM-PDD-FORM; • Make editorial improvement.
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: project activities, project design document		