CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Killik ~~40.0 MW~~ Wind Power Plant
(in the following: Killik WPP)

Document version: 0~~4321~~
Date of completion: 24/04/2012

A.2. Description of the project activity:

PEM Enerji A.Ş. (PEM) proposes to install Killik WPP with 40.0~~5~~ MWe installed capacity ~~capacity~~ in borders of central district of Tokat. Killik WPP will have 16~~54~~ turbines each having an installed capacity of 2.5~~0.75~~ MWe. The total electricity production of the project is expected to be some 85,657.50 MWh/year. The purpose of the project is to utilize wind energy potential in Turkey and to compensate energy requirement through a sustainable, environmentally and cost effective way.

Before the investment decision (the first real action date which is the date of the subcontractor agreement for the construction of transmission line) on~~in October~~24th September –2010, it was planned that 54 wind turbines, each with an installed capacity of 0.75 ~~MW~~MWe would be erected, generating 96,351~~85,658~~ MWh annually. Correspondingly, the feasibility calculations realised on 08/06/2010 were realised taking into account the assumed generation figure. On 15/12/2010, t~~T~~he amendment of the generation licence ~~has been~~was realised. As a result, the installed capacity of the project activity was changed from 40.5 ~~MW~~MWe to 40 MWe and instead of 54 wind turbines, 16 turbines would be erected. ~~accordingly.~~ Consequently, the electricity generation figure dropped to 85,657.50 MWh/year. Therefore, it may be summarised that while the IRR study has been carried out using the financial inputs obtained from the feasibility calculations executed by the project developer on 08/06/2010 (which is before the date of the investment decision), the emission reduction of the project activity has been calculated using the most current generation figure as per the methodology applied. The realised generation figures also support the electricity generation estimation of 85,657.50 MWh/yr.

The plant load factor of the project is defined based on *Option (b)* of "*Section II. Ex ante definition of plant load factors*" of "*Guidelines for the reporting and validation of plant load factors, Version 1*". The reports of third party contracted by the project participant is used to calculate the Plant Load Factor (PLF). Based on the final annual electricity generation estimation and installed capacity figures, the plant load factor of the project is calculated as follows:

[87,657.50 MWh/yr] / [40.0 MW] / [8,760 hours/yr] = 25%.

~~(Although it was contemplated to erect 54 wind turbines in the project area during the time of investment decision, according to reconfiguration of the project design occurred in October 2010, it was decided to change the design of the project as to have 16 turbines each having an installed capacity of 2.5 MW with an expectation of 95.912 MWh/year electricity production). The purpose of the project is to utilize wind energy potential in Turkey and to compensate energy requirement through a sustainable, environmentally and cost effective way.~~

Killik WPP shall be registered as a Gold Standard Voluntary Emission Reduction (GS-VER) project in order to facilitate the project implementation by means of financial inflows coming from the credits sale. Due to its significant contribution to climate change mitigation and sustainable development in the region, this project is expected to fulfil the requirements of the Gold Standard rigorously.

The project will help Turkey to stimulate and commercialise the use of grid connected renewable energy technologies and markets. It will demonstrate the viability of wind power plants which will support improved energy security, improved air quality, alternative sustainable energy futures, improved local livelihoods and sustainable renewable energy industry development. The specific goals of the project are:

• reducing greenhouse gas emissions in Turkey compared to business-as-usual scenario,
• helping to stimulate the growth of wind power industry in Turkey,
• creating local employment during the construction and the operation phase of the plant,
• reduce other pollutants resulting from fossil fuel dependent power generation industry in Turkey, compared to business-as-usual scenario,
• helping to reduce Turkey's increasing energy deficit and
• diversifying the electricity generation mix and reducing import dependency.

The project contributes to sustainable development in Turkey in following ways:

- Wind power presents various environmental benefits compared to other primary energy sources: wind energy does not result in emissions of pollutants into the atmosphere nor does it emit residuals that can have negative impact on soil, water etc. As a renewable energy source wind energy can be used without putting the supply of primary energy sources in danger for future generations. The proposed project will also contribute to reduction in emissions other than GHG, such as sulphur dioxide, nitrogen oxides and particulates.

- Killik WPP will result in extra employment – the realization of the project will result in increased jobs in the local area, especially during the construction phase. Priority will be given to local labor force both for construction and operation of the plant.

- Construction materials for the foundations, cables and access roads have been preferentially be sourced locally.

PEM, as the project developer, from the very beginning was committed providing sustainability through environmental protection as well as social development and community support. Based on the information collected during the stakeholder meeting (for details see section E) the Sustainable Development Matrix (for details see section D) were prepared. The results of the in-depth assessment of environmental and social impacts confirm the positive influence of the project on all domains of environment and social support.

In the baseline scenario, the electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants. Since Turkey's grid mainly consists of thermal power plants, this would have resulted in GHG emissions. However, in the project scenario, the project whose characteristics are summarised below will generate electricity from wind power and will result in emission reductions in parallel with its electricity generation figures.

Although it was contemplated to erect 54 wind turbines in the project area during the time of investment decision, according to reconfiguration of the project design occurred in October 2010 there will be 16 Nordex N100 type of wind turbines with 100 m rotor diameter, and 80 m hub height, each having an output

of 2.500 kW (total capacity 40.0 MWe). The equipments will be provided from Nordex which is one of the largest suppliers of wind turbines in the world.[1]

~~During the time of investment decision, t~~The annual average energy production of the power plant is~~was~~ expected to be some 85.658 GWh/year. ~~However, according to reconfiguration of the project design occurred in October 2010, the annual average energy production of the power plant is expected to be some 95.912 GWh/year.~~ The connection of the project to the National Electricity System will be done via 15 km transmission line to the 154 kV Tokat OSB Transformer Station

The construction of the project is to start on~~in~~ 24th September 2010. The commissioning of the project realized in parts. First, 8 turbines (20 MW) were commissioned on October 13th, 2011. Second, 6 turbines were commissioned (15 MW) on December 1st, 2011 and finally, the last two turbines were commissioned on December 17th, 2011. ~~and it is expected to be completed until the beginning of 3Q of 2011~~October 2011.

A.3. Project participants:

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Turkey (host)	PEM Enerji A.Ş. (PEM)	No

PEM is a project participant.

Republic of Turkey: Host country. Turkey has ratified the Kyoto Protocol on February 5, 2009. Yet, in practice, Turkey will not commit to a cap on its greenhouse gas emissions and will not be a host for Clean Development Mechanism (CDM) or Joint Implementation (JI) projects until the end of 2012, because of its particular situation (Please see the final report of COP-7, Marrakesh)[2]. Turkish National Focal Point to the UNFCCC is the Ministry of Environment and Forestry[3]. ~~Regional Environmental Centre Country Office Turkey (REC Turkey) acts as the National Focal Point for UNFCCC Article 6 – Education, Training and Public Awareness.~~

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

The **Republic of Turkey** is the host country. Turkey has ratified the Kyoto Protocol. According to the UNFCCC website, the Ministry of Environment and Forestry is in charge of administration of the climate

[1] http://www.vestas.com/

[2] http://ec.europa.eu/environment/climat/pdf/marrakech_report.pdf

[3] UNFCCC, list of the National Focal Points http://maindb.unfccc.int/public/nfp.pl?mode=wim (accessed in February 2009)

project issues[4]. The Turkish Country Office of the REC initiative has taken over certain functions of a National Focal Point for UNFCCC Article 6[5].

A.4.1.2. Region/State/Province etc.:

Central Anatolia Region, province of Tokat.

A.4.1.3. City/Town/Community etc.:

Killik Wind Power Project (Killik WPP) is located in the northeast of Turkey, in borders of central district of Tokat. The nearest settlements to the project site are Killik, Cayoren and Tekneli villages. The closest turbines to Killik, Cayoren and Tekneli villages

A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

Turbine No	6 degree UTM Coordinates (ED50)				Turbine Capacity
	Y	X	Grid Region Mark	Letter	MW
RT1	289389,68	4450211,17	37	T	2,5
RT2	289777,98	4450596,51	37	T	2,5
RT3	289974,14	4450521,57	37	T	2,5
RT4	290167,25	4450752,08	37	T	2,5
RT5	290649,61	4450774,01	37	T	2,5
RT6	291042,46	4450992,62	37	T	2,5
RT7	291416,13	4450882,55	37	T	2,5
RT8	291752,80	4450504,30	37	T	2,5
RT9	292090,33	4451322,40	37	T	2,5
RT10	292792,39	4451560,02	37	T	2,5
RT11	292731,97	4450876,32	37	T	2,5
RT12	292877,73	4450730,33	37	T	2,5
RT13	293090,65	4451295,70	37	T	2,5
RT14	293338,20	4451435,17	37	T	2,5
RT15	294023,23	4451204,64	37	T	2,5
RT16	294246,33	4451425,53	37	T	2,5

[4] See UNFCCC website, List of National Focal Points http://maindb.unfccc.int/public/nfp.pl?mode=wim (accessed on 25 February 2009)

[5] See REC Turkey website, http://www.rec.org.tr/sayfa_en.asp?id=31 (accessed on 25 February 2009)

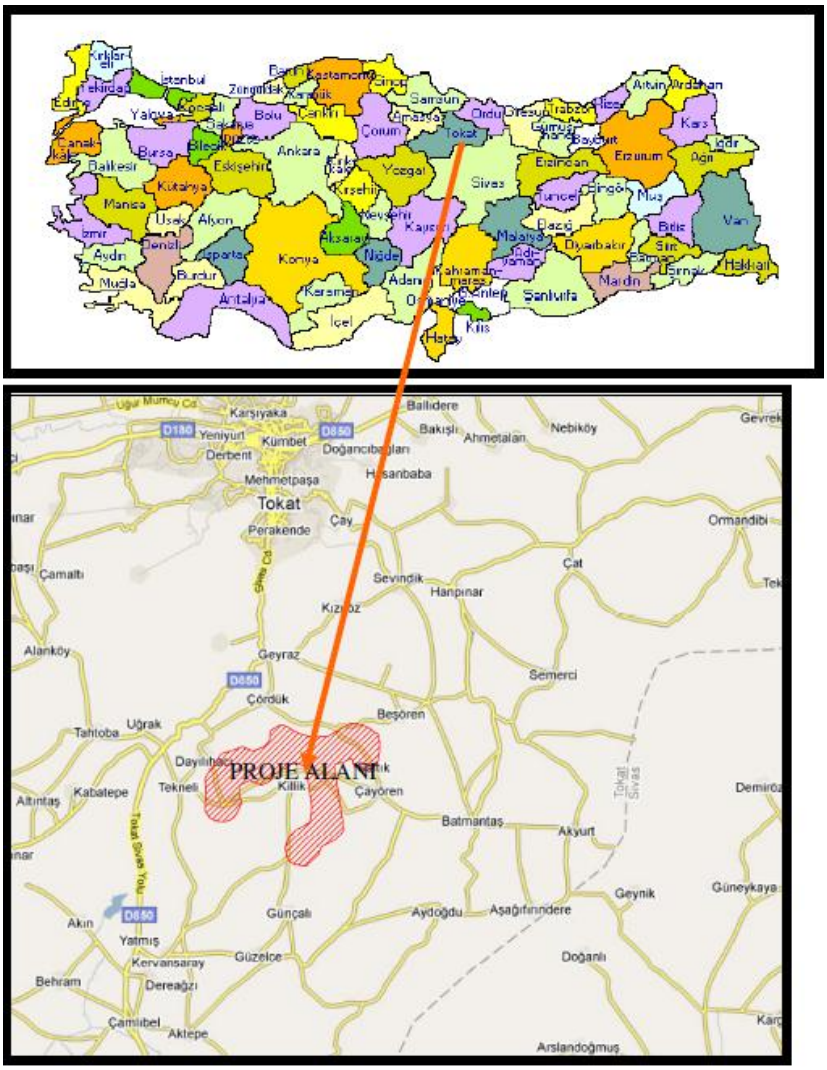


***Figure 1**: Project Location on Turkey Map*

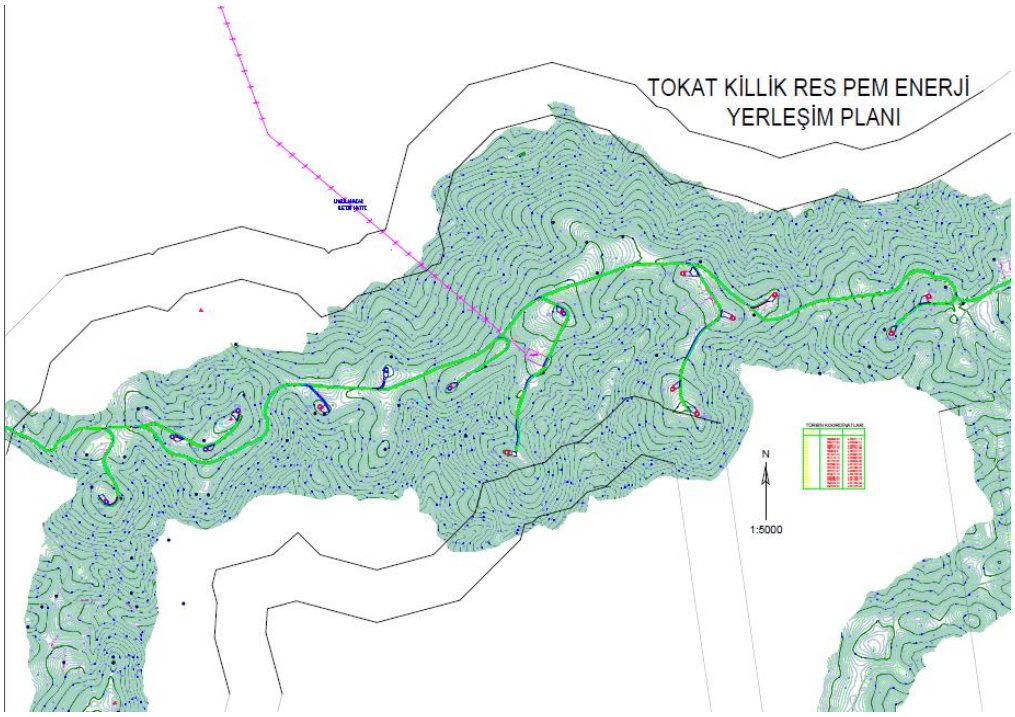


Figure 2: Site Layout

A.4.2. Category(ies) of project activity:

Killik WPP falls in the "Renewable Energy Supply Category", according to the Gold Standard Toolkit.6 Also, as the proposed project activity is a grid connected renewable energy project, according to the UNFCCC definitions for sectoral scopes for CDM projects, project activity is included in the Sectoral Scope 01: Energy Industries (Renewable / Non-renewable sources).7

A.4.3. Technology to be employed by the project activity:

Wind power is one of the most commonly used environment friendly technologies in energy sector all over the world. Within the scope of the project, all precautions have been taken for the environment during the design phase and the project will be implemented in line with the environmental law and related regulations.

Killik WPP entails the construction and operation of a 40.0~~0~~ MWe wind power plant upon the reconfiguration of the project design occurred in October 2010. The project consists of 16 wind turbines of 2.5 MWe each. The first-hand turbines which will be used in the project will be Nordex N100 type with 80 m hub and 100 m rotor diameter. This turbine is known to have IEC WTGS Class II type certificates and considered suitable to the project site after the wind and energy yield assessments.

Wind and energy yield assessment of the project was made by Lahmeyer International GmbH which is a DIN EN ISO/ IEC 17025 accredited testing laboratory for wind measurements and wind resource assessments of wind farms. The result of the measurements made by Lahmeyer International the net annual energy productions, confidence levels and uncertainties are projected:

Prob. Of Exceedance (%)	Energy Production (MWh/y)	Capacity Factor (%)
90	89.400	25,5
75	95.912	27,4
50	103.418	29,4

***Table 2**: Projected Net Annual Energy Productions*

As it is seen in the table above, the interpretation of confidence level for 75% shall be "The average net annual energy production of the WPP will be more than 85.657~~95.912~~ GWh/year.

The wind turbines of the plant are to be supplied from Nordex which is one of the world leading companies in wind power technologies. The technology used in the plant includes first wind turbines and its auxiliary equipments with extensive automatization. The project does not need extensive initial training and maintenance efforts in order to work as presumed during the project period. Necessary trainings to the plant staff will be delivered by the supplier in line with the agreement between the project owner and the supplier.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

The crediting period starts with the commissioning of first phase of the plant (~~September~~ October 13th, 2011), exactly with the first day of documented electricity supply to the grid. The expected yearly net electricity generation is listed in the table below:

Years	Annual estimation of

[6] http://www.cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/GSv2.1/GSv2.1_Toolkit_Clean.pdf

[7] http://cdm.unfccc.int/DOE/scopelst.pdf

	emission reductions in tonnes of CO2e
2011	~~17,362~~4397~~7~~,635
2012	~~52.316~~52,087
2013	52,087~~52.316~~
2014	52,087~~52.316~~
2015	52,087~~52.316~~
2016	52,087~~52.316~~
2017	52,087~~52.316~~
2018	~~34.725878~~40,671
Total emission reductions (tonnes of CO2e)	360,829[8]
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	52,087

Table 3*: Estimated amount of emission reductions over the chosen crediting period*

A.4.5. Public funding of the project activity:

There has been no public funding used for the financing of the project.

[8] Emission reductions are calculated in Excel spreadsheet, where values are considered with 9 decimal places. In the PDD at hand the presented values are rounded down, therefore the total number of emission reductions may not equal the sum of the yearly emission reductions.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

For determination of the baseline, the official methodology ACM0002/Version 12.1.0, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"9, approved by the CDM Executive Board, is applied, using conservative options and data as presented in the following section. Also, to prove additionality and to calculate the grid emission factor, the official methodologies: "Tool for the demonstration and assessment of additionality, Version 05.2"10 and "Tool to calculate the emission factor for an electricity system, Version 02"11 are used. The completion date of the baseline study is 08/11/2010.

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The choice of methodology ACM0002/Version 12.1.0 is justified as the proposed project activity meets relevant applicability criteria:

Biçimlendirilmiş: Yazı tipi: Garamond

- Killik ~~40.5~~40.0 ~~MWe~~ WPP Project is the installation of a grid connected renewable power generation project which adds electricity capacity to the grid from wind power sources and which supplies electricity to a system that is supplied by at least one fossil fuel fired generating unit.
- The project involves construction of new units in a brand new plant, in other words the project does neither involve the addition of renewable energy generation units at an existing renewable power generation facility nor does it foresee to retrofit or modify an expired facility of renewable energy generation.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available;
- The project does not involve switching from fossil fuels to renewable energy at the site of the project activity.

B.3. Description of the sources and gases included in the project boundary:

The greenhouse gasses and emission sources are defined for the project activity and the baseline scenario. In the baseline scenario, the electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants. Since Turkey's grid mainly consists of thermal power plants, this would have resulted in GHG emissions. However, in the project scenario, the project whose characteristics are summarized above, will generate electricity from wind power and will result in emission reductions in parallel with its electricity generation figures. The baseline boundary only includes CO2 emissions from fossil fuel fired power plants that are displaced due to project activity. For the project activity, no GHG emissions exist. As a result, the project boundary for Killik WPP is as demonstrated in the figure below:

The greenhouse gasses and emission sources are defined and listed below for the project activity and the baseline scenario. As a result, the project boundary is as follows:

[9] http://cdm.unfccc.int/EB/052/eb52_repan07.pdf

[10] http://cdm.unfccc.int/EB/016/eb16repan1.pdf

[11] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf

	Source	Gas	Included?	Justification
Baseline	Generation mix of electricity grid in Turkey	CO_2	Yes	CO_2 emission from fossil fuel fired power plant that are displaced due to project activity was taken into account.
		CH_4	No	Minor emission sources as suggested by ACM0002, Version 12.0.0.
		N2O	No	
Project Activity	Construction and Operation of the project activity	CO_2	No	As net electricity approach is adopted, emissons that occur during construction and during the operation are negligible and non-existent respectively.
		N2O	No	Minor emission source as suggested by ACM0002, Version 12.0.0.
		CH_4	No	Minor emission source as suggested by ACM0002, Version 12.0.0. Emissions that occur during the construction are negligible.

Table 4: *The justification for project boundary*

Potential leakage emissions in the context of power sector projects are emissions that arise from the project activities such as power plant construction, fuel handling and land inundation. According to ACM0002 / Version 12.1.0, such emissions do not need to be taken into account.

~~**Turkish Electricity Sector**~~[12]

~~Demand Side:~~

~~Gross electricity demand (Gross Generation + Imports – Exports) in Turkey rose at a rate of 8.0% per annum for the last three decades since 1975, which reflects one of the basic indicators of an emerging economy. Gross electricity demand in Turkey reached 198,085 GWh in 2008, which makes Turkey one of the ten largest markets for electricity among European countries. However, in 2009, as a result of the financial crisis which hit all economies in the world, the gross electricity generation of Turkey dropped to 194,079 GWh. Nevertheless, it can be easily said that Turkey shows a sustainable growth in its electricity sector. Even the devastating earthquake that hit Turkey in 1999, and the economic crisis in 2001, could not reverse the robust growth record of the country. In 1999, consumption grew by 4.5% despite the decline in GDP by 5%. In 2001, Turkey's electricity consumption dropped only 1.1% whereas GDP shrank by 7.5%. Parallel to the gross demand, the net consumption figure reflects an average of 7.9% increase since 1975, reaching to 161,948 GWh in 2008. However, the net consumption was dropped to 156,894 GWh. Although there has been significant improvements in the recent years, Turkey's per capita electricity consumption figure is 2,053 kWh (as of 2006), which is one of the lowest among European countries.[13] According to International Energy Agency (IEA) statistics, OECD average per capita electricity consumption is 8,381 kWh in 2006, which is an indicator of the growth potential in Turkey.[14] This figure has been 3,258 kWh among CEE countries.[15] Per capita consumption is expected to increase to 5,050 kWh by 2020 according to the MENR base case demand growth scenario, and with a projected annual population growth rate of 1.5%.~~

[12] ~~http://www.teias.gov.tr/istatistik2009/index.htm~~

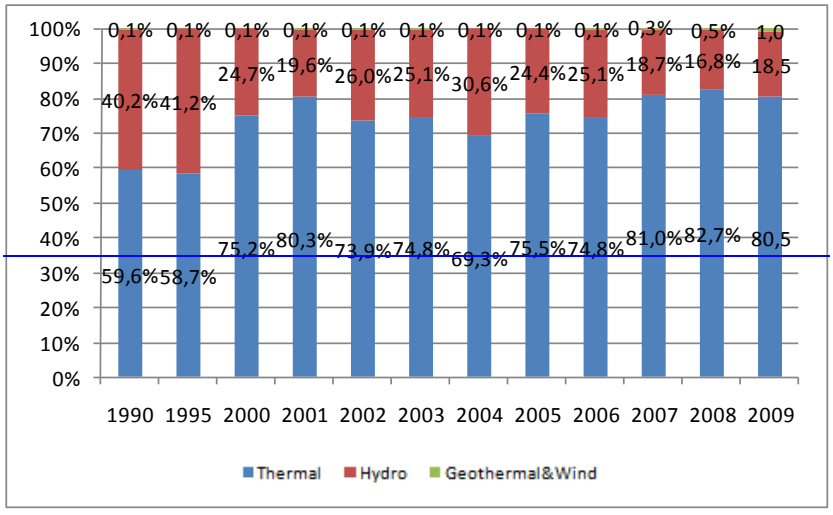
[13] ~~http://www.iea.org/Textbase/country/maps/EUROPE/ele_pop.htm~~

[14] ~~http://www.iea.org/Textbase/stats/indicators.asp?COUNTRY_CODE=28~~

[15] ~~http://www.iea.org/Textbase/stats/indicators.asp?COUNTRY_CODE=33~~

~~Supply Side:~~

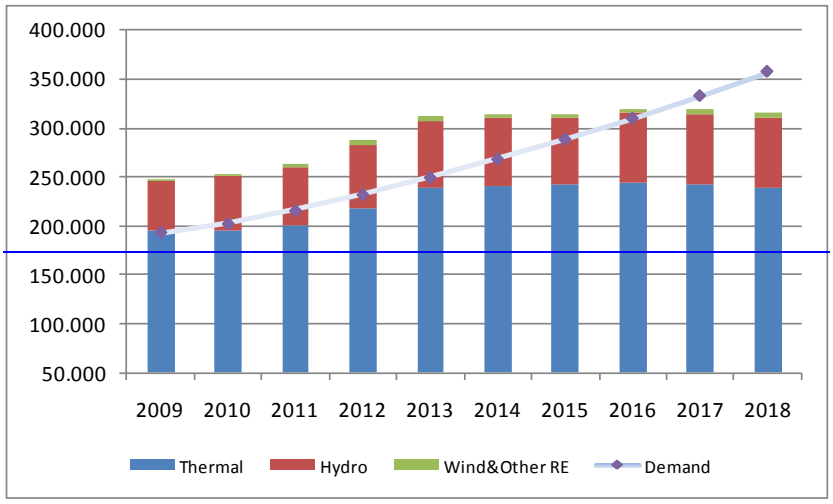
~~Installed capacity and electricity generation in Turkey increased in line with consumption growth in recent decades. In 2008, electricity generation reached 198,418 GWh while imports stood at 789 GWh – 0.40% of total supply. However, the gross electricity generation of the country was realized as 194,813 GWh by decreasing 2%. Turkey became an importer in the mid-1970s; however, the share of imports in total supply never exceeded 3.6% for the last 20 years. The imports reached its peak as a portion of total supply in 1984 with 8%. By the end of 2008 the installed capacity of Turkey reached 41,817 MW, representing a CAGR of 8.0% since 1975. The rate of the increase in the capacity was well above 10% from 1970 to 1980. 45.5% of the installed capacity of 44,761 MW in 2009, was held by the State Generation Company EUAS, 8.6% by Affiliated Partnerships of EUAS, 0.6% Mobile Power Plants and the remaining 45.3% owned by Autoproducers, Production companies, TOOR and ADÜAŞ. There is an increasing trend in favour of IPPs, switching away from the State Generation Company in the recent years. When we compare the breakdown of the installed capacity in 2000, we see that EUAS's contribution to the installed capacity was 80% whereas the IPPs' share was only 9%. This is a concrete indication of the trend of the generation in favour of independent producers. The contribution of thermal power has always been the dominant source in both the generation and the installed capacity. In 2009, thermal power plants accounted for the 65.5% of the installed capacity whereas the hydro power plants' contribution was 32.5%. This is one of the lowest figures since 1970. On the other hand geothermal and wind powered capacity is still negligible with 0.2% and 1.8% shares, respectively. The existing electricity grid in Turkey is an interconnected single entity which to a larger extend fed by fossil fuel fired power plants. (Graph 2.1)~~



~~Graph 1:~~ *~~Electricity Production Fuel Type~~* [~~16~~]

~~The Graph below displays the forecast in increasing demand along the years between 2008 and 2017. The supply projection is based on the planned projects for energy production but it is very probable that, under increasing pressure of increasing demand, the government will shift to thermal power plants as they present higher financial feasibility with relatively short construction periods.~~

[~~16~~] ~~http://www.teias.gov.tr/istatistik2009/32(75-09).xls~~



~~***Graph 2:*** *Electricity Supply and Demand Projections for Turkey*[17]~~

~~Turkish Renewable Energy Sector~~

~~Although Turkey has not committed to cap on its GHG emissions and will not be a host for Clean Development Mechanism (CDM) or Joint Implementation (JI) projects until the end of 2012 under Kyoto Protocol,), having signed the United Nations Framework Convention on Climate Change it is committed to managing greenhouse gas emissions. The goal is to maintain emissions at the level of 1990 (3,15 per capita). Therefore, Turkish government keeps focusing on renewable sources.~~

~~Turkey enacted its first specific renewable energy law in 2005, but there are also provisions regarding renewable energy in the Electricity Market Law (EML), which authorises the Energy Market Regulatory Authority (**"EMRA)** to take measures to promote renewable energy use and in secondary legislation:~~

- ~~The Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy[18] (**"Law"**) was adopted on 18 May 2005. This article provides as overview of the general provisions of the Law, as well as other supporting legislation regarding renewable energy resources. However, the legislation on bio-fuel will not be taken into account.[19]~~
- ~~Renewable energy resources (**"RER"**) is not a brand-new topic, as the Electricity Market Law [20](**"EML"**), which was enacted in March 2001 and the Electricity Market License Regulation[21] (**"Regulation"**) demonstrate. According to the EML, EMRA is authorized to take the necessary measures to encourage the utilization of RER.~~

~~[17] http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf~~

~~[18] Law No. 5346, published in the Official Gazette dated 18 May 2005 and numbered 25819.~~

~~[19] See Petroleum Market Law No. 5015, published in the Official Gazette dated 20 December 2003 and numbered 25322; Petroleum Market License Regulation, published in the Official Gazette on 17 June 2004 and numbered 25495; Regulation on Technical Criteria for Petroleum Market, published in the Official Gazette on 10 September 2004 and numbered 25579.~~

~~[20] Law No. 4628, published in the Official Gazette dated 3 March 2001 and numbered 24335~~

~~[21] Published in the Official Gazette dated 4 August 2002 and numbered 24836; see moreover Electricity Market Grid Regulation, published in the Official Gazette dated 22 June 2003 and numbered 25001; Regulation on Balancing and Settlement, published in the Official Gazette dated 21 December 2004 and numbered 25677; Communiqué Regarding the Principles and Procedures of Financial Settlement, published in the Official Gazette dated 4 November 2003 and numbered 25279.~~

- According to the European Council Decision of 23 January 2006 on the principles, priorities and conditions contained in the Accession Partnership with Turkey[22], one of the short-term priorities identified for Turkey relates to "[s]tart alignment on the *acquis* on energy efficiency and renewable energy sources and develop administrative capacity in these sectors". Therefore, the new Law contains new incentives for RER development.

Objective and Scope of the Law

It is important to note that there is no region specific regulation and law in Turkey as it is not a federal state. The purpose of the Renewable Law is "to expand the use of renewable energy resources for generating electricity and to benefit from these resources in a secure, economic and qualified manner; and to increase the diversification of energy resources, reduce greenhouse gas emissions, assess waste products, protect the environment and develop the related manufacturing sector to realize these objectives."

The Renewable Law covers wind, solar, geothermal, biomass, biogas, wave, stream, tidal, river and arc type hydroelectric generation facilities and hydroelectric generation facilities either canal or run of river type or with a reservoir area of less than 15 km².

Incentives provided by the Renewable Law and Electricity Market Licensing Regulation

Renewable Energy Law

(a) Development plans which might have a negative effect on the use and efficiency of RER areas can no longer be created on public land.

(b) Each legal entity holding a retail sale licence must purchase a specified amount of electrical energy from RER certified generators which have been in generation for less than 10 years. This amount is based on a comparison between the amount of energy sold by that retail sale licence holder, in the previous calendar year, and the total electrical energy offered for sale by all retail sale licence holders in Turkey.

The price of electrical energy bought in accordance with this provision is determined by EMRA and is the average Turkish wholesale price announced in the previous year. This amount is 9.67 Ykr/Kwh in 2007 (approximately 5 Euro cents). The retail price must be between 5.0 and 5.5 Euro cents but a generator can sell its electrical energy for a higher price if there is market demand.

In practice all generators are currently selling their electrical energy to the Market Financial Reconciliation Centre, which currently offers the highest price in Turkey due to a recent supply gap.

(c) Real persons and legal entities establishing an isolated electricity generation plant and grid supported electricity generation plant; using hydraulic resources with a maximum installed capacity of 1,000 kW that is to be used solely to satisfy their own needs, are not required to pay service charges for these projects. This is provided that the final design, planning, master planning, preliminary surveying and first auditing were prepared by either the DSI (State Hydraulic Works) or the EIE (Electrical Power Resources Survey and Development Administration).

(d) The sale price, rent, rights of access and usage permissions of state owned land are subject to an 85% reduction where the property is used for the purpose of generating electrical energy from RER which fall within the scope of the Renewable Law. ORKOY (General Directorate of Forest and Village Relations) and forestation special allowance revenue are not charged for forested land.

(e) Within the framework of the Renewable Law: (i) investment in energy generation facilities; (ii) procurement of domestically manufactured electromechanical systems; (iii) investment in research,

[22] OJ 2006 L 22/34.

~~development and manufacturing in the scope of electricity generation systems using solar cells and concentrated collectors; and (iv) investment in research and development facilities for the generation of electrical energy or fuels by utilizing biomass resources, can benefit from incentives determined by the Council of Ministers. Nevertheless, despite good intention of the government to promote electricity generation from renewable energy sources, it is not possible to say that the incentives provided so far are sufficient or the existing incentives are applied properly. Considerable barriers for renewable energy projects still exist, as discussed in Section 2.5; Barrier Analysis.~~

~~Licensing Regulation~~

~~Legal entities applying for Licences for the construction of facilities based on domestic natural resources and RER only pay 1% of the total licensing fee and do not pay annual Licence fees for the first 8 years following completion of the facility.~~

~~Legal entities engaged in generation activities at facilities based on RER can purchase electricity from private sector wholesale companies on the condition that they do not exceed the annual average generation amounts indicated in their Licences for that calendar year.~~

~~TEIAS and/or legal entities holding distribution Licences must give priority for connection of generation facilities to the system based on whether they use domestic natural resources and RER.~~

~~**Licence guarantee**~~

~~Since November 2007 EMRA has been requesting bid bonds and performance bonds for Licence applications. Bid bonds with an amount of 10,000 YTL per mw are requested at the application stage and, if EMRA approves the application, a performance bond, with an amount to be calculated in accordance with the capacity to be installed, is also requested.~~

~~**Renewable Energy Resource (RER) Certificates**~~

~~If and when requested by any legal entity holding a generation Licence, a RER certificate must be granted by EMRA for the purpose of identifying and monitoring the resource type used in electrical energy generation or for the purpose of accessing the incentives applicable under the Renewable Law.~~

~~The principles and procedures relating to RER certification are governed by secondary legislation issued by EMRA in 2005. There are two types of RER certificates which govern the:~~

~~(a) type of resource utilized to generate electrical energy; and~~

~~(b) incentives that the owner is entitled to under the Renewable Law.~~

~~No GHG sources in terms of sinks and reservoirs could be identified for this project.~~

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

The method to describe and calculate the baseline has clearly been specified by the Baseline Methodology. CDM Executive Board has already provided a consolidated tool for appraising and demonstrating the additionality feature of the projects.

Since the project is an installation of a new grid-connected renewable power plant, the baseline scenario is formulated in ACM0002 / Version 12.1.0: *"Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the Combined Margin (CM) calculations described below".*

The project is not a modification/retrofit of an existing grid-connected renewable power plant/unit. Therefore the other alternative baseline scenario mentioned in ACM0002 / Version 12.1.0 is not chosen.

According to the "Baseline Methodology Procedure" in "Tool to calculate the emission factor for an electricity system, Version 02" following steps should be followed.

All the information pertaining to the grid and estimating baseline emissions are publicly available, and was available at the website of TEIAS (Turkish Electricity Transmission Company Inc. - www.teias.gov.tr).

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

Referred by the Baseline Methodology, the "Tool for the Demonstration and Assessment of Additionality (Version 5.2)" outlines a step by step approach for the assessment of additionality or in other words the emission reductions that would have occurred in the absence of the project.

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

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

In the absence of the proposed project activity, plausible and credible project activities to the proposed project activity are as follows:

Alternative 1 : Construction of a thermal power plant with the same annual power output
Alternative 2 : The proposed project activity not undertaken as a VER project activity
Alternative 3 : The same service of power supply is provided from the grid (Killik WPP is not built)

Although the coal and natural gas reserves in Turkey is very limited, there are many thermal power plants that have been being commissioned in recent years and Turkey's grid mainly consists of thermal power plants. As they have become common practice in the energy sector due to off-take agreements provided by the government, these projects face easier circumstances in terms of financing and realisation. In addition, these projects use imported coal, so they can be realized regardless of their geographic proximity to coal supply. Therefore, construction of a thermal plant with the same annual electricity output is a realistic alternative.

As mentioned above, the Turkish Electricity Sector is heavily dependent on fossil fuel plants. According to a new bill that passed in 2001(Electricity Market Law, Law No: 4628, Enactment Date: 20/02/2001) [23], the public funding in energy investments have stopped. The new bill allows incentives for private sector participation in energy investments. In addition to rehabilitation of existing plants, new capacities to be added to meet the increasing demand require mass amount of investments. Because the public funding of energy investments is no more legitimate, the new projects need to be accomplished by private sector. Yet, Killik WPP cannot influence the future fuel mix in the energy market, but can only decide to invest on the project because Killik WPP has no influence on the domestic energy policy of the decision makers.

Under these circumstances, analyzing these three alternatives, it is seen that all scenarios are consistent with the baseline definition of ACM0002 / Version 12.1.0 where it defines the baseline scenario as the amount of electricity that would be delivered to the grid by the project activity, generated by the operation of existing grid-connected power plants and by the addition new generation sources, as reflected by the combined margin.

Sub-step 1b: Enforcement of applicable laws and regulations

[23] http://www.epdk.gov.tr/mevzuat/kanun/elektrik/elektrik_piyasalari_kanunu.pdf

The following applicable mandatory laws and regulations have been identified:

1. Electricity Market Law [24]
2. Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy[25]
3. Energy Efficiency Law[26]
4. Forest Law[27]
5. Environment Law[28]
6. Regulation on procedures and principles of signing the agreement of utilization of water resources for the purpose of electricity production in the electricity market[29]
7. Regulation on Environmental Impact Assessment[30]

All energy projects are in compliance with the mandatory laws and regulations listed above except 2nd and 6th one. "Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy" is only applicable for renewable energy projects. Also, "Regulation on procedures and principles of signing the agreement of utilization of water resources for the purpose of electricity production in the electricity market" is only applicable for hydropower projects. The electricity Market Law structures the market in general. Therefore, it is applicable for all projects in the electricity market. On the other hand, Forest Law, Environment Law, energy efficiency Law and the Regulation on EIA are also applicable for all alternatives.

Outcome of Sub-Step b

The alternatives discussed above are in line with applicable legal and regulatory requirements.

Step 2: Investment Analysis

The purpose of investment analysis is to determine whether the proposed project activity is economically or financially less attractive without carbon revenues than the remaining alternatives. To conduct the investment analysis, the following sub-steps are adhered to:

Sub-step 2a: Determine appropriate analysis method

The „*Tool for the Demonstration and Assessment of Additionality'*, version 05.2, from EB39, lists three possible analysis methods:

- Option I: Simple cost analysis;
- Option II: Investment comparison analysis; and
- Option III: Benchmark analysis.

Since the proposed project generates financial and economic benefits via the sales of electricity other than carbon revenues, Option I cannot be used.

[24] Law number 4628, enactment date 03/03/2001, http://www.epdk.gov.tr/english/regulations/electricity.htm

[25] Law number 5346, enactment date 18/05/2005, http://www.eie.gov.tr/duyurular/YEK/LawonRenewableEnergyReources.pdf

[26] Law number 5627, enactment date 02/05/2007, http://www.eie.gov.tr/english/announcements/EV_kanunu/EnVer_kanunu_tercume_revize2707.doc

[27] Law number 6831, enactment date 31/08/1956.

[28] Law number 2872. Published in Official Gazette No. 18132 on 11/08/"83.

[29] National Gazette number 25150, 06/06/2003

[30] National Gazette number 26939, 17/07/2008

Option II is only applicable to projects where alternatives should be similar investment projects in terms of generation capacity. Between Option II and Option III, benchmark financial analysis (Option III) is selected as the analysis method.

As a result Option III: Benchmark Analysis is selected as the analysis method and the Equity IRR is selected as the financial indicator for the demonstration of the additionality of the project.

Sub-step 2b: Option III. Apply Benchmark Analysis

While applying the Benchmark Analysis, Option III, the Equity IRR is selected as the financial indicator for the demonstration of the additionality of the project as permitted in the additionality tool.

The relevant benchmark rate is calculated in line with the suggestion in "Tool for the demonstration and assessment of additionality" Version 05.2 which suggests using the government bond rates, increased by a suitable risk premium. In relation to this, the benchmark rate is calculated in line with the Capital Asset Pricing Model (CAPM)[31]. The CAPM suggests below formula to calculate the discount rate (in other words benchmark rate).

$$E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

where:

- $E(R_i)$ is the expected return on the capital asset
- R_f is the risk-free rate of interest such as interest arising from government bonds
- β_i (the beta coefficient) is the sensitivity of the asset returns to market returns, or also $\beta_i = \frac{\mathrm{Cov}(R_i, R_m)}{\mathrm{Var}(R_m)}$,
- $E(R_m)$ is the expected return of the market
- $E(R_m) - R_f$ is sometimes known as the market premium or risk premium (the difference between the expected market rate of return and the risk-free rate of return).

Risk Free Rate (R_f)

As the Turkish Eurobonds represent a risk-free rate, it must be increased by a suitable risk premium, which reflects the premium that investors demand for an average risk investment. The interest rate for Eurobond with longest duration of 10 years which XS0285127329 - 02.04.2019 was 6.1% at the time of decision (End of January 2008, please see http://www.ziraat.com.tr/tr/bankamiz/faiz-ve-ucretler/aspx/eurobond.aspx for 31 of January 2008). However the maturity of this bond does not match with the investment analysis duration which is 49 years (license duration[32]). Therefore the yield of a synthetic bond with 49 years maturity at the time of decision was calculated using the yield curve derived from http://www.ziraat.com.tr/tr/bankamiz/faiz-ve-ucretler/aspx/eurobond.aspx was used. Please see Annex 7 to see the yield curve. According to this calculation the synthetic bond's yield should be around 9.11%.

The Beta Coefficient (β_i)

31 Please see http://en.wikipedia.org/wiki/Capital_asset_pricing_model for the definition of CAPM

32 The license of the project was granted to the company on 10/04/2008 for 49 years duration. Therefore, the license duration will end in 2057. On the other hand, the company prepared the financial fesibility of the project in 2009. As a result, the the operational lifetime of the project, including the investment duration, is accepted as 45 years between 2010 and 2057.

The Beta coefficient of securities with values close to 1 determines the company securities as being of average risk. There are four power generating and trading companies under trade in the Istanbul Stock Exchange (ISE). The βi for the Electricity Index is calculated as 0.939 by Bloomberg which is one of the prominent data suppliers in financial markets. (Please see Annex 8 for Betas of these companies)

Market risk premium ($E(R_m) - R_f$)

To estimate the "Market risk premium" of Turkey, the independent study of Aswath Damodaran – Stern School of Business (New York University) was used. The study offers an assessment of the market risk for different countries according to their credit ratings as the determined market risk premium for Turkey is 12.88%, calculated on the basis of the credit rating Ba3 with positive perspective given to Turkey by Stern School of Business.[33]

All in all, the relevant discount rate is calculated as:

$$9.11\% + 12.88\% * 0.939 = 21.2\ \%$$

The above discount rate can easily be assumed as conservative as the above benchmark assumes that the benchmark and the project have same natures in terms of risk. However, the Beta of the index includes lower risk compared to the project, as the index includes already established companies (which are up and running). However, it is obvious that the project includes more risk compared to already established companies as there are extra construction risks and inexperienced operational risks for the project. Therefore, the Beta of the project should be significantly higher than the index Beta. All in all, we can say that the CAPM derived benchmark rate is conservative and also in consistency with the benchmark rates received from local bankers mentioned above.

IRR Calculation of the Project

The below IRR calculations of the project reveal the fact that the project is not financially attractive. Therefore, carbon revenues are crucial for the project. Aiming to show that the income of the GS VER is important for the financial performance of the project, two scenarios are presented in this section, one which excludes revenues from the sale of GS VERs and the second which includes the revenues from the sale of GS VERs. The assumptions used for this analysis are outlined as follows:

- The project lifetime is defined as 47 years, which is the licence duration for the project. (The license is obtained in 2008 for a 49 year period and will end in 2057)
- The financial analysis is performed over the 25~~47~~ years period and fair value of the project activity assets at the end of investment period is considered. This therefore includes the investments made by the project owner during the construction phase and the operational costs along the financial analysis period.
- The Equity IRR (Internal Rate of Return) of the project cash flow has been calculated.
- A tax rate of 20% is applied to the project in line with Turkish tax laws.
- The depreciation period of machinery and equipment was assumed as 30. years as the local law allows companies to depreciate machinery and equipment in 30 to 40 years (Please see http://www.alomaliye.com/2007/isa_yilmaz_amortismanlar.htm). In the meantime, the other fixed assets' (buildings etc) depreciation life is assumed as 40 years.
- The annual power generation figure is assumed as 96,351,000 kWh.
- The power purchase price for the project is assumed to be 5.5 Euro cents per kWh which is the upper limit of purchase guarantee offered by the State as an incentive to the investment (Please refer to Turkish Renewable Energy Law No: 5346 Article 6.c.)

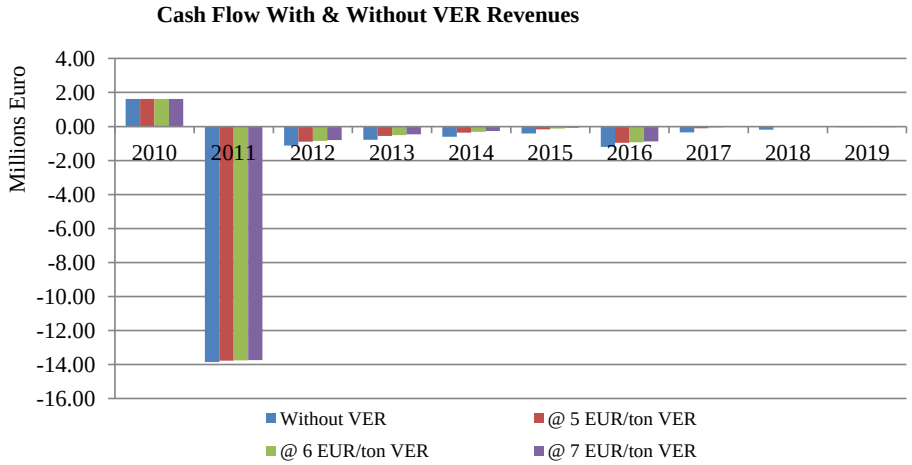
[33] http://www.stern.nyu.edu/~adamodar/pc/archives/ctryprem08.xls

- The revenues from GS VERs are excluded from scenario 1, and included in scenario 2. The volume of GS VERs generated by the project is calculated by multiplying the annual electricity output of the project by the emission factor. For sensitivity analysis, the revenues related to the sale of the GS VERs are applied by multiplying the volume of GS VERs by the €5, €6 and €7 price. The GS VERs are generated and sold for the first 7 years of the operational lifetime of the project.

Results

The cash flow analysis has been performed on two project scenarios;

- Scenario 1 – excludes revenues from the sale of GS VER
- Scenario 2 – includes revenues from the sale of GS VERs



Graph 3: *Project Cumulative Cash Flow Comparison, with and without GS VERs.*

Below are the details of the Equity IRR estimations for the project. ***(Table 5)***

Capacity & Production																					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Energy Production (1000 Kwh/year)		**0**	**32,117**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**	**96,351**
Firm Energy (1000 KWh/year)		0	32,117	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351
Sales Volume & Revenues																					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Loss & Pilferage Rate		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Net Sales Volume (1000 Kwh/year)		0	32,117	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351	96,351
Sales Prices (EUR/Kwh)																					
Firm Energy		0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
Price increase (%)		*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Sales Revenues (EUR)		**0**	**1,766,435**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**
Firm Energy		0	1,766,435	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305	5,299,305
Cost of Goods Sold																					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
General production expenses		129,140	552,251	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252	1,576,252
Depreciation		0	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724
Total (EUR/year)		**129,140**	**1,799,975**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**	**2,823,976**
Working Capital																					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Days of Receivables		15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Receivables		0	73,601	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804	220,804
Costs of Goods Sold & Operating Expenses Calculation Details																					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
General Production Expenses		**129,140**	**552,251**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**	**1,576,252**
Turbine Repair, Maintenance & Spare Parts		0	245,333	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000	736,000
Unforeseen costs		0	29,630	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889	88,889
Administration+ Unforeseen costs		0	59,259	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778
Energy Transfer Fee		0	88,889	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667	266,667
Land Rent		129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140	129,140
Insurance		0	0	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778	177,778
General Administrative Expenses																					
Personnel Expenses	(Salary per year)	0	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275	24,275
Investment Details (EUR)																					
		2010	**2011**	**Total**	**Weight**				**Original Investment Amount**		**Weight**										
Costs for Turbines	33,600,000	**11,777,470**	**21,822,530**	**33,600,000**	89%					33,600,000	89%										
Turbines	28,560,000	9,996,000	18,564,000	28,560,000	76%					28,560,000	76%										
Shipping	2,688,000	1,546,270	1,141,730	2,688,000	7%					2,688,000	7%										
Assembly	2,352,000	235,200	2,116,800	2,352,000	6%					2,352,000	6%										
Construction	1,088,961	**272,240**	**816,721**	**1,088,961**	3%					1,088,961	3%										
Electromechnical Installments	3,015,000	**90,450**	**2,924,550**	**3,015,000**	8%					3,015,000	8%										
Total Investment Amount		**12,140,160**	**25,563,801**	**37,703,961**						37,703,961	100%										

Depreciation																					
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Depreciation of New Investment																					
Equipment																					
Depreciation period (years)	**30**																				
Balance @ beginning	**0**	0	0	35,394,500	34,174,000	32,953,500	31,733,000	30,512,500	29,292,000	28,071,500	26,851,000	25,630,500	24,410,000	23,189,500	21,969,000	20,748,500	19,528,000	18,307,500	17,087,000	15,866,500	14,646,000
Additions	0	0	36,615,000	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Depreciation	0	0	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500	1,220,500
Balance @ end	0	0	35,394,500	34,174,000	32,953,500	31,733,000	30,512,500	29,292,000	28,071,500	26,851,000	25,630,500	24,410,000	23,189,500	21,969,000	20,748,500	19,528,000	18,307,500	17,087,000	15,866,500	14,646,000	13,425,500
Construction																					
Depreciation period (years)	**40**																				
Balance @ beginning	**0**	0	0	1,061,737	1,034,513	1,007,289	980,065	952,841	925,617	898,393	871,169	843,945	816,721	789,497	762,273	735,049	707,825	680,601	653,377	626,153	598,929
Additions	0	0	1,088,961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	0	0	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224	27,224
Balance @ end	0	0	1,061,737	1,034,513	1,007,289	980,065	952,841	925,617	898,393	871,169	843,945	816,721	789,497	762,273	735,049	707,825	680,601	653,377	626,153	598,929	571,705
Total	**0**	**0**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**	**1,247,724**

Income Statement (EUR)																				
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Net Sales	**0**	**1,766,435**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**	**5,299,305**
Cost of Sales	-129,140	-1,799,975	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976	-2,823,976
Gross Profit	**-129,140**	**-33,540**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**	**2,475,329**
General Administrative Expenses	0	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275	-24,275
Income from Operations	**-129,140**	**-57,815**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**
EBITDA	**-129,140**	**1,189,909**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**	**3,698,778**
EBITDA Margin		*67%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*	*70%*
Financing income / (expense), net	-1,894,624	-1,894,624	-1,847,258	-1,657,796	-1,468,334	-1,278,871	-1,089,409	-899,946	-710,484	-521,022	-331,559	-142,097	0	0	0	0	0	0	0	0
Other Income /(Expenses)- net	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income before Tax	**-2,023,764**	**-1,952,440**	**603,795**	**793,258**	**982,720**	**1,172,183**	**1,361,645**	**1,551,107**	**1,740,570**	**1,930,032**	**2,119,495**	**2,308,957**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**	**2,451,054**
Taxation on income	0	0	0	0	0	0	-982,720	-310,221	-348,114	-386,006	-423,899	-461,791	-490,211	-490,211	-490,211	-490,211	-490,211	-490,211	-490,211	-490,211
Deferred Taxation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income before Monetary Gain / (Loss)	**-2,023,764**	**-1,952,440**	**603,795**	**793,258**	**982,720**	**1,172,183**	**378,925**	**1,240,886**	**1,392,456**	**1,544,026**	**1,695,596**	**1,847,166**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**
Monetary gain/(loss)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Income for the period	**-2,023,764**	**-1,952,440**	**603,795**	**793,258**	**982,720**	**1,172,183**	**378,925**	**1,240,886**	**1,392,456**	**1,544,026**	**1,695,596**	**1,847,166**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**	**1,960,843**

Cash Flow Statement (Eur)																				
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Net Income	-2,023,764	-1,952,440	603,795	793,258	982,720	1,172,183	378,925	1,240,886	1,392,456	1,544,026	1,695,596	1,847,166	1,960,843	1,960,843	1,960,843	1,960,843	1,960,843	1,960,843	1,960,843	1,960,843
Depreciation	0	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724	1,247,724
Working Capital Requirement																				
Change in Trade Receivables	0	-73,601	-147,203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Trade Payables	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change In Other Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change Liabilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investments	-12,140,160	-25,563,801	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equity	-1,622,496	15,024,690	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Debt - Loan	15,786,420	12,491,551	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Debt Repayments																				
Bank Loans (Ak Leasing)	0	0	-2,827,797	-2,827,797	-2,827,797	-2,827,797	-2,827,797	-2,827,797	-2,827,797	-2,827,797	-2,827,797	-2,827,797	0	0	0	0	0	0	0	0
Cash Generated During the Year	0	1,174,123	-1,123,481	-786,815	-597,353	-407,890	-1,201,148	-339,187	-187,617	-36,047	115,523	267,093	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567
Cumulative Cash Generated	0	1,174,123	50,642	-736,173	-1,333,526	-1,741,416	-2,942,565	-3,281,752	-3,469,369	-3,505,416	-3,389,894	-3,122,801	85,766	3,294,333	6,502,900	9,711,467	12,920,035	16,128,602	19,337,169	22,545,736
Cash Flow to Equity	1,622,496	-13,850,567	-1,123,481	-786,815	-597,353	-407,890	-1,201,148	-339,187	-187,617	-36,047	115,523	267,093	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567

VER Revenues																				
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Baseline EF (tCO2/MWh)	0.6108																				
Expected CO_2 Reduction (tons)		0	19,616	58,848	58,848	58,848	58,848	58,848	58,848	39,232	0	0	0	0	0	0	0	0	0	0	0
Expected VER Revenue@ 5 EUR/ton		0	98,079	294,238	294,238	294,238	294,238	294,238	294,238	196,159	0	0	0	0	0	0	0	0	0	0	0
Expected VER Revenue@ 6 EUR/ton		0	117,695	353,086	353,086	353,086	353,086	353,086	353,086	235,391	0	0	0	0	0	0	0	0	0	0	0
Expected VER Revenue@ 7 EUR/ton		0	137,311	411,934	411,934	411,934	411,934	411,934	411,934	274,622	0	0	0	0	0	0	0	0	0	0	0
Cash Flow with VER																					
@ 5 EUR/ton VER		1,622,496	-13,772,104	-888,090	-551,425	-361,962	-172,500	-965,758	-103,796	-30,690	-36,047	115,523	267,093	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567
@ 6 EUR/ton VER		1,622,496	-13,756,411	-841,012	-504,346	-314,884	-125,422	-918,679	-56,718	695	-36,047	115,523	267,093	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567
@ 7 EUR/ton VER		1,622,496	-13,740,718	-793,934	-457,268	-267,806	-78,343	-871,601	-9,640	32,081	-36,047	115,523	267,093	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567	3,208,567
IRR Calculation without VER																					
IRR - 27 Years (Technical lifetime of the equipment)	6.98%																				
IRR Calculation with VER																					
IRR - 27 Years (Technical lifetime of the equipment)																					
@ 5 EUR/ton VER	7.54%																				
@ 6 EUR/ton VER	7.66%																				
@ 7 EUR/ton VER	7.78%																				

Sub-step 2c: Calculation and Comparison of Financial Indicators

1. Parameters required for calculation of key financial indicators

According to the financial feasibility study of the proposed project[18], the parameters required for the calculation of key financial indicators are in **Table 6**:

Parameter[34]	Value	Reference	Page/ Column Number of the Reference Document	Date of the Document
Installed capacity (MWe)	~~40.5~~40.0	~~Financial Feasibility~~The Generation License	½	24/07/2008
Grid connected output (MWh)	96,351~~85,658~~	Financial Feasibility Calculation	"Assumptions" page	08/06/2010
Capital investment (€)	37,703,961	Financial Feasibility Calculation	"Assumptions" page	08/06/2010
Income tax rate (%)	20.0	Corporate Tax Law, Art.32		
Expected tariff (€ cent/kWh)	0.055	The Law on Utilization of Renewable Energy Sources for the Purpose of Generating Electrical Energy~~Energy Efficiency Law, Art.17~~	Part 3 Section C (published in the Official Gazette No. 27052)	12/11/2008
Expected VER price (Euro/tCO2e)	5-7	Estimated by the Consultant The IRR Excel Sheet		
Gen. Production Expenses (€/year)	1,576,252	Financial Feasibility Calculation	The page "Assumptions"	08/06/2010
Project lifetime – (years)	47.0	Electricity Generation License	½	24/07/2008
Loan: Equity Ratio	75:25	Assumption[35]		
Interest Rate	6.70% Euribor+5.5	Financial Feasibility Calculation	The "Assumptions" page	08/06/2010
Repayment Period	12 (10+2)	Financial Feasibility Calculation	The "Assumptions" page	08/06/2010

[34] Unless otherwise mentioned all figures are taken from the Financial Feasibility Study which was prepared in ~~May~~ June 2010 by the company

[35] Please see the general link: http://www.iso.org.tr/tr/documents/cevre/tkb.pdf?redirected=1

Benchmark rate (%)	21.20	IRR Excel Sheet ~~Calculated~~	The "Benchmark" page	

Table 6: *Basic Parameters for Financial Analysis*

2. Results of the Financial Analysis

Table 7 includes the results of the financial analysis for the Project, at the time that the decision to go ahead was made, both with and without VER financing. The IRR of the Project without VER financing was lower than the applicable benchmark rate of return. This therefore indicates that in comparison to alternative investments, the Project was financially unattractive in the absence of VER financing.

	Without VER	@ 5 Eur/ton VER	@ 6 Eur/ton VER	@ 7 Eur/ton VER
Equity IRR (%)	6.98%	7.54%	7.66%	7.78%

Table 7: *Summary of Project investment analysis without and with VER financing*

3. Comparison of IRR for the proposed project to the financial benchmark

In accordance with benchmark analysis (Option III), if the financial indicators of the proposed project, such as the project IRR[36], are lower than the benchmark, the proposed project is not considered financially attractive.

Table 7 highlights the project IRR with and without carbon revenues. Without the additional income to the project developer resulting from VER sales, the Equity IRR is 6.98%, which is lower than the financial benchmark. Thus, the proposed project is not financially attractive. However, taking VER revenues into consideration, the Equity IRR increases to 7.78% (with 7 EUR/ton VER price).

While the IRR with VERs remains lower than the financial benchmark of 21.20%, the Project Developer will also benefit from the following intangible benefits that VERs provide:

- A third party review of project documents will give extra confidence to both investors and financiers.

- Enhanced corporate green image of the project developer through its contribution to a clean source of electricity and the diversification of electricity sources in Turkey, which broadens stakeholder confidence.

Sub-step 2d: Sensitivity Analysis

Sensitivity analysis was applied to Investment Costs, Energy Production and Electricity Sales Price. Applying variations on investment costs, Energy Production and Electricity Sales Price the range was considered to be in a bandwidth of +10% and –10% as advised in "Tool for the demonstration and assessment of additionality (Version 05.2)."

Biçimlendirilmiş: Yazı tipi: Garamond, İtalik Değil

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

[36] For Benchmark Analysis, the IRR shall be calculated as equity IRR, according to the "Tool for the demonstration and assessment of additionality", version 05, from EB39.

The sensitivity in the investment amount was applied to the investment items which represent equal or above 20% of the total investment amount as suggested by "Tool for the demonstration and assessment of additionality (Version 05.2)."

	IRR Sensitivity with Investment Costs				
Change in %	-10%	-5%	0%	5%	10%
Without VER	8.51%	7.68%	6.98%	6.38%	5.84%
IRR @6 US$/ton VER	9.24%	8.32%	7.54%	6.88%	6.30%
IRR @7 US$/ton VER	9.39%	8.45%	7.66%	6.98%	6.39%
IRR @8 US$/ton VER	9.55%	8.58%	7.78%	7.09%	6.49%

Table 8: Sensitivity to Variation in Investment Costs

Variation on energy production was also applied in a bandwidth of +10% and –10%.

	IRR Sensitivity with Electricity Production				
Change in %	-10%	-5%	0%	5%	10%
Without VER	4.87%	5.92%	6.98%	8.07%	9.17%
IRR @6 US$/ton VER	5.30%	6.41%	7.54%	8.70%	9.89%
IRR @7 US$/ton VER	5.39%	6.51%	7.66%	8.83%	10.04%
IRR @8 US$/ton VER	5.48%	6.62%	7.78%	8.97%	10.20%

Table 9: Sensitivity to Variation in Energy Production

Due to the fact that the feed in guaranteed tariff prices are fixed in Turkey, the unit energy price is not considered to be an exogenous variable. However, sensitivity on the upward side was also applied to see the effect of price changes.

	IRR Sensitivity with Electricity Price				
Change in %	-10%	-5%	0%	5%	10%
Without VER	4.87%	5.92%	6.98%	8.07%	9.17%
IRR @6 US$/ton VER	5.35%	6.44%	7.54%	8.67%	9.82%
IRR @7 US$/ton VER	5.45%	6.55%	7.66%	8.79%	9.96%
IRR @8 US$/ton VER	5.55%	6.65%	7.78%	8.92%	10.10%

Table 10: Sensitivity to Variation in Electricity Price

The above benchmark and accompanying sensitivity analyses reveal the fact that no alternative scenario, with or without VER revenues, can make the project pass the benchmark IRR expectation. The equity IRR without VER revenues of the project cannot approach to the benchmark rate, even with a 10% increase in the electricity price (7.16%). Therefore, the project is not financially attractive without VER revenues.

Step 3: Barrier Analysis

Not applicable

~~*Sub step 3a: Identify barriers that would prevent the implementation of type of the proposed VER project activity*~~

~~It is important to note that the participation of Turkish private sector in the renewable energy business is a very new concept. Before the subject Energy Law, companies had never been responsible for the whole process planning and financing of the project, choosing the technology and operating of WPPs of the investment and had never taken all the risks related to the entire investment process. Hence, most of the private companies in Turkey have little experience and know how in the management and operation of WPPs. As part of its energy policy during late 80's, Turkey started a liberalization process in its electricity market. The liberalization process commenced with electricity production and is expected to be completed early 2010's when full privatization of state owned distribution and production assets are completed. Formerly, all energy plants have been built and operated by the State. While the privatization of energy production through licenses wind farms offers lucrative investment opportunities, the Turkish private sector still has limited experience in this field.~~

~~On the other hand, the financial institutions in the country lack the technical capacity and know how to assess such projects to ensure the output from them. Verification of output from an independent third party and the resulting financial support from international buyers of carbon emission reduction would be a leap of faith for the banks and financial institutions which hesitate to be on the long-term financing side of such projects. The support would not only ease the crediting process for the project owners but would also give a stronger hand in negotiating for less expensive loans. Consequently, even if such projects achieve some financing from the banks; the project owners are seldom content with the credit terms regarding the tenor and the price.~~

~~**Technological Barriers**~~

~~*Lack of Distribution Centre in the Region*~~

~~The most significant technological barrier is the requirement of construction of a distribution centre to connect to the grid. In Turkey, all electricity generation facilities transmit the produced electricity to the national grid via the existing distribution centres of TEDAS. In order to connect to the national grid, Killik WPP is planned to transmit the produced electricity to 154 kV Tokat OSB Transformer Station through a 15 km energy transmission line to be constructed between the project site and the distribution centre. Although the cost of the transmission line construction is supposed to be paid by TEDAS to the company in the future (the payment schedule is not certain yet), all these planning and construction works brings waste of time, extra financial and operational risks to the project.~~

~~**Other Barriers**~~

~~Since the renewable energy investments of private sector is a new concept in Turkey, the lack legal framework and related regulations can cause inefficiencies during the investment process. In relation to this, the project owners face some bureaucratic barriers due to the lack of coordination between the public bodies~~

originating from insufficient regulatory infrastructure. These bureaucratic barriers lead delays in obtaining the necessary permits and as a result delays and stops in the construction of the project.

Sub step 3b: The identified barriers would not prevent the implementation of at least one of the alternatives (except for the proposed small-scale project activity)

The barriers explained above are specific to renewable energy projects in general and to WPPs in particular. They do not apply to thermal power plants (Alternative 1). The barrier market liberalization has not applied to thermal power plants in Turkey because such plants are provided with off take agreements up to now as part of the incentive mechanism for energy investments. Also, since the renewable energy producers have high production volatility, these producers have less chance to engage in bilateral agreements with a large consumer which is allowed to purchase directly from producers in the law as this type of producers need steady and pre-determined electricity needs. In addition, the system usage fee also do not apply thermal power plants, as the pricing of system usage fee is based on the installed capacities and also the renewable energy plants operate on 40 percent capacity on average whereas the conventional plants utilize their installed capacity with a rate up to 80 percent. As for side investments that the government refrains from, such as transmission lines do not apply to thermal power plant projects because those plants have higher investment return that encourage the project owner to realize side investments to finish the project easier. In addition, thermal power plants have an "economies of scale" advantage where the cost of side investments is very small compared to their capital investments. Also, except these general barriers that apply to renewable energy projects, Killik WPP faces some project specific barriers such as lack of distribution centre in the region, the mid voltage line problem in the project site and the land ownership problem. These problems do not apply not only to Alternative 1, but also to the similar project activities.

As a result, sub step 3b is satisfied because the identified barriers do not apply to Alternative 1 and Alternative 3.

All in all, sub-step 3a and sub-step 3b are satisfied because the identified barriers put significant impediment in front of the realisation of the project while they do not apply to Alternative 1 and 3. Therefore, subject to outcome of Common Practice Analysis (Step 4), the project is additional.

Alleviation of Barriers through Carbon Revenue

As the main hurdle in realizing the WPP projects is unexpected operational and bureaucratic works and also cost increases in the implementation of the project, the additional revenue through the sale of GS VERs will play an extremely crucial role in the realization of these projects.

The positive impact of VER sales on the equity IRR is an important factor for potential lenders as the carbon revenue is generated as long as the project operates and the source of revenues is quite stable and could be pledged to the banks. On the other hand, any financial institution with insecurity on the technical capability and the output from the project will deem to have better opinion for the project. If Turkey becomes a JI or Annex 2 country, the project proponent will aim at registering the project as a CDM project activity. With higher unit prices, the carbon revenues from the CDM market will have even more dramatic impact on the equity IRR. There are strong signals that Turkey has ratified the protocol and this definitely created a positive mood not only on the project owners but also those financial institutions taking a stake in the project. Also, the VER revenues will help project owner to secure the project against the volatile electricity prices in Turkish Electricity Market. In addition, since the VER revenues are usually in foreign currencies, the

~~additional revenues in a foreign currency will decrease some of the currency risk of the project. On the other hand, the VER revenues will help the project owner to ease the costs of extra operations and delays because of the above described barriers.~~

Project Timeline:

Acquisition of the Project by Iltek Group	October 30th 2007
Licence obtained from EMRA	July 24th 2008
System Connection Agreement with TEIAS	December 5th 2008
Board decision for investment and carbon finance support (Prior considetaion)	June 1st 2009
EIA Not Rquired	December 28th 2009
Project Description Document	December 2009
Feasibility Report	June 8th, 2010
Agreement with the Carbon Finance Consultant	June 21st 2010
Local Stakeholder Consultation Meeting	August 10th 2010
PEM's declaration of non-use of ODA funding	September 16th 2010
Subcontractor Agreement for the Construction of Transmission Line (start date of construction) (Project activity start date)	September 24th 2010
Subcontractor Agreement for the Excavation And Ground Works (Project activity start date)	September 24th 2010
Agreement with the turbine supplier	October 6th 2010
Opinion for Construction Permit by Development and Public Works of Tokat Governorship)	October 8th 2010
Construction Permit by Tokat Provincial Council	October 8th 2010
Leasing Agreement with the financial institutuion	October 17th 2010
Subcontractor Agreement for the Electromechanical Works	October 20th 2010
Wind And Energy Yield Estimation Report	October 27th 2010
Subcontractor Agreement for General Construction Works	Decemder 9th 2010
Revised Feasibility Report	December 15th, 2010
Agreement With te DOE	January 11th 2011
Service Agreement for Work Security Services	February 9th 2011
Start of VER Validation	March 15th 2011
Positive EIA Decision for Transmission Line	April 29th 2011
Commissioning date of first 8 turbines (20 MW)	October 13th 2011
Commissioning date of 6 turbines (15 MW)	December 1st 2011
Commissioning date of first 2 turbines (5 MW)	October 17th 2011

Table 12: The time line of the project activity

Biçimlendirilmiş Tablo

Biçimlendirilmiş: Üst simge

Biçimlendirilmiş: Üst simge

Acquisition of the Project by İltek Group	October 30th, 2007
License obtained from EMRA	July 24th, 2008
System Connection Agreement with TEIAS	December 5th, 2008
Board Decision for investment and carbon finance support	June 1st, 2009
EIA not required decision by the Ministry of Environment and Forestry for Tokat region	December 28th, 2009
TOKAT_Killlik -RES_Project Description Document	December 2009
Agreement with the Carbon Finance Consultant	June 21st, 2010
Local Stakeholder Consultation Meeting	August 10th, 2010
PEM's declaration of non-use of ODA funding	September 16th, 2010
Subcontractor Agreement for the Construction of Transmission Line	September 24th, 2010
Subcontractor Agreement for the Excavation and Ground Works	September 24th, 2010
Start Date of the Construction	October 1st, 2010
Agreement with turbine supplier	October 6th, 2010
Opinnion for Construction Permit by Development and Public Works of Tokat Governorship	October 8th 2010
Construction Permit by Tokat Provincial Council	October 8th 2010
Leasing agreement with the financial institution	October 17th, 2010
Subcontractor Agreement for the Electromechanical Works October 20th 2010	October 20th, 2010
Wind and Energy Yield Estimation Report	October 27th, 2010
Subcontractor Agreement for General Construction Works	December 09th, 2010
Agreement with the DOE	January 11th, 2011
Service Agreement for Work Security Services	February 9th 2011
Start of VER validation	March 15th, 2011
Positive EIA Decision for Transmission Line by the Ministry of Environment and Forestry	April 29th, 2011
Expected commissioning of the power plant	October 1st, 2011

~~**Project Timeline:**~~

~~Events and Actions~~	~~Date~~
~~EIA not required decision by the Ministry of Environment and Forestry for Balikesir region~~	~~March 21st, 2008~~
~~License obtained from EMRA~~	~~April 10th, 2008~~
~~Wind and Energy Yield Estimation Report~~	~~June 30th, 2009~~
~~Acquisition of GALATA by Agaoglu Group~~	~~September, 2009~~
~~Agreement with turbine supplier~~	~~December 31st, 2009~~
~~EIA not required decision by the Ministry of Environment and Forestry for Bursa region~~	~~March 23rd, 2010~~
~~System Connection Agreement with TEIAS~~	~~May 14th, 2010~~
~~Agreement with the PDD Consultant~~	~~May 21st, 2010~~
~~Loan agreement with the bank~~	~~June 4th, 2010~~
~~Local Stakeholder Consultation Meeting~~	~~June 18th, 2010~~
~~GALATA's declaration of non-use of ODA funding~~	~~June 21st, 2010~~
~~Permission granted by Ministry of Environment and Forestry for the use of forestry are in the project area~~	~~July 9th, 2010~~
~~Start Date of the Construction~~	~~July, 2010~~
~~Agreement with the DOE~~	~~October, 2010~~
~~System Usage Agreement with TEIAS~~	~~January 17th, 2011~~
~~Start of VER validation~~	~~January 24th, 2011~~
~~Expected commissioning of the power plant~~	~~April 1st, 2011~~

Step 4: Common Practice Analysis

Sub-step 4a: Other activities similar to the proposed small-scale project activity

As mentioned above sections, participation of private sector in the electricity generation from wind power plants is a very new concept in Turkey. Facing the growing demand for electricity and lacking the capital to realize wind investment, the State outsourced the construction of those plants through licenses. As seen in the table below, among the projects under construction, the number of projects that are close to completion is very low (only 8 projects out of 66 were completed more than 50% as of now)[37].

[37] http://www.epdk.gov.tr/lisans/elektrik/proje/yenilenebilir.xls (Accessed on November 22, 2010)

Completion Ratio (%)	Number of Facilities
<10% Completed	**40**
>10% Completed	26
>20% Completed	18
>30% Completed	12
>40% Completed	10
>50% Completed	8
>60% Completed	8
>70% Completed	8
>80% Completed	7
>90% Completed	**5**

Table 1~~3~~1: *Number of WPP facilities completed over a certain completion ratio*

In addition, there were not any electricity generation activities from wind power plants in Turkey until 1998. In 1998, total installed capacity of wind power plants in Turkey was just 8.7 MW. As of end of 2009, the total installed capacity of wind power plants reached 791.6 MW, but still this amount is at negligible level. The share of wind power plants in Turkey's total installed capacity is only 1.8%.[38]

Sub-step 4b: Discuss any similar options that are occurring

(The region for Common Practice Analysis is defined as all Turkey and all wind power plants are considered in the analysis.)

The explanations above show that the electricity generation from wind power is not common practice in Turkey. Also, the table below supports this argument. The participation of private sector to the electricity generation from wind power starts with the license applications made on November 1, 2007. On October 4, 2007, EMRA declared that it would receive license applications for wind power plants on November 1, 2007. When EMRA received the licence applications of private sector for wind power plants, 751 applications were made. The total installed capacity of these applications was 78,000 MW. However, EMRA could not grant any licenses, since more than one application were made for some locations. Then, EMRA declared that 724 of these applications were accepted and the other applications were cancelled.[39] Despite this great interest of private sector, only small portion could obtain licenses and commence their investment.[40]

[38] http://www.teias.gov.tr/istatistik2009/3(2).xls

[39] http://www.epdk.gov.tr/duyuru/elektrik/acil/1kasim2007ResBasvurulari.pdf

[40] http://www.mondaq.com/article.asp?articleid=91268

Status of Projects	Number of Projects	Total Installed Capacity (MW)
(1) License Applicaitons made on November1, 2007	751	78.000
(2) Accepted License Applications made on November 1, 2007	724	-
(3) Currently waiting Licence Applicaitons made on November 1, 2007	667	28.282
(4) License Applicaitons under Evalualtion	51	2.580
(5) Approved License Applications	20	1.054
(6) License Granted	92	3.483
(7) Under Construction	66	2.302
(8) Operational	-	792

Sources:

(1) http://www.energydanismanlik.com/tr/haberler/s/62
(2) http://www.epdk.gov.tr/duyuru/elektrik/acil/1kasim2007ResBasvurulari.pdf
(3) http://www.epdk.gov.tr/lisans/elektrik/1kasim2007RESlistesi/index.asp
(4) http://www.epdk.gov.tr/lisans/elektrik/lisansdatabase/basvuruuretimRES.asp
(5) http://www.epdk.gov.tr/lisans/elektrik/lisansdatabase/uygunuretim.asp
(6) http://www.epdk.gov.tr/lisans/elektrik/lisansdatabase/verilentesistipi.asp
(7) http://www.epdk.gov.tr/lisans/elektrik/proje/yenilenebilir.xls
(8) http://www.teias.gov.tr/istatistik2009/7.xls

Table 1~~4~~2: *The number and total installed capacities of WPPs in different stages*

As seen in the above explanations, the electricity generation from wind power is not a common practice in Turkey. In addition to this, it can be easily said that currently operational power plants have been commenced by benefitting from carbon revenues. The table below shows the names and installed capacities of all the wind power plants which are operational as of end of 2008[41] and if they benefit from carbon revenues or not.

* ARES and BORES projects are Turkey's first wind power plant projects and at the time of these investments made, the existence of VER revenues was not known in the country.

[41] The table is obtained from the Annex 1 of the TEIAS Capacity Projection Report for 2009-2010. Since the plant based data for 2009 has not been published by TEIAS yet, the currently operational power plants as of end of 2008 is evaluated regarding their status of benefiting from carbon revenues.

Project Name	Installed Capacity (MW)	Benefit from carbon revenues?
ARES (ALAÇATI)*	7,2	N
BORES (BOZCAADA)*	10,2	N
SUNJÜT	1,2	N
ALİZE ENERJİ (Delta Plastik)	1,5	N
ERTÜRK ELEKTRİK (TEPE)	0,9	N
ANEMON ENERJİ (İNTEPE)	30,4	Y
BARES (BANDIRMA)	30	Y
DOĞAL ENERJİ (BURGAZ)	14,9	Y
DENİZLİ ELEKTRİK (Karakurt-Akhisar)	10,8	Y
MARE MANASTIR	39,2	Y
BAKİ ELEKTRİK ŞAMLI RÜZGAR	21	Y
DATÇA RES	8,1	Y
ERTÜRK ELEKTRİK (ÇATALCA)	60	Y
INNORES ELEKTRİK (YUNTDAĞ)	42,5	Y
LODOS RES (TAŞOLUK)	24	Y
SAYALAR RÜZGAR (DOĞAL ENERJİ)	30,6	Y
SEBENOBA (DENİZ ELEKTRİK-SAMANDAĞ)	31,2	Y

Table 1~~5~~3: *Currently operational (as of end of 2008) WPP and their status of benefiting from carbon revenues*

On the other hand, it is impossible to compare all similar projects if they benefit from carbon revenues or not, since there is no registration authority in the host country to apply for this information. However, the accessible information shows that there are a lot projects which benefit from carbon revenues.[42] This proves that it is not a common practice to develop wind power plant projects without VER revenues.

In addition, the most recently commissioned power plants (commissioned in 2009) are considered in the context of the subject project. The below table also shows that constructing the proposed project activity not undertaking as a VER project activity is not a common practice.

[42] Please see the Gold Standard (https://gs1.apx.com/myModule/rpt/myrpt.asp?r=111) and VCS (https://vcsprojectdatabase1.apx.com/myModule/rpt/myrpt.asp) Registry web sites

Company	Installed Capacity (MW)	Commissioning Date	Benefit from Carbon revenues?
AK ENERJİ (AYYILDIZ RES)	15	2009	N
ALİZE ENERJİ (ÇAMSEKİ RES)	20,8	2009	Y
ALİZE ENERJİ (KELTEPE RES)	18,9	2009	Y
ALİZE ENERJİ (SARIKAYA RES) (Şarköy)	28,8	2009	Y
AYEN ENERJİ A.Ş. AKBÜK RÜZGAR	31,5	2009	Y
BAKİ ELEKTRİK ŞAMLI RÜZGAR	69	2009	Y
BELEN ELEKTRİK BELEN RÜZGAR - HATAY	30	2009	Y
BORASCO ENERJİ (BANDIRMA RES)	45	2009	Y
DATÇA RES (Datça)	21,5	2009	Y
KORES KOCADAĞ RES (Urla/İZMİR)	15	2009	Y
MAZI-3 RES ELEKT. ÜR. A.Ş. (MAZI-3 RES)	22,5	2009	Y
ROTOR ELEKTRİK (OSMANİYE RES)	57,5	2009	Y
SAYALAR RÜZGAR	3,6	2009	Y
SOMA ENERJİ ÜRETİM (SOMA RES)	45	2009	Y
ÜTOPYA ELEKTRİK (DÜZOVA RES)	15	2009	Y

Last, the low rate of completion of the projects and the low rate of license grants for wind projects confirm ~~the barriers elaborated above and in addition to these, the similar WPP projects which benefit from VER revenues prove~~ that the electricity generation from WPP business is not a common practice, especially without VER revenues. Therefore Step 4 is satisfied.

~~While conducting the Common Practice Analysis, "Guideline on common Practice Analysis, Version 01.0" (EB 63 Report, Annex 12) is followed and it is demonstrated in a stepwise approach that, Balikesir WPP is not a common practice:~~

~~***Step 1:*** *Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity:*~~

~~The installed capacity of the project is 40.0 MW. Therefore, the lower limit of the applicable output range is 20.00 MW and upper limit is 60.00 MW.~~

~~***Step 2:*** *In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project:*~~

~~The start date of the project is defined as the agreement with the subcontractor for the construction of the transmission line (24th September 2010). At that date, the most up-to-date version of the TEIAS Capacity projection Report lists the power plant projects connected to Turkey's national electricity grid as of end of~~

Biçimlendirilmiş: Üst simge

2009. (Please see Annex 1 of the report[43]) As can be seen in the subject report, the lists of all power plants that deliver same capacity within the applicable output range (between 20.0 MW and 60.0 MW) are as listed in the table below:

Project	Installed Capacity (MW)	Project Generation Capacity (GWh)	Primary Generation Capacity (2010) (GWh)	Fuel Type	Company Type
HOPA	50,0	350	241	Fuel Oil	EUAS
SOMA A	44,0	286	245	Lignite	EUAS Affiliates
ALMUS	27,0	100	30	Hydro	EUAS
ÇAMLIGÖZE	32,0	102	68	Hydro	EUAS
DERBENT	56,4	257	150	Hydro	EUAS
KAPULUKAYA	54,0	190	120	Hydro	EUAS
KARACAÖREN-1	32,0	142	60	Hydro	EUAS
KARACAÖREN II	46,4	206	90	Hydro	EUAS
KEMER	48,0	80	45	Hydro	EUAS
MANAVGAT	48,0	220	110	Hydro	EUAS
TORTUM	26,2	100	85	Hydro	EUAS
YENİCE	37,9	122	50	Hydro	EUAS
SEYHAN I	60,0	350	212	Hydro	EUAS
KADINCIK II	56,0	307	165	Hydro	EUAS
KEPEZ I-II	32,4	170	55	Hydro	EUAS
SANLI URFA	51,8	124	85	Hydro	EUAS
HAZAR 1-2	30,1	0	0	?	TOOR
MOPAK (Dalaman)	26,2	106	106	Fuel Oil	Autoproducer
SUPER FİLM	25,3	203	203	Fuel Oil	Autoproducer
TÜPRAŞ İZMİR (ALİAĞA RAF.)	44,0	306	306	Fuel Oil	Autoproducer
TÜPRAŞ (Orta Anadolu-Kırıkkale)	34,0	238	238	Fuel Oil	Autoproducer
KARDEMİR	35,0	300	300	Coal	Autoproducer
KALESERAMİK (Çan.seramik+Kalebodur)	21,6	157	157	N.gas	Autoproducer
KARTONSAN (İzmit)	24,0	192	192	N.gas	Autoproducer
MARMARA PAMUK	43,7	340	340	N.gas	Autoproducer
TÜPRAŞ ALİAĞA	24,7	170	170	N.gas	Autoproducer
YILDIZ SUNTA (Köseköy)	27,8	180	180	N.gas	Autoproducer
BATIÇİM ENERJİ (AK ENERJİ)	45,0	370	370	N.gas	Generation Company
ALİAĞA Çakmaktepe Enerji	34,8	278	278	N.gas	Generation Company
AYEN OSTİM	41,0	348	348	N.gas	Generation Company

[43] http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf

BİL ENERJİ (Ankara)	36,6	255	255	N.gas	Generation Company
CAM İŞ ELEKTRİK (B.Karıştıran)	32,9	270	270	N.gas	Generation Company
CAN ENERJİ	56,3	327	327	N.gas	Generation Company
ÇERKEZKÖY ENERJİ	49,2	403	403	N.gas	Generation Company
DELTA ENERJİ	60,0	467	467	N.gas	Generation Company
GLOBAL ENERJİ (PELİTLİK)	20,3	155	155	N.gas	Generation Company
GÜL ENERJİ	24,3	170	170	N.gas	Generation Company
KEN KİPAŞ KAREN ELEKTRİK	41,8	180	180	N.gas	Generation Company
KAREGE ARGES	43,6	348	348	N.gas	Generation Company
NUH ENERJİ 1 (Nuh Çimento)	38,0	326	326	N.gas	Generation Company
SÖNMEZ ELEKTRİK	34,9	269	269	N.gas	Generation Company
SAHİNLER ENERJİ(ÇORLU/TEKİRDAĞ)	26,0	185	185	N.gas	Generation Company
ZORLU ENERJİ (Sincan)	50,3	429	429	N.gas	Generation Company
ESKİŞEHİR ENDÜSTRİ ENERJİ(OSB)	59,0	452	452	N.gas	Generation Company
ITC KA ENERJİ MAMAK	22,6	170	170	Landfill	Generation Company
AKSA ENERJİ (Hakkari)	24,0	175	175	Fuel Oil	Generation Company
HABAŞ (İzmir)	36,0	288	288	Fuel Oil	Generation Company
KIZILTEPE	34,1	250	250	Fuel Oil	Generation Company
PS3 A-2 (İDİL)	24,4	180	180	Fuel Oil	Generation Company
SİLOPİ ELEKT.ÜRETİM ESENBOĞA	44,8	315	315	Fuel Oil	Generation Company
SİİRT	25,6	190	190	Fuel Oil	Generation Company
AKÇAY	28,8	95	45	Hydro	Generation Company
CEYKAR BAĞIŞLI	29,6	99	47	Hydro	Generation Company
BEREKET (DALAMAN)	37,5	179	179	Hydro	Generation Company
BEREKET (MENTAŞ)	39,9	163	140	Hydro	Generation Company
BEREKET (KOYULHİSAR)	42,0	329	155	Hydro	Generation Company
DAREN HES (SEYRANTEPE BARAJI)	49,7	182	161	Hydro	Generation Company
DEĞİRMENÜSTÜ (KAHRAMANMARAŞ)	38,6	106	52	Hydro	Generation Company
ENERJİ SA BİRKAPILI	48,5	171	17	Hydro	Generation Company
EŞEN-II (GÖLTAŞ)	43,4	170	80	Hydro	Generation Company
HİDRO KONTROL YUKARI MANAHOZ	22,4	79	45	Hydro	Generation Company
KALEN ENER. (KALEN I-II)	31,3	104	47	Hydro	Generation Company
TGT EN. LAMAS III-IV	35,7	150	71	Hydro	Generation Company
ÖZGÜR ELEKTR.AZMAK II	24,4	91	43	Hydro	Generation Company
PAMUK (Toroslar)	23,3	112	28	Hydro	Generation Company
SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ)	21,0	96	54	Hydro	Generation Company
SARMAŞIK II HES (FETAŞ FETHİYE ENERJİ)	21,6	108	61	Hydro	Generation Company
TEKTUĞ KARGILIK	23,9	83	19	Hydro	Generation Company
TURKON MNG REŞADİYE III	22,3	175	88	Hydro	Generation Company

UZUNCAYIR	27,3	105	49	Hydro	Generation Company
TÜM EN. PINAR	30,1	138	65	Hydro	Generation Company
KUZGUN ZORLU	20,9	36	0	Hydro	Generation Company
MERCAN ZORLU	20,4	78	48	Hydro	Generation Company
ALİZE ENERJİ (ÇAMSEKİ)	20,8	82	70	Wind	Generation Company
ALİZE ENERJİ (SARIKAYA ŞARKÖY)	28,8	96	82	Wind	Generation Company
ANEMON ENERJİ (İNTEPE)	30,4	92	83	Wind	Generation Company
AYEN ENERJİ (AKBÜK)	31,5	123	104	Wind	Generation Company
BARES (BANDIRMA)	30,0	105	95	Wind	Generation Company
BELEN HATAY	30,0	95	81	Wind	Generation Company
BORASKO BANDIRMA	45,0	179	152	Wind	Generation Company
MARE MANASTIR	39,2	129	129	Wind	Generation Company
MAZI 3	22,5	79	67	Wind	Generation Company
ROTOR OSMANİYE	57,5	218	185	Wind	Generation Company
DATCA RES	29,6	84	71	Wind	Generation Company
ERTÜRK ELEKT. (ÇATALCA)	60,0	210	180	Wind	Generation Company
İNNORES ELEK. YUNTDAĞ	42,5	161	145	Wind	Generation Company
LODOS RES (TAŞOLUK)KEMERBURGAZ	24,0	85	69	Wind	Generation Company
SAYALAR RÜZGAR (DOĞAL ENERJİ)	34,2	108	100	Wind	Generation Company
SOMA RES	45,0	150	127	Wind	Generation Company
GÜRMAT EN.	47,4	313	313	Geothermal	Generation Company

Table 10: *List of all power plants that deliver same capacity within the applicable output range (between 20.0 MW and 60.0 MW)*

Biçimlendirilmiş: Vurgulu

As seen in the table above, the number of all power plants which have installed capacities within the applicable output range (N_{all}) is 90.

Step 3: *Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity (N_{diff}):*

While defining the power plants which have different technologies than the proposed project activity, "***energy source/fuel***" is selected as the main criterion. The above listed power plants have different fuel types such as wind, hydro, lignite, natural gas, fuel oil, coal. Except "BAKI ELEKTRIK SAMLI RUZGAR", all power plants have different technology according to the "energy source/fuel" criterion. As a result, N_{diff} is 74.

Step 4: *Calculate factor representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity:*

The factor F defined in the guideline is calculated with the formula below:

$$F = 1 - N_{diff}/N_{all}$$

As a result, F = 1 – 74/90

~~= 0.18~~

~~Since the factor F is lower than 0.2, the Killik WPP is not a "Common Practice".~~

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The baseline for the project was established through the official methodology of ACM0002 / Version 12.1.0, named "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"[44] as approved by the CDM Executive Board. Also, to prove additionality and to calculate the grid emission factor, the official methodologies: "Tool for the demonstration and assessment of additionality, Version 05.2"[45] and "Tool to calculate the emission factor for an electricity system, Version 01"[46] are used. Last, the consolidated monitoring methodology for grid connected generation from renewable sources named as "Approved Monitoring Methodology ACM0002 / Version 12.1.0 is applied in order to define the monitoring plan.

The project emissions, baseline emissions and emission reductions are calculated as demonstrated in the methodologies:

In order to calculate the emission reductions resulting from the project, first, the baseline emissions are calculated in "7 Steps" as suggested in the "Tool to calculate the emission factor for an electricity system, Version 02" In the first step, the relevant electricity system is defined. In the second step, Option I is chosen, which includes only the grid connected power plants. In the third step, the "Simple OM Method" is selected and in the fourth step the OM Emission factor value is calculated according to the formula (7) of the selected method. When it comes to the Step 5, the power units which are included to the BM Emission Factor calculations are defined as the " The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently." In the sixth step, the BM value is calculated with the formula 13. And last, in Step 7, the combined margin emission factor is calculated as the average of the OM and BM emission factor values (formula 14). Before calculating the BM value, the EF_{EL} values are calculated for each type of power plant according to the fuel used in these plants. To calculate the EF_{EL} values, the fuel specific emission factors (tCO_2/TJ) are converted to "tCO_2/MWh" first. And then, these values are multiplied with the default plant efficiency rates given under Annex I of the tool. (The detail of BM Calculation can be found in Section B.6.3 and Annex 3)

On the other hand, since the project is a wind power plant project and the parameters in the formula (1) of ACM0002 / Version 12.1.0 are not related to the project type, the project emissions are assumed as "0", as suggested in the tool.

Last, baseline emissions are calculated by multiplying annual electricity generation of the project with the grid emission factor (formula 6), as suggested by ACM0002 / Version 12.1.0. Last, the emission reductions are calculated by deducting project emissions from baseline emissions (formula 11 in ACM0002/Version 12.1.0).

[44] http://cdm.unfccc.int/UserManagement/FileStorage/HGY3TLRFPQVM016WA4I7XCZD92KE5S

[45] http://cdm.unfccc.int/EB/016/eb16repan1.pdf

[46] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf

Since there are no project emissions in this project, emission reductions are equal to baseline emissions. (Please see B.6.3. for the calculation details.)

The application of ACM0002 / Version 12.1.0 to Killik WPP is justified because;

- Killik ~~40.5~~40.0 ~~MWe~~ WPP Project is the installation of a grid connected renewable power generation project which adds electricity capacity to the grid from wind power sources and which supplies electricity to a system that is supplied by at least one fossil fuel fired generating unit.
- The project involves construction of new units in a brand new plant, in other words the project does neither involve the addition of renewable energy generation units at an existing renewable power generation facility nor does it foresee to retrofit or modify an expired facility of renewable energy generation.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available;
- The project does not involve switching from fossil fuels to renewable energy at the site of the project activity.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**EGgross, y**
Data unit:	GWh
Description:	Turkey's Gross Electricity Generated by primary energy source for the five most recent years (2005 - 2009).
Source of data used:	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/istatistik2009/32(75-09).xls
Value applied:	Please refer to **Step 3, Table 15 in Section B.6.3**
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Any comment:	-

Data / Parameter:	**$FC_{i,y}$**
Data unit:	Ton (m^3 for Natural Gas)
Description:	Amount of fossil fuel type *i* consumed in the project electricity system in year *y*
Source of data used:	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/istatistik2009/43.xls http://www.teias.gov.tr/istatistik2009/44.xls
Value applied:	Please see **Annex 3**

Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Any comment:	-

Data / Parameter:	**NCV**
Data unit:	TJ/Ton (TJ/m^3 for Natural Gas)
Description:	Net calorific value of fossil fuel type
Source of data used:	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/istatistik2009/45.xls http://www.teias.gov.tr/istatistik2009/46.xls
Value applied:	Please see **Annex 3**
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Any comment:	The conversion factor of 4.187 Joules/Cal is used.

Data / Parameter:	**$EF_{CO_2,i,y}$**
Data unit:	tCO_2/GJ
Description:	Default CO_2 emission factor of fossil fuel type i
Source of data used:	IPCC default values (as provided in Table 1.4, Chapter 1, Volume 2 (Energy), 2006 IPCC) Guidelines for National Greenhouse Gas Inventory) are used. Link: http://www.ipccnggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied:	Please see **Annex 3**
Justification of the choice of data or description of measurement methods and procedures actually applied :	There is no information on the fuel specific default emission factor in Turkey. Hence, IPCC values haves been used as per the "Tool to calculate the emission factor for an electricity system (version 02)".
Any comment:	-

Data / Parameter:	**Electricity Imports**
Data unit:	GWh
Description:	Electricity imported to the Grid from other countries

Source of data used:	Turkish Electricity Transmission Company (TEIAS) http://www.teias.gov.tr/istatistik2009/23.xls
Value applied:	Please refer to the link above for Turkey's electricity imports.
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available.
Any comment:	-

Data / Parameter:	**Capacity additions**
Data unit:	Name of the plant; Installed capacity (MW); Fuel type; Commissioning date.
Description:	Set of power capacity additions in the electricity system that comprise 20% of the system generation (in GWh) and that have been built most recently.
Source of data used:	Turkish Electricity Transmission Company (TEIAS) Generation units put into operation in 2004, 2005, 2006, 2007 and 2008. The Annex 2 of TEIAS Capacity Projection Reports for years 2008, 2007, 2006, 2005 and 2004 are applied for the capacity additions: *http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202005.pdf* for year 2004. *http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202006.pdf* for year 2005. *http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf* for year 2006 *http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU200.pdf* for year 2007 *http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU200.pdf* for year 2008
Value applied:	Please refer to **Annex 3** for Capacity Additions
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, hence providing the most up-to-date and accurate information available.
Any comment:	-

B.6.3. Ex-ante calculation of emission reductions:

While developing the baseline and calculation the emission reductions, the approved methodology "Tool to Calculate the Emission Factor for an Electricity System, (Version 02)" is used. The calculation details are as follows:

STEP 1: Identify the relevant electricity system

The project electricity system is defined as "the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints" in the "Tool to calculate the emission factor for an electricity system, Version 02" page 3. 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" in the same document."

In the project's case "the project electricity system" and "the connected system" are same. As also confirmed by TEIAS (Turkish Electricity Transmission Company Inc.), the Turkish transmission system is interconnected. There is an independent regional grid system neither in Bursa, Balikesir nor in Marmara Region.

In addition to this, since there is no DNA in the host country to delineate the project electricity system, the suggested criterion in "Tool to calculate the emission factor for an electricity system, Version 02" was used. According to this, 1-The capacity usage figure for the transmission line should be checked. 2-Spot market prices of different systems in the country should be compared.

Since there is no capacity usage figure for transmission line published, the criteria "The transmission line is operated at 90% or more of its rated capacity during 90% percent or more of the hours of the year." could not be proved.

On the other hand, there is no spot electricity market available in the country as suggested in the other criteria "In case of electricity systems with spot markets for electricity: there are differences in electricity prices (without transmission and distribution costs) of more than 5 percent between the systems during 60 percent or more of the hours of the year." Therefore, this criterion is not applicable as well.

As suggested in "Tool to calculate the emission factor for an electricity system, Version 02", "if these criteria do not result in a clear grid boundary, use a regional grid definition in the case of large countries with layered dispatch systems (e.g. provincial / regional / national)." However, there are no layered dispatch systems in the host country. As a result the national grid was used as the project electricity system. Hence, the estimation of OM (Operating Margin) and BM (Built Margin) are based on the definition of the Turkish electricity network as one single interconnected system.

The interconnected electricity transmission grid of Turkey is as shown below:

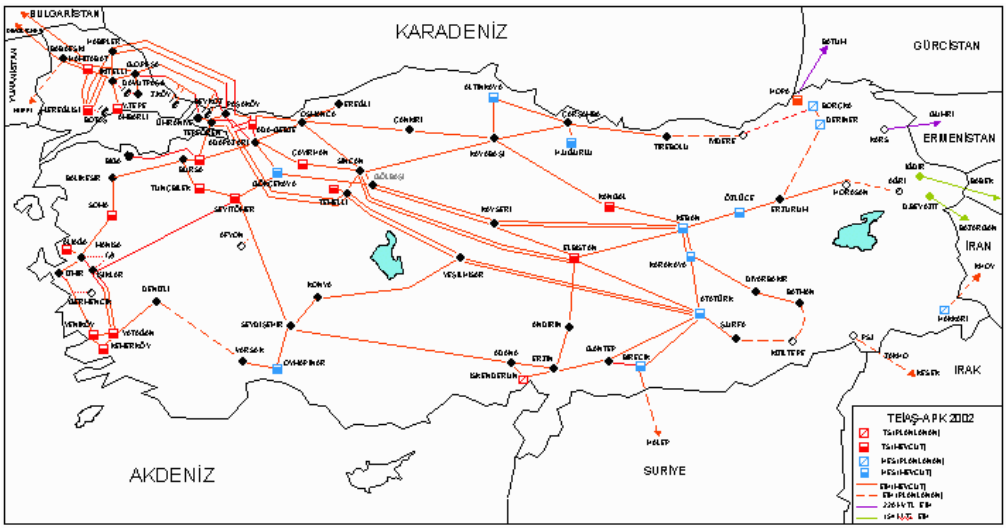


Figure 3: *Turkey's Electricity Transmission Grid*[47]

The electricity produced in any power plant is transmitted to the national grid and the produced electricity is distributed to the consumers via the local distribution companies. Turkey is divided into 21 regions for the distribution of the electricity. The electricity distribution regions of the country are as shown in the figure and the table below[48]:

Figure 4: *Electricity Distribution Regions on Turkey Map*

[47] http://www.geni.org/globalenergy/library/national_energy_grid/turkey/turkishnationalelectricitygrid.shtml

[48] http://kojenerasyon.com/duyurular/2005/03/09/0.htm

REGION NO	PROVINCES INCLUDED IN THE REGION	REGION CENTRE	REGION NAME
1	Batman, Diyarbakır, Mardin, Siirt, Şanlıurfa, Şırnak	Diyarbakır	Dicle Electricity Distribution Company (Dicle EDAS)
2	Bitlis, Hakkari, Muş, Van	Van	Vangölü Electricity Distribution Company (Vangölü EDAS)
3	Ağrı, Ardahan, Bayburt, Erzincan, Erzurum, Iğdır, Kars	Erzurum	Aras Electricity Distribution Company (Aras EDAS)
4	Artvin, Giresun, Gümüşhane, Rize, Trabzon	Trabzon	Çoruh Electricity Distribution Company (Coruh EDAS)
5	Bingöl, Elazığ, Malatya, Tunceli	Elazığ	Fırat Electricity Distribution Company (Firat EDAS)
6	Sivas, Tokat, Yozgat	Sivas	Çamlıbel Electricity Distribution Company (Camlibel EDAS)
7	Adana, Gaziantep, Hatay, Kilis, Mersin, Osmaniye	Adana	Toroslar Electricity Distribution Company (Toroslar EDAS)
8	Konya, Karaman, Kırşehir, Nevşehir, Niğde Aksaray	Konya	Meram Electricity Distribution Company (Meram EDAS)
9	Ankara, Bartın, Çankırı, Karabük, Kastamonu, Kırıkkale, Zonguldak	Ankara	Başkent Electricity Distribution Company (Baskent EDAS)
10	Antalya, Burdur, Isparta	Antalya	Akdeniz Electricity Distribution Company (Akdeniz EDAS)
11	İzmir, Manisa	İzmir	Gediz Electricity Distribution Company (Gediz EDAS)
12	Balıkesir, Bursa, Çanakkale, Yalova	Bursa	Uludağ Electricity Distribution Company (Uludag EDAS)
13	Edirne, Kırklareli, Tekirdağ	Tekirdağ	Trakya Electricity Distribution Company (Trakya EDAS)
14	İstanbul Anadolu Yakası	İstanbul Anadolu Yakası	İstanbul Anadolu Yakası Electricity Distribution Company (AYEDAS)
15	Bolu, Düzce, Kocaeli, Sakarya	Sakarya	Sakarya Electricity Distribution Company (Sakarya EDAS)
16	Afyon, Bilecik, Eskişehir, Kütahya, Uşak	Eskişehir	Osmangazi Electricity Distribution Company (Osmangazi EDAS)
17	İstanbul Avrupa Yakası	İstanbul Avrupa Yakası	Boğaziçi Electricity Distribution Company (BEDAS)
19	Aydın, Denizli, Muğla	Denizli	Menderes Electricity Distribution Company (Menderes EDAS)
20	Adıyaman, Kahramanmaraş	Kahramanmaraş	Göksu Electricity Distribution Company (Goksu EDAS)
21	Amasya, Çorum, Ordu, Samsun, Sinop	Samsun	Yeşilırmak Electricity Distribution Company (Yesilirmak EDAS)

Table 164: *Electricity Distribution Regions of Turkey*

For each project which is connected to Turkey's national grid transmits its electricity to the national grid and sell the produced electricity to the Electricity Distribution Company in the region or to big consumers via bilateral agreements. Also, in Killik project case, the electricity produced in the power plant will be transmitted to the Turkey's national grid physically and the produced electricity will be sold to Camlıbel Electricity Distribution Company (Camlıbel EDAS), if the company does not enter into bilateral contracts with a big electricity consumer.

STEP 2: Choose whether to include 0ff-grid power plants in the project electricity system

According to "Tool to calculate the emission factor for an electricity system, Version 02", the OM and BM values can be calculated based on the following two options:

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.

Option I is selected in the calculation of Built Margin and Operating Margin for the proposed project activity. The reason why the tool suggests the Option II is, "in some countries off-grid power generation is significant and can partially be dispatched by CDM project activities, e.g. if off-grid power plants are operated due to an unreliable and unstable electricity grid."

As Turkey's grid is more appropriate for calculating the OM and BM values according to Option I, this option is selected.

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

According to "Tool to calculate the emission factor for an electricity system, Version 02", four alternative methods to calculate OM can be chosen. In choosing the right method for the calculation of OM, "Simple adjusted OM", "Dispatch data analysis OM" and "Average OM" methods are eliminated since all these methods require power plant specific information of power plants which are connected to the grid. However, no power plant specific information is available. Similarly, option A and option B of "Simple OM" methods were also eliminated as again there is no power plant specific data is publicly available.

All in all, option C of "Simple OM" method was adopted as "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" is the only available data in the host country.

Simple OM option C method is eligible when low cost and/or must run resources constitute, as an average of the five most recent years, less than 50 percent of the total generation for the grid. Nevertheless, the only relevant low operating cost and must run resource in Turkey is hydropower because the share of all other renewable resources is close to nil and therefore can be assumed negligible. The share of all non-hydro renewable resources in the entire electricity generation is 1% for the five most recent years (between 2005 and 2009). There is no example of coal being used as must-run and nuclear energy is not practiced in Turkey.

As it can be seen in the electricity generation statistics of TEIAS [49] and as depicted in Table 13 [50] the share of low-cost/must run resources (including hydroelectric, wind and geothermal) were never higher than 50% not only between 2005 and 2009, but also for last two decades (since 1989).

[49] http://www.teias.gov.tr/istatistik2009/32(75-09).xls

	2005	2006	2007	2008	2009
Turkey's Gross Electiricity Production (GWh)	161.956	176.300	191.558	198.418	194.813
~~Electricity Production From Hydro (GWh)~~	~~39.561~~	~~44.244~~	~~35.851~~	~~33.270~~	~~35.958~~
Electricity Production From Wind & Geothermal (GWh)	153	221	511	1.009	1.931
Total share of renewables (%)	25%	25%	19%	17%	19%

	2005	2006	2007	2008	2009
Turkey's Gross Electiricity Production (GWh)	161,956	176,300	191,558	198,418	194,813
Electricity Production From Hydro (GWh)	39,561	44,244	35,851	33,270	35,958
Electricity Production from Wind and Geothermal (Gwh)	153	221	511	1,009	1,931
Share (%)	25%	25%	19%	17%	19%

Biçimlendirilmiş: İki Yana Yasla

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Arial, 10 nk

Table 1~~7~~5: *Share of hydroelectric, wind and geothermal production in Turkey, 2005 – 2009*

Step 4: Calculate the operating margin emission factor according to the selected method

The Simple Operating Margin Emission Factor ($EF_{OM,y}$) is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO_2 /MWh) of all generating power plants serving the system, not including low-cost/must run power plants/units as determined by the Baseline Methodology.

According to "Tool to calculate the emission factor for an electricity system, Version 02", the formula given below is applied for computing the $EF_{grid,OMsimple,y}$.

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

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

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO2 emission factor in year y (tCO2/MWh)
FCi,y	=	Amount of fossil fuel type i consumed in the project electricity system in ye (mass or volume unit)
NCVi,y	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mas volume unit)
EFCO2,i,y	=	CO2 emission factor of fossil fuel type i in year y (tCO2/GJ)
EGy	=	Net electricity generated and delivered to the grid by all power sources serving system, not including low-cost / must-run power plants / units, in year y (MW
i	=	All fossil fuel types combusted in power sources in the project electricity sys in year y

[50] All data presented in the baseline calculations are provided from official sources as mentioned in related footnotes. Therefore, uncertainties of data sets were not estimated.

y	=	Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

In order to calculate the emission amounts from each fuel types, emission factors from IPCC website were used.[51] Three sets of emission factors were identified as minimum, medium and maximum values. To be conservative side, the minimum values are used in the OM calculations.

	kg CO_2/GJ			Default Carbon Oxidation Factor
	min	mid	max	
hard coal	92,8	96,1	100,0	1,0
lignite	90,9	101,0	115,0	1,0
fuel oil	75,5	77,4	78,8	1,0
diesel oil	72,6	74,1	74,8	1,0
natural gas	54,3	56,1	58,3	1,0
lpg	61,6	63,1	65,6	1,0
naphta	69,3	73,3	76,3	1,0

	kg CO_2/GJ			Default Carbon Oxidation Factor
	min	mid	max	
hard coal	92.8	96.1	100.0	1.0
lignite	90.9	101.0	115.0	1.0
fuel oil	75.5	77.4	78.8	1.0
diesel oil	72.6	74.1	74.8	1.0
natural gas	54.3	56.1	58.3	1.0
lpg	61.6	63.1	65.6	1.0
naphta	69.3	73.3	76.3	1.0

Table 1~~8~~6: *Emission factors from IPCC*

Turkey's GHG Emissions Inventories for year 2007 and 2008 are announced by Turkish Statistical Institute (TUIK). However, to be on the conservative side, CO2 emissions figures from electricity production are not taken from these announced figures, as the calculation method is not known and these figures are a bit higher than the calculated figures.[52],[53], [54] As a result, for years 2007, 2008 and 2009, the CO2 emissions are calculated with the IPCC minimum values:

[51] *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction, Table 1.4* (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

[52] http://www.tuik.gov.tr/PreHaberBultenleri.do?id=4078

[53] http://www.tuik.gov.tr/PreHaberBultenleri.do?id=6333

	2007	2008	2009
~~CO_2 Emmission from Electricity~~ Production (tons)	98.352.660	104.062.368	98.532.497

	2007	2008	2009
CO_2 Emmission from Electricity Production (tons)	98,352,660	104,062,368	98,532,479

Biçimlendirilmiş: İki Yana Yasla

Table 19~~17~~: *CO_2 Emissions of Turkey from Electricity Production*

The calculation of net electricity production is demonstrated below. [55] As the efficiency factor from gross to net electricity for thermal resources is not known, the overall relation between gross and net electricity production is assumed to be the same for thermal production. Table 16 shows the overall gross/net relation where the estimated net electricity production from thermal resources were calculated by using the same relation.

	2007	2008	2009
Gross Electricity Production (a)	191,558	198,418	194,813
Net Electricity Production (b)	183,340	189,762	186,619
Net/Gross (c=b/a)	0.957	0.956	0.958
Gross Electricity Production from thermal sources (d)	155,196	164,139	156,923
Net Electricity Production from thermal sources (c*d)	148,538	156,979	150,323

Biçimlendirilmiş Tablo

	2007	2008	2009
Gross Electricity Production (a)	191.558	198.418	194.813
Net Electricity Production (b)	183.340	189.762	186.619
Net/Gross (c= a/b)	0,957	0,956	0,958
Gross Electricity Production from thermal sources (d)	155.196	164.139	156.923
Net Electricity Production from thermal sources (c*d)	148.538	156.979	150.323

Table 20~~18~~: *Net Electricity Production of Turkey from Thermal Sources*

Obviously, using the same relation for both overall electricity production and thermal production is an approximation based on a rough assumption. Yet, obviously, such assumption results in a very conservative estimation because the efficiency of thermal plants is much lower than other plants as the operational consumption in those plants are relatively higher and this would only lead to a lower net electricity generation with higher OM emission factor and higher emission reductions.

With respect to the Baseline Methodology, electricity import amount is added to the domestic supply where the imports from connected grids located in other countries are weighted with an emission factor of zero tCO_2/MWh.

The last part of Step 1 is calculating the ratio of emissions and generation as follows:

[54] http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=488

[55] http://www.teias.gov.tr/istatistik2009/30(84-09).xls

	2007	2008	2009
OM (MWh/tCO2)	0.6631	0.6638	0.6555

	2007	2008	2009
OM (MWh/tCO_2)	0,6631	0,6638	0,6555

Table 2~~19~~: *OM Emission Factor for 2007 – 2009*

Biçimlendirilmiş Tablo

Biçimlendirilmiş: Ortadan

Biçimlendirilmiş: Ortadan

Biçimlendirilmiş: Ortadan

According to the methodology, two data vintages are allowed for the calculation of the OM emission factor, ex-ante and ex-post:

- Ex-ante: A 3-year average, based on the most recent statistics available at the time of PDD submission
- Ex-post: The year in which project generation occurs, if the OM emission factor is updated based on ex-post monitoring

In this case, the ex-ante approach is preferred because the data is available and it is a conservative approach due to the forecast that the weight of fossil fuel use in the generation of electricity in Turkey will increase.

As the weighted average of the figures between 2007 and 2009 is computed, the OM emission factor is 0.6608 tCO_2 / MWh.

STEP 5: Identify the group of power units to be included in the build margin

Computing the BM is based on the sample of plants, in either of the two proposed ways:

(a) The set of five power units that have been built most recently, or
(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Among these two options, the sample group that comprises the larger annual generation should be used.

The data for the recently built power plants is available for their capacity, type of utility in terms of IPP, auto-producer, BOT, fuel type and date of commissioning. According to the data:

- The total annual production of the five plants that have been built most recently is 1,842.3 GWh. Such capacity represents approximately 0.93 percent of the overall electricity generation capacity in Turkey which is in the amount of 198.4 TWh. Obviously, this is far below the 20 percent threshold proposed by the methodology.
- Instead, the Build Margin could also be computed by using the most recent capacity additions that comprise the 20 percent of the total system generation. This corresponds to 39.7 TWh which is 20 percent of the overall generation of 198.4 TWh in year 2008.

The tables in Annex 3 display the details of generations from those plants in specific.

STEP 6: Calculate the build margin emission factor [56]

According to the Baseline Methodology, the Build Margin (BM) Emission Factor EF_{BM} is calculated as the generation-weighted average emission factor of a sample of power plants m for a specific year, as follows:

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

Where:

$EF_{grid, BM, y}$	Build margin CO_2 emission 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 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

There is no available CO2 emission data for the power units included in the BM calculation. The available data for on plant basis is the name, type, installed capacity and annual electricity production figures of these facilities. However, there is no available data for the electricity production figures of some small facilities, most probably because these projects are included in the "Other Projects". Therefore, annual electricity productions of these facilities were calculated with the following formula unless the exact production figures are reached. The data used in the BM calculation is provided from the Turkey's Capacity Projection Reports published in years: 2009[57], 2008[58], 2007[59], 2006[60] and 2005[61].

$EG_{m,y}$= Full Load Working Hours x Installed Capacity

In addition to this, the efficiency rates for the fuel consumption of these facilities should be added to the calculation (as the thermal plants do not consume 100% of the fuel which they are fed with). Within the context of the calculation in this document, higher the efficiency figure means lower the CO_2 emissions (as the electricity calculation assumes that the electricity production is a function of the designed installed capacity not the efficiency. However, in theory the installed capacity of a plant increases with the higher efficiency).

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[56] *Since the plant based data for the power plants which were commissioned in year 2009 has not been published yet, the BM Emission Factor calculations were made based on the power plants which were commissioned in 2004, 2005, 2006, 2007 and 2008.*

[57] http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf

[58] http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf

[59] http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf

[60] http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202006.pdf

[61] http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202005.pdf

Therefore, in the calculation of the $EF_{grid, BM, y}$, first $EF_{EL,m,y}$ values are calculated by using the formula (4) as suggestd in the tool. Also, to calculate the $EF_{EL,m,y}$ values, the default efficiency figures listed under the "Appendix-1: Default efficiency factors for power plants" are used.

	Grid Power Plants	
Generation Technology	**Old Units (before and in 2000)**	**New units (after 2000)**
Coal	-	-
Subcritical	37%	39%
Supercritical	-	45%
Ultra-upercritical	-	50%
IGCC	-	50%
FBS	35.5%	-
CFBS	36.5%	40.0%
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%

Grid Power Plants		
Generation Technology	**Old Units (before and in 2000)**	**New units (after 2000)**
Coal	-	-
Subcritical	37%	39%
Supercritical	-	45%
Ultra-upercritical	-	50%
IGCC	-	50%
FBS	35,5%	-
CFBS	36,5%	40,0%
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%

Table 2~~0~~: *Default Efficiency Factors for power plants (Appendix 1 of the tool)*

As seen in the table above, the efficiency figures of coal, oil and natural gas, for different generation technologies, are given in the tool. In Turkey, the generation technologies for natural gas and oil is "Combined cycle" and for coal "Subcritical". Since the default values for lpg and naphta are not given in the tool, to be on the conservative side, ~~the efficiency factors of these fuel types are calculated with the available data provided on TEIAS web site.~~
the efficiency factors of these fuel types are assumed as 60% (equal to the highest efficiency figure / Efficiency figure for Natural Gas-Combined Cycle).

As a result, in line with the tool, the efficiency factors for each fuel type are assumed as presented in the table below:

Fuel Type	Generation Technology	Efficiency Factor
hard coal	Coal - Subcritical	39%
lignite	Coal - Subcritical	39%
fuel oil	Oil - Combined Cycle	46%
diesel oil	Oil - Combined Cycle	46%
natural gas	Natural Gas - Combined Cycle	60%
lpg	Natural Gas - Combined Cycle	27.2%
naphta	Natural Gas - Combined Cycle	32.5%

Fuel Type	Generation Technology	Efficiency Factor
hard coal	Coal - Subcritical	39%
lignite	Coal - Subcritical	39%
fuel oil	Oil - Combined Cycle	46%
diesel oil	Oil - Combined Cycle	46%
natural gas	Natural Gas - Combined Cycle	60%
lpg	Natural Gas - Combined Cycle	60%
naphta	Natural Gas - Combined Cycle	60%

Table 2~~3~~: *Efficiency Factors used for BM Emission Factor Calculation*

The Build Margin estimation is based on the emission factors calculated for each energy source.

Fuel Specific Emission Factors

Carbon content factors for each fuel type (tC/TJ) refer to the factors stated in "2006 IPCC Guidelines for National Greenhouse Gas Inventories" and the fuel specific CO2 emission factors were estimated from the same factors. To be on the conservative side, minimum emission factors were used in the calculation.

Electric Efficiency Rates

Default efficiency factors given in the tool. (Please see table 20)

Equivalent Electricity Generation

The equivalent electricity generation for each fuel type j out of the most recent 20 percent plants is calculated as follow:

Average Running Hours (Hours): For each specific fuel type, average running hours of similar facilities in Turkey for the year 2008, 2007, 2006 and 2005. Relevant figures were calculated based on the installed capacity and electricity production figures. On the other hand EUAS announces the electricity production figures of its facilities in each year. For these facilities actual figures were used.

Installed Capacity (MW): Total installed capacities of facilities run by similar fuel types for the period between January 8th, 2004 and December 31st, 2008.

Electricity Production (GWh): The announced electricity production figures of the facilities which were commissioned in the period between January 8th, 2004 and December 31st, 2008. And, multiplication of running hours and installed capacity for each fuel type, unless the energy production figures are not reached.

The computations display a weighted Build Margin emission factor of 0.4606 tCO_2 / MWh..

STEP 7: Calculate the combined margin emissions factor

The baseline emission factor is the weighted average of the Operating Margin Emission Factor and Build Margin Emission Factor. The formula is:

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

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

The default values recommended by Methodological tool: "Tool to calculate the emission factor for an electricity system, Version 02" for w_{OM} and w_{BM} for activities for wind and solar power generation projects are 0.75 and 0.25, respectively. Therefore, for Killik WPP:

$$\mathbf{EF_{grid,\,CM,\,y} = 0.6608 \times 0.75 + 0.4606 \times 0.25}$$

Therefore resulting $EF_{grid,CM,y}$ is 0,610763530772581 tCO_2/MWh

Please refer to Section "**B.4.Description of baseline and its development" for** the details of the baseline calculation. Also, the details of the calculation of the project emissions are as follows:

Project emissions

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y =	Project emissions in year y (tCO2e/yr)
$PE_{FF,y}$ =	Project emissions from fossil fuel consumption in year y (tCO2/yr)
$PE_{GP,y}$ =	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO2e/yr)
$PE_{HP,y}$ =	Project emissions from water reservoirs of hydro power plants in year y (tCO2e/yr)

All these parameters ($PE_{FF,y}$, $PE_{GP,y}$ and $PE_{HP,y}$) are irrelevant with the project activity and therefore assumed "0", as the proposed project activity is a new grid-connected wind power plant. Therefore, PE_y is assumed to be 0 as suggested in ACM0002 / Version 12.1.0.

Accordingly the baseline emissions BE_y are calculated as following:

$$BE_y = (EG_y - EG_{baseline}) \times EF_{grid, CM, y}$$

Where:

BEy : Baseline emissions (tCO2e)
EGy : Annual electricity supplied by the project to the grid (MWh)
EGbaseline : Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero.
EFgrid, CM, y : Baseline emission factor (tCO2e/MWh)
y : Refers to a given year

EG_y = 85,658 MWh/year

$EG_{baseline}$ = 0 (The figure is zero for the project as the project is new)

Therefore, the expected baseline emission for the full year production of the project is:

BE_y = 0,610763530772581 x (55,658 – 0) = ~~52,316~~52,087 tCO_2e

Capacity of each turbines	2.5~~0.75~~ MWe
Number of turbines	16~~54~~
Total installed capacity	40.0 MWe
Net electricity delivered to the grid from all windturbines (EG_y)	85,658 MWh
Baseline emission factor (Combined Margin) of Turkish grid (EF_y) EFy = w_{OM} x $EF_{OM,y}$ + W_{BM} x $EF_{BM,y}$	0.6608 x 0.75 + 0.4606 x 0.25 = 0,610763530772581 tCO_2e/MWh
Baseline emissions from all wind turbines (BEy)	85,658 x 0,610763530772581 = ~~52,316~~52,087 tCO_2e/year
Project emissions (PE_y)	0 tCO_2e/year
Leakage emissions (LE_y)	0 tCO_2e/year
Emission reduction (ER_y)	~~52,316~~52,087 tCO_2e/year

***Table 2~~2~~:** Summary of the emission reductions calculation*

B.6.4 Summary of the ex-ante estimation of emission reductions:

The ex-ante emission reductions calculated in Section B.6.3 are as summarised in the table below:

Year	Estimation of project	Estimation of	Estimation of	Estimation of

	activity emission reductions (tonnes CO_2 e)	baseline emission reduction (tonnes CO2 e)	leakage (tonnes CO_2 e)	emission reductions (tonnes CO_2 e)
2011	0	7,635	0	7,635
2012	0	52,087	0	52,087
2013	0	52,087	0	52,087
2014	0	52,087	0	52,087
2015	0	52,087	0	52,087
2016	0	52,087	0	52,087
2017	0	52,087	0	52,087
2018	0	40,671	0	40,671
Total	**0**	**364,610**	**0**	**360,829**

Table 2~~3~~: *Summary of the emission reductions calculation*

B.7. Application of the monitoring methodology and description of the monitoring plan:

All relevant baseline emission factors are defined ex-ante. Please see the baseline estimations - Section B.6.3 - for Operating and Build Margin estimations. Hence, there is only one parameter to be monitored during the project activity.

There will be two meters attached to the power plant for measurement of the generated electricity. One of the meters is main meter and the other is control meter. The role of the second meter is to check if the main meter measures the generated electricity accurately. The recalibration of these equipments will be done in line with the equipment requirements but re-calibration periods are defined by national metrology institutes country by country and in Turkey this period is defined as 10 years. [62] However, the calibration requirement of the meters will be monitored continuously and if there is a measuring difference between these two meters and one of the parties (TEIAS or the company) requests for calibration of the meters, in this case, the meters will be calibrated without waiting for the periodic calibration date. (TEIAS System Usage Agreement, Art 3, B./2./b))[63] This calibration process is done by another third party under the control of TEIAS. The company is not responsible for calibration of the meters in Turkey according to the local standards. In all calculations, the main meter's measurements are used.

The generated electricity will be measured continuously by the meters attached to the facility and reported in a monthly basis. An authorized person from Camlibel EDAŞ will visit the plant at the end of each month and record the generated and consumed electricity by the power plant. After each measurement, a "Monthly Electricity Reading Record ("Sayaç Okuma Tutanağı") signed by both Camlibel EDAS and the company. One of the coppies of the monthly electricity measurement records will be collected and stored in the plant. The plant manager of Killik WPP will be responsible for providing the measurement records which show the monthly electricity generation of the company.

The data will be collected and stored by PEM ENERJİ A.S. not only during the crediting period but also two years after the last issuance of GS VERs to Killik WPP project for that crediting period.

Biçimlendirilmiş: Yazı tipi: Garamond
Biçimlendirilmiş: Yazı tipi: Garamond
Biçimlendirilmiş: Yazı tipi: Garamond, 11 nk
Biçimlendirilmiş: Yazı tipi: Garamond
Biçimlendirilmiş: Yazı tipi: Garamond
Biçimlendirilmiş: Yazı tipi: Garamond
Biçimlendirilmiş: Yazı tipi: Garamond
Biçimlendirilmiş: Yazı tipi: Garamond

[62] *http://www.mevzuat.adalet.gov.tr/html/21179.html*

[63] *www.teias.gov.tr/sistemkullanim1.doc*

In addition, the emission factors are calculated ex-ante for the period of seven years. The combined margin will be recalculated through ACM0002 / Version 12.1.0, any time the crediting period is renewed. Please note that the project is a zero emission generating activity and no particularly sensitive or critical sustainable development indicator was identified.

ID Number	Data Variable	Source of Data	Data Unit	Measured (m) Calculated (c) Estimated (e)	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic or paper)	Comment
1. EGfacility,y	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y	Project activity site	MWh/yr	m	Continuous Measurement and Montly Recording	100%	Electronic and paper	The data will be obtained from the monthly meter readings. "Meter reading document" is already required for the invoicing to TEIAS.

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

~~***Table 24:*** *Data to be Monitored and Monitoring Process*~~

All relevant baseline emission factors are defined ex-ante. Please see the baseline estimations - Section B.6.3 - for Operating and Build Margin estimations. Hence, there are three sets of data to be monitored during the project activity.

The first one is the amount of electricity fed into the grid. There will be two meters attached to the power plant for measurement of the generated electricity. One of the meters is main meter and the other is control meter. The role of the second meter is to check if the main meter measures the generated electricity accurately. The recalibration of these equipments will be done in line with the equipment requirements but re-calibration periods are defined by national metrology institutes country by country and in Turkey this period is defined as 10 years. [64] If there is a measuring difference between these two meters and one of the parties (TEIAS or the company) requests for calibration of the meters, in this case, the meters will be calibrated without waiting for the periodic calibration date. (TEIAS System Usage Agreement, Art 3, B./2./b))[65] This calibration process is done by another third party under the control of TEIAS. The company is not responsible for calibration of the meters in Turkey according to the local standards. In all calculations, the main meter's measurements are used. The generated electricity will be measured continuously and reported in a monthly basis. The plant manager of Killik WPP will be responsible for providing the measurement records which show the monthly electricity generation of the company.

The second data to be monitored is the installed capacity of the project activity. The installed capacity only changes if the project design is changed. If there is any changes in the installed capacity of the project, EMRA has to be informed about this change. The company will report the installed capacity changes in each monitoring period, if there is any and this information will be checked from EMRA website. The plant manager will be responsible to provide the data.

The data will be collected and stored by PEM not only during the crediting period but also two years after the last issuance of GS VERs to Killik WPP project for that crediting period.

[64] ~~http://www.mevzuat.adalet.gov.tr/html/21179.html~~

[65] ~~www.teias.gov.tr/sistemkullanim1.doc~~

The third data, the emission factors are calculated ex-ante for the period of seven years. The combined margin will be recalculated through ACM0002 / Version 12.1.0, any time the crediting period is renewed. Please note that the project is a zero emission generating activity and no particularly sensitive or critical sustainable development indicator was identified.

ID Number	Data Variable	Source of Data	Data Unit	Measured (m) Calculated (c) Estimated (e)	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic or paper)	Comment
1. EGfacility,y	Quantity of net electricity delivered to the grid.	Project activity site	MWh	m	Continiously	100%	Electronic and paper	The data will be obtained from the monthly meter readings. "Meter reading document" is already required for the invoicing
2. CapPJ	Installed capacity of project activity after implementation	Project activity site	W	m	Yearly	100%	Electronic and paper	Data will be obtained from the digital displays on the equipments
3. $EF_{grid,CM,y}$	Combined margin CO2 emision factor for grid connected power generation in	As per the "Tool to calculate the emission factor for an electricity system"	tCO2 / MWh	c	Calculated once for any crediting period	100%	Electronic and paper	Calculated once for any crediting period

Table 2~~6~~4: *Data to be Monitored and Monitoring Process*

B.7.1 Data and parameters monitored:

Details of the parameters which are included to the Monitoring Plan are as shown below:

Data / Parameter:	**Electricity Production / EGfacility,y**
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year
Source of data to:	Project Activity Site (Monthly electricity meter reading records)
Measurement Procedures (if any):	The produced and consumed electricity is continuously measured by the meters attached to the power plant. This continuous measurement is recorded in a monthly basis. The meter measurements are read and checked by the company and the purchaser end of each month and a protocol on the electricity generation amount is signed by both parties. This protocol includes both the produced electricity and the electricity traction from the grid. As a result, net electricity supplied to the grid is calculated.

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş Tablo

Biçimlendirilmiş: Yazı tipi: Garamond, 11 nk

Biçimlendirilmiş: Yazı tipi: Garamond

Monitoring Frequency:	Continuous measurement and monthly recording
QA/QC procedures to be applied:	The quantity of net electricity delivered to the grid will be cross checked with the PMUM records. Calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately.~~Double check with the grid operator~~
Any comment:	N/A

Data Unit / Parameter:	$CapPJ_A$
Data unit:	MWe
Description:	Installed capacity of the wind power plant after the implementation of the project activity
Source of data:	Project site.
Description of measurement methods and procedures to be applied:	Supplier information on the equipment
Frequency of monitoring/recording:	Yearly
Value applied:	40.0
Monitoring equipment:	*N/A*
QA/QC procedures to be applied:	Supplier information on the related equipment and the existence of the equipment will be checked. Also, this information may be checked from EMRA website.
Calculation method:	N/A
Any comment:	-

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, Kalın Değil, Üst simge/Alt simgeAltı kesik çiziliDeğil

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, Kalın Değil

Biçimlendirilmiş Tablo

Table 2~~7~~5: *Data and Parameters to be monitored*

~~Details of the parameters which are included to the Monitoring Plan are as shown in the tables below:~~

~~**Data / Parameter:**~~	~~**Electricity Production / $EG_{facility,y}$**~~
~~Data unit:~~	~~kWh~~
~~Description:~~	~~Quantity of net electricity delivered to the grid~~
~~Source of data to be used:~~	~~Monthly Invoice~~
~~Value of data applied for the purpose of calculating expected emission reductions in section B.5~~	~~85,657,500 kWh~~
~~Description of measurement methods and procedures to be applied:~~	~~TEIAS readings and monthly invoices~~
~~QA/QC procedures to be applied:~~	~~Double check with the grid operator~~

Any comment:	N/A

Data / Parameter:	**Installed Capacity / Cap_{PJ}**
Data unit:	W
Description:	Installed Capacity of the power plant after the implementation of the project activity
Source of data to be used:	Project Site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	40,500,000 W
Description of measurement methods and procedures to be applied:	Supplier information on the equipment
QA/QC procedures to be applied:	Supplier information on the related equipment and the existence of the equipment will be checked. Also, this information may be checked from EMRA website.
Any comment:	N/A

Data / Parameter:	**Combined Margin CO2 Emission Factor / $EF_{grid,CM,y}$**
Data unit:	tCO2 / MWh
Description:	Combined margin emission factor for grid connected power generation in year y calculated using the latest version of "Tool to calculated the emission factor for an electricity system"
Source of data to be used:	As per the "Tool to calculate the emission factor for an electricity system"
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0,610763530772581 tCO2/MWh
Description of measurement methods and procedures to be applied:	As per the "Tool to calculate the emission factor for an electricity system"
QA/QC procedures to be applied:	As per the "Tool to calculate the emission factor for an electricity system"
Any comment:	To be calculated once for each crediting period

Table 25: *Data and Parameters to be monitored*

B.7.2. Description of the monitoring plan:

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the proposed Project within the crediting period is complete, consistent, clear and accurate.

The project is operated by PEM Enerji A.S. which ensures the overall site management in accordance with Turkish Laws and technology providers' guidelines.

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk

The approved baseline and monitoring methodology ACM0002-Version 12 1.0: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" ("ACM0002") is applied[66].

The plant management of PEM ENERJİ A.S. is responsible with all monitoring and reporting issues in general. The plant manager will be responsible to control the electricity measurements with the authorized person from Camlibel EDAS and store the monthly electricity measurement records in the power plant for the calculation of emission reductions at the end of each monitoring period. *(Please also see Section B.7)*

Data	Uncertainty Level of Data (High/Medium/Low)	Explain QA/QC Procedures Planned for this Data or why such procedures are not necessary
Quantity of net electricity generation supplied by the project activity in year y	Low	The metering equipment will properly be calibrated and checked periodically for accuracy, to ensure that any error resulting from such equipment shall not exceed +0.2% of full scale rating. Rules for meter accuracy are stated in the TEIAS connection agreement. In addition to the main meter, a second meter will be installed to exclude the possibility of data loss.
Installed capacity of the wind power plant after the implementation of the project activity	Low	The total installed capacity is equal to the installed capacities of all the turbines. The installed capacity of the project activity shall be monitored from the supplier's related documents.

Data	Uncertainty Level of Data (High/Medium/Low)	Explain QA/QC Procedures Planned for this Data or why such procedures are not necessary
Quantity of net electricity generation supplied by the project plant/unit to the grid in year y	Low	The metering equipment will be properly calibrated and checked periodically for accuracy, to ensure that any error resulting from such equipment shall not exceed +0.2% of full scale rating. Rules for meter accuracy are stated in the TEIAS connection agreement. In addition to the main meter, a redundant meter will be installed to exclude the possibility of data loss.

~~***Table 26:*** *Quality Control of Monitoring*~~

Each monitoring period is planned to last one year. At the end of each period, the annual net electricity generation will be calculated as an accumulation of monthly readings over the year. The total amount of the

[66] Available at: http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_YOYKBRCBIK7TSPSB7MQT75SPX75PE8

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İtalik Değil, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Varsayılan Paragraf Yazı Tipi, Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İtalik Değil, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

Biçimlendirilmiş: Yazı tipi: Garamond

net electricity generation of that period will then be multiplied with the combined emission factor. An excel sheet that also includes the estimation of the combined emission factor will be used to calculate the amount of ERs through the multiplication of net electricity generated and combined emission factor. Thus, a transparent and traceable baseline approach and ER calculation will be provided. The kWh invoice from PEM ENERJİ A.S. to the purchasers will be cross-checked with metering as well.

Biçimlendirilmiş: Yazı tipi: Garamond

Data	Uncertainty Level of Data (High/Medium/Low)	Explain QA/QC Procedures Planned for this Data or why such procedures are not necessary
Quantity of net electricity delivered to the grid	Low	The metering equipment will be properly calibrated and checked periodically for accuracy, to ensure that any error resulting from such equipment shall not exceed +0.2% of full scale rating. Rules for meter accuracy are stated in the TEIAS connection agreement. In addition to the main meter, a redundant meter will be installed to exclude the possibility of data loss.
Combined margin CO2 emision factor for grid connected power generation in year *y*	Low	Combined margin CO2 emission factor for grid connected power generation in year y is calculated according to the methodology and validated by the DOE. For each crediting period, the data is recalculated.
Installed capacity of the project after the implementation	Low	The installed capacity of the project is equal to the total installed capacities of the equipment implemented at the beginning of the project's life. The installed capacity will be monitoredfrom supplier's documents related to the equipment.

***Table 2~~8~~6:** Quality Control of Monitoring*

Each monitoring period is planned to last one year. At the end of each period, the installed capacity will be checked from the information provided by the company and on site visits and the annual net electricity generation will be calculated as an accumulation of monthly readings over the year. The total amount of the net electricity generation of that period will then be multiplied with the combined emission factor. An excel sheet that also includes the estimation of the combined emission factor will be used to calculate the amount of ERs through the multiplication of net electricity generated and combined emission factor. Thus, a transparent and traceable baseline approach and ER calculation will be provided. The kwh invoice from PEM to the purchasers will be cross-checked with metering as well.

The plant management of PEM is responsible with all monitoring and reporting issues in general.

Measuring

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, Kalın Değil, İtalik Değil, İngilizce (ABD)

All relevant baseline emission factors are defined ex-ante. Please see the baseline estimations - Section 3.1 - for Operating and Build Margin estimations. Hence, there are three sets of data to be monitored during the project activity.

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

The first one is the amount of electricity fed into the grid. There will be two meters attached to the power plant for measurement of the generated electricity. One of the meters is main meter and the other is control meter. The role of the second meter is to check if the main meter measures the generated electricity accurately. The recalibration of these equipments will be done in line with the equipment requirements but re-calibration periods are defined by national metrology institutes country by country and in Turkey this

period is defined as 10 years. [67] If there is a measuring difference between these two meters and one of the parties (TEIAS or the company) requests for calibration of the meters, in this case, the meters will be calibrated without waiting for the periodic calibration date. (TEIAS System Usage Agreement, Art 3, B./2./b))68 This calibration process is done by another third party under the control of TEIAS. The company is not responsible for calibration of the meters in Turkey according to the local standards. In all calculations, the main meter's measurements are used. The generated electricity will be measured continuously and reported in a monthly basis. The plant manager of Killik WPP will be responsible for providing the measurement records which show the monthly electricity generation of the company. The quantity of net electricity delivered to the grid will be also cross checked with the PMUM records. The project developer is not responsible for the transmission losses; therefore transmission losses are not included. During the each monitoring period, the invoices will be presented to the DOE, together with the calculation details. All production figures which are subject to sales to the grid are agreed with PMUM (Market Financial Reconciliation Center). These figures can be accesses from PMUM's web site by the seller. Therefore, net electricity sales figures announced by PMUM will be used in emission calculation figures. These figures will also be cross checked with the production and usage figures provided by the project owner during the onsite visit.

The Electrical Engineers will receive sufficient and continuous training in terms of monitoring and verification on aspects such as meter's reading and calibration and reading's recording, adjustment and reporting every year. If new personnel are hired, they will have to follow up a training program and will be trained in the specific skills required to carry out the Monitoring Plan.

All relevant baseline emission factors are defined ex-ante. Please see the baseline estimations - Section 3.1 - for Operating and Build Margin estimations. Hence, there are three sets of data to be monitored during the project activity.

The first one is the amount of electricity fed into the grid. There will be two meters attached to the power plant for measurement of the generated electricity. One of the meters is main meter and the other is control meter. The role of the second meter is to check if the main meter measures the generated electricity accurately. The recalibration of these equipments will be done in line with the equipment requirements but re-calibration periods are defined by national metrology institutes country by country and in Turkey this period is defined as 10 years. 69 If there is a measuring difference between these two meters and one of the parties (TEIAS or the company) requests for calibration of the meters, in this case, the meters will be calibrated without waiting for the periodic calibration date. (TEIAS System Usage Agreement, Art 3, B./2./b))[70] This calibration process is done by another third party under the control of TEIAS. The company is not responsible for calibration of the meters in Turkey according to the local standards. In all calculations, the main meter's measurements are used. The generated electricity will be measured continuously and reported in a monthly basis. The plant manager of Eglence HEPP will be responsible for providing the measurement records which show the monthly electricity generation of the company. The quantity of net electricity

[67] *http://www.mevzuat.adalet.gov.tr/html/21179.html*

[68] *www.teias.gov.tr/sistemkullanim1.doc*

[69] *http://www.mevzuat.adalet.gov.tr/html/21179.html*

[70] *www.teias.gov.tr/sistemkullanim1.doc*

Biçimlendirilmiş: Üst simge

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Varsayılan Paragraf Yazı Tipi, Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Varsayılan Paragraf Yazı Tipi, Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD), Üst simge

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

delivered to the grid will be also cross checked with the PMUM records. The project developer is not responsible for the transmission losses; therefore transmission losses are not included. During the each monitoring period, the invoices will be presented to the DOE, together with the calculation details. All production figures which are subject to sales to the grid are agreed with PMUM (Market Financial Reconciliation Center). These figures can be accesses from PMUM's web site by the seller. Therefore, net electricity sales figures announced by PMUM will be used in emission calculation figures. These figures will also be cross checked with the production and usage figures provided by the project owner during the on site visit.

The Electrical Engineers will receive sufficient and continuous training in terms of monitoring and verification on aspects such as meter's reading and calibration and reading's recording, adjustment and reporting every year. If new personnel are hired, they will have to follow up a training program and will be trained in the specific skills required to carry out the Monitoring Plan.

The second data to be monitored is the installed capacity of the project activity. The installed capacity only changes if the project design is changed. If there are any changes regarding the installed capacity of the project, EMRA has to be informed about this change. The company will report the installed capacity changes in each monitoring period, if there is any and this information will be checked from EMRA website. The plant manager will be responsible to provide the data.

The data will be collected and stored by PEM Enerji not only during the crediting period but also two years after the last issuance of GS VERs to Killik WPP project for that crediting period.

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, 11 nk, İngilizce (ABD)

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

The application of the baseline study and the monitoring methodology was completed on 08/03/2011.

Name of person/entity determining the monitoring methodology

Gürkan BAYRAKTAR

GAIA Finansal Danismanlik, Turkey
Tel: 0090 (0) 212 244 4243
Fax: 0090 (0) 212 244 4245
Email: info@gaiacf.com

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

Starting date of the project activity is the ~~commissioning~~ date agreement with the contractors for Excavation And Ground Works and Energy Transmission Line constructions ~~date of the power plant~~ which is ~~Octo~~September 24th, 2010.

C.1.2. Expected operational lifetime of the project activity:

The expected lifetime of the Killik WPP project ~~is the license duration~~45 years 9 months which is the rest license duration ~~(~~starting ~~from July 2008~~date of the project activity.) ~~which is 49 years.~~

C.2. Choice of the crediting period and related information:

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

The first crediting period starts with commissioning of the power plant which is ~~expected to be in September 1st, 2011~~October 13th, 2011.

C.2.1.2. Length of the first crediting period:

7 years, 0 month (Each crediting period shall be at most 7 years and may be renewed at most two times if the DOE informs the Executive Board that the original project baseline is still valid.)

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable.

C.2.2.2. Length:

Not applicable.

SECTION D. Environmental impacts

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

Since Killik WPP project is a wind power plant project with an installed capacity of more than 10 MW, the project is assessed under Annex-II List of the EIA Regulation and therefore a Project Description Report was prepared for the project by MIMKO Engineering Construction Manufacturing Consulting & Trade Corp. on December 2009 respectively. As a result of these reports, the project obtained the "EIA not required" Letter from Tokat Provincial Directorate of Environment and Forestry on December 28, 2009. In

addition, an ornithology report regarding the effects of the project activity to biodiversity of the region was prepared by a third party.

The results of the preliminary assessment of the environmental impacts of the project is summarised as below:

The Results of the KİLLİK WPP Project Description Report, prepared by MIMKO Engineering Construction Manufacturing Consulting & Trade Corp., dated December 2009

- The project is located in the centre of Turkey, within the borders of central district of Tokat. Within the scope of the project, 54 turbines each having an output of 0.75 MWe will be erected in the project area.
- Within the scope of the project, the energy which will be generated by Killik WPPP will be transmitted to national electricity grid.
- During the construction of the plant 20 workers and during the operation of the plant 5 workers will be hired. Priority will be given to local labor force both for construction and operation of the plant. Also, the material needs of the plant will be met from the region.
- For the implementation of the project, there will be excavation works for the construction of the project items. The areas which will be excavated are as explained in the previous sections of the report.
- During the construction and operation phase of the plant, the company will comply with the laws and regulations

The Ornithology Report, prepared by a third party (an ornithologist at Haccettepe University, Turkey), dated April 2009

Before the start of the project activity, an Ornithology Report was prepared. The assessment of the project activity was based on the assumption that 54 turbines each with installed capacity of 0.75 MWe would be erected. The three major suggestions, regarding the project activity could be summarized as (1) the reduction in the number of turbines, (2) the design and location of the turbines and (3) the illumination and colouring of turbines .with the consideration of bird collisions.

Taking into account the ornithology report prepared, the project developer decided that 16 turbines each with an installed capacity of 2.5 MWe would be erected. In addition, the other two suggestions were considered during the implementation of the project activity. As a result, it may be claimed that the project developer has realised an effective discharge of responsibility with respect to the protection of biodiversity.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

According to the results of Local Stakeholder Consultation Meeting, environmental impacts are not considered significant. The project participants have agreed that minor issues of environmental impact can be addressed and solved during project implementation as the project owner is believed to have the best intention to address all concerns and bring solutions immediately.

Still, the company shall comply with the laws and regulations given below:

Biçimlendirilmiş: Girinti: Sol: 0,63 cm

Biçimlendirilmiş: Yazı tipi: Kalın

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, İtalik Değil

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond, İtalik Değil

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond

Biçimlendirilmiş: Girinti: Sol: 0 cm

Biçimlendirilmiş: Yazı tipi: (Varsayılan) Garamond

- ✓ *"Regulation on Control of Air Pollution Resulting From Industrial Plants" (Dated: 22/07/2006, numbered: 26236)*
- ✓ *"Regulation on Assessment and Management of Air Quality" (Dated: 06/06/2008, numbered: 26898)*
- ✓ *"Regulation on Assessment and Management of Environmental Noise" (Dated: 07/03/2008, numbered: 26809)*
- ✓ *"Regulation on Control of Water Pollution" (Dated: 31/12/2004, numbered: 25687)*
- ✓ *"Regulation on Control of Solid Wastes" (Dated: 14/03/1991, numbered: 20814)*
- ✓ *"Regulation on Control of Medical Wastes" (Dated: 22/07/2005, numbered: 25883)*
- ✓ *"Regulation on Control of Hazardous Wastes" (Dated: 14/03/2005, numbered: 25755)*
- ✓ *"Regulation on Environmental Impact Assessment" (Dated: 17/07/2008, numbered: 26939)*
- ✓ *4875 numbered "Labour Law" and "Regulations on Occupational Health and Safety"*
- ✓ *"Regulation on Control of Excavated Earth, Construction and Wrack Wastes" (Dated: 18/03/2004, numbered: 25406)*
- ✓ *"Regulation on Control of Waste Oils" (Dated: 30/07/2008, numbered: 26952)*
- ✓ *"Wetland Area Conservation Regulation" (Dated: 17/05/2005, numbered: 25812)*
- ✓ *1380 numbered "Aquaculture Resources Regulation"*
- ✓ *"Soil Conservation and Land Use Law" (Dated: 19/07/2005, numbered: 25880)*

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

In order to develop the project as a Gold Standard VER project a Local Stakeholder Consultation Meeting which is in line with Gold Standard Requirements was held on August 10th, 2010, before the construction had started.

Stakeholders were invited to the meeting held on August 10th, 2010, through different means including:

1- E-mail correspondence.
2- Newspaper advertisements.
3- Personal face to face invitations to local public managers, NGOs and local people.

During the meeting, to introduce project to the local people and to give details about how this project will impact their lives, a presentations from the carbon asset development consultant firm was given. The information given in presentations was based on the non-technical summary of the project. The presentation was addressing the issues about project specifications and how the project might have some environmental effects, how these issues will be mitigated by the investor and also climate change and how the project will help the fight against climate change.

After that, to get an understanding about an overall perspective of stakeholder opinion on the project, a questionnaire which consists of two parts was distributed to participants. The first part of the questionnaire applies for stakeholders' comments on SD Indicators and the second part asks stakeholders what they like or not like about the project. Also, it is asked to the stakeholders in the second part of questionnaire that what they think in general about the project and what they suggests to the project owner. In addition, the participants had chance to ask questions and express their comments and requests about the project verbally during the meeting. The questions of the stakeholders were responded during the consultation meeting and their requests were assessed.

The detailed information can be found in LSC Report of the project.
In addition to the LSCM, a Stakeholder Feedback Round was organised for this project. All project documents were uploaded to Gold Standard Registry web site; and the Stakeholder Feedback Round was started on April 1st, 2011. The Gold standard Foundation, global Gold Standard supporter NGOS, local NGOs who were previously invited to the live meeting, Ministry of Environment and Forestry and also the auditors who are responsible for the validation of the project were informed by e-mail on April 5th, 2011. What's more, in order to reach other stakeholders (local people), the Turkish summary of the project documentation was prepared and these summary documents were distributed in the region. The documentation was planned to be made available until June 3rd, 2011, but since no comments were received until this date, the SFR was extended to end of December 2011. (Please see the GS Passport of the project for details of the SRF)

E.2. Summary of the comments received:

During the consultation meeting, stakeholders had some comments about the project and asked for some contributions from the project owner.

First, a participant asked why this facility will be constructed near Killik Village, whether it is possible to erect the project at any other place. The project representative told him that tThere are a lot of wind power plant projects in different regions of Turkey. The project locations are decided after long measurements. The companies searched for suitable places for wind power plants and then apply to Energy Market Regulatory Authority (EMRA) to obtain electricity production license. As PEM, they also made measurements in this region and the results show that this location is suitable for energy production from wind power. In addition, the project area is not too close to their settlements, and the project will not affect their daily life.

Another participant asked about the land status of the project area; whether there are any posture areas included in the project location. The project representative told him that the treasury and forestry lands will be preferred for the project area. As far as possible, no posture or agricultural areas will be selected. 80% of the project area is treasury lands.

The participant also asked for help them about the unemployment problem in their village, and the possible benefits of the project for the villagers. The project representative explained that the project will provide job opportunities to the local people during the construction and operation of the plant. For example, there will be 20-25 security guards in the project operation. PEM will make contributions to the villages around project area. The current village roads will be widened. If the villagers have construction works, PEM will help them with our construction equipments. In addition, the cell phones have no signal in this region. There is no GSM network here. PEM has made necessary applications and been waiting for network investment from the GSM operators.

(Please see the LSC Report of the project for the details of the stakeholder assessments.)

E.3. Report on how due account was taken of any comments received:

The comments received and how these comments have been taken into account is explained in Section E.2. For more information please see the LSC Report of the project.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	PEM Enerji A.Ş.
Street/P.O.Box:	
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State/Region:	
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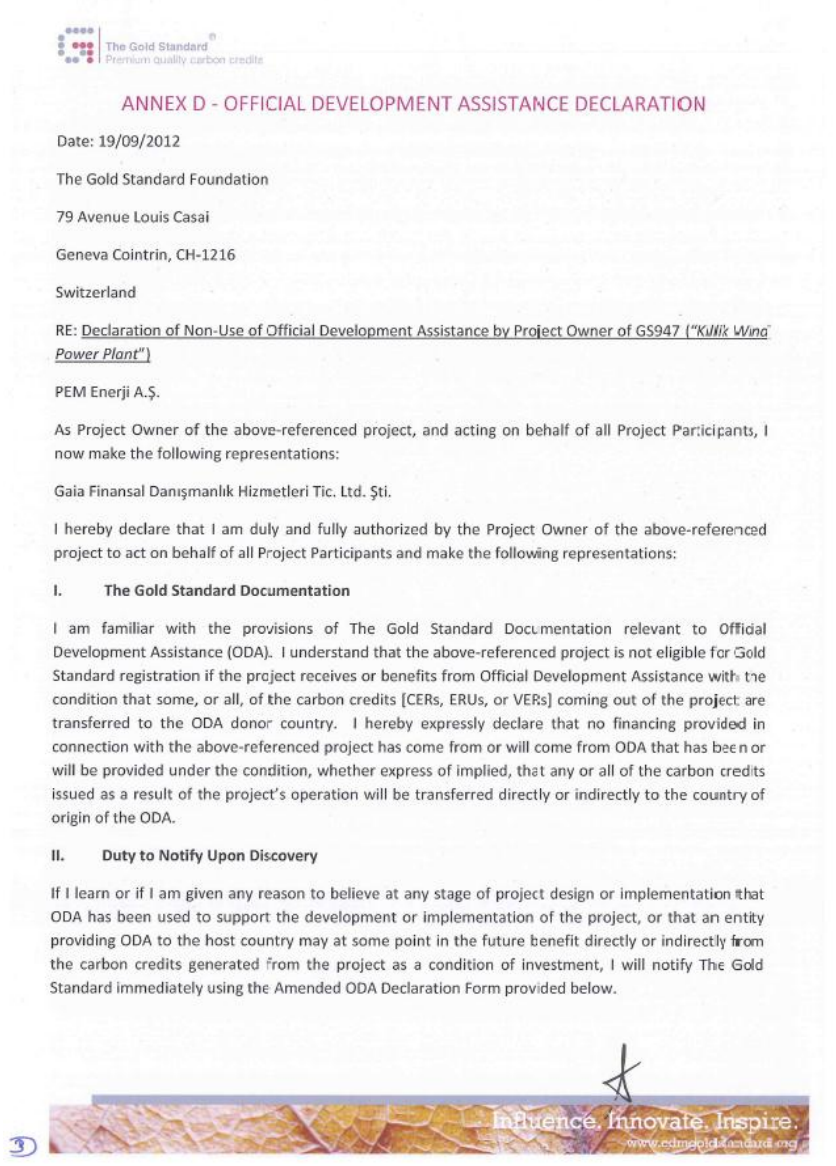
FAX:	0090 216 544 24 04
E-Mail:	ahmet.atak@eksim.com.tr
URL:	
Represented by:	Mr. Ahmet Atak
Title:	
Salutation:	
Last name:	Atak
Middle name:	
First name:	Ahmet
Department:	
Mobile:	
Direct FAX:	0090 216 544 24 04
Direct tel:	0090 216 544 24 00
Personal e-mail:	ahmet.atak@eksim.com.tr

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding in the project. Please find below the ODA declaration of Project Owner below:



The Gold Standard
Premium quality carbon credits

ANNEX D - OFFICIAL DEVELOPMENT ASSISTANCE DECLARATION

Date: 19/09/2012

The Gold Standard Foundation

79 Avenue Louis Casai

Geneva Cointrin, CH-1216

Switzerland

RE: Declaration of Non-Use of Official Development Assistance by Project Owner of GS947 (*"Kilik Wind Power Plant"*)

PEM Enerji A.Ş.

As Project Owner of the above-referenced project, and acting on behalf of all Project Participants, I now make the following representations:

Gaia Finansal Danışmanlık Hizmetleri Tic. Ltd. Şti.

I hereby declare that I am duly and fully authorized by the Project Owner of the above-referenced project to act on behalf of all Project Participants and make the following representations:

I. The Gold Standard Documentation

I am familiar with the provisions of The Gold Standard Documentation relevant to Official Development Assistance (ODA). I understand that the above-referenced project is not eligible for Gold Standard registration if the project receives or benefits from Official Development Assistance with the condition that some, or all, of the carbon credits [CERs, ERUs, or VERs] coming out of the project are transferred to the ODA donor country. I hereby expressly declare that no financing provided in connection with the above-referenced project has come from or will come from ODA that has been or will be provided under the condition, whether express of implied, that any or all of the carbon credits issued as a result of the project's operation will be transferred directly or indirectly to the country of origin of the ODA.

II. Duty to Notify Upon Discovery

If I learn or if I am given any reason to believe at any stage of project design or implementation that ODA has been used to support the development or implementation of the project, or that an entity providing ODA to the host country may at some point in the future benefit directly or indirectly from the carbon credits generated from the project as a condition of investment, I will notify The Gold Standard immediately using the Amended ODA Declaration Form provided below.

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III. Investigation

The Gold Standard reserves the right to conduct an investigation into any project it reasonably believes may be receiving ODA with the condition that some or all of the carbon credits from the project will be transferred to the ODA donor country.

IV. Sanctions

I am fully aware that the sanctions identified in The Gold Standard Terms and Conditions may be applied to me or the above-referenced project in the event that any of the information provided above is false or I fail to notify The Gold Standard of any changes to ODA in a timely manner.

I swear that all of the statements contained herein are true to the best of my knowledge.

Signed:

Name: Abdullah TİVNİKLİ

Title: President

On behalf of: PEM ENERJİ A.Ş.

Place: İSTANBUL / TURKEY

Annex 3

BASELINE INFORMATION

Details of OM Calculation

Turkey's total CO2 emissions from electricity production:

CO2 Emissions		2007	2008	2009	2007	2008	2009
		GJ	GJ	GJ	CO_2 Emissions (t CO_2)		
EUAS							
	hard coal	25.393	23.086	22.828	2.356.465	2.142.382	2.118.454
	lignite	358.729	393.748	348.995	32.608.485	35.791.657	31.723.685
	fuel oil	28.860	39.666	15.019	2.178.901	2.994.764	1.133.925
	diesel oil	2.152	3.580	5.102	156.236	259.887	370.437
	natural gas	170.189	199.895	177.248	9.241.275	10.854.276	9.624.551
Autoproducers							
	hard coal	109.066	116.376	124.253	10.121.338	10.799.720	11.530.685
	imported coal				0	0	0
	lignite	61.291	59.377	59.852	5.571.312	5.397.387	5.440.556
	fuel oil	54.052	43.894	48.453	4.080.895	3.314.028	3.658.171
	diesel oil	13	1.980	2.560	912	143.774	185.881
	lpg	0	0	5	0	0	318
	naphta	494	473	353	34.237	32.786	24.430
	natural gas	579.872	591.649	602.610	31.487.039	32.126.555	32.721.721
Production companies							
	imported coal	0	0	0	0	0	0
	fuel oil	0	0	0	0	0	0
	diesel oil	0	0	0	0	0	0
	naphta	0	0	0	0	0	0
	natural gas	0	0	0	0	0	0
Mobile							
	fuel oil	6.829	2.717	0	515.565	205.151	0
	diesel oil	0	0	0	0	0	0
TOOR							
	lignite	0	0	0	0	0	0
	fuel oil	0	0	0	0	0	0
	diesel oil	0	0	0	0	0	0
		1.396.938	1.476.442	1.407.278	98.352.660	104.062.368	98.532.815

Turkey's Gros/Net Electricity Generations and Imports

Electricity generation (GWh)	2007	2008	2009
Gross Electricity Production	191.558,1	198.418,0	194.812,9
Net Electricity Production	183.339,7	189.761,9	186.619,3
Net/Gross	0,957	0,956	0,958
Net Electricity Production from Thermal Sources	148.333,3	156.768,3	150.323,4
Net Electricity Production incl. Mobile producers	148.333,3	156.768,3	150.323,4
Imports	864	789	812
Net Generated + Imports	149.197,6	157.557,7	151.135,4

Default IPCC Values

	kg CO_2/GJ			Default Carbon
	min	mid	max	Oxidation Factor
hard coal	92,8	96,1	100,0	1,0
lignite	90,9	101,0	115,0	1,0
fuel oil	75,5	77,4	78,8	1,0
diesel oil	72,6	74,1	74,8	1,0
natural gas	54,3	56,1	58,3	1,0
lpg	61,6	63,1	65,6	1,0
naphta	69,3	73,3	76,3	1,0

Fuel Consumptions

	Fuel Consumption (FC i,y)		
	2007	2008	2009
hard coal	6.029.143	6.270.008	6.621.177
lignite	61.223.821	66.374.120	63.620.518
fuel oil	2.250.686	2.173.371	1.594.321
diesel oil	50.233	131.206	180.857
natural gas	20.457.793	21.607.635	20.978.040
lpg	0	0	111
naphtha	11.441	10.606	8.077

Net Calorific Values

	Net Calorific Value (NCVi,y)		
	2007	2008	2009
hard coal	22,3	22,2	22,2
lignite	6,9	6,8	6,4
fuel oil	39,9	39,7	39,8
diesel oil	43,1	42,4	42,4
natural gas	36,7	36,6	37,2
lpg	0,0	0,0	0,0
naphtha	43,2	44,6	43,6

OM Emission Factor

	2007	2008	2009
$EFgrid_{OMsimple,}$	0,663	0,664	0,655

EFGrid,OM,y (tCO2/MWh)	**0,6608**

Details of BM Calculation

Recently Commissioned Power Plants

2008										
Company	Facility	Index	Installed Capacity (MW)	Commissioning Date	Energy Production (MWh)*	CO_2 EF (ton/TJ)	tCO_2/MWh *	Facility Energy Efficiency	BM Emission Factor tCO2/MWh	CO_2 (tons)
MB Şeker Nişasta San. A.Ş. (Sultanhanı)	N.GAS	ANG	8,80	2008	60,0	54,3	0,20	60,0%	0,33	19,5
AKSA ENERJI (Antalya)	N.GAS	ANG	183,80	2008	1.290,0	54,3	0,20	60,0%	0,33	419,9
AKSA ENERJI (Manisa)	N.GAS	ANG	52,38	2008	370,0	54,3	0,20	60,0%	0,33	120,4
ANTALYA ENERJİ (ilave)	N.GAS	ANG	17,46	2008	122,3	54,3	0,20	60,0%	0,33	39,8
ATAÇ İNŞAAT SAN. A.S.B. (ANTALYTA)	N.GAS	ANG	5,40	2008	37,0	54,3	0,20	60,0%	0,33	12,0
BAHÇIVAN GIDA (LÜLEBURGAZ)	N.GAS	ANG	1,17	2008	8,0	54,3	0,20	60,0%	0,33	2,6
CAN ENERJİ (Çorlu - Tekirdağ) (İlave)	N.GAS	ANG	52,38	2008	304,2	54,3	0,20	60,0%	0,33	99,0
FOUR SEASONS OTEL (ATİK PASHA TUR	N.GAS	ANG	1,17	2008	7,0	54,3	0,20	60,0%	0,33	2,3
FRITOLAY GIDA San. Ve TİC. A.Ş. (İlave)	N.GAS	ANG	0,60	2008	4,0	54,3	0,20	60,0%	0,33	1,3
ITC-KA Enerji Üretim A.Ş. (Mamak((İlave)	ENEW.+WASTES	AR	14,13	2008	107,0	-	-	na	-	0,0
KARKEY (SİLOPİ-5) (154kV) (İlave)	F.OIL	AF	14,78	2008	103,2	75,5	0,27	46,0%	0,59	60,9
MELİKE TEKSTİL (GAZİANTEP)	N.GAS	ANG	1,58	2008	11,0	54,3	0,20	60,0%	0,33	3,6
MİSİS APRE TEKSTİL BOYA EN. SAN.	N.GAS	ANG	2,00	2008	14,0	54,3	0,20	60,0%	0,33	4,6
MODERN ENERJİ (LİLEBURGAZ)	N.GAS	ANG	13,40	2008	94,1	54,3	0,20	60,0%	0,33	30,6
ORTADOĞU ENERJİ (ODA YERİ) (Eyip/İST.)	ENEW.+WASTES	AR	2,83	2008	22,0	-	-	na	-	0,0
POLAT TURZ. (POLAT RENAISSANCE	N.GAS	ANG	1,60	2008	11,0	54,3	0,20	60,0%	0,33	3,6
SARAYKÖY JEOTERMAL (Denizli)	GEOTHERMAL	AH	6,85	2008	50,0	-	-	na	-	0,0
YILDIZ SUNTA (Uzunçiftlik-Köseköy)(Düzelt)	N.GAS	ANG	22,63	2008	146,5	54,3	0,20	60,0%	0,33	47,7
SÖNMEZ Elektrik (İlave)	N.GAS	ANG	8,73	2008	67,3	54,3	0,20	60,0%	0,33	21,9
ALP ELEKTRİK TINAZTEPE / ANTALYA	HYDRO	AH	7,69	2008	29,0	-	-	na	-	0,0
CANSU ELEKTRİK (Murgul/Artvin)	HYDRO	AH	9,18	2008	47,0	-	-	na	-	0,0
ÇELDERE ELK. (ÇALDERE HES)	HYDRO	AH	8,74	2008	35,0	-	-	na	-	0,0
DAREN HES ELEKTRİK	HYDRO	AH	49,70	2008	182,0	-	-	na	-	0,0
DEĞİRMENÜSTÜ EN. (Kahramanmaraş)	HYDRO	AH	25,70	2008	69,0	-	-	na	-	0,0
GÖZEDE HES (TEMSA ELEKTRİK) Bursa	HYDRO	AH	2,40	2008	10,0	-	-	na	-	0,0
H.G.M. Enerji (KEKLİCEK HES)	HYDRO	AH	8,67	2008	18,0	-	-	na	-	0,0
HAMZALI HES (TURKON MNG ELEKTRİK)	HYDRO	AH	16,70	2008	117,0	-	-	na	-	0,0
HİDRO KNT. (YUKARI MANAHOZ Reg. Ve Hes)	HYDRO	AH	22,40	2008	79,0	-	-	na	-	0,0
İÇ-EN ELK. (ÇALKIŞLA REG. Ve HES)	HYDRO	AH	7,66	2008	18,0	-	-	na	-	0,0
KALEN ENERJİ (KALEN II Reg. Ve Hes)	HYDRO	AH	15,65	2008	50,0	-	-	na	-	0,0
MARAŞ ENERJİ (FIRNIS Reg. Ve HES)	HYDRO	AH	7,22	2008	36,0	-	-	na	-	0,0
SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ)	HYDRO	AH	21,04	2008	96,0	-	-	na	-	0,0
SARMAŞIK II HES (FETAŞ FETHİYE ENERJİ)	HYDRO	AH	21,58	2008	108,0	-	-	na	-	0,0
TORUL	HYDRO	EH	105,60	2008	322,0	-	-	na	-	0,0
YEŞİL ENERJİ ELEKTRİK (TAYFUN HES)	HYDRO	AH	0,82	2008	5,0	-	-	na	-	0,0
ZORLU ENERJİ (MERCAN)	HYDRO	AH	1,28	2008	4,9	-	-	na	-	0,0
BAKİ ELEKTRİK ŞAMLI RÜZGAR	WIND	AR	21,00	2008	104,0	-	-	na	-	0,0
DATÇA RES	WIND	AR	8,10	2008	24,0	-	-	na	-	0,0
ERTÜRK ELEKTRİK Çatalca RES	WIND	AR	60,00	2008	210,0	-	-	na	-	0,0
INNORES ELEKTRİK Yuntdağ RÜZG. (Aliağa)	WIND	AR	42,50	2008	161,0	-	-	na	-	0,0
LODOS RES (Taşoluk)	WIND	AR	24,00	2008	85,0	-	-	na	-	0,0
SAYALAR RÜZGAR	WIND	AR	30,60	2008	97,0	-	-	na	-	0,0
SEBENOBA (Deniz Elk.)	WIND	AR	31,20	2008	100,0	-	-	na	-	0,0

2007										
Company	Facility	Index	Installed Capacity (MW)	Commissioning Date	Energy Production (MWh)*	CO_2 EF (ton/TJ)	tCO_2/MWh *	Facility Energy Efficieny	BM Emission Factor tCO2/MWh	CO_2 (tons)
HABAŞ (Aliağa - İlave)	N.GAS	ANG	9,10	2007	72,8	54,3	0,20	60,0%	0,33	23,7
MODERN ENERJI	N.GAS	ANG	5,20	2007	38,7	54,3	0,20	60,0%	0,33	12,6
ARENKO	N.GAS	ANG	0,10	2007	0,8	54,3	0,20	60,0%	0,33	0,3
ALTINMARKA GIDA	N.GAS	ANG	0,10	2007	0,8	54,3	0,20	60,0%	0,33	0,3
TEKBOY ENERJI	N.GAS	ANG	0,10	2007	0,7	54,3	0,20	60,0%	0,33	0,2
VELSAN AKRILIK	N.GAS	ANG	0,10	2007	0,6	54,3	0,20	60,0%	0,33	0,2
Acıbaden Sağlık Hiz. Ve Tic. A.Ş. / Kadıköy	N.GAS	ANG	0,50	2007	4,0	54,3	0,20	60,0%	0,33	1,3
Acıbaden Sağlık Hiz. Ve Tic. A.Ş. / Kozyatağı	N.GAS	ANG	0,60	2007	5,0	54,3	0,20	60,0%	0,33	1,6
Acıbaden Sağlık Hiz. Ve Tic. A.Ş. / Bursa	N.GAS	ANG	1,30	2007	11,0	54,3	0,20	60,0%	0,33	3,6
AKATEKS	N.GAS	ANG	1,80	2007	14,0	54,3	0,20	60,0%	0,33	4,6
FLOKSER TEKSTIL / Poliser Tesisi	N.GAS	ANG	2,10	2007	17,0	54,3	0,20	60,0%	0,33	5,5
FLOKSER TEKSTIL / Süetser Tesisi	N.GAS	ANG	2,10	2007	17,0	54,3	0,20	60,0%	0,33	5,5
FRITOLAY GIDA	N.GAS	ANG	0,50	2007	4,0	54,3	0,20	60,0%	0,33	1,3
KIVANÇ TEKSTİL	N.GAS	ANG	3,90	2007	33,0	54,3	0,20	60,0%	0,33	10,7
KİL-KAN Kil San. Ve Tic	N.GAS	ANG	3,20	2007	25,0	54,3	0,20	60,0%	0,33	8,1
SÜPERBOY BOYA SAN.	N.GAS	ANG	1,00	2007	8,0	54,3	0,20	60,0%	0,33	2,6
SWISS OTEL	N.GAS	ANG	1,60	2007	11,0	54,3	0,20	60,0%	0,33	3,6
TAV Esenboğa	N.GAS	ANG	3,90	2007	33,0	54,3	0,20	60,0%	0,33	10,7
NUH ENERJİ-2	N.GAS	ANG	73,00	2007	514,0	54,3	0,20	60,0%	0,33	167,3
AKTEKS	F.OIL	AF	0,80	2007	5,4	75,5	0,27	46,0%	0,59	3,2
UŞAK ŞEKER	LIGNITE	AL	1,70	2007	10,3	90,9	0,33	39,0%	0,84	8,6
BOĞAZLIYAN ŞEKER	.GAS+NAPHTHA	ANG	16,40	2007	102,6	54,3	0,20	60,0%	0,33	33,4
KARTONSAN	.GAS+NAPHTHA	ANG	5,00	2007	40,0	54,3	0,20	60,0%	0,33	13,0
ESKİŞEHİR END. ENERJİ	.GAS+NAPHTHA	ANG	3,50	2007	26,8	54,3	0,20	60,0%	0,33	8,7
ESKİŞEHİR ŞEKER	.GAS+NAPHTHA	ANG	2,90	2007	18,1	54,3	0,20	60,0%	0,33	5,9
İGSAŞ	.GAS+NAPHTHA	ANG	2,20	2007	15,2	54,3	0,20	60,0%	0,33	4,9
DESA	.GAS+NAPHTHA	ANG	0,70	2007	5,6	54,3	0,20	60,0%	0,33	1,8
DENTAŞ	.GAS+NAPHTHA	ANG	0,30	2007	2,3	54,3	0,20	60,0%	0,33	0,7
SÜPER FİLMCİLİK	.GAS+NAPHTHA	ANG	0,10	2007	0,8	54,3	0,20	60,0%	0,33	0,3
ATAER ENERJİ	.GAS+NAPHTHA	ANG	0,10	2007	0,6	54,3	0,20	60,0%	0,33	0,2
BİL ENERJİ	.GAS+NAPHTHA	ANG	0,10	2007	0,7	54,3	0,20	60,0%	0,33	0,2
ITC-KA	ENEW.+WASTES	AR	1,40	2007	11,1	-	-	na	-	0,0
BIS ENERJİ Bursa ilave	N.GAS	ANG	43,00	2007	354,8	54,3	0,20	60,0%	0,33	115,5
ALİAĞA ÇAKMAKTEPE	N.GAS	ANG	34,80	2007	278,0	54,3	0,20	60,0%	0,33	90,5
BİS ENERJİ Bursa DÜZELTİLME	N.GAS	ANG	28,30	2007	233,5	54,3	0,20	60,0%	0,33	76,0
BIS ENERJİ Bursa ilave	N.GAS	ANG	48,00	2007	396,1	54,3	0,20	60,0%	0,33	128,9
BOSEN ENERJİ	N.GAS	ANG	142,80	2007	1.071,0	54,3	0,20	60,0%	0,33	348,7
SAYENERJİ ELEKTRİK	N.GAS	ANG	5,90	2007	47,0	54,3	0,20	60,0%	0,33	15,3
T ENERJİ ÜRETİM A.Ş.	N.GAS	ANG	1,60	2007	13,0	54,3	0,20	60,0%	0,33	4,2
ZORLU ENERJİ Kayseri	N.GAS	ANG	7,20	2007	55,0	54,3	0,20	60,0%	0,33	17,9
SİİRT	F.OIL	AF	25,60	2007	190,0	75,5	0,27	46,0%	0,59	112,2
MARDİN KIZILTEPE	F.OIL	AF	34,10	2007	250,0	75,5	0,27	46,0%	0,59	147,6
KAREN	F.OIL	AF	24,30	2007	180,0	75,5	0,27	46,0%	0,59	106,3
İDİL 2 (PS3 A-2)	F.OIL	AF	24,40	2007	180,0	75,5	0,27	46,0%	0,59	106,3
BORÇKA HES	HYDRO	EH	300,60	2007	1.039,0	-	-	na	-	0,0
TEKTUĞ (KEBAN DERESİ)	HYDRO	AH	5,00	2007	32,0	-	-	na	-	0,0
YPM Ener. Yat. A.Ş. Altıntepe Hidro	HYDRO	AH	4,00	2007	18,0	-	-	na	-	0,0
YPM Ener. Yat. A.Ş. Beypınar Hidro	HYDRO	AH	3,60	2007	18,0	-	-	na	-	0,0
YPM Ener. Yat. A.Ş. Konak Hidro	HYDRO	AH	4,00	2007	19,0	-	-	na	-	0,0
KURTEKS Tekstil (KARASU HES - Andırın)	HYDRO	AH	2,40	2007	19,0	-	-	na	-	0,0
ISKUR TEKSTIL (SULEYMANLI HES)	HYDRO	AH	4,60	2007	18,0	-	-	na	-	0,0
ÖZGÜR ELK. AŞ. (K.MARAŞ) (Tahta)	HYDRO	AH	6,30	2007	27,0	-	-	na	-	0,0
ÖZGÜR ELK. AŞ. (K.MARAŞ) (Tahta) İlave	HYDRO	AH	6,30	2007	27,0	-	-	na	-	0,0
ANEMON EN: ELEK. ÜRETİM A.Ş.	WIND	AR	8,00	2007	24,2	-	-	na	-	0,0
ANEMON EN: ELEK. ÜRETİM A.Ş. İlave	WIND	AR	15,20	2007	46,0	-	-	na	-	0,0
ANEMON EN: ELEK. ÜRETİM A.Ş. İlave	WIND	AR	7,20	2007	21,8	-	-	na	-	0,0
BURGAZ RES (Doğal Enerji Üretim A.Ş.)	WIND	AR	4,00	2007	12,9	-	-	na	-	0,0
BURGAZ RES (Doğal Enerji Üretim A.Ş.)	WIND	AR	10,90	2007	35,1	-	-	na	-	0,0
DENİZ ELEK. ÜRETİM Ltd. Şti. (Karakurt)	WIND	AR	10,80	2007	28,0	-	-	na	-	0,0
MARE MMANASTIR RÜZGAR ENERJİ	WIND	AR	11,2	2007	36,9	-	-	na	-	0,0
MARE MMANASTIR RÜZGAR ENERJİ	WIND	AR	20,00	2007	65,8	-	-	na	-	0,0

2006										
Company	Facility	Index	Installed Capacity (MW)	Commissioning Date	Energy Production (MWh)*	CO_2 EF (ton/TJ)	tCO_2/MWh *	Facility Energy Efficiency	BM Emission Factor tCO2/MWh	CO_2 (tons)
EKOTEN TEKSTİL GR-I	N.GAS	ANG	1,93	16.02.2006	14,0	54,3	0,20	60,0%	0,33	4,6
ERAK GİYİM GR-I	N.GAS	ANG	1,37	22.02.2006	10,0	54,3	0,20	60,0%	0,33	3,3
ALARKO ALTEK GR-III	N.GAS	ANG	21,89	23.02.2006	158,3	54,3	0,20	60,0%	0,33	51,5
AYDIN ÖRME GR-I	N.GAS	ANG	7,52	25.02.2006	60,0	54,3	0,20	60,0%	0,33	19,5
NUH ENERJİ-2 GR II	N.GAS	ANG	26,08	02.03.2006	180,1	54,3	0,20	60,0%	0,33	58,6
MARMARA ELEKTRİK (çorlu) GR-I	N.GAS	ANG	8,73	13.04.2006	63,0	54,3	0,20	60,0%	0,33	20,5
MARMARA PAMUK (Çorlu) GR-I	N.GAS	ANG	8,73	13.04.2006	63,0	54,3	0,20	60,0%	0,33	20,5
ENTEK (Köseköy) GR IV	N.GAS	ANG	47,62	14.04.2006	391,3	54,3	0,20	60,0%	0,33	127,4
ELSE TEKSTİL (Çorlu) GR I-II	N.GAS	ANG	3,16	15.04.2006	25,0	54,3	0,20	60,0%	0,33	8,1
BARES IX GRUP	WIND	AR	13,50	20.04.2006	47,3	-	-	na	-	0,0
SÖNMEZ ELEKTRİK (Çorlu) GR I - II	N.GAS	ANG	17,46	03.05.2006	126,0	54,3	0,20	60,0%	0,33	41,0
DENİZLİ ÇİMENTO (DÜZELTME)	N.GAS	ANG	0,45	04.05.2006	3,2	54,3	0,20	60,0%	0,33	1,0
MENDERES ELEKTRİK GR I	GEOTHERMAL	AH	7,95	10.05.2006	56,0	-	-	na	-	0,0
KASTAMONU ENTEGRE BALIKSİR GR-I	N.GAS	ANG	7,52	24.05.2006	54,0	54,3	0,20	60,0%	0,33	17,6
BARES X. VE XX. GRUPLAR	WIND	AR	16,50	26.05.2006	57,8	-	-	na	-	0,0
BOZ ENERJİ GR-I	N.GAS	ANG	8,73	09.06.2006	70,0	54,3	0,20	60,0%	0,33	22,8
ADANA ATIK SU ARITMA TESİSİ	ENEW.+WASTES	AR	0,80	09.06.2006	6,0	-	-	na	-	0,0
AMYLUM NİŞASTA (ADANA)	N.GAS	ANG	14,25	09.06.2006	34,0	54,3	0,20	60,0%	0,33	11,1
ŞIK MAKAS (Çorlu) GR-I	N.GAS	ANG	1,58	22.06.2006	13,0	54,3	0,20	60,0%	0,33	4,2
ELBİSTAN B GR-III	LIGNITE	EL	360,00	23.06.2006	2.340,0	90,9	0,33	39,0%	0,84	1.961,9
ANTALYA ENERJİ GR I - II - III - IV	N.GAS	ANG	34,92	29.06.2006	245,0	54,3	0,20	60,0%	0,33	79,8
HAYAT TEM. VE SAĞLIK GR I - II	N.GAS	ANG	15,04	30.06.2006	108,0	54,3	0,20	60,0%	0,33	35,2
EKOLOJİK EN. (Kemerburgaz) GR I	ENEW.+WASTES	AR	0,98	31.07.2006	6,0	-	-	na	-	0,0
EROĞLU GİYİM (Çorlu) GR-I	N.GAS	ANG	1,17	01.08.2006	9,0	54,3	0,20	60,0%	0,33	2,9
CAM İŞ ELEKTRİK (Mersin) GR I	N.GAS	ANG	126,10	13.09.2006	1.008,0	54,3	0,20	60,0%	0,33	328,1
ELBİSTAN B GR II	LIGNITE	EL	360,00	17.09.2006	2.340,0	90,9	0,33	39,0%	0,84	1.961,9
YILDIZ ENT. AĞAÇ (Kocaeli) GR I	N.GAS	ANG	6,18	21.09.2006	40,0	54,3	0,20	60,0%	0,33	13,0
ÇERKEZKÖY ENERJİ GR I	N.GAS	ANG	49,16	06.10.2006	390,0	54,3	0,20	60,0%	0,33	127,0
ENTEK (Köseköy) GR V	N.GAS	ANG	37,00	03.11.2006	304,0	54,3	0,20	60,0%	0,33	99,0
ITC-KA EN. MAMAK TOP.M. GR I-II-III	ENEW.+WASTES	AR	4,24	03.11.2006	30,0	-	-	na	-	0,0
ELBİSTAN B GRUP IV	LIGNITE	EL	360,00	13.11.2006	2.340,0	90,9	0,33	39,0%	0,84	1.961,9
MARE MANASTIR RÜZGAR (X GRUP)	WIND	AR	8,00	08.12.2006	25,0	-	-	na	-	0,0
ÇIRAĞAN SARAYI GR I	N.GAS	ANG	1,32	01.12.2006	11,0	54,3	0,20	60,0%	0,33	3,6
ERTÜRK ELEKTRİK Tepe RES GR I	WIND	AR	0,85	22.12.2006	2,0	-	-	na	-	0,0
AKMAYA (Lüleburgaz) GR I	N.GAS	ANG	6,91	23.12.2006	50,0	54,3	0,20	60,0%	0,33	16,3
BURGAZ (Lüleburgaz) GR I	N.GAS	ANG	6,91	23.12.2006	54,0	54,3	0,20	60,0%	0,33	17,6
SEYHAN I-II	HYDRO	EH	0,30	20.02.2006	1,7	-	-	na	-	0,0
ŞANLIURFA GR I-II	HYDRO	EH	51,80	01.03.2006	124,0	-	-	na	-	0,0
BEREKET ENERJİ GÖKYAR HES 3 Grup	HYDRO	AH	11,62	05.05.2006	43,3	-	-	na	-	0,0
MOLU EN. Zamantı Bahçelik GR I - II	HYDRO	AH	4,22	31.05.2006	16,7	-	-	na	-	0,0
SU ENERJİ BALIKESİR GR I - II	HYDRO	AH	4,60	27.06.2006	20,7	-	-	na	-	0,0
BEREKET EN. MENTAŞ REG. GR I - II	HYDRO	AH	26,60	31.07.2006	108,7	-	-	na	-	0,0
EKİN (Başaran Hes) (Nazilli)	HYDRO	AH	0,60	11.08.2006	4,5	-	-	na	-	0,0
ERE (Suçözü Reg. Ve Kızıldüz HES)	HYDRO	AH	15,43	08.09.2006	31,6	-	-	na	-	0,0
ERE (AKSU REG. VE ŞAHMALLAR HES)	HYDRO	AH	14,00	16.11.2006	26,7	-	-	na	-	0,0
TEKTUĞ (KALEALTI) GR I - II	HYDRO	AH	15,00	30.11.2006	52,0	-	-	na	-	0,0
BEREKET EN. MENTAŞ REG. GR III	HYDRO	AH	13,30	13.12.2006	54,4	-	-	na	-	0,0

2005										
Company	Facility	Index	Installed Capacity (MW)	Commissioning Date	Energy Production (MWh)*	CO_2 EF (ton/TJ)	tCO_2/MWh *	Facility Energy Efficieny	BM Emission Factor tCO2/MWh	CO_2 (tons)
BOSEN GR-III	N.GAS	ANG	51,02	30.12.2005	372,8	54,3	0,20	60,0%	0,33	121,4
KARKEY (SİLOPİ-4) GR-V	F.OIL	AF	6,75	23.12.2005	51,9	75,5	0,27	46,0%	0,59	30,6
AKÇA ENERJİ GR-III	.GAS+NAPHTHA	ANG	8,73	14.12.2005	65,5	54,3	0,20	60,0%	0,33	21,3
KAHRAMANMARAŞ KAĞİT GR-I	MPORTED COAL	AHC	6,00	08.12.2005	45,0	92,8	0,33	39,0%	0,86	38,5
PAK GIDA	N.GAS	ANG	5,67	07.12.2005	45,0	54,3	0,20	60,0%	0,33	14,6
KORUMA KLOR GR I-II-III	N.GAS	ANG	9,60	03.12.2005	77,0	54,3	0,20	60,0%	0,33	25,1
İÇDAŞ ÇELİK GR-I	MPORTED COAL	AHC	135,00	30.11.2005	1.080,0	92,8	0,33	39,0%	0,86	924,4
KÜÇÜKÇALIK TEKSTİL GR I-II-III-IV	N.GAS	ANG	8,00	27.11.2005	64,0	54,3	0,20	60,0%	0,33	20,8
ZORLU ENERJİ YALOVA GR I-II	N.GAS	ANG	15,93	26.11.2005	122,0	54,3	0,20	60,0%	0,33	39,7
HABAŞ ALİAĞA GR-V	N.GAS	ANG	23,00	24.11.2005	184,0	54,3	0,20	60,0%	0,33	59,9
GRANİSER GRANİT GR-I	N.GAS	ANG	5,50	14.11.2005	42,0	54,3	0,20	60,0%	0,33	13,7
MOSB GR I-II-III-IV-V-VI-VII	N.GAS	ANG	84,83	11.11.2005	434,0	54,3	0,20	60,0%	0,33	141,3
AK ENERJİ(K.paşa) GR- III	N.GAS	ANG	40,00	09.11.2005	256,9	54,3	0,20	60,0%	0,33	83,6
ZORLU ENERJİ KAYSERİ GR-IV	N.GAS	ANG	38,63	26.10.2005	294,9	54,3	0,20	60,0%	0,33	96,0
ALTEK ALARKO GR I-II	N.GAS	ANG	60,10	14.10.2005	420,0	54,3	0,20	60,0%	0,33	136,7
AYKA TEKSTİL GR-I	N.GAS	ANG	5,50	24.09.2005	40,0	54,3	0,20	60,0%	0,33	13,0
HABAŞ ALİAĞA GR IV	N.GAS	ANG	44,62	21.09.2005	357,0	54,3	0,20	60,0%	0,33	116,2
EVYAP GR I-II	N.GAS	ANG	5,12	27.08.2005	30,0	54,3	0,20	60,0%	0,33	9,8
ÇEBİ ENERJİ BT	N.GAS	ANG	21,00	27.08.2005	164,7	54,3	0,20	60,0%	0,33	53,6
CAN ENERJİ GR-I	N.GAS	ANG	3,90	25.08.2005	28,0	54,3	0,20	60,0%	0,33	9,1
NOREN ENERJİ GR-I	N.GAS	ANG	8,73	24.08.2005	70,0	54,3	0,20	60,0%	0,33	22,8
ÇEBİ ENERJİ GT	N.GAS	ANG	43,37	23.08.2005	340,1	54,3	0,20	60,0%	0,33	110,7
YAMULA GRUP I-II	HYDRO	EH	100,00	31.07.2005	422,0	-	-	na	-	0,0
ZORLU ENERJİ KAYSERİ GR-I-II-III	N.GAS	ANG	149,87	22.07.2005	1.144,1	54,3	0,20	60,0%	0,33	372,5
BEREKET EN. (DALAMAN) GR XIII-XIV-XV	HYDRO	AH	7,50	15.07.2005	35,8	-	-	na	-	0,0
ETİ MAD.(BAN.ASİT)GR-I	ENEW.+WASTES	AR	11,50	15.07.2005	88,0	-	-	na	-	0,0
ZEYNEP GİYİM SAN. GR-I	N.GAS	ANG	1,17	07.07.2005	9,0	54,3	0,20	60,0%	0,33	2,9
KARKEY (SİLOPİ-4) GR-IV	F.OIL	AF	6,15	30.06.2005	47,2	75,5	0,27	46,0%	0,59	27,9
AKBAŞLAR GR-II(İZOLE)	N.GAS	ANG	9,00	24.06.2005	71,3	54,3	0,20	60,0%	0,33	23,2
MODERN ENERJİ (DG) GR-III	N.GAS	ANG	8,38	14.06.2005	61,1	54,3	0,20	60,0%	0,33	19,9
MODERN ENERJİ (DG+LPG) GR-II	N.GAS+LPG	ANG	7,68	13.06.2005	56,0	54,3	0,20	60,0%	0,33	18,2
MODERN ENERJİ (DG+LPG) GR-II (DÜZELTME	N.GAS+LPG	ANG	4,50	13.06.2005	32,8	54,3	0,20	60,0%	0,33	10,7
MURATLI GR I-II	HYDRO	EH	115,00	03.06.2005	444,0	-	-	na	-	0,0
HABAŞ ALİAĞA GR III	N.GAS	ANG	44,62	02.06.2005	356,9	54,3	0,20	60,0%	0,33	116,2
HAYAT KAĞİT GR-I	N.GAS	ANG	7,53	27.05.2005	56,0	54,3	0,20	60,0%	0,33	18,2
TEZCAN GALVANİZ GR I-II	N.GAS	ANG	3,66	27.05.2005	29,0	54,3	0,20	60,0%	0,33	9,4
YONGAPAN(KAST.ENTG) GR-II	N.GAS	ANG	5,20	25.05.2005	35,8	54,3	0,20	60,0%	0,33	11,7
NUH ENERJİ-2 GR I	N.GAS	ANG	46,95	24.05.2005	319,7	54,3	0,20	60,0%	0,33	104,1
İÇTAŞ ENERJİ (Yukarı Mercan) GR I-II	HYDRO	AH	14,19	22.05.2005	44,0	-	-	na	-	0,0
AK ENERJİ(K.paşa) GR I-II	N.GAS	ANG	87,20	30.04.2005	560,1	54,3	0,20	60,0%	0,33	182,3
TEKTUĞ (Kargılık) GR I-II	HYDRO	AH	23,90	25.04.2005	83,0	-	-	na	-	0,0
SUNJÜT(RES) GR I-II	WIND	AR	1,20	23.04.2005	2,0	-	-	na	-	0,0
KAREGE GR IV-V	N.GAS	ANG	18,06	07.04.2005	141,9	54,3	0,20	60,0%	0,33	46,2
BİS ENERJİ GR VII	N.GAS	ANG	43,70	18.03.2005	287,6	54,3	0,20	60,0%	0,33	93,6
ÇAN GR I (EÜAŞ)	LIGNITE	EL	160,00	15.03.2005	1.040,0	90,9	0,33	39,0%	0,84	871,9
ÇAN GR I (EÜAŞ)	LIGNITE	EL	160,00	15.02.2005	1.040,0	90,9	0,33	39,0%	0,84	871,9
ELBİSTAN-B GR I (EÜAŞ)	LIGNITE	EL	360,00	15.02.2005	2.340,0	90,9	0,33	39,0%	0,84	1.961,9
ENTEK ELK.A.Ş. KOÇ ÜNİ.GR I-II	N.GAS	ANG	2,33	07.02.2005	19,0	54,3	0,20	60,0%	0,33	6,2
BAYDEMİRLER GR IV-V-VI	N.GAS	ANG	6,21	04.02.2005	49,3	54,3	0,20	60,0%	0,33	16,1
MERCEDES BENZ TURK GR I-II-III-IV	N.GAS	ANG	8,28	04.02.2005	68,0	54,3	0,20	60,0%	0,33	22,1
METEM ENERJİ (Hacısıramat) GR I-II	N.GAS	ANG	7,83	29.01.2005	58,0	54,3	0,20	60,0%	0,33	18,9
METEM ENERJİ (Peliklik) GR I-II-III	N.GAS	ANG	11,75	29.01.2005	89,0	54,3	0,20	60,0%	0,33	29,0

2004										
Company	Facility	Index	Installed Capacity (MW)	Commissioning Date	Energy Production (MWh)*	CO_2 EF (ton/TJ)	tCO_2/MWh *	Facility Energy Efficieny	BM Emission Factor tCO2/MWh	CO_2 (tons)
ALTINMARKA GIDA GR I-II-III	N.GAS	ANG	3,60	17.12.2004	28,8	54,3	0,20	60,0%	0,33	9,4
KARKEY-II 3+3 DGM	FUEL-OIL	AF	54,30	12.11.2004	370,0	75,5	0,27	46,0%	0,59	218,4
STANDART PROFİL 3 GM	N.GAS	ANG	6,74	22.10.2004	49,2	54,3	0,20	60,0%	0,33	16,0
HABAŞ ALİAĞA GRUP I-II	N.GAS	ANG	89,23	08.10.2004	713,7	54,3	0,20	60,0%	0,33	232,3
AYEN OSTİM ENERJİ ÜRETİM(BT)	N.GAS	ANG	9,89	01.10.2004	84,0	54,3	0,20	60,0%	0,33	27,4
KOMBASSAN KAĞ. MATBAA GIDA	N.GAS	ANG	5,50	24.09.2004	35,7	54,3	0,20	60,0%	0,33	11,6
BEREKET EN.(Feslek Hes) Gr-1-2	HYDRO	AH	9,48	05.08.2004	41,0	-	-	na	-	0,0
ÇELİK ENERJİ ÜR.ŞTİ. 2 GM	N.GAS	ANG	2,42	09.07.2004	19,0	54,3	0,20	60,0%	0,33	6,2
BESLER GR-2, BT (5,2+7,5)	N.GAS	ANG	12,70	07.07.2004	95,3	54,3	0,20	60,0%	0,33	31,0
ŞAHİNLER ENERJİ 1 GM	N.GAS	ANG	3,20	29.06.2004	24,9	54,3	0,20	60,0%	0,33	8,1
ENERJİ-SA ADANA 1 BT	NAPHTA	AN	49,77	23.06.2004	373,3	69,3	0,25	32,5%	0,77	286,3
BİS ENERJİ 2 GT	N.GAS	ANG	73,04	16.06.2004	602,6	54,3	0,20	60,0%	0,33	196,2
AYEN OSTİM ENERJİ ÜRETİM	N.GAS	ANG	31,08	11.06.2004	264,1	54,3	0,20	60,0%	0,33	86,0
KOMBASSAN KAĞIT GIDA VE TEKS	N.GAS	ANG	5,50	09.06.2004	38,1	54,3	0,20	60,0%	0,33	12,4
GÜL ENERJİ GR-II	FUEL-OIL	AF	12,50	03.06.2004	93,8	75,5	0,27	46,0%	0,59	55,4
TEKBOY TEKSTİL 1 GM	N.GAS	ANG	2,25	18.05.2004	16,0	54,3	0,20	60,0%	0,33	5,2
ÇOLAKOĞLU(KAPASİTE ARTIRIMI)	MPORTED COAL	AHC	45,00	05.05.2004	347,8	92,8	0,33	39,0%	0,86	297,7
İSKUR TEKS.TİL(SÜLEYMANLI) GR I-II	HYDRO	AR	4,60	28.04.2004	17,9	-	-	na	-	0,0
ELTA ELK(DODURGA) GR-I-II-III-IV	HYDRO	AR	4,14	26.04.2004	12,3	-	-	na	-	0,0
TANRIVERDİ 4 GM	N.GAS	ANG	4,66	24.03.2004	38,7	54,3	0,20	60,0%	0,33	12,6
ERE(BİR KAPILI HES) GRUP-I	HYDRO	AR	48,50	11.03.2004	170,5	-	-	na	-	0,0
ATATEKS 2 GM	N.GAS	ANG	5,63	20.02.2004	45,0	54,3	0,20	60,0%	0,33	14,6
ENTEK GR-IV	N.GAS+NAPHTA	ANG	31,13	12.02.2004	233,5	54,3	0,20	60,0%	0,33	76,0
ANKARA D.G.(BAYMİNA) GR-I-II-III	N.GAS	ANG	798,00	08.01.2004	6.500,0	54,3	0,20	60,0%	0,33	2.116,0

Built Margin Emission Factor

	Total Elect.	Net Elect.	Total CO2	BM
2008	4.835,6	4.624,6	889,9	0,19243
2007	5.785,8	5.537,6	1.614,2	0,29150
2006	11.218,1	10.788,2	7.019,7	0,65069
2005	13.615,5	13.070,1	6.958,0	0,53236
2004	10.215,2	9.833,4	3.718,9	0,37819

BM Emission Factor :	0,4606

Summary of Grid Emission Factor Calculation

Parameter	SI Unit	Result
$EF_{Grid,OM,y}$	tCO2/MWh	0,6608
$EF_{Grid,BM,y}$	tCO2/MWh	0,4606
$EF_{Grid,CM,y}$	tCO2/MWh	0,6108

Annex 4

MONITORING INFORMATION

Monitoring plan is explained in detail under Section B.7.

Annex 5

LICENCE OF THE PROJECT

03 SUBAT 2011

T.C.
ENERJİ PİYASASI DÜZENLEME KURUMU

EPDK

№03920

ÜRETİM LİSANSI

Bu Lisans kapsamındaki üretim tesisi Yenilenebilir Enerji Kaynağı kullanmaktadır.

Lisans No : EÜ/1690-4/1226

Tarih : 24/07/2008

Bu Lisans; **PEM Enerji Anonim Şirketi**'ne, Tokat ilinde, rüzgar enerjisine dayalı Killik RES projesi kapsamında, 24/07/2008 tarihinden itibaren 49 yıl süreyle üretim faaliyeti göstermek üzere 4628 sayılı Elektrik Piyasası Kanunu ve ilgili mevzuat uyarınca Enerji Piyasası Düzenleme Kurulu'nun 24/07/2008 tarihli ve 1690-4 sayılı Kararı ile verilmiştir.

SURET
T.C.
ANKARA OTUZ DÖRDÜNCÜ NOTERLİĞİ
Karanfil Sokak No:14/5 Kızılay/ANKARA
Tel:(0.312)425 46 40-419 96 30
İşbu Suret
ASLINA UYGUNDUR
onaylarım
ANKARA 34. NOTER
Başkatip
Yavuz ALTUN

Hasan KOKTAŞ
Başkan

Annex 6

PRELIMINARY EIA RESULT – "*EIA NOT REQUIRED LETTER*"

T.C.
Çevre ve Orman
Bakanlığı

T. C.
TOKAT VALİLİĞİ
İL ÇEVRE VE ORMAN MÜDÜRLÜĞÜ

Karar Tarihi :25/12/2009
Karar No : 2009 / 18

ÇEVRESEL ETKİ DEĞERLENDİRME BELGESİ

17 Temmuz 2008 tarih ve 26939 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin Ek-II Listesinde yer alan "Rüzgar Enerji Santrali" projesi ile ilgili olarak inceleme-değerlendirme yapılmış ve Proje Tanıtım Dosyasında çevresel etkilere karşı alınması öngörülen önlemler yeterli görülmüştür. Ayrıca ÇED Raporu hazırlanmasına gerek bulunmadığı tespit edilmiş olup, söz konusu projeye ÇED Yönetmeliğinin 17. Maddesi gereğince Valiliğimizce "Çevresel Etki Değerlendirmesi Gerekli Değildir Kararı" verilmiştir.

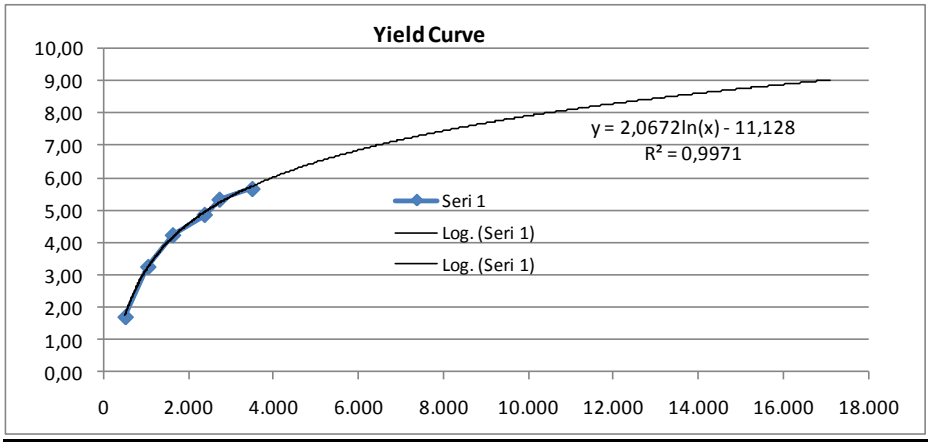
Sedat Sırrı ARISOY
Vali a.
Vali Yardımcısı

T.C.

Proje Sahibi : Pem Enerji A.Ş.
Faaliyetin Yeri : Tokat İli, Merkez İlçesi, Killik, Halilin Damı, Aktaş, Kızıltepe, Ağılkaya Tepe, Hasanpınar ve Çaltepe Mevkileri

Annex 7

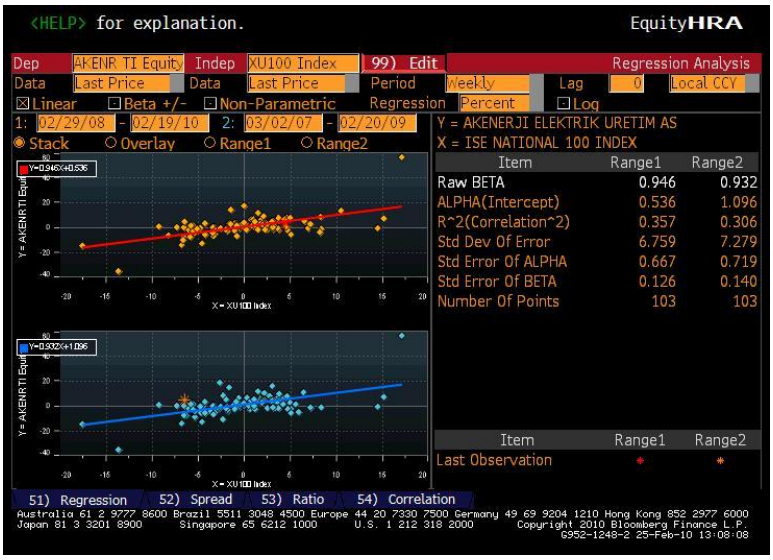
YIELD CURVE



Annex 8

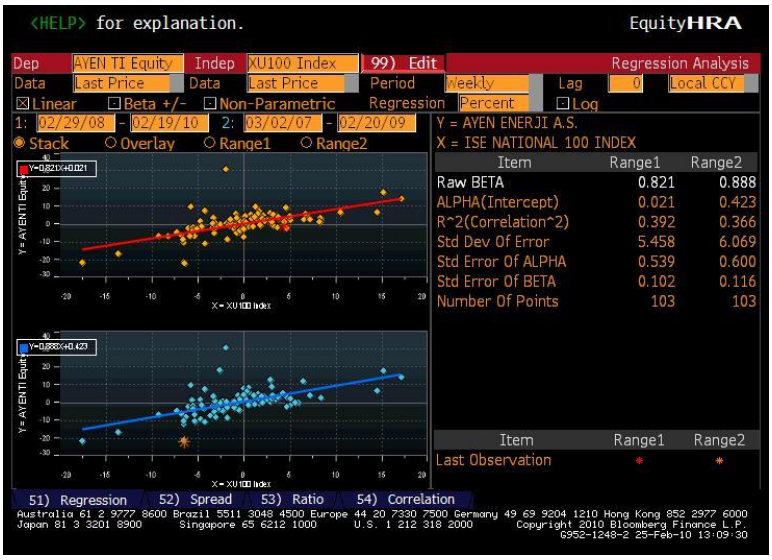
Beta Values of the energy companies traded in ISE 100 derived from Bloomberg:

AK ENERJI



AKSU ENERJI

AYEN



ZORLU ENERJI


<HELP> for explanation.
EquityHRA
Dep ZOREN TI Equity
Indep XU100 Index
99) Edit
Regression Analysis
Data Last Price
Data Last Price
Period Weekly
Lag 0
Local CCY
Linear
Beta +/-
Non-Parametric
Regression Percent
Log
1: 02/29/08 - 02/19/10
2: 02/29/08 - 02/20/09
Stack
Overlay
Range1
Range2
Y = ZORLU ENERJI ELEKTRIK URETIM
X = ISE NATIONAL 100 INDEX
Item Range1 Range2
Raw BETA 0.925 0.971
ALPHA(Intercept) 0.571 -0.249
R^2(Correlation^2) 0.368 0.518
Std Dev Of Error 6.464 5.963
Std Error Of ALPHA 0.638 0.847
Std Error Of BETA 0.121 0.134
Number Of Points 103 51
Item Range1 Range2
Last Observation
51) Regression
52) Spread
53) Ratio
54) Correlation
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000
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