



**Verified Carbon
Standard**

ÇIRAKDAMI HYDRO ELECTRICITY POWER PLANT



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Project Title	Çırakdamı Hydro Electricity Power Plant
Version	1.05
Report ID	ÇırakdamıVCSMR-01
Date of Issue	11-December-2020
Project ID	VCS 1506
Monitoring Period	28-June-2012 to 30-September-2020
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Karadeniz Hidroelektrik Enerjiden Elektrik Üretim Santrali Ltd (KARHES) which is owned by Aydem Yenilenebilir Enerji A.S. is planned to construct Çırakdamı Regulator and Hydro Electric Power Plant (HPP) on the Aksu River, within the jurisdiction of Dereli Town of Giresun Province. The purpose of the project is electricity production using the potential energy of Aksu River as a renewable resource. Therefore, the electricity is produced without causing airborne pollutants or Green House Gas (GHG) emissions. The construction and operation of the Çırakdamı Hydro Electric Power Plant (HEPP) is delaying the addition of conventional thermal power plants to the Turkish National Electricity Grid.

As shown on the EMRA approved electricity production license¹ the established capacity of Çırakdamı HEPP is 49.1 MW. The project is expected to produce a total of 165,990.00 MWh² of electricity per year therefore the plant load factor of the project calculates to be, 38.59 %, as shown in the below calculation:

$$\frac{165,987 \text{ MWh}}{49.1 \text{ MW} \times 365 \times 24 \text{ h}} = \frac{165,990}{430,116} = 0.3859 = 38.59\%$$

Based on Turkey's Combined Margin Emission Factor of 0.53323 CO₂e tonnes /MWh, the project was expected to produce 88,510 tonnes of CO₂e GHG reductions each year. During this monitoring period the project has produced a net total of 700,441.53 MWh electricity and a total amount of 373,493 tCO₂e of emission reduction.

The Major milestones at the project development history can be summarized as shown in the following table (Table 1):

¹ Çırakdamı Electricity Production Licence Dated 14/09/2004 numbered EÜ/365-2/478

² Based on Çırakdamı Revised Feasibility Report pdf page 299 (March 2007)

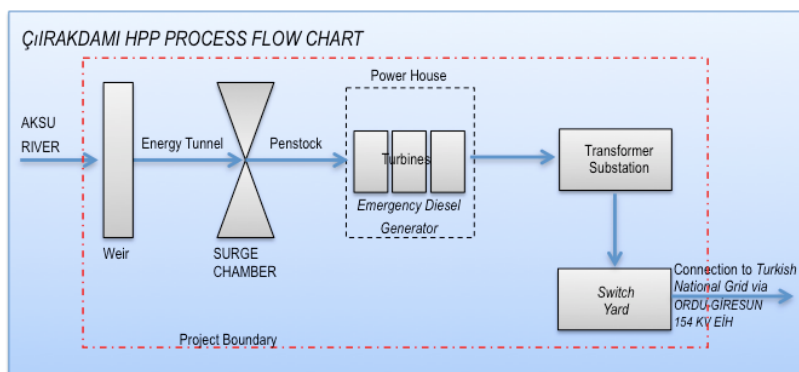
Table 1 :The Major milestones at the project development history

Date	Milestone	Reference
26/08/04	Water usage agreement signed with DSI	Water Usage Agreement
14/09/04	The Electricity Production License is granted for the project activity	License number EU/365-2/478
06/03/06	Board decision to take VER revenues into account	Board Decision
20/03/06	Local Stake holder consultation is announced	Announcement document
09/04/06	Local Stake holder consultation meeting is held	Meeting Minutes
27/04/06	EIA Exemption certification issued	Certificate
21/06/06	Construction started	NHS Records
05/09/06	Grid connection agreement signed	Agreement
29/08/07	The Loan agreement is signet between Karhes and the crediting banks	Loan Agreements
24/11/09	The EMRA decision for expropriation is issued	Expropriation decision letter
12/01/11	DOE Contracted for validation	Contract
02/08/11	The project site is visited with the DOE	DOE Testimonial

The Çırakdamı HPP is made up of one hydro power plant. There is one regulating body that is taking up the water from the 492 m elevation level and the tail water level is 475 m. The potential energy of water at approximate gross head level of 23 m is utilized and the electricity is produced by the power plant.

The water is entering to the regulatory body and the water collecting area over the Aksu River at the 492 m elevation level. Then the water will be settled at the sedimentation pool and will be transferred to a tunnel. The water that pass this tunnel is transferred to a canal and transferred to the loading pool via penstock, and passed to the hydro power plant building where the electricity is produced. The water is than be left back to the Aksu River at the 475 m elevation level. How the project activity operating is shown below in Figure 1:

Figure 1: Flow chart showing the basic operational principles of the project activity. The project activity is connected to the grid via the 154 KV Ordu-Giresun Transmission Line, as indicated in the connection agreement provided to the validating DOE.



1.2 Sectoral Scope and Project Type

The project category is Sectoral Scope 1: Energy industries (renewable-/non-renewable sources). The project is a non-grouped, stand-alone project.

1.3 Project Proponent

Organization name	Aydem Yenilenebilir Enerji A.Ş. ³
Contact person	Özgün Gül Koparan
Title	Environmental Affairs Manager
Address	Gazi Mustafa Kemal Bulvarı 15 Mayıs Mah. 832 Sok. No:2 75.Yıl Esnaf Sarayı K:2 Denizli-Turkey
Telephone	+90 258 242 27 76
Email	ozgun.gulkoparan@aydemenerji.com.tr

1.4 Other Entities Involved in the Project

Organization name	Ekobil Environmental Services and Consultancy Ltd. ⁴
Role in the Project	Preparation of the Project Description Document ⁵
Contact person	Dr. Aslı Sezer Özçelik

³In the registered VCS PD the PP is "Karhes Elektrik Üretim A.Ş.". However Karhes was a company set up for the purpose of license obtaining under the management of Bereket Enerji Üretim A.Ş. Title of the company changed from Bereket Enerji Üretim San. ve Tic. A. Ş. to Aydem Yenilenebilir Enerji A.Ş. So the ownership passed to Aydem Yenilenebilir Enerji A.Ş. which is the mother company. Now it is owned by Aydem Yenilenebilir Enerji A.Ş..

⁴Ekobil Environmental Services and Consultancy Ltd. is a limited liability company registered to the Ankara Chamber of Commerce with the registration number of 145009 and with the full title of Ekobil Çevre Hizmetleri Danışmanlık Eğitim Tarım Hayvancılık Madencilik İnşaat İthalat İhracat Turizm ve Ticaret Limited Şirketi

⁵Ekobil was contracted by "Türkuaz Karbon Varlık Yönetimi Enerji Projeve Dan. San. İth. İhr. Ltd. Şti." for the preparation of PD and now Ekobil Environmental Services and Consultancy Ltd. is directly contacted by project proponent for monitoring report preparation

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1.5 Project Start Date

28.06.2012, is the date when the project started to supply electricity to the Turkish grid as substantiated by the partial acceptance letter sent to the Governance of Giresun Province, Giresun-Turkey.

1.6 Project Crediting Period

The project crediting period is 10 years: 28.06.2012 to 27.06.2022 (both days inclusive). Renewable twice.

1.7 Project Location

The project is located at the Northern Black Sea region of Turkey at the Giresun Province as shown in the location Map below (Figure 2). The coordinates of the weir and the power house are indicated in the below table (Table 2):

Table 2: The geographical coordinates⁶ indicating the location of the major components of the project activity:

Component's name	Latitude	Longitude
Weir	40°41'24.29"N	38°26'22.67"E
Powerhouse	40°43'58.23"N	38°26'33.02"E

⁶These coordinates are taken from the pdf page 16 of the Revised FSR dated Marh 2007. This document is submitted to the host country authorities and was acknowledged by a correspondence dated 25/07/2007, both documents are provided to the validating DOE.

- “Tool for the demonstration and assessment of additionality” (Version 07.0.0)
- “Tool to calculate the emission factor for an electricity system”. (Version 04.0)
- "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02)
- “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 5.0.0).

Only the following tools are utilized:

- “Tool for the demonstration and assessment of additionality” (Version 07.0.0)
- “Tool to calculate the emission factor for an electricity system”. (Version 04.0.0)

1.9 Participation under other GHG Programs

Not applicable:

- Emission Trading Programs and Other Binding Limits: The project reduces GHG emissions from activities that are not included in an emissions trading program or any other mechanism that includes GHG allowance trading, therefore the net GHG emission reductions or removals generated during this monitoring period are not to be used for compliance under such programs or mechanisms. The host country does not have binding emissions limits and the project is not eligible to produce any compliance emissions reductions.
- Other Forms of Environmental Credit: The project has not sought or has not received another form of GHG-related environmental credit, including renewable energy certificates, during this monitoring period. Additionally, the project activity is not eligible to create another form of GHG-related environment credit.
- Participation under Other GHG Programs: The project is not registered under any other GHG programs and, the project activity does not have any GHG credits claimed under such programs.

1.10 Other Forms of Credit

Not Applicable.

- Host country does not have an emissions trading scheme and the project activity is not taking place in any other form of environmental credit.
- Other Forms of Environmental Credit: The project has not sought or received any other form of GHG-related environmental credit, including renewable energy certificates, during this monitoring period.

1.11 Sustainable Development

The project aims to generate electricity by using the potential energy of Aksu River to supply the increasing national electricity demand in a cleaner and sustainable manner. The electricity is produced without causing airborne pollutants or Green House Gas (GHG) emissions.

As shown on the EMRA approved electricity production license⁷ the established capacity of Çırakdamı HPP is 49.1 MW. The project produce a total of 165,990.00 MWh⁸ of electricity per year therefore the plant load factor of the project calculates to be, 38.59 %. The project is a

⁷Çırakdamı Electricity Production Licence Dated 14/09/2004 numbered EÜ/365-2/478

⁸ Based on Çırakdamı Revised Feasibility Report pdf page 299 (March 2007)

green field project and in the absence of the project activity an equivalent amount of electricity would have been generated in the fossil fuel based national grid.

The following is a list of the project's contribution to the UN SDG:

SDG 7 on access to affordable, reliable, and sustainable energy, as the project is not relying on imported fossil fuels. In this monitoring period, 700,441.53 MWh renewable electricity has supplied to national grid that supports to increase the renewable energy share in the energy mix.

SDG-8 on decent work and economic growth. As the project is providing a decent and secure work environment. All personnel working at the power plant are receiving regular trainings about occupational health and safety.

SDG-12 on responsible consumption and production as the hydroelectric power plants are producing clean source of energy. They are replacing the fossil fuel based national grid. Because of that these plants drives people to consume more sustainable type of energy.

SDG 13 on urgent action to combat climate change, as the project is replacing the fossil fuel based national grid and it is producing emission reductions. In this particular project the power plant prevented the release of 373,493 tCO₂ into the atmosphere.

2 SAFEGUARDS

2.1 No Net Harm

According to the rules and regulations at the time of licence application for electricity production the project was given a certificate of Exemption for the EIA process, by the Giresun Provincial Directorate of Environment and Forestry. Because, at the time of licence application the Hydro Power Plants that had installed capacity lower than 50 MW was considered to be out of scope according to EIA regulation that was active during the period of application. This letter is attached in Appendix 1. Although there was no significant environmental impact determined, the following is the summary of the impacts and the mitigation actions outlined in the Project Presentation Report submitted to the authorities:

Air Quality: Necessary precautions, such as watering roads, careful loading and unloading and covering the top of loaded trucks by tarpaulin; will be taken in order to minimize the dust formed during excavation.

Water & Wastewater Management: tankers to the site will supply water for domestic use and wastewater will be collected in septic tanks which will be emptied regularly. The wastewater will be discharged in accordance with Water Pollution Control Regulations.

The Wasteoil: Any kind of waste oil that may result during construction or operation stages, will be collected in impermeable containers and transferred to recycling centres in accordance with Hazardous Waste Control Regulations and Waste Oil Control Regulations.

Solid Waste: Solid waste is collected and recyclables are separated to be sent to recycling centres. The rest will be disposed to the nearest landfill site in coordination with Dereli Municipality.

Biodiversity: The region is defined to include some of species under conservation by international conventions. Necessary precautions will be taken if any seen on the site. Also a fish passage will be constructed to ease up and down stream movements of the fish living in Aksuriver.

2.2 Local Stakeholder Consultation

The project owner have organized a local stake holders meeting on 09/04/2006 in the Muhtarship room of the Kuşluhan Subdistrict which is a close settlement .at the project site.

The meeting was announced by announcements placed at the Muhtarship board and several places at the nearby settlements. These announcements were given to the Muhtar on 20/03/2006 and announced the meeting time and place.

The meeting was held in the afternoon at 14:00 and the Muhtar coordinated the meeting. Here is a translation summary of the meeting minutes that is provided to the validating DOE:

Muhtar Ç. Aydoğan: Made an introduction and explained that the meeting was held upon written request sent by the project owner on March 20, 2006, and the purpose of the meeting was to provide information about the project that would be constructed within the borders of their neighborhood.

Company Representative Mr. Karaduman: Mr. Karaduman explained the characteristics of the project in detail but with a plain language, and explained that 60% of the project area was forestry land, 20 % would be on Private land that was acquired by the project owner in accordance with their owners and 20% of the project land was over the land that would be expropriated. Mr. Karaduman also provided numeric information about how much energy would be produced by the project activity, he then added that the project will be operating without creating any waste, dirt or noise and would be environmentally friendly.

Mr. Saray: asked if there would be any job opportunities and how many people would have a chance to work for the project.

The company HR answered and explained that it was planned to start by employing 50 people than the number would increase towards 200 and taking into account the subcontractors it would increase up to 250 people throughout the course of the construction period.

Mr. H. Aksu asked if there was any agricultural land in the area where reservoir was planned to be constructed. The project owner representatives answered and explained that the reservoir would only cover a small area in a narrow part of the valley and there were no arable land in that area, except 5 lots of high sloped, rocky lands that have some barns. They have also added that the owners of these barns were informed and their lands were acquired with their consent.

Based on this explanation Mr. Aksu raised and added that they were very happy about the situation and he expressed his gratitude. On this topic, Mr. Mustafa Yenidede and Mr. Hayati Yenidede who have also sold their lands to support the project, also raised and explained that they were very happy to sell their lands to the project owner, and they have also expressed their gratitude.

In addition to this Muhtar Ç. Aydoğan also added that both him and the board of elders were involved in these land acquisition agreements and they have also witnessed, and the sales were made upon agreed protocols that the landowners were happy with the results.

Mr. Aksu mentioned that the local inhabitants were familiar with this type of constructions and some of them had worked in similar constructions, and asked if the local inhabitants would be considered if the employment opportunities will arise. Mr. Karaduman answered that especially for the security positions and for other suitable positions their intention was to prefer 70% of the employees from the local area.

Mr. YılmazGürses asked if there would be any noise heard from the power house building during the operation stage. The project owner representative explained that there would be no noise from the power house building and all the necessary precautions to eliminate noise would be taken and this would also be checked by the Ministry of Energy representatives at the stage of commissioning and approval of the power house.

The Muhtar Mr. Aydoğan asked if there were other citizens who would like to ask questions. Seeing that there were no more questions he thanked the project owners for organizing this meeting and he mentioned that they were informed and happy to have the project in their neighborhood.

The project representative raised and thanked to the citizens for attending the meeting and thank to the muhtar for moderating the meeting.

Finally The Muhtar Mr. Aydoğan mentioned that as far as he knows all the local citizens were happy to have the project and they had no complaints about the project, that they were supporting it. And he announced the closure of the meeting as of 09/04/2006 at 17:30.

Then the Muhtar, the board of elderly and the representatives of the Project owner have signed the written minutes of the meeting.

These minutes and the list of the attendees are provided to the validating DOE.

2.3 AFOLU-Specific Safeguards

The Project is a non-AFOLU project

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project start date is 28.06.2012. The project consists of 2 units. Unit 1 was commissioned in 26.04.2013. Unit 2 was commissioned in 28.06.2012. Çırakdamı HPP was completed in 2012, however, growing vibration and valve problems have occurred due to the manufacturing defect in both units. From October 2014 to December 2014, the power plant stopped working due to these problems. When the problems started, the equipment was sent to maintenance and tested when it arrived in January 2015. When faced with the same problems, new equipment was requested.

On the condition that the embedded parts are not changed, it has been decided to purchase a new Turbine, Generator, Valve and Governor. Contract date for the new units was November, 2014. The delivery date of these new units to the field was January, 2016. Finally, the commissioning date of these units were March, 2016.

In conclusion, due to these problems and changes, the power plant could not operate from October 2014 until February 2016 (except in January 2015, the equipment that was overhauled was tested and electricity generation can be observed however the vibration and valve problems have been observed again). No GHG emission reductions or removals were observed between these months (October 2014 until February 2016, with the exception of January 2015) since the plant was not in operation. With the commissioning of the new units, this problem was solved and the Çırakdamı Power Plant became operational again. Since that day the power plant has been maintained and tested regularly and operates stably during operation periods. In addition, vibration sensors are installed on the units and are constantly monitored.

There is no special event that may have impact on monitoring of GHG emission reductions since March, 2016. The following table summarizes the project milestones:

Table 3 : Chronological history of the project development and the Significant dates for the project monitoring period:

<i>Date</i>	<i>Event</i>
26-08-04	Water usage agreement signed with DSI
14-09-04	The Electricity Production Licence is granted for the project activity
06-03-06	Board decision to take VER revenues into account
20-03-06	Local Stake holder consultation is announced
09-04-06	Local Stake holder consultation meeting is held
27-04-06	EIA Exemption certification issued

21-06-06 ⁹	Construction started
05-09-06	Grid connection agreement signed
29-08-07	The Loan agreement is signed between Karhes and the crediting banks
24-11-09	The EMRA decision for expropriation is issued
12-01-11	DOE Contracted for Validation
02-08-11	The project site is visited with the DOE
05-11-2015	The Project is registered as a VCS Project
28-06-2012	The project started to produce electricity

3.2 Deviations

3.2.1 Methodology Deviations

The UNFCCC methodology of ACM0002(version 14.0.0) and its related tools are applied as they are without any deviation from methodology.

3.2.2 Project Description Deviations

In the registered VCS PD the PP is “KARHES Elektrik Üretim A.Ş”. Çırakdamı Hydroelectric Power Plant was previously owned by KARHES which is under the management of Bereket Enerji Üretim A.Ş. Then, title of the company changed from Bereket Enerji Üretim San. ve Tic. A. Ş. to Aydem Yenilenebilir Enerji A.Ş which is the current project proponent.

Other than that, the project activity is in compliance with the scenario described at the Project Design Document, and validated by the validation report dated 25.11.2015.

3.3 Grouped Projects

The project is not a grouped project activity.

⁹This date is identified as the investment decision date,since the investor signed a loan agreement to finance the project activity.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

The following are the data and parameters available at validation:

Data / Parameter	$FC_{i,y}$
Data unit	Mass or Volume Unit (Tonnes or cubic meter)
Description	Amount of fuel consumed by relevant power plants in Turkey in years, 2009, 2010, 2011
Source of data	Turkish Electricity Transmission Company (TEİAŞ) Web Site (https://webapi.teias.gov.tr/file/303fcd3e-6f03-462a-88b3-7a96d9078dad?download)
Value applied	Please see Appendix 2 (Table 1)
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid.
Purpose of Data	Data used for the calculation of $EF_{grid,OM,Simple,y}$
Comments	-

Data / Parameter	NCV
Data unit	GJ/Mass or Volume Unit
Description	Net Calorific Values for fossil fuels in years 2009, 2010 and 2011
Source of data	Turkish Electricity Transmission Company Web Site https://webapi.teias.gov.tr/file/5bf00429-d313-459b-a844-4d04470a9059?download (https://webapi.teias.gov.tr/file/303fcd3e-6f03-462a-88b3-7a96d9078dad?download)
Value applied	Please see Appendix-2 (Table 5)
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to date and reliable data available for the Turkish grid.
Purpose of Data	Data used for the calculation of $EF_{grid,OM,Simple,y}$. As data on the NCV is not published directly on the TEİAŞ website, this data is calculated

	using the heating values of fuels and the volume or mass of fuels consumed for each year.
Comments	-

Data / Parameter	EF _{CO₂,i,y}
Data unit	tCO ₂ /GJ
Description	CO ₂ emission factor of fossil fuel type i in year y
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied	Please see Appendix 2 (Table 2)
Justification of choice of data or description of measurement methods and procedures applied	According to the “Tool to calculate the emission factor for an electricity system” version 2, if values provided by the fuel supplier of the power plants in invoices or regional or national average defaults values are not available the IPCC default values at the lower limit of uncertainty must be used.
Purpose of Data	Data used both for the calculation of EF _{grid,OM,Simple,y} and EF _{EL,m,y}
Comments	-

Data / Parameter	EG _y
Data unit	MWh
Description	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
Source of data	Turkish Electricity Transmission Company Web Site https://webapi.teias.gov.tr/file/28dec725-b91a-424a-8883-d2831bdf84f1?download
Value applied	Please see Appendix 2, Table 3 and Table 4
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to-date and reliable data available for the Turkish grid.
Purpose of Data	Data used for the calculation of EF _{grid,OM,Simple,y}
Comments	-

Data / Parameter	EG _{m,y}
Data unit	MWh

Description	Net quantity of electricity generated and delivered to the grid by power unit m in year y
Source of data	Turkish Electricity Transmission Company Web Site (www.teias.gov.tr). Data is extracted from the relevant annexes of the capacity projection reports for the years 2011 ¹⁰ and 2012 ¹¹ .
Value applied	Please see Appendix 2-Table 6a and 6b
Justification of choice of data or description of measurement methods and procedures applied	Data used is taken from the TEİAŞ website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEİAŞ website is the most up-to-date and reliable data available for the Turkish grid.
Purpose of Data	Data used for the calculation of $EF_{grid,BM,y}$
Comments	-

Data / Parameter	$\eta_{m,y}$
Data unit	-
Description	Average net energy conversion efficiency of power unit m in year y
Source of data	The default values provided at the annex 1 of the “Tool to calculate emission factor for an electricity sector (version 4.0.0)” are used
Value applied	Please see Appendix 2 Table 7
Justification of choice of data or description of measurement methods and procedures applied	According to the “tool to calculate emission factor for an electricity system if documented manufacturer’s specifications or data from the utility, the dispatch center or official records are not available then the default values given in annex 1 of the tool shall be used. The first two options are not available for the power plants supplying the Turkish grid, therefore the default values are used.
Purpose of Data	Data used for the calculation of $EF_{grid,BM,y}$
Comments	-

4.2 Data and Parameters Monitored

The following are the data and parameters monitored subsequent to validation:

Data / Parameter	EG_y
Data unit	MWh
Description	Electricity

¹⁰ <http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2011.pdf>

¹¹ <http://www.teias.gov.tr/KAPASITEPROJEKSIYONU2012.pdf>

Source of data	Net Amount of Electricity supplied to the “Turkish National Grid” by the proposed project
Description of measurement methods and procedures to be applied	Data will be measured directly from meters and records on TEİAŞ readings protocol papers.
Frequency of monitoring/recording	Annually
Value monitored	Total 700,441.53
Monitoring equipment	Data will be monitored continuously by redundant metering devices, which will provide the data for the monthly invoicing to TEİAŞ. All meters will be in compliance with the communiqué for Metering Devices to be used in the Electricity Market ¹² .
QA/QC procedures to be applied	There will be two meters that will backup each other. Generated electricity will also be monitored by the operator using software for internal monitoring.
Purpose of the data	Data to be used for the calculation of Baseline Emissions.
Calculation method	Direct Continuous Measurement
Comments	The collected data will be kept by KaradenizHidroelektrikEnerjidenElektrikÜretimSantralı Ltd. Sti. During the crediting period and until two years after the last issuance of VERs for the “Çırakdamı Hydro Electricity Power Plant” project activity for that crediting period.

Data / Parameter	CapPJ
Data unit	W
Description	Installed capacity of the hydropower plants after the implementation of the Project Activity.
Source of data	Project site computers with SCADA system and the turbine name plates.
Description of measurement methods and procedures to be applied	Observed via the SCADA system of the Project Activity
Frequency of monitoring/recording	Once for each monitoring period
Value applied	49,100,000 W

¹² The latest version of the communiqué (in Turkish) can be found in the following link: <http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44>

Monitoring equipment	SCADA system of the Project Activity.
QA/QC procedures to be applied	Can be confirmed also by the parameter readings on the design plates of each turbine and by summing the two units.
Purpose of the data	Data to be used for the calculation of Baseline Emissions.
Calculation method	N/A
Comments	-

Data / Parameter	A _{PJ}
Data unit	m ²
Description	Area of the reservoir measured in the surface of the water, after the implementation of the Project Activity, when the reservoir is at its maximum fullness.
Source of data	Surface area determined using the lake surface area map provided in Appendix 3.
Description of measurement methods and procedures to be applied	The reservoir area corresponding to maximum operational level has been determined via the topographic map showing the lake area, presented in Appendix 3.
Frequency of monitoring/recording	Once during each monitoring period
Value applied	2,827.116 m ²
Monitoring equipment	-
QA/QC procedures to be applied	Can be checked and compared to satellite imagery available by Google Earth.
Purpose of the data	Data to be used for the calculation of Baseline Emissions.
Calculation method	N/A
Comments	-

4.3 Monitoring Plan

Objectives of the monitoring program

The Monitoring plan is developed to ensure that the Project Activity is well organized from the start in terms of the collection and archiving of complete and reliable data that is needed to ensure reliable and accurate measurements of actual emission reductions.

Data to be monitored

Given that the emission factor is calculated on an ex-ante basis, the first data to be monitored is the net electricity supplied to the grid.

The second data to be monitored is the installed capacity of the Project Activity. Using the SCADA system installed capacity will be measured automatically.

The third data to be monitored is the reservoir area of the Project Activity. The reservoir area corresponding to maximum operational level has been determined as a certain value according to the topographical maps. In order to make verification of the reservoir area, the reservoir lake can be visited during the verification site visit and be compared to the reservoir area map, presented in Appendix 3.

The electricity produced will be sold to TEİAŞ. Therefore, TEİAŞ measures the electricity produced by two meters placed on the switchgear station where the power plant gets connected to the Turkish national grid. Those meters will provide official data which will be read and recorded monthly by TEİAŞ officers for invoicing. TEİAŞ also conducts the calibration and maintenance of these meters and thus, ensures the accuracy and quality of the measurements. The quality standards that the meters need to comply is “The ICE/TSE 62053-22: Electricity metering equipment (a.c) – Particular requirements - Part 22: Static meters for active energy (Classes 0,2 S and 0,5 S)” The calibration of the meters is done and the meters will be checked continuously if there is a difference of 0.2 % in the readings of the main and the auxiliary meters, the calibration is repeated.

The net electricity produced is calculated by subtracting the total electricity consumed by the hydroelectric power plant, from the gross electricity generation and a certain percentage is lost during the transmission. After obtaining the net electricity production value, the emission reductions will be calculated by multiplying the net electricity with the Combined Margin calculated above.

The Verified Emission Reduction (VER) Monitoring Team conducts the monitoring. The VER Team Members, and their position and duties for the monitoring is outlined in the following table (Table 4):

Table 4: Positions and responsibilities of the VER monitoring team members.

Position	Responsibility
Çırakdamı HPP Manager	- Day to day operation of the Çırakdamı HPP, - Compliance of the project activity with the host country rules and regulations - Coordination of the data collection and recording for the VCS monitoring report.
Chief Electrical Engineer	- Day to day follow up of electrical equipment - Recording and monitoring of the electricity generation data
Accounts Manager	- Data keeping for power sales - Data entry to PMUM system
Chief Mechanical Engineer	- Day to day operation of the power plant - Keeping records of malfunctions and repairs
Carbon Consultant	- Emission reduction calculations - Scripting of the periodic monitoring report - Follow up of the verification process

The power generation meter readings are performed by using the main metering devices and the auxiliary metering devices for accuracy checks only. Data from metering devices will be recorded by TEİAŞ on monthly-agreed protocols and will form the basis for invoicing. In addition to the readings of the two metering devices, generation data of the Çırakdamı HEPP can be cross checked, via the TEİAŞ – PMUM web site (<http://pmum.teias.gov.tr>) which is accessible by a password available to the electricity generation companies. The electricity generation data at the Market Financial Reconciliation Centre (MFRC/PMUM) web page will exhibit the net electricity generated less transmission loss, to be able to produce comparable numbers, the figures taken from PMUM web site needs to be multiplied by the transmission loss factor of the grid.

Data will be monitored continuously by redundant metering devices, which will provide the data for the monthly invoicing to TEİAŞ. All meters will be in compliance with the communiqué for Metering Devices to be used in the Electricity Market¹³. Details of the meters are given in the table below (Table 5):

¹³The latest version of the communiqué (in Turkish) can be found in the following link: <http://www.epdk.gov.tr/web/elektrik-piyasasi-dairesi/44>

Table 5: Information about the meters

Meter number	Manufacturer	Calibration Date ¹⁴	Valid Until	Accuracy Class
Main Meter:9798711	EMH	2010	2020	0.2S
Spare Meter :9798712	EMH	2010	2020	0.2S
Main Meter: 53077777	ACTARIS	2020	2030	0.5S
Spare Meter: 53077778	ACTARIS	2020	2030	0.5S

¹⁴Within the scope of this Regulation in Turkey (<https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5>), the stamp year is taken as basis and the year it is stamped is counted as the first year, regardless of the date in the year and the remaining period is calculated from the year following the year it was stamped.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emissions (BE_y) are calculated based on the following formula:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad \text{Where:}$$

BE_y = Baseline emissions in year y (tCO₂-yr)

EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh-yr)

EF_{grid,CM,y} = Combined margin CO₂ emissions factor in year y (tCO₂-MWh) And

And

$$EG_{PJ,y} = EG_{Facility,y}$$

EG_{Facility,y} = Quantity of net electricity generation supplied by the project plant to the grid in year y (MWh-y)

The Combined margin CO₂ emissions factor in year y (tCO₂ -MWh), EF_{grid,CM,y}, is fixed ex-ante for the duration of the crediting period, and is 0,53323 tCO_{2e}-MWh.

The following table shows the original data as reported in the monthly meter reading records, which are the result from remote meter readings sent by TEIAS staff being e-mailed to Çirakdamı HPP Operation management, at the end of each month. The meter reading records serve as basis for all sub-sequent processes, especially settlement and billing for electricity supplied to the grid. The collected data is kept by Aydem Yenilenebilir Enerji Üretim A. Ş. during the crediting period. The following table is the Baseline emissions of the project calculated for the monitoring period.

Table 6: Baseline emissions of the project calculated for the monitoring period (National Grid Emission Factor EF_{CM} is 0,53323 tCO_{2e}-MWh).

		A-Gross Electricity Production	B-Self Electricity Consumption	C-Net electricity production C=A-B	Baseline Emissions = $EG_{PP-net,y} * EF_{CM}$
	Symbol	$EG_{PP-gross, y}$	$EG_{PP-self consumption, y}$	$EG_{PP-net, y}$	BE1
YEAR	Units	MWh	MWh	MWh	tCO ₂ e
2012	July	2,561.11	135.51	2,425.60	1,293.40
	August	2,002.85	36.85	1,966.00	1,048.33
	September	1,333.59	34.68	1,298.91	692.62
	October	1,354.37	34.67	1,319.70	703.70
	November	7,957.89	21.44	7,936.45	4,231.95
	December	5,319.92	26.57	5,293.35	2,822.57
Total in 2012		20,529.73	289.72	20,240.01	10,792
2013	January	6,142.26	21.68	6,120.58	3,263.68
	February	5,855.57	18.26	5,837.31	3,112.63
	March	14,106.11	6.05	14,100.06	7,518.57
	April	17,236.31	0.79	17,235.52	9,190.50
	May	20,481.19	1.60	20,479.59	10,920.33
	June	8,660.38	14.21	8,646.17	4,610.40
	July	3,175.39	35.55	3,139.84	1,674.26
	August	1,266.78	35.79	1,230.99	656.40
	September	2,318.93	30.33	2,288.60	1,220.35
	October	6,071.65	21.43	6,050.22	3,226.16
	November	1,859.69	32.41	1,827.28	974.36
	December	1,725.19	39.76	1,685.43	898.72
Total in 2013		88,899.45	257.86	88,641.59	47,266
2014	January	1,679.91	35.66	1,644.25	876.76
	February	1,864.59	30.92	1,833.67	977.77
	March	8,958.59	13.00	8,945.59	4,770.06
	April	15,160.16	0.73	15,159.43	8,083.46
	May	10,498.53	5.11	10,493.42	5,595.41
	June	402.14	32.58	369.56	197.06
	July	3.08	35.77	-32.69	-17.43
	August	5.63	36.99	-31.36	-16.72
	September	50.18	32.61	17.57	9.37
	October	0.00	34.88	-34.88	-18.60
	November	0.00	35.92	-35.92	-19.15
	December	0.00	38.98	-38.98	-20.79
Total in 2014		38,622.81	333.15	38,289.66	20,417
2015	January	12.46	40.82	-28.36	-15.12
	February	0.00	32.76	-32.76	-17.47
	March	0.00	35.91	-35.91	-19.15
	April	0.00	33.16	-33.16	-17.68

		A-Gross Electricity Production	B-Self Electricity Consumption	C-Net electricity production C=A-B	Baseline Emissions = $EG_{PP-net,y} * EF_{CM}$
	Symbol	$EG_{PP-gross, y}$	$EG_{PP-self consumption, y}$	$EG_{PP-net, y}$	BE1
YEAR	Units	MWh	MWh	MWh	tCO₂e
	May	0.00	32.41	-32.41	-17.28
	June	0.00	30.50	-30.50	-16.26
	July	0.00	34.64	-34.64	-18.47
	August	0.00	33.34	-33.34	-17.78
	September	0.00	31.31	-31.31	-16.70
	October	0.00	34.80	-34.80	-18.56
	November	0.00	36.80	-36.80	-19.62
	December	0.00	40.20	-40.20	-21.44
Total in 2015		12.46	416.65	-404.19	-215
2016	January	0.00	41.15	-41.15	-21.94
	February	0.00	42.42	-42.42	-22.62
	March	10,865.72	15.03	10,850.69	5,785.91
	April	18,304.27	1.22	18,303.05	9,759.74
	May	19,440.46	2.16	19,438.30	10,365.08
	June	14,812.83	3.68	14,809.15	7,896.68
	July	10,735.32	6.61	10,728.71	5,720.87
	August	2,444.14	26.91	2,417.23	1,288.94
	September	2,740.44	25.57	2,714.87	1,447.65
	October	2,791.60	28.16	2,763.44	1,473.55
	November	2,284.69	31.71	2,252.98	1,201.36
	December	3,036.24	33.40	3,002.84	1,601.20
Total in 2016		87,455.71	258.02	87,197.69	46,496
2017	January	2,690.91	34.77	2,656.14	1,416.33
	February	4,446.84	24.64	4,422.20	2,358.05
	March	16,869.41	0.34	16,869.07	8,995.09
	April	26,623.88	0.39	26,623.49	14,196.44
	May	31,724.04	0.12	31,723.92	16,916.15
	June	18,695.46	0.36	18,695.10	9,968.79
	July	3,187.81	22.93	3,164.88	1,687.61
	August	1,727.59	31.87	1,695.72	904.21
	September	1,646.95	31.16	1,615.79	861.59
	October	4,260.92	25.19	4,235.73	2,258.62
	November	4,149.12	24.17	4,124.95	2,199.55
	December	8,060.20	16.11	8,044.09	4,289.35
Total in 2017		124,083.13	212.05	123,871.08	66,051
2018	January	5,362.16	20.14	5,342.02	2,848.53
	February	9,025.71	7.56	9,018.15	4,808.75
	March	22,054.85	1.27	22,053.58	11,759.63

		A-Gross Electricity Production	B-Self Electricity Consumption	C-Net electricity production C=A-B	Baseline Emissions = $EG_{PP-net,y} * EF_{CM}$
	Symbol	$EG_{PP-gross, y}$	$EG_{PP-self consumption, y}$	$EG_{PP-net, y}$	BE1
YEAR	Units	MWh	MWh	MWh	tCO₂e
	April	17,441.05	0.06	17,440.99	9,300.06
	May	25,277.71	0.16	25,277.55	13,478.75
	June	14,980.48	0.57	14,979.91	7,987.74
	July	4,492.83	17.12	4,475.71	2,386.58
	August	2,244.93	28.73	2,216.20	1,181.74
	September	1,578.99	30.81	1,548.18	825.54
	October	5,480.15	23.58	5,456.57	2,909.61
	November	7,017.96	13.25	7,004.71	3,735.12
	December	12,014.88	5.69	12,009.19	6,403.66
Total in 2018		126,971.70	148.94	126,822.76	67,625
2019	January	9,055.27	8.78	9,046.49	4,823.86
	February	6,592.86	11.22	6,581.64	3,509.53
	March	13,650.99	3.21	13,647.78	7,277.41
	April	26,398.07	0.17	26,397.90	14,076.15
	May	34,298.92	0.05	34,298.87	18,289.19
	June	15,469.40	0.3	15,469.10	8,248.59
	July	1,464.32	6.47	1,457.85	777.37
	August	2,432.62	29.33	2,403.29	1,281.51
	September	2,402.25	28.28	2,373.97	1,265.87
	October	2,333.04	30.79	2,302.25	1,227.63
	November	3,059.84	26.22	3,033.62	1,617.62
	December	2,352.33	29.86	2,322.47	1,238.41
Total in 2019		119,509.91	174.68	119,335.23	63,633
2020	January	2,795.27	37.51	2,757.76	1,470.52
	February	7,515.63	13.84	7,501.79	4,000.18
	March	22,228.64	0.42	22,228.22	11,852.75
	April	18,259.76	0	18,259.76	9,736.65
	May	30,831.10	0.01	30,831.09	16,440.06
	June	10,139.12	3.30	10,135.82	5,404.72
	July	3,428.44	25.12	3,403.32	1,814.75
	August	851.94	36.76	815.18	434.68
	September	550.12	35.36	514.76	274.49
Total in 2020		96,600.02	152.32	96,447.70	51,428
Grand Total		702,684.92	2,243.39	700,441.53	373,493

5.2 Project Emissions

As methodology states the PE_y in case of a hydro power project will be calculated:

“Emissions from water reservoirs of hydro power plants (PE_{HP,y})

For hydro power project activities that result in new reservoirs and hydro power project activities that result in the increase of existing reservoirs, project proponents shall account for CH₄ and CO₂ emissions from the reservoir, estimated as follows:”

“...the power density of the project activity (PD) is greater than 4 W/m² and less than or equal to 10 W/m²:”

As shown by the following calculation, The project has a power density of 17,367.52 W/m². this is greater than 10 W/m²,

Project Activity	Installed Capacity	/	Reservoir Area ¹⁵	=	Power Density
Çırakdamı HPP	49,100,000 W	/	2,827.116 m ²	=	17,367.52 W/m ²

Therefore: $PE_{HP,y} = 0$

Where:

PE_{HP,y} = Project emissions from water reservoirs (tCO₂e/yr)

There may be one diesel generator installed within the project boundary. This is only going to be utilized as a back-up or emergency generator, therefore, the emissions from this back up generator have been deemed negligible as per the ACM0002 (version 14.0.0) methodology.

5.3 Leakage

There are no leakage emissions related to project activity.

5.4 Net GHG Emission Reductions and Removals

The following table (Table 6) gives a summary of the project activity related emission reductions with respect to vintage years:

Table 6: Project activity related emission reductions with respect to vintage years.

¹⁵ The reservoir Area map that indicates the aerial extent of the reservoir at maximum operation level is provided in Appendix 3.

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2012 (28 th of June to 31 December)	10,792	0	0	10,792
2013(1 st of January to 31 December)	47,266	0	0	47,266
2014(1 st of January to 31 December)	20,417	0	0	20,417
2015(1 st of January to 31 December)	-215,00	0	0	-215,00
2016(1 st of January to 31 December)	46,496	0	0	46,496
2017(1 st of January to 31 December)	66,051	0	0	66,051
2018(1 st of January to 31 December)	67,625	0	0	67,625
2019(1 st of January to 31 December)	63,633	0	0	63,633
2020(1 st of January to 30 th of September)	51,428	0	0	51,428
Total	373,493	0	0	373,493

APPENDIX 1: THE EIA EXCEMPTION CERTIFICATE OF THE PROJECT

T.C.
Çevre ve Orman
Bakanlığı

T.C.
ÇEVRE ve ORMAN BAKANLIĞI
ÇEVRESEL ETKİ DEĞERLENDİRMESİ VE PLANI AMA
GENEL MÜDÜRLÜĞÜ

Karar Tarihi: 27./04/2006
Karar No :

ÇED GEREKLİ DEĞİLDİR BELGESİ

16.12.2003 tarih ve 25318 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin 17. maddesi gereğince; "Çırakdamı Regülasyonu ve HES (49,11 MW)" projesi hakkında "Çevresel Etki Değerlendirmesi Gerekli Değildir" kararı verilmiştir.

Osman TÜZÜN
Bakan a.
Genel Müdür

Proje Sahibi : Karadeniz Hidroelektrik Enerjiden Elektrik Üretim Santrali Ltd. Şti.
Projenin Yeri : Giresun İl, Dereli İlçesi, Çırakdamı Mevki

APPENDIX 2: BASELINE INFORMATION

Appendix 2 Table 1: <http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2011/yakit46-49/47.xls>

TÜRKİYE TERMİK SANTRALLARINDA TÜKETİLEN YAKIT MİKTARLARININ ÜRETİCİ KURULUŞLARA DAĞILIMININ YILLAR İTİBARIYLA GELİŞİMİ (BİRLEŞİK İSİ-ELEKTRİK SANTRALLARINDA İSİ ÜRETİMİ İÇİN KULLANILAN YAKITLAR DAHİL) ANNUAL DEVELOPMENT OF FUELS CONSUMED IN THERMAL POWER PLANTS IN TURKEY BY THE ELECTRIC UTILITIES (FUELS USED FOR HEAT PRODUCTION IN CHP PLANTS INCLUDED)					
Birim(Unit):Ton/Gaz(gas) 10 ³ m ³					
			2009	2010	2011
EÜAŞ VE BAĞLI ORTAKLIKLARI EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ	Taşkömürü	Hard Coal	1,664,859	1,563,792	1,700,458
	Linyit	Lignite	57,850,129	50,123,941	54,558,282
	TOPLAM	TOTAL	59,514,988	51,687,733	56,258,740
	Fuel-Oil	Main Fuel	239,410	16,864	27,098
		Auxiliary Fuel	134,007	105,073	118,439
	TOPLAM	TOTAL	373,417	121,937	145,537
	Motorin	Main Fuel	45,364	4	0
		Auxiliary Fuel	72,956	18,901	13,984
	TOPLAM	TOTAL	118,320	18,905	13,984
	TOPLAM	TOTAL	491,737	140,842	159,521
MOBİL SANTRALLAR MOBILE POWER PLANTS	Doğal Gaz	Natural Gas	5,091,011	4,493,275	4,173,420
	Fuel-Oil	Fuel Oil	0	0	0
	Motorin	Diesel Oil	0	0	0
	TOPLAM	TOTAL	0	0	0
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ* AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ	Taşkömürü+İthal kömür	Hard Coal+Imported Coal	4,956,318	5,855,911	8,873,976
	Linyit	Lignite	5,770,389	6,565,451	6,949,028
	TOPLAM	TOTAL	10,726,707	12,421,362	15,823,004
	Fuel-Oil	Fuel Oil	1,220,904	769,845	386,071
	Motorin	Diesel Oil	62,537	1,449	1,063
	LPG	LPG	111	0	0
	Nafta	Naphta	8,077	13,140	0
	TOPLAM	TOTAL	1,291,629	784,434	387,134
	Doğal Gaz	Natural Gas	15,887,029	17,290,139	18,631,167
	TOPLAM	TOTAL	15,887,029	17,290,139	18,631,167
TÜRKİYE TURKEY	Taşkömürü+İthal kömür	Hard Coal+Imported Coal	6,621,177	7,419,703	10,574,434
	Linyit	Lignite	63,620,518	56,689,392	61,507,310
	TOPLAM	TOTAL	70,241,695	64,109,095	72,081,744
	Fuel-Oil	Fuel Oil	1,594,321	891,782	531,608
	Motorin	Diesel Oil	180,857	20,354	15,047
	LPG	LPG	111	0	0
	Nafta	Naphta	8,077	13,140	0
	TOPLAM	TOTAL	1,783,366	925,276	546,655
	Doğal Gaz	Natural Gas	20,978,040	21,783,414	22,804,587
	TOPLAM	TOTAL	20,978,040	21,783,414	22,804,587

Not:Ayrıca Otoprodüktör santrallerde kullanılan Ağaç Kabuğu, Talaş ,Sıvı Kükürt, Siyah Likör, Katran, Kükürt keki , Kok Gazı, YF Gazı Rafineri gazı,Biogaz ve Endüstriyel atık ile ilgili miktarlar tabloda yer almamaktadır.

Note: Quantities of Wood Wastes, Liquid Sulphur, Black Liquor, Bitumen Pyrite, Sulphur Cake etc. and Natural Gas, Coke Oven Gas , Blast Furnace Gas and Refinery Gas values used by autoproducers are not included in the table.

* ADÜAŞ'ın lisansı Eylül 2008 tarihinde serbest üretim lisansına dönüştürülmüştür.
ADÜAŞ's license has been turned into the IPP license in September 2008

Appendix 2 Table 2: IPCC Default CO₂ Emission Factors

Fuel Type:	EF (tCO ₂ /TJ)
Coal	92.80
Lignite	90.90
Fuel Oil	75.50
Diesel	72.60
LPG	61.60
Naphta	69.30
Natural Gas	54.30
Bitümen	73.00

Appendix 2 Table 3: <http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2011/yakit46-49/49.xls>

http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2011/yakit46-49/49.xls TÜRKİYE TERMİK SANTRALLARINDA TÜKETİLEN YAKITLARIN KURULUŞLARA GÖRE ISI DEĞERLERİ (BİRLEŞİK ISI-ELEKTRİK SANTRALLARINDA ISI ÜRETİMİ İÇİN KULLANILAN YAKITLAR DAHİL) HEATING VALUES OF FUELS CONSUMED IN THERMAL POWER PLANTS IN TURKEY BY THE ELECTRIC UTILITIES (FUELS USED FOR HEAT PRODUCTION IN CHP PLANTS INCLUDED)					
Birim(Unit): Tcal					
EÜAŞ VE BAĞLI ORTAKLIKLARI EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ	Taşkömürü	Hard Coal	2009	2010	2011
	Linyit	Lignite	5,452	4,990	5,511
	TOPLAM	Total	83,356	80,967	91,352
	Fuel-Oil	Fuel Oil	88,809	85,957	96,863
	Motorin	Diesel Oil	2,301	162	261
	Yrd. Yakıt	Auxiliary Fuel	1,286	1,009	1,137
	TOPLAM	TOTAL	3,587	1,171	1,398
	Motorin	Diesel Oil	467	0	0
	Yrd. Yakıt	Auxiliary Fuel	751	195	144
	TOPLAM	TOTAL	1,219	195	144
MOBİL SANTRALLAR MOBIL POWER PLANTS	TOPLAM	TOTAL	4,806	1,366	1,542
	Doğal Gaz	Natural Gas	42,335	37,354	34,621
	TOPLAM	TOTAL	135,949	124,676	133,026
	Fuel-Oil	Fuel Oil	0	0	0
	Motorin	Diesel Oil	0	0	0
	TOPLAM	TOTAL	0	0	0
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ	Taşkömür+İthal kömür	Hard Coal+Imported Coal	29,677	34,556	52,056
	Linyit	Lignite	14,295	15,584	15,857
	TOPLAM	Total	43,973	50,141	67,914
	Fuel-Oil	Fuel Oil	11,573	7,398	3,882
	Motorin	Diesel Oil	612	15	11
	Lpg	Lpg	1	0	0
	Nafta	Naphta	84	105	0
	TOPLAM	TOTAL	12,270	7,518	3,893
	Doğal Gaz	Natural Gas	143,931	157,134	167,443
	TOPLAM	TOTAL	187,904	207,275	235,357
TÜRKİYE TURKEY	Taşkömür+İthal kömür	Hard Coal+Imported Coal	35,130	39,546	57,567
	Linyit	Lignite	97,652	96,551	107,210
	TOPLAM	Total	132,781	136,097	164,777
	Fuel-Oil	Fuel Oil	15,160	8,569	5,280
	Motorin	Diesel Oil	1,830	209	155
	Lpg	Lpg	1	0	0
	Nafta	Naphta	84	105	0
	TOPLAM	TOTAL	17,076	8,884	5,435
	Doğal Gaz	Natural Gas	186,266	194,487	202,064
	TOPLAM	TOTAL	336,123	339,468	372,276

Not 1 :Ayrıca Ağaç kabuğu,talaş,sıvı kükürt,siyah likör,katran,kok gazı,YF gazı,rafineri gazı v.b otoprodüktör santrallarda kullanılan yakıtların ısı değerleri tabloda yer almamaktadır.

Note 1: Heating values of wood wastes,liquid sulphur,black liquor,bitumen,coke oven gas,blast furnace gas,refinery gas used by autoproducers are not included in the table.

Appendix 2 Table 4:

<https://webapi.teias.gov.tr/file/28dec725-b91a-424a-8883-d2831bdf84f1?download>

TÜRKİYE TERMİK SANTRALLARINDA TÜKETİLEN YAKITLARIN KURULUŞLARA GÖRE ISI DEĞERLERİ (BİRLEŞİK ISI-ELEKTRİK SANTRALLARINDA ISI ÜRETİMİ İÇİN KULLANILAN YAKITLAR DAHİL) HEATING VALUES OF FUELS CONSUMED IN THERMAL POWER PLANTS IN TURKEY BY THE ELECTRIC UTILITIES (FUELS USED FOR HEAT PRODUCTION IN CHP PLANTS INCLUDED) 1cal = 4,1868 Joule				
Birim(Unit): Gjoule				
EÜAŞ VE BAĞLI ORTAKLIKLARI			2009	2010
			2011	
EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ	Taşkömürü	Hard Coal	22,828,163	20,892,383
	Linyit	Lignite	348,995,433	338,990,622
	TOPLAM	Total	371,823,595	359,883,005
	Fuel-Öil	Fuel Oil	9,632,696	679,656
	Asıl Yakıt	Main Fuel	5,386,180	4,223,229
	Yrd. Yakıt	Auxiliary Fuel	15,018,876	4,902,885
	TOPLAM	TOTAL	15,018,876	4,902,885
	Motorin	Diesel Oil	1,956,278	159
	Asıl Yakıt	Main Fuel	3,146,162	815,082
	Yrd. Yakıt	Auxiliary Fuel	5,102,441	815,241
MOBİL SANTRALLAR MOBIL POWER PLANTS	TOPLAM	TOTAL	20,121,317	5,718,126
	Doğal Gaz	Natural Gas	177,247,713	156,392,061
	TOPLAM	TOTAL	569,192,626	521,993,192
	Fuel-Öil	Fuel Oil	0	0
	Motorin	Diesel Oil	0	0
	TOPLAM	TOTAL	0	0
	Taşkömür+İthal kömür	Hard Coal+Imported Coal	124,253,075	144,680,890
	Linyit	Lignite	59,852,102	65,249,084
	TOPLAM	Total	184,105,177	209,929,975
	Fuel-Öil	Fuel Oil	48,452,601	30,974,336
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ	Motorin	Diesel Oil	2,560,350	61,818
	Lpg	Lpg	5,158	0
	Nafta	Naphta	352,524	440,154
	TOPLAM	TOTAL	51,370,633	31,476,308
	Doğal Gaz	Natural Gas	602,609,967	657,887,178
	TOPLAM	TOTAL	786,715,144	867,817,153
	Taşkömür+İthal kömür	Hard Coal+Imported Coal	147,081,237	165,573,274
	Linyit	Lignite	408,847,535	404,239,706
	TOPLAM	Total	555,928,772	569,812,980
	Fuel-Öil	Fuel Oil	63,471,478	35,877,221
TÜRKİYE TURKEY	Motorin	Diesel Oil	7,662,790	877,059
	Lpg	Lpg	5,158	0
	Nafta	Naphta	352,524	440,154
	TOPLAM	TOTAL	71,491,950	37,194,434
	Doğal Gaz	Natural Gas	779,857,681	814,279,239
	TOPLAM	TOTAL	1,407,278,403	1,421,286,653
	Taşkömür+İthal kömür	Hard Coal+Imported Coal	147,081,237	165,573,274
	Linyit	Lignite	408,847,535	404,239,706
	TOPLAM	Total	555,928,772	569,812,980
	Fuel-Öil	Fuel Oil	63,471,478	35,877,221

Appendix 2 Table 5:

<https://webapi.teias.gov.tr/file/5bf00429-d313-459b-a844-4d04470a9059?download>

NET CALORIFIC VALUES OF FUELS CONSUMED IN THE THERMAL POWER PLANTS					
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Unit: TJ/KT					
			2009	2010	2011
EÜAŞ VE BAĞLI ORTAKLIKLARI EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ	Taşkömürü	Hard Coal	13.71	13.36	13.57
	Linyit	Lignite	6.03	6.76	7.01
	TOPLAM	TOTAL	6.25	6.96	7.21
	Fuel-Oil	Fuel Oil	40.24	40.30	40.27
	Yrd. Yakıt	Auxiliary Fuel	40.19	40.19	40.19
	TOPLAM	TOTAL	40.22	40.21	40.21
	Motorin	Diesel Oil	0.00	1.00	0.00
	Yrd. Yakıt	Auxiliary Fuel	43.12	43.12	43.17
	TOPLAM	TOTAL	43.12	43.12	43.17
	TOPLAM	TOTAL	40.92	40.60	40.47
MOBİL SANTRALLAR MOBILE POWER PLANTS	Doğal Gaz	Natural Gas	34.82	34.81	34.73
	Fuel-Oil	Fuel Oil	0.00	0.00	0.00
	Motorin	Diesel Oil	0.00	0.00	0.00
	TOPLAM	TOTAL	0.00	0.00	0.00
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ* AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ	Taşkömür+İthal kömür	Hard Coal+Imported Coal	25.07	24.71	24.56
	Linyit	Lignite	10.37	9.94	9.55
	TOPLAM	TOTAL	17.16	16.90	17.97
	Fuel-Oil	Fuel Oil	39.69	40.23	42.10
	Motorin	Diesel Oil	40.94	42.66	42.85
	LPG	LPG	0.00	1.00	0.00
	Nafta	Naphta	43.65	33.50	0.00
	TOPLAM	TOTAL	39.77	40.13	42.10
	Doğal Gaz	Natural Gas	37.93	38.05	37.63
	TOPLAM	TOTAL	37.93	38.05	37.63
TÜRKİYE TURKEY	Taşkömür+İthal kömür	Hard Coal+Imported Coal	22.21	22.32	22.79
	Linyit	Lignite	6.43	7.13	7.30
	TOPLAM	TOTAL	7.91	8.89	9.57
	Fuel-Oil	Fuel Oil	39.81	40.23	41.58
	Motorin	Diesel Oil	42.37	43.09	43.15
	LPG	LPG	46.47	0.00	0.00
	Nafta	Naphta	43.65	33.50	0.00
	TOPLAM	TOTAL	40.09	40.20	41.63
	Doğal Gaz	Natural Gas	37.17	37.38	37.10
	TOPLAM	TOTAL	37.17	37.38	37.10

Appendix 2 Table 6a: <http://www.teias.gov.tr/KAPASITEPROJEKSIYONU2011.pdf>(based on year 2011)

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
SELİMOĞLU REG. VE HES	0.00	0.00	0.00	Private	Hydro	7-Jan-10
KULP IV HES (YILDIZLAR EN.ELK.ÜR.AŞ.)	12.30	41.00	23.00	Private	Hydro	13-Jan-10
TUZLA JEOTERMAL	0.00	0.00	0.00	Private	Geothermal	13-Jan-10
ROTOR ELEKTRİK (OSMANİYES)	0.00	0.00	0.00	Private	Wind	14-Jan-10
CİNDERE HES (İlave)	9.07	28.29	16.07	Private	Hydro	21-Jan-10
ETİ SODA ÜRE.PAZ.NAK.VE ELK.ÜRE.SAN.	24.00	144.00	144.00	Auto producer	Lignite	22-Jan-10
BAYBURT HES (BAYBURT ENERJİ ÜRET.)	14,6	51.00	24.00	Private	Hydro	28-Jan-10
UZUNÇAYIR HES (Tunceli) (İlave)	0.00	0.00	0.00	Private	Hydro	28-Jan-10
ALTINMARKA	4.60	37.02	37.02	Auto producer	Natural Gas	28-Jan-10
CAN TEKSTİL (Çorlu/TEKİRDAĞ)	7.83	60.25	60.25	Auto producer	Natural Gas	28-Jan-10
ALAKIR HES (YURT ENERJİ ÜRETİM)	2.06	6.00	4.00	Private	Hydro	29-Jan-10
CEV ENERJİ ÜRETİM (GAZİANTEP ÇÖP Biogas)	0.00	0.00	0.00	Private	Biogas	1-Feb-10
AKBAŞLAR (İlave)	1.54	1.54	12.08	Auto producer	Natural Gas	18-Feb-10
ASA ENERJİ (KALE REG.ve HES)	9,6	0.00	0.00	Private	Hydro	19-Feb-10
PETA MÜHENDİSLİK EN. (MURSAL II HES)	4.50	19.00	11.00	Private	Hydro	19-Feb-10
HETAŞ HACISALİHOĞLU (YILDIZLI HES)	1.20	5.00	3.00	Private	Hydro	23-Feb-10
ORTADOĞU ENERJİ (ODA YERİ) (Eyüp/İST.)	0.00	0.00	0.00	Private	LFG	24-Feb-10
KONYA ŞEKER SAN. VE TİC. A.Ş.1	6.00	36.00	36.00	Auto producer	Lignite	26-Feb-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
GLOBAL ENERJİ (PELİTLİK)	3.54	27.06	27.06	Private	Natural Gas	26-Feb-10
ASMAKİNSAN (BANDIRMA 3 RES)	20.00	0.00	0.00	Private	Wind	26-Feb-10
FLOKSER Tekstil (Çatalça-İstanbul)(Süetser tesisi)	-2.13	0.00	0.00	Auto producer	Natural Gas	28-Feb-10
RASA ENERJİ (VAN)	26.19	166.62	166.62	Private	Natural Gas	3-Mar-10
ROTOR ELEKTRİK (OSMANIYE RES)	17.50	0.00	0.00	Private	Wind	10-Mar-10
SOMA ENERJİ ÜRETİM (SOMA RES)	4.50	0.00	0.00	Private	Wind	10-Mar-10
DOĞUBAY ELEKTRİK (SARIMEHMET HES)	3.10	10.00	6.00	Private	Hydro	11-Mar-10
DENİZ ELEKTRİK (SEBENOBA RES)	10.00	0.00	0.00	Private	Wind	12-Mar-10
AKDENİZ ELEKTRİK (MERSİN RES)	33,0	0.00	0.00	Private	Wind	19-Mar-10
AKSA ENERJİ (ANTALYA)	25.00	192.50	192.50	Private	Natural Gas	20-Mar-10
NURYOL ENERJİ (DEFNE REG. VE HES)	7.23	22.00	13.00	Private	Hydro	26-Mar-10
MENDERES GEOTERMAL DORA-2	0.00	0.00	0.00	Private	Jeothermal	26-Mar-10
ASMAKİNSAN (BANDIRMA 3 RES)	4.00	0.00	0.00	Private	Wind	26-Mar-10
ÖZGÜR ELEKTRİK (AZMAK I REG.VE HES)	5.91	0.00	0.00	Private	Hydro	1-Apr-10
BİRİM HİDR. ÜRETİM AŞ. (ERFELEK HES)	3.23	9.50	5.50	Private	Hydro	3-Apr-10
BEYTEK EL. ÜR. A.Ş. (ÇATALOLUK HES)	9,5	0.00	0.00	Private	Hydro	7-Apr-10
NİSAN E.MEKANİK EN. (BAŞAK REG. HES)	6.85	22.00	12.00	Private	Hydro	9-Apr-10
BOREAS ENERJİ (BOREAS I ENEZ RES)	15,0	0.00	0.00	Private	Wind	9-Apr-10
UZUNÇAYIR HES (Tunceli) (İlave)	27.33	0.00	0.00	Private	Hydro	11-Apr-10
FIRTINA ELEKTRİK ÜR. A.Ş. (SÜMER HES)	21.60	59.41	33.27	Private	Hydro	16-Apr-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
FRİTOLAY GIDA SAN.VE TİC A.Ş.	0.07	4.00	4.00	Auto producer	Biogas	21-Apr-10
YILDIZ ENTEGRE AĞAÇ (Kocaeli)	12.37	79.79	79.79	Auto producer	Natural Gas	22-Apr-10
BAKRAS EN. ELKT.ÜR. A.Ş. ŞENBÜK RES	15,0	0.00	0.00	Private	Wind	22-Apr-10
ALİZE ENERJİ (KELTEPE RES)	1.80	0.00	0.00	Private	Wind	28-Apr-10
KAR-EN KARADENİZ EL.A.Ş. ARALIK HES	12.41	56.00	32.00	Private	Hydro	30-Apr-10
ITC-KA ENERJİ (SİNCAN)	0.00	0.00	0.00	Private	LFG	30-Apr-10
ATAER ENERJİ ELEKTRİK ÜRETİM A.Ş.	49.00	277.89	277.89	Private	Natural Gas	5-May-10
BİRİM HİDR. ÜRETİM AŞ. (ERFELEK HES)	3.23	9.50	5.50	Private	Hydro	14-May-10
CENGİZ ENERJİ SAN. VE TİC. A.Ş. (Tekkeköy)	101.95	802.00	802.00	Private	Natural Gas	22-May-10
KARADENİZ EL.ÜRET. (UZUNDERE-1 HES)	31.08	82.44	46.46	Private	Hydro	27-May-10
SİMKO(Kartal)	-2.05	0.00	0.00	Auto producer	Natural Gas	27-May-10
AKIM ENERJİ (CEVİZLİK REG. VE HES)	91,4	0.00	0.00	Private	Hydro	28-May-10
CEYHAN HES (OŞKAN HES) (ENOVA EN.)	23.89	0.00	0.00	Private	Hydro	3-Jun-10
ERENLER REG. ve HES (BME BİR.MÜT.EN.)	45.00	85.00	48.00	Private	Hydro	4-Jun-10
ROTOR ELEKTRİK (GÖKÇEDAĞ RES)	20.00	0.00	0.00	Private	Wind	5-Jun-10
ÇAKIT HES (ÇAKIT ENERJİ A.Ş.)	20.18	0.00	0.00	Private	Hydro	10-Jun-10
SOMA ENERJİ ÜRETİM (SOMA RES)	7.20	0.00	0.00	Private	Wind	10-Jun-10
PAŞA REG. VE HES (ÖZGÜR ELEKTRİK)	8.68	0.00	0.00	Private	Hydro	11-Jun-10
GÜZELÇAY-I HES (İLK ELEKTRİK ENERJİ)	3.14	16.67	9.30	Private	Hydro	15-Jun-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
KALE REG. VE HES (KALE ENERJİ ÜR.)	34.14	0.00	0.00	Private	Hydro	16-Jun-10
BERGAMA RES EN. ÜR. A.Ş. ALIĞA RES	37.50	0.00	0.00	Private	Wind	16-Jun-10
MAZI-3 RES ELEKTRİK (MAZI-3 RES)	7.50	0.00	0.00	Private	Wind	18-Jun-10
UĞUR ENERJİ ÜRETİM TİC. VE SAN. A.Ş.	48.20	405.14	405.14	Private	Natural Gas	21-Jun-10
SÖKTAŞ (N+LPG)(Aydın)	-4.50			Auto producer	NAFTA	23-Jun-10
ÇAMLIKAYA REG. VE HES	5.65	19.00	11.00	Private	Hydro	30-Jun-10
ERİKLİ-AKOCAK REG. ve AKOCAK HES	41.25	0.00	0.00	Private	Hydro	30-Jun-10
BORASKO ENERJİ (BANDIRMA RES)	12.00	0.00	0.00	Private	Wind	30-Jun-10
AKSA ENERJİ (ANTALYA)	25.00	192.50	192.50	Private	Natural Gas	1-Jul-10
DİNAR HES (ELDA ELEKTRİK ÜRETİM)	4.44	15.00	9.00	Private	Hydro	3-Jul-10
DAMLAPINAR HES (CENAY ELEKTRİK ÜR.)	16.42	92.00	0.00	Private	Hydro	8-Jul-10
DİM HES (DİLER ELEKTRİK ÜRETİM)	38.25	123.00	70.00	Private	Hydro	8-Jul-10
ÖZGÜR ELEKTRİK (AZMAK I REG.VE HES)	5.91	0.00	0.00	Private	Hydro	10-Jul-10
ALTEK ALARKO ELEKTRİK SANTRALLARI	60.10	415.57	415.57	Private	Natural Gas	10-Jul-10
KİRPİLİK REG. VE HES (ÖZGÜR ELEKTRİK)	6.24	22.00	13.00	Private	Hydro	11-Jul-10
YAVUZ REG. VE HES (MASAT ENERJİ)	22.50	0.00	0.00	Private	Hydro	14-Jul-10
EREN ENERJİ ELEKTRİK ÜRETİM A.Ş.	160.00	4,005.88	4,005.88	Private	Coal	15-Jul-10
ZİYARET RES (ZİYARET RES ELEKTRİK)	12.50	0.00	0.00	Private	Wind	15-Jul-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
FLOKSER TEKSTİL (Çerkezköy/TEKİRDAĞ)	5.17	42.00	42.00	Autoproducer	Natural Gas	17-Jul-10
KAYABÜKÜ REG. VE HES (ELİTE ELEKT.)	14.58	0.00	0.00	Private	Hydro	21-Jul-10
RB KARESİ İTHALAT İHRACAT TEKSTİL	8.60	65.00	65.00	Autoproducer	Natural Gas	23-Jul-10
SOMA ENERJİ ÜRETİM (SOMARES)	7.20	0.00	0.00	Private	Wind	28-Jul-10
ERİKLİ-AKOC AK REG. ve AKOC AK HES	41.25	0.00	0.00	Private	Hydro	29-Jul-10
CENGİZ ENERJİ SAN. VE TİC. A.Ş. (Tekkeköy)	101.95	802.00	802.00	Private	Natural Gas	31-Jul-10
GÖK REG. ve HES (GÖK ENERJİ EL. SAN.)	10.01	43.00	24.00	Private	Hydro	6-Aug-10
BULAM REG. VE HES (MEM ENERJİ ELK.)	7.03	0.00	0.00	Private	Hydro	10-Aug-10
KESKİNOĞLU TAVUKÇULUK VE DAM. İŞL.	3.50	25.00	25.00	Autoproducer	Natural Gas	11-Aug-10
SOMA RES (BİLGİN Wind SAN. EN.ÜR.)	32.50	0.00	0.00	Private	Wind	13-Aug-10
BİNATOM ELEKTRİK ÜRETİM A.Ş.	2.00	13.00	13.00	Private	Natural Gas	17-Aug-10
KURTOĞLU BAKIR KURŞUN SAN. A.Ş.	1.59	12.00	12.00	Autoproducer	Natural Gas	19-Aug-10
CAN ENERJİ ELEKTRİK ÜR. A.Ş.(Tekirdağ)	29.10	203.00	203.00	Private	Natural Gas	19-Aug-10
CEYHAN HES (BERKMAN HES)(ENOVA EN.)	12.61	0.00	0.00	Private	Hydro	20-Aug-10
SOMA ENERJİ ÜRETİM (SOMARES)	6.30	0.00	0.00	Private	Wind	20-Aug-10
GÜDÜL I REG. VE HES (YAŞAM ENERJİ)	2.36	14.00	8.00	Private	Hydro	25-Aug-10
SÖNMEZ ENERJİ ÜRETİM (UŞAK)	33.24	248.59	248.59	Private	Natural Gas	26-Aug-10
CEYHAN HES (BERKMAN HES)(ENOVA EN.)	12.61	0.00	0.00	Private	Hydro	28-Aug-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
KARŞIYAKA HES (AKUA ENERJİ ÜRET.)	1.59	0.00	5.00	Private	Hydro	28-Aug-10
ITC ADANA BİOKÜTLE SANT.	0.00	0.00	0.00	Private	LFG	2-Sep-10
BELEN ELEKTRİK (BELEN RES) (İlave)	6.00	0.00	0.00	Private	Wind	2-Sep-10
TEKÜĞ ELEKTRİK (ANDIRIN HES)	40.50	106.00	60.00	Private	Hydro	3-Sep-10
ÜTOPIYA ELEKTRİK (DÜZOVA RES) (İlave)	15.00	0.00	0.00	Private	Wind	3-Sep-10
BERGAMA RES EN. ÜR. A.Ş. ALIĞA RES	52.50	0.00	0.00	Private	Wind	4-Sep-10
ROTOR ELEKTRİK (OSMANIYE RES)	17.50	0.00	0.00	Private	Wind	4-Sep-10
SELEN ELEKTRİK (KEPEZKAYA HES)	28.00	0.00	0.00	Private	Hydro	6-Sep-10
REŞADİYE 2 HES (TURKON MNG ELEKT.)	26.14	0.00	0.00	Private	Hydro	17-Sep-10
KOZAN HES (SER-ER ENERJİ)	4.00	9.00	5.00	Private	Hydro	21-Sep-10
SOMA RES (BİLGİN Wind SAN) (İlave)	27.50	0.00	0.00	Private	Wind	23-Sep-10
KIRKA BORAKS(Kırka) (Eti Maden İşl.) (İlave)	10.00	65.93	65.93	Autoproducer	Natural Gas	29-Sep-10
KAHRAMAN REG. VE HES (KATIRCIOĞLU)	1.42	6.00	3.00	Private	Hydro	30-Sep-10
NARİNKALE REG. VE HES (EBD ENERJİ)	3.10	10.00	6.00	Private	Hydro	30-Sep-10
SOMA ENERJİ ÜRETİM (SOMA RES) (İlave)	9.00	0.00	0.00	Private	Wind	1-Oct-10
ERENKÖY REG. VE HES (TÜRKERLER)	21.46	87.00	49.00	Private	Hydro	7-Oct-10
ENERJİ-SA (BANDIRMA)	1,000.00	7,540.00	7,540.00	Private	Natural Gas	7-Oct-10
UĞUR ENERJİ ÜR. TİC.VE SAN. A.Ş. (İlave)	12.00	100.86	100.86	Private	Natural Gas	7-Oct-10
ZİYARET RES (ZİYARET RES ELEK.) (İlave)	22.50	0.00	0.00	Private	Wind	13-Oct-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
KAHTA I HES (ERDEMYILDIZ ELEK. ÜRT.)	7.12	0.00	0.00	Private	Hydro	14-Oct-10
ROTOR ELEKTRİK (GÖKÇEDAĞ RES) (İlave)	2.50	0.00	0.00	Private	Wind	15-Oct-10
AZMAK-II REG. VE HES (Düzeltilme)	-18.07	0.00	0.00	Private	Hydro	25-Oct-10
ITC ADANA BİOKÜTLE SANT. (Düzeltilme)	0.00	0.00	0.00	Private	LFG	25-Oct-10
ENERJİ-SA (BANDIRMA) (Düzeltilme)	-69.20	0.00	0.00	Private	Natural Gas	25-Oct-10
ULUABAT KUVVET TÜNELİ VE HES	48.51	0.00	0.00	Private	Hydro	27-Oct-10
SABUNSUYU II HES (ANG ENERJİ ELK.)	7.35	21.00	12.00	Private	Hydro	28-Oct-10
EREN ENERJİ ELEKTRİK ÜR. A.Ş. (İlave)	600.00	4,005.88	4,005.88	Private	Coal	1-Nov-10
BURÇ BENDİ VE HES (AKKUR ENERJİ)	27.33	0.00	0.00	Private	Hydro	4-Nov-10
KARADENİZ EL. (UZUNDERE-1 HES)(İlave)	31.08	82.44	46.46	Private	Hydro	7-Nov-10
GÜZELÇAY-II HES (İLK ELEKTRİK ENERJİ)	4.96	26.33	14.70	Private	Hydro	11-Nov-10
MURGUL BAKIR (Ç.Kaya) (İlave)	19.60	40.50	31.59	Private	Hydro	11-Nov-10
KUYUCAK RES (ALİZE ENERJİ ÜRET.)	8.00	0.00	0.00	Private	Wind	11-Nov-10
SOMA RES (BİLGİN Wind SAN.)(İlave)	30.00	0.00	0.00	Private	Wind	11-Nov-10
ULUABAT KUVVET TÜNELİ VE HES (İlave)	48.51	0.00	0.00	Private	Hydro	25-Nov-10
MARMARA PAMUKLU MENSUCAT (İlave)	26.19	203.45	203.45	Autoproducer	Natural Gas	25-Nov-10
FRİTOLAY GIDA SAN.VE TİC A.Ş. (İlave)	0.33	3.00	3.00	Autoproducer	Biogas	26-Nov-10
EGEMEN 1 HES (ENERSİS ELEKTRİK)	8.82	0.00	0.00	Private	Hydro	26-Nov-10
REŞADIYE 1 HES (TURKON MNG ELEKT.)	15.68	0.00	0.00	Private	Hydro	26-Nov-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
ALİAĞA ÇAKMAKTEPE ENERJİ (İlave)	69.84	557.92	557.92	Private	Natural Gas	26-Nov-10
YEDİGÖZE HES (YEDİGÖZE ELEKTRİK)	155.33	474.00	268.00	Private	Hydro	2-Dec-10
SÖNMEZ ENERJİ ÜRETİM (UŞAK) (İlave)	2.56	19.77	19.77	Private	Natural Gas	7-Dec-10
AK-ENERJİ (UŞAK OSB)(Uşak-Ak.en.)	-15.24	0.00	0.00	Private	Natural Gas	9-Dec-10
AK-ENERJİ(DG+N) (Deba-Denizli)	-15.60	0.00	0.00	Private	Natural Gas	9-Dec-10
KUYUCAK RES (ALİZE ENERJİ ÜR.) (İlave)	17.60	0.00	0.00	Private	Wind	9-Dec-10
UMUT III REG. VE HES (NİSAN ELEKTR.)	12.00	26.00	15.00	Private	Hydro	13-Dec-10
TÜPRAŞ RAFİNERİ (İZMİT) (İlave)	40.00	258.82	258.82	Autoproducer	Natural Gas	15-Dec-10
POLYPLEX EUROPA POLYESTER FİLM	7.81	61.00	61.00	Autoproducer	Natural Gas	16-Dec-10
ALTEK ALARKO ELEKTRİK SANTRALLARI	21.89	151.36	151.36	Private	Natural Gas	18-Dec-10
AKSA ENERJİ (Demirtaş/BURSA)	-1.40	0.00	0.00	Private	Waste	21-Dec-10
SARES RES (GARET ENERJİ ÜRETİM)	15.00	0.00	0.00	Private	Wind	22-Dec-10
FEKE 2 BARAJI VE HES (AKKUR ENERJİ)	69.34	0.00	0.00	Private	Hydro	24-Dec-10
EGEMEN 1B HES (ENERSİS ELEKTRİK)	11.10	0.00	0.00	Private	Hydro	28-Dec-10
EREN ENERJİ ELEKTRİK ÜR. A.Ş. (İlave)	600.00	4,005.88	4,005.88	Private	Coal	29-Dec-10
RASA ENERJİ (VAN) (İlave)	10.12	64.41	64.41	Private	Natural Gas	29-Dec-10
KALKANDERE REG. VE YOKUŞLU HES	14.54	0.00	0.00	Private	Hydro	30-Dec-10
TURGUTTEPE RES (SABAŞ ELEKTRİK ÜR.)	22.00	0.00	0.00	Private	Wind	30-Dec-10

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
AK TEKSTİL-1 (G.ante)	-13.04	0.00	0.00	Autoproducer	FUEL-OIL	31-Dec-10
SİLOPİ ELEKTRİK ÜR. A.Ş. (ESENBOĞA)	-44.78	0.00	0.00	Private	FUEL-OIL	31-Dec-10
INTERNATIONAL HOSPITAL İSTANBUL AŞ.	0.77	6.00	6.00	Autoproducer	Natural Gas	31-Dec-10
TÜPRAŞ RAFİNERİ (İZMİT) (Düzeltilme)	-39.14	0.00	0.00	Autoproducer	Natural Gas	31-Dec-10
YALOVA ELYAF	-12.30	0.00	0.00	Autoproducer	Natural Gas	31-Dec-10

Appendix 2 Table 6b: <http://www.teias.gov.tr/KAPASITEPROJEKSİYONU2012.pdf> (based on year 2012)

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
AKIM ENERJİ BAŞPINAR (SÜPER FİLM)	25.32	177.00	177.00	PRIVATE	NATURAL GAS	Unknown
AKSA AKRİLİK (İTHAL KÖM.+D.G)	25.00	175.00	175.00	PRIVATE	NATURAL GAS	Unknown
AKSA ENERJİ (Antalya)	300.00	1,800.00	1,800.00	PRIVATE	NATURAL GAS	Unknown
AKSA ENERJİ (Antalya) (İlave)	300.00	1,800.00	1,800.00	PRIVATE	NATURAL GAS	Unknown
ALDAŞ ALTYAPI YÖNETİM DANIŞMANLIK	1.95	15.00	15.00	AUTOPRODUCER	NATURAL GAS	Unknown
ALİAĞA ÇAKMAKTEPE ENERJİ (İlave)	130.95	986.25	986.25	PRIVATE	NATURAL GAS	Unknown
ALİAĞA ÇAKMAKTEPE ENERJİ (İlave)	8.73	67.76	67.76	PRIVATE	NATURAL GAS	Unknown
BEKİRLİ TES (İÇDAŞ ELEKTRİK EN.)	600.00	4.32	4.32	PRIVATE	IMPORTED COAL	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
BOSEN ENERJİ ELEKTRİK ÜRETİM AŞ.	93.00	698.09	698.09	PRIVATE	NATURAL GAS	Unknown
BOYTEKS TEKSTİL SAN. VE TİC. A.Ş.	8.60	67.00	67.00	PRIVATE	NATURAL GAS	Unknown
CENGİZ ÇİFT YAKITLI K.Ç.E.S.	131.34	985.00	985.00	PRIVATE	NATURAL GAS	Unknown
CENGİZ ENERJİ SAN.VE TİC.A.Ş.	35.00	281.29	281.29	PRIVATE	NATURAL GAS	Unknown
ETİ BOR (Borik Asit)(Emet) (Düzeltilme)	0.60	4.47	4.47	AUTOPRODUCER	NATURAL GAS	Unknown
FRAPORT İC İÇTAŞ ANTALYA HAVALİMANI	8.00	64.00	64.00	AUTOPRODUCER	NATURAL GAS	Unknown
GLOBAL ENERJİ (PELİTLİK)	4.00	29.91	29.91	PRIVATE	NATURAL GAS	Unknown
GORDİON AVM (REDEVCO ÜÇ EMLAK)	2.01	15.00	15.00	AUTOPRODUCER	NATURAL GAS	Unknown
GOREN-1 (GAZİANTEP ORGANİZE SAN.)	48.65	277.00	277.00	PRIVATE	NATURAL GAS	Unknown
GÜLLE ENERJİ(Çorlu) (İlave)	3.90	18.43	18.43	PRIVATE	NATURAL GAS	Unknown
HAMİTABAT (Lisans Tadili)	36.00	244.15	244.15	GOVERNMENT	NATURAL GAS	Unknown
HASIRCI TEKSTİL TİC. VE SAN. LTD. ŞTİ.	2.00	15.00	15.00	AUTOPRODUCER	NATURAL GAS	Unknown
HG ENERJİ ELEKTRİK ÜRET. SAN.TİC. A.Ş.	52.38	366.00	366.00	PRIVATE	NATURAL GAS	Unknown
ISPARTA MENSUCAT (Isparta)	4.30	33.00	33.00	AUTOPRODUCER	NATURAL GAS	Unknown
İSTANBUL SABİHA GÖKÇEN UL.AR. HAV.	4.00	32.00	32.00	AUTOPRODUCER	NATURAL GAS	Unknown
KARKEY (SİLOPİ 1)	100.44	697.67	697.67	PRIVATE	F.OIL	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
KNAUF İNŞ. VE YAPI ELEMANLARI SN.	1.56	12.00	12.00	AUTOPRODUCER	NATURAL GAS	Unknown
LOKMAN HEKİM ENGÜRÜ SAĞ.(SİNCAN)	0.51	44.00	44.00	AUTOPRODUCER	NATURAL GAS	Unknown
MARDİN-KIZILTEPE (AKSA ENERJİ)	32.10	225.00	225.00	PRIVATE	F.OIL	Unknown
MOSB Enerji Elektrik Üretim Ltd. Şti.(İlave)	43.50	351.86	351.86	PRIVATE	NATURAL GAS	Unknown
NUH ENERJİ EL. ÜRT.A.Ş. (ENERJİ SANT.-2)	119.98	900.00	900.00	PRIVATE	NATURAL GAS	Unknown
ODAŞ DOĞALGAZ KÇS (ODAŞ ELEKTRİK)	54.96	415.00	415.00	PRIVATE	NATURAL GAS	Unknown
POLYPLEX EUROPA POLYESTER FİLM	3.90	31.45	31.45	AUTOPRODUCER	NATURAL GAS	Unknown
SAMSUN TEKKEKÖY EN. SAN. (AKSA EN.)	131.34	980.00	980.00	PRIVATE	NATURAL GAS	Unknown
SAMUR HALI A.Ş.	4.30	33.00	33.00	AUTOPRODUCER	NATURAL GAS	Unknown
SARAY HALI A.Ş.	4.29	33.00	33.00	AUTOPRODUCER	NATURAL GAS	Unknown
ŞANLIURFA OSB (RASA ENERJİ ÜR. A.Ş.)	116.76	800.00	800.00	PRIVATE	NATURAL GAS	Unknown
AKSU REG. VE HES (KALEN ENERJİ)	5.20	16.00	12.00	PRIVATE	HYDRO	Unknown
DEĞİRMENDERE (Kadirli) (KA-FNİH ELEK.)	0.50	1.20	0.80	OP.RIGHTS TRANSFER	HYDRO	Unknown
DERME (KAYSERİ VE CİVARI ENERJİ)	4.50	14.00	7.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
ERKENEK (KAYSERİ VE CİVARI ENERJİ)	0.32	1.23	0.74	OP.RIGHTS TRANSFER	HYDRO	Unknown
BALKONDU I HES (BTA ELEKTRİK ENERJİ)	9.19	33.00	20.00	PRIVATE	HYDRO	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
BATMAN	0.48	1.16	1.08	PRIVATE	HYDRO	Unknown
GİRLEVİK (BOYDAK ENERJİ)	3.04	21.00	19.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
BERDAN	10.20	47.20	15.00	PRIVATE	HYDRO	Unknown
BOĞUNTU HES (BEYOBASI ENERJİ)	3.80	17.00	10.00	PRIVATE	HYDRO	Unknown
HAKKARİ (Otluca) (NAS ENERJİ A.Ş.)	1.28	6.00	5.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
HASANLAR	9.35	39.90	29.60	GOVERNMENT	HYDRO	Unknown
BÜNYAN (KAYSERİ VE CİVARI EL. T.A.Ş)	1.16	3.40	3.20	PRIVATE	HYDRO	Unknown
ÇAKIRMAN REG. VE HES (YUSAKA EN.)	6.98	22.00	15.00	PRIVATE	HYDRO	Unknown
İNEGÖL(Cerrah) (KENT SOLAR ELEKTRİK)	0.27	1.00	0.80	OP.RIGHTS TRANSFER	HYDRO	Unknown
İZNİK (Dereköy) (KENT SOLAR ELEKTRİK)	0.24	1.00	0.90	OP.RIGHTS TRANSFER	HYDRO	Unknown
ÇAMARDI (KAYSERİ VE CİVARI EL. T.A.Ş)	0.07	0.01	0.01	PRIVATE	HYDRO	Unknown
KARAÇAY (Osmaniye) (KA-FNİH ELEKTRİK)	0.40	2.30	2.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
ÇAMLICA III HES (ÇAMLICA ELEKTRİK)	27.62	43.00	25.00	PRIVATE	HYDRO	Unknown
ÇAMLIKAYA REG.VE HES (ÇAMLIKAYA EN)	2.82	6.71	3.88	PRIVATE	HYDRO	Unknown
ÇANAKÇI HES (CAN ENERJİ ENTEGRE)	4.63	19.43	10.96	PRIVATE	HYDRO	Unknown
ÇANAKÇI HES (CAN ENERJİ ENTEGRE)	4.63	19.43	10.96	PRIVATE	HYDRO	Unknown
ÇEŞMEBAŞI REG. VE HES (GİMAK EN.)	8.20	28.00	17.00	PRIVATE	HYDRO	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
KAYADIBİ (BARTIN) (İVME ELEKTROMEK.)	0.46	2.30	2.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
KERNEK (KAYSERİ VE CİVARI ENERJİ)	0.83	0.80	0.60	OP.RIGHTS TRANSFER	HYDRO	Unknown
ÇUKURÇAYI HES (AYDEMİR ELEKTRİK ÜR.)	1.80	8.00	4.00	PRIVATE	HYDRO	Unknown
DAREN HES ELEKTRİK (SEYRANTEPE)	49.70	181.13	140.88	PRIVATE	HYDRO	Unknown
DURU 2 REG. VE HES (DURUCASU ELEK.)	4.49	22.00	13.00	PRIVATE	HYDRO	Unknown
KOVADA-I (BATIÇİM ENERJİ ELEKTRİK)	8.25	4.10	1.60	OP.RIGHTS TRANSFER	HYDRO	Unknown
KOVADA-II (BATIÇİM ENERJİ ELEKTRİK)	51.20	36.20	24.40	OP.RIGHTS TRANSFER	HYDRO	Unknown
ERENKÖY REG. VE HES (NEHİR ENERJİ)	21.46	87.00	49.00	PRIVATE	HYDRO	Unknown
EŞEN-1 HES (GÖLTAŞ ENERJİ ELEKTRİK)	30.00	120.00	65.00	PRIVATE	HYDRO	Unknown
EŞEN-1 HES (GÖLTAŞ ENERJİ ELEKTRİK)	30.00	120.00	65.00	PRIVATE	HYDRO	Unknown
GÖKMEN REG. VE HES (SUGÜCÜ ELEKT.)	2.87	13.00	8.00	PRIVATE	HYDRO	Unknown
KUZUCULU (Dörtöl) (KA-FNİH ELEKTRİK)	0.27	1.30	1.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
M.KEMALPAŞA (Suuçtu) (KENT SOLAR)	0.47	1.50	1.30	OP.RIGHTS TRANSFER	HYDRO	Unknown
MALAZGİRT (MOSTAR ENERJİ ELEKTRİK)	1.22	4.00	3.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
TEKİRDAĞ-ÇORLU TEKS.TES.(NİL ÖRME)	2.68	21.00	21.00	AUTOPRO DUCER	NATURAL GAS	Unknown
TİRENDA TİRE ENERJİ ÜRETİM A.Ş.	58.38	410.00	410.00	PRIVATE	NATURAL GAS	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
TOROS TARIM (MERSİN) (NAFTA+D.GAZ)	12.14	96.00	96.00	AUTOPRODUCER	NAPHTA	Unknown
TÜPRAŞ O.A. RAFİNERİ (Kırıkkale) (İlave)	12.00	84.78	84.78	AUTOPRODUCER	NAPHTA	Unknown
YENİ UŞAK ENERJİ ELEKTRİK SANTRALI	8.73	65.00	65.00	PRIVATE	NATURAL GAS	Unknown
ZORLU ENERJİ (B.Karıştırıran)	7.20	54.07	54.07	PRIVATE	NATURAL GAS	Unknown
ADİLCEVAZ (MOSTAR ENERJİ ELEKTRİK)	0.39	0.80	0.50	OP.RIGHTS TRANSFER	HYDRO	Unknown
AHLAT (MOSTAR ENERJİ ELEKTRİK)	0.20	0.60	0.50	OP.RIGHTS TRANSFER	HYDRO	Unknown
HACININOĞLU HES (ENERJİ-SA ENERJİ)	71.14	180.00	102.00	PRIVATE	HYDRO	Unknown
HACININOĞLU HES (ENERJİ-SA ENERJİ)	71.14	180.00	102.00	PRIVATE	HYDRO	Unknown
HASANLAR HES (DÜZCE ENERJİ BİRLİĞİ)	4.68	21.00	12.00	PRIVATE	HYDRO	Unknown
İNCİRLİ REG. VE HES (LASKAR ENERJİ)	25.20	126.00	71.00	PRIVATE	HYDRO	Unknown
KARASU 4-3 HES (İDEAL ENERJİ ÜRETİMİ)	4.60	22.00	12.00	PRIVATE	HYDRO	Unknown
KARASU 5 HES (İDEAL ENERJİ ÜRETİMİ)	4.10	24.00	14.00	PRIVATE	HYDRO	Unknown
BAYBURT (BOYDAK ENERJİ)	0.40	1.90	1.70	OP.RIGHTS TRANSFER	HYDRO	Unknown
KARASU I HES (İDEAL ENERJİ ÜRETİMİ)	3.84	19.00	11.00	PRIVATE	HYDRO	Unknown
BESNİ KAYSERİ VE CİVARI ENERJİ)	0.27	0.50	0.20	OP.RIGHTS TRANSFER	HYDRO	Unknown
KAZANKAYA REG. VE İNCESU HES (AKSA)	15.00	48.00	27.00	PRIVATE	HYDRO	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
KESME REG. VE HES (KIVANÇ ENERJİ)	2.31	8.02	4.51	PRIVATE	HYDRO	Unknown
KESME REG. VE HES (KIVANÇ ENERJİ)	2.31	8.02	4.51	PRIVATE	HYDRO	Unknown
ÇAĞ-ÇAĞ (NAS ENERJİ A.Ş.)	14.40	25.00	22.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
KIRAN HES (ARSAN ENERJİ A.Ş.)	9.74	41.00	23.00	PRIVATE	HYDRO	Unknown
KORUKÖY HES (AKAR ENERJİ SAN. TİC.)	3.03	22.00	13.00	PRIVATE	HYDRO	Unknown
KÖYOBASI HES (ŞİRİKOĞLU ELEKTRİK)	1.07	5.00	3.00	PRIVATE	HYDRO	Unknown
KOZDERE HES (ADO MADENCİLİK ELKT.)	3.15	14.00	8.00	PRIVATE	HYDRO	Unknown
KULP I HES (YILDIZLAR ENERJİ ELK.ÜR.)	22.92	78.00	44.00	PRIVATE	HYDRO	Unknown
ÇEMİŞKEZEK (BOYDAK ENERJİ)	0.12	0.80	0.50	OP.RIGHTS TRANSFER	HYDRO	Unknown
MOLU ENERJİ (Zamanlı-Bahçelik HES)	4.17	30.00	30.00	PRIVATE	HYDRO	Unknown
MURATLI REG. VE HES (ARMAHES EL.)	26.70	94.00	55.00	PRIVATE	HYDRO	Unknown
NARİNKALE REG. VE HES (EBD ENERJİ)	30.40	108.00	61.00	PRIVATE	HYDRO	Unknown
ÖREN REG. VE HES (ÇELİKLER ELEKTRİK)	6.64	29.00	16.00	PRIVATE	HYDRO	Unknown
OTLUCA II HES (BEYOBASI ENERJİ ÜR.)	6.36	27.00	15.00	PRIVATE	HYDRO	Unknown
PINARBAŞI (KAYSERİ VE CİVARI EL.T.A.Ş)	0.10	0.40	0.30	OP.RIGHTS TRANSFER	HYDRO	Unknown
POYRAZ HES (YEŞİL ENERJİ ELEKTRİK)	2.66	10.00	6.00	PRIVATE	HYDRO	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
SARAÇBENDİ HES (ÇAMLICA ELEKTRİK)	25.48	101.00	57.00	PRIVATE	HYDRO	Unknown
SARIKAVAK HES (ESER ENERJİ YAT. AŞ.)	8.06	43.00	24.00	PRIVATE	HYDRO	Unknown
SAYAN HES (KAREL ELEKTRİK ÜRETİM)	14.90	47.00	27.00	PRIVATE	HYDRO	Unknown
SEFAKÖY HES (PURE ENERJİ ÜRETİM AŞ.)	33.11	121.00	68.00	PRIVATE	HYDRO	Unknown
SEYRANTEPE HES (Düzeltilme))	7.14	26.02	20.24	PRIVATE	HYDRO	Unknown
SIZIR (KAYSERİ VE CİVARI EL. T.A.Ş)	5.76	46.00	35.00	OP.RIGHTS TRANSFER	HYDRO	Unknown
SÖĞÜTLÜKAYA (POSOF III) HES	6.13	31.00	18.00	PRIVATE	HYDRO	Unknown
TEFEN HES (AKSU MADENCİLİK SAN.)	11.00	47.00	26.67	PRIVATE	HYDRO	Unknown
TEFEN HES (AKSU MADENCİLİK SAN.)	22.00	94.00	53.33	PRIVATE	HYDRO	Unknown
TURUNÇOVA(Finike) (TURUNÇOVA EN.)	0.55	1.50	0.80	OP.RIGHTS TRANSFER	HYDRO	Unknown
TUZTAŞI HES (GÜRÜZ ELEKTRİK ÜR.)	1.61	10.00	6.00	PRIVATE	HYDRO	Unknown
ULUDERE (NAS ENERJİ A.Ş.)	0.64	3.20	2.60	OP.RIGHTS TRANSFER	HYDRO	Unknown
ÜZÜMLÜ HES (AKGÜN ENERJİ ÜRETİM)	11.36	41.00	23.00	PRIVATE	HYDRO	Unknown
VARTO (MOSTAR ENERJİ ELEKTRİK)	0.29	0.80	0.60	OP.RIGHTS TRANSFER	HYDRO	Unknown
YAMAÇ HES (YAMAÇ ENERJİ ÜRETİM A.Ş.)	5.46	17.00	10.00	PRIVATE	HYDRO	Unknown
YAPRAK II HES (NİSAN ELEKTROMEK.)	5.40	16.00	10.50	PRIVATE	HYDRO	Unknown

Unit Name	Capacity (MW)	Project Production Potential (GWh)	Firm Production (GWh)	Type	Fuel	Date of Commissioning
YAPRAK II HES (NİSAN ELEKTROMEK.)	5.40	16.00	10.50	PRIVATE	HYDRO	Unknown
YAŞIL HES (YAŞIL ENERJİ ELEKTRİK)	1.52	6.00	3.20	PRIVATE	HYDRO	Unknown
YAŞIL HES (YAŞIL ENERJİ ELEKTRİK)	2.28	9.00	4.80	PRIVATE	HYDRO	Unknown
YEDİGÖL REG. VE HES (YEDİGÖL HİDR.)	21.90	77.00	42.00	PRIVATE	HYDRO	Unknown
YEDİGÖZE HES (YEDİGÖZE ELEK.) (İlave)	155.33	474.83	133.95	PRIVATE	HYDRO	Unknown
AYRANCILAR HES (MURADIYE ELEKTRİK)	13.38	53.34	31.16	PRIVATE	HYDRO	Unknown
AYRANCILAR HES (MURADIYE ELEKTRİK)	18.72	74.64	43.73	PRIVATE	HYDRO	Unknown
BAYRAMHACILI BARAJI VE HES	47.00	175.00	95.00	PRIVATE	HYDRO	Unknown
CEVHER I-II REG. VE HES (ÖZCEVHER EN.)	16.36	65.00	32.00	PRIVATE	HYDRO	Unknown
KARASU II HES (İDEAL ENERJİ ÜRETİMİ)	3.08	13.00	8.00	PRIVATE	HYDRO	Unknown
BANDIRMA ENERJİ (BANDIRMA RES)	3.00	10.50	9.50	PRIVATE	WIND	Unknown

Appendix 2 Table 7: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf>

Grid power plant		
Generation technology	Old units (before and in 2000)	New units (after 2000)
Coal	-	-
Subcritical	37%	39%
Supercritical	-	45%
Ultra-supercritical	-	50%
IGCC	-	50%
FBS	35.5%	-
CFBS	36.5%	40%
PFBS	-	41.5%
Oil	-	-
Steam turbine	37.5%	39%
Open cycle	30%	39.5%
Combined cycle	46%	46%
Natural gas	-	-
Steam turbine	37.5%	37.5%
Open cycle	30%	39.5%
Combined cycle	46%	60%

APPENDIX 3: THE MAP SHOWING THE RESERVOIR AREA OF THE PROJECT

