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:

Soma Wind Power Plant
Version.2.6
01.06.2011

A.2. Description of the project activity:

As indicated by the 9th Official Development Plan published by the State Planning Organization the electricity demand in Turkey is expected to increase by 8.1 % each year over the Period 2007-13 due to the expected developments in the industry, production and service sectors[1]. As also laid out by the Global Wind Energy Council, "Turkey's economy, which is growing at around 8% per year, is hungry for energy. At the moment, with around 42 GW of total installed power generation capacity, the country gets one third of its electricity from hydroelectric generation, one third from natural gas and one quarter from coal. The rest is made up of liquefied petroleum gas, wind energy and other sources. Power demand has been growing by about 9% each year, and power shortages are already widespread.[2]"

Against this background, Bilgin RES Elektrik Üretim A.Ş., as indicated in their board decision number 12 dated June 3rd, 2008 decided to invest and planed to build a wind power plant in order to utilise renewable energy resources to generate electricity in Manisa Province.

The project involves installation of 36 wind turbines, each having a capacity of 2.5 MW in Soma and Kirkagac Towns. 12 of the turbines will be located in Kirkagac on East of the province and 24 of them will be on West in Soma Town. The purpose of the project is to supply a portion of country's electricity demand as well as to contribute Turkish economy. The total installed power will be **90 MW** and the annual electricity generation is estimated to be **275,422 MWh**[3] .

The turbines (3-Bladed) of the project will be located on four hills namely: Davullu, Karadede, Ören and Şifa hills and will cover an area of 150 hectares. The site selection is based on detailed wind measurements, smoothness of the surface, availability of the topographical conditions for access and construction, the available area size and the distance to the national grid connection point: The connection point will be Soma B Thermal Power Plant TM, 154 KV bara[4].

In the absence of the project activity (same as pre project scenario) the equivalent amount of electricity would have been generated in the regional grid which is electricity deficient. The 9th Official Development Plan published by the

[1] Paragraph 341 at the "9th Official Development Plan (2007 to 2013)" published by SPO

[2] http://www.gwec.net/index.php?id=133 (Last visited 23.06.2010)

[3] Taken from feasibility and micrositing report prepared by Garrad Hassan and Partners Ltd (Unpublished document with the internal document No:101562/BR/01 Soma Wind Farm Issue A Final) . For the Western part of the wind farm, the report gives POE 90,75 and 50 values for the turbines. However, for the Eastern side only POE50 is given. From experience this overstates the amount of electricity actually produced and the POE 75 is more conservative. The POE 75 is implied to be in the same ratio for the East to the West and the calculation is given to the DOE.

[4] The connection point is also indicated in the electricity production license uploaded to the registry and provided to the DOE.

State Planning Organization of Turkey states that the electricity demand is expected to increase by 8.1 % each year over the period from 2007-13. This is primarily due to the expected developments in the industry, production and service sectors[5]. The Global Wind Energy Council has also stated, "Turkey's economy, which is growing at around 8% per year, is hungry for energy. At the moment, with around 42 GW of total installed power generation capacity, the country gets one third of its electricity from hydroelectric generation, one third from natural gas and one quarter from coal. The rest is made up of liquefied petroleum gas, wind energy and other sources. Power demand has been growing by about 9% each year, and power shortages are already widespread.[6]" Considering that the majority of the installed capacity of electricity generation is in form of fossil fuel power plants in the country.

From this point of view, considering that majority of the installed capacity for electricity generation is in the form of fossil fuel power plants in the country, the project will contribute to clean energy generation. Based on the base line scenario (same as pre-project scenario) that the project is not going to be realized and the energy that would be supplied by the project would be supplied by the existing National Grid of Turkey. The project is estimated to reduce approximately **163,556 tonnes of CO_2e per annum** which would be released from the generation of the same amount of electricity by grid-connected power plants. Turkey, being in a region where the continuous and powerful wind resources exist, has great potential to utilise environmental friendly, renewable resources for electricity generation[7].

The project will contribute Sustainable Development (SD) by lowering energy costs and the dependency on imported resources like natural gas and oil. One of the Millennium Development Goals of Turkey is defined as "Target.9. Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources". Air pollution is one of the concerns under the heading defined with three indicators:

- Energy use per $1 Gross Domestic Product: Energy production and consumption have not reached the desired levels and total energy supply per $1 GDP is below OECD average. Turkey's GDP decreased due to the unstable economic environment, however unit price of energy increased.
- Carbon dioxide emissions (per capita) and consumption of ozone depleting CFCs: CO_2 emissions are the highest among the other Green House Gas (GHG) emissions. 10% increase in CO_2 emissions per capita has been observed between1995-2003.
- Proportion of the population using solid fuels.[8]

The project will contribute to that target in Millennium Development Goals by:

- Utilising local resources for electricity production and lowering the unit price of energy,
- Lowering CO_2 emissions by clean energy production instead of fossil fuel fired power plants.

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[5] Paragraph 341 at the "9th Official Development Plan (2007 to 2013)" published by SPO

[6] http://www.gwec.net/index.php?id=133 (Last visited 23.06.2010)

[7] *(http://www.yesilekonomi.com/yesilkose_detay.asp?konu=NA==;21/07/09* ***Tanay Sıdkı Uyar, Prof.Dr.*** *TÜRÇEP Türkiye Çevre Platformu Koordinatörü Marmara Üniversitesi Öğretim Üyesi EUROSOLAR Türkiye, Avrupa Yenilenebilir Enerjiler Birliği Türkiye Bölümü Başkanı)*
http://www.yesilekonomi.com/roportaj_soner_aksoy.asp
http://www.eie.gov.tr/duyurular/YEK/YEKrepa/REPA-duyuru_01.html
http://www.cumhuriyet.com.tr/?hn=149076
http://www.alternaturk.org/turkiyede-ruzgar-enerjisi.php
http://www.solar-santral.com/menu_detay.asp?id=326

[8] Millennium Development Goals Report, Turkey 2005

The project will utilise local resources for electricity production. This will stimulate the economic development as the wind power, being an infinite and natural resource is more economical and sustainable than other choices.

From a local perspective, the project will provide job opportunities for local people and create household income for them. The side works such as wiring will be done by local companies and this will increase their technological capacity in renewable energy projects and will stimulate the local economy as well.

The major dates in the course of development of the Soma WPP Project are indicated below in Table 1.

Table 1:Major important dates in the course of development of the Soma WPP:

Major Event	Date
Investment decision Date	03/06/08
Licence Date:	17/07/08
Signing of ERPA	08/10/08
LSC Meeting	10/11/08
Last Modification to licence	07/04/09
Turbine Supply and Installation Agreement	06/07/09
DOE Agreement	21/05/09
Construction/ RecruitmentStartDate	20/08/09
DOE Site Visit	25/08/09
LSC Report Uploaded to APX/GS Registry	22/01/09
LSC Feedback report uploaded	18/09/09
Partial Commissioning Date (first 32.5 MW –T1-T13)	13/08/10
Partial Commissioning Date (next 27.5 MW T14-T24)	23/09/10
Full Commissioning Date (next 30 MW T25-T36)	11/11/10

The investment decision was taken based on quotations from suppliers who had not yet signed contracts. The DOE has been supplied with information regarding the costs charged by suppliers based on the contracts that resulted from these quotations.

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)	Bilgin RES Enerji Üretim A.Ş.[9]	No

[9] Private Entity

USA and United Kingdom	J.P. Morgan Ventures Energy Corporation[10]	No

[10] Private Entity

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

The project will be based on Soma and Kırkağaç, Manisa, Turkey

A.4.1.1. Host Party(ies):

Republic of TURKEY

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

Aegean region, Province of Manisa (Figure.1)

Figure 1. Manisa, Turkey (Google Map)

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

Soma and Kırkağaç Towns (Figure.2)

Figure 2. Soma and Kırkağaç Towns (Google Map)

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

The turbines will be located on the top of Davullu Hill, Karadede Hill, Ören Hill, Şifa Hill and will cover an area of 150 hectares. The site selection is based on detailed wind measurements, smoothness of the surface, availability of the topographical conditions for access and construction, the available area size and the distance to the national grid connection point.

The turbines are located within the boundaries of two Towns in two clusters, but the project is licensed under one license and is therefore not a de-bundled project.

The locations of the turbines are shown below, on Figure 3, and the Turbine coordinates are provided in the following table (Table 2).

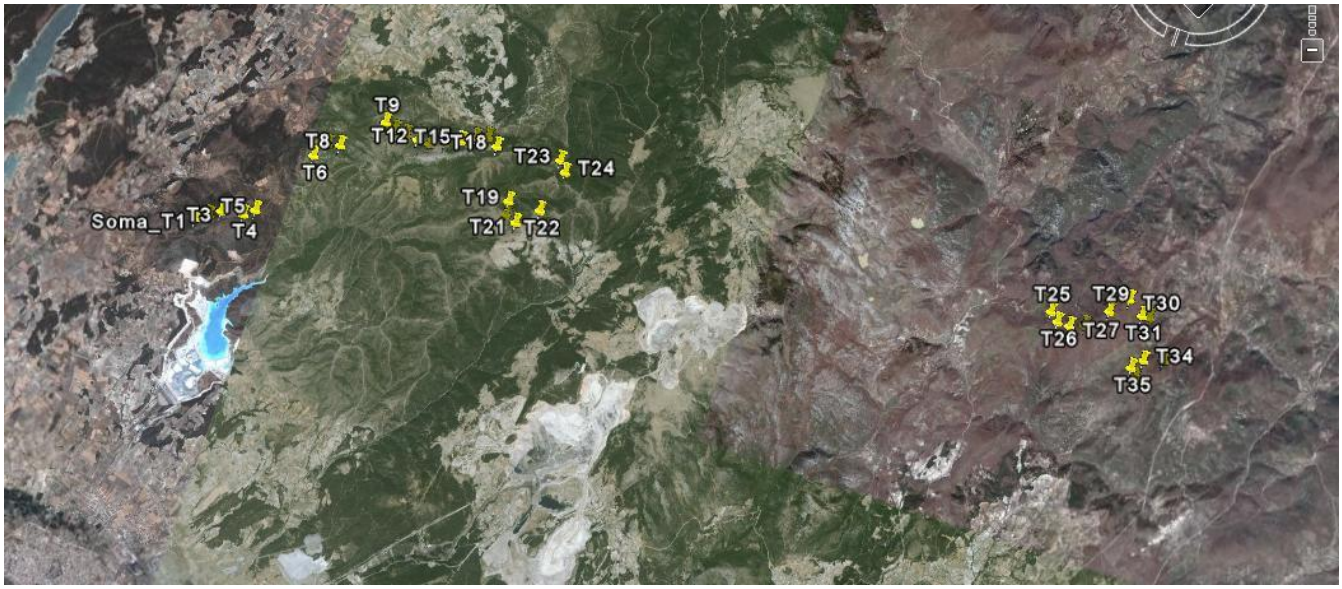

Figure 3. Location of the turbines (Google Earth)**Table 2.** Coordinates of the turbines

Turbine No	Latitude			Longitude			Turbine No	Latitude			Longitude		
1	39^0	15	56.78376	27^0	36	46.41697	**19**	39^0	17	28.21527	27^0	41	32.03049
2	39^0	16	2.043475	27^0	36	57.8132	**20**	39^0	17	18.02069	27^0	41	33.55805
3	39^0	16	8.119337	27^0	37	8.173823	**21**	39^0	17	14.41522	27^0	41	45.25183
4	39^0	16	11.37796	27^0	37	29.69395	**22**	39^0	17	29.41794	27^0	42	4.143265
5	39^0	16	17.45437	27^0	37	39.80533	**23**	39^0	18	10.76187	27^0	42	6.517992
6	39^0	17	11.39826	27^0	38	15.72482	**24**	39^0	18	3.284398	27^0	42	14.66794
7	39^0	17	23.21887	27^0	38	25.14068	**25**	39^0	18	26.42022	27^0	50	31.71867
8	39^0	17	25.52113	27^0	38	37.05845	**26**	39^0	18	20.74095	27^0	50	41.04478
9	39^0	17	53.51596	27^0	39	11.84021	**27**	39^0	18	20.51771	27^0	50	53.90168
10	39^0	17	50.63226	27^0	39	22.79295	**28**	39^0	18	25.0883	27^0	51	7.651717
11	39^0	17	50.17579	27^0	39	34.68665	**29**	39^0	18	41.39962	27^0	51	25.97136
12	39^0	17	49.26273	27^0	39	46.95172	**30**	39^0	18	55.04216	27^0	51	41.00353
13	39^0	17	49.32144	27^0	39	59.3929	**31**	39^0	18	46.33441	27^0	51	51.71158
14	39^0	17	54.56019	27^0	40	13.51163	**32**	39^0	18	47.01373	27^0	52	5.04017
15	39^0	17	59.50653	27^0	40	27.62814	**33**	39^0	18	19.62914	27^0	52	32.00743
16	39^0	18	5.33424	27^0	40	40.70996	**34**	39^0	18	14.6123	27^0	52	13.24054
17	39^0	18	9.258563	27^0	40	51.93691	**35**	39^0	18	6.30808	27^0	52	4.57905
18	39^0	18	4.554857	27^0	41	3.038456	**36**	39^0	18	0.386015	27^0	52	11.39442

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

The project category is Sectoral Scope 1: Energy industries (renewable-/non -renewable sources)

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

The project aims to generate electricity by utilising wind power in order to supply the increasing demand in a more economical and sustainable means. It will replace the air pollution caused by the grid connected power plants which are mostly fossil fuel fired. The following Figure (Figure 4) exhibits the schematic representation of the project and its boundaries.

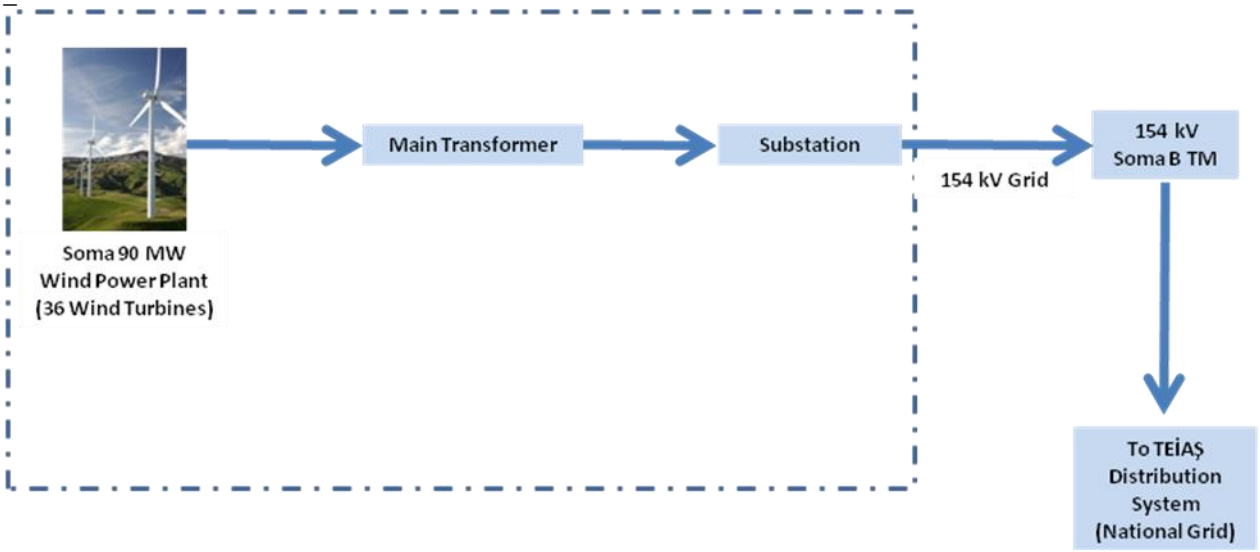

Figure 4. Schematic representation of the Project.

The project comprises **36** wind turbines, each having **2.5 MW** capacity, which will be located in Soma and Kırkağaç, Manisa, Turkey. The total installed capacity is **90.0 MW** and the annual electricity generation will be **275,422 MWh.**

High speed, 3 blade wind turbines will be used for the project. Those high speed turbines are lighter and cheaper than low speed turbines, operational with a small torque and have a low rate of cycling. The turbine blades have the ability to change angles according to wind direction.

The turbines will be located upwind aspect. The towers will have 80 m height and 3m diameter.The diameter of the blades is 90m. The lifespan of the turbines are indicated to be 20 years by the manufacturer (in the Nordex N90 2.5 MW turbine catalogue).

Based on the micrositing studies each turbine location is placed to achieve maximum yield from the wind blow. As indicated in their catalogue[11], the Nordex N90 2.5 MW turbines provide energy at even lower wind speeds (Figure 5). However the overall efficiency of the wind turbine is dependent on the placement of each turbine based on the

[11] N90 N**ordex N90/2500** New dimensions in the 3rd generation.(Manufacturer's product brochure,01,2009 available at http://www.nordex-online.com/fileadmin/MEDIA/Produktinfos/EN/N90_2500_Broschuere_GB_web.pdf)

research conducted prior to project implementation. According to the micrositing report by Garrad Hassan and Partners Ltd. the overall efficiency of the wind farm is estimated to be about 39% based on total net energy output estimatesş

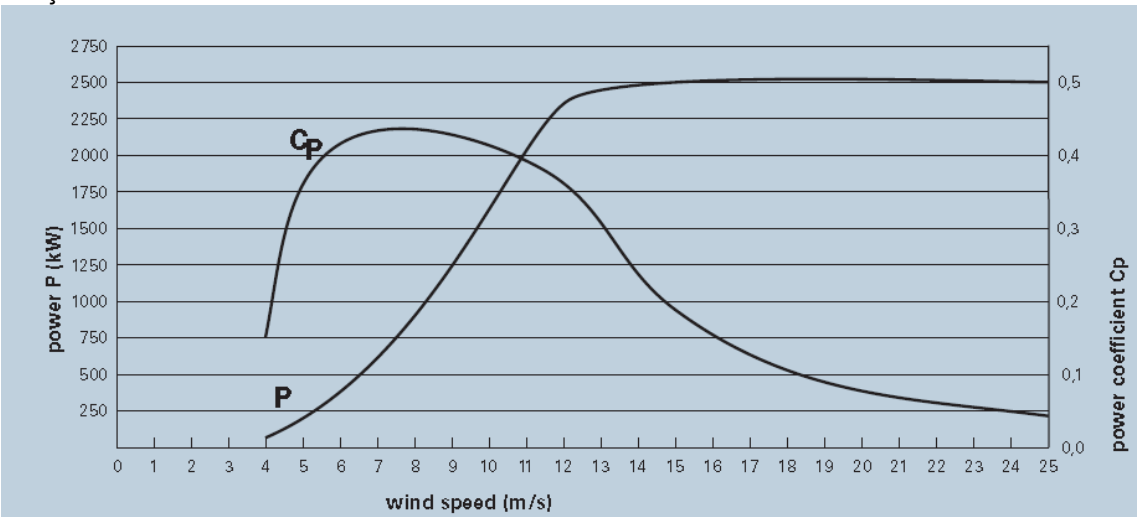

Figure 5: N90/2500 LS Power curve indicates that the turbines will be providing high yield at even lower wind speeds (Figure taken from the catalogue of N90 Nordex Turbines)

The following table (Table 3) is a list of the equipment that will be installed to the Soma Wind Power Plant:

Table 3. List of Equipments that will be installed to the Soma Wind Power Plant.

Name of Part	Unit
Anchor Parts	36
Tower Section 1	36
Tower Section 2	36
Tower Section 3	36
Tower Section 4	36
Tower Equipment	36
Tower Bolts	36
Blade 1	36
Blade 2	36
Blade 3	36
Nacelle incl. Accessories	36
Drive Train	36
Cooling Hood	36
Hub	36
Converter Cabinet	36
Accessory and Consumable Container	36
Scada Equipment	1

Electricity Meters[12]	4

The project provides a more sustainable means of electricity generation compared to the general tendency to fossil fuel fired thermal power plants. The majority of the electricity generated by grid is from natural gas fired power plants and there are no incentives or future targets defined for wind energy by the government. The know-how and technology will be imported from European countries in the context of the project; which will stimulate the development of wind energy sector in the country. Thus, the project uses an environmentally safe and sound technology in the project activity.

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

The annual electricity generation is estimated to be **275,422 MWh** and approximately **,163,556 tCO_2** emissions per year will be saved by the project. The total amount of emission reduction sums up to **1,144,892 tCO_2** over the crediting period of **7 years** (Table 4).

Table 4- Expected emission reduction by the project activity

Year	**VERs**
2010 (16th August to 31st December)	59,761
2011	163,556
2012	163,556
2013	163,556
2014	163,556
2015	163,556
2016	163,556
2017 (1 Jan - 15 August)	103,795
Total estimated emission reductions (tonnes of CO_2e)	1,144,892
Total number of crediting years	7
Annual Average over the crediting period of estimated reductions (tonnes of CO_2e)	163,556

A.4.5. Public funding of the project activity:

No public funding from an Annex 1 party is involved in the project activity

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:

[12] The electricity meters belong to TEİAŞ, and will be sealed and locked as they will be installed in the main control room.

(a) Version 12.1.0 of ACM0002 "Consolidated baseline methodology for grid connected electricity generation from renewable sources "

The above methodology is hereafter referred to as the "Baseline Methodology". The Baseline Methodology will be used in conjunction with the approved monitoring methodology Version 12.1.0 of ACM0002 ("Monitoring Methodology").

(b) Version 5.2 of "Tool for the demonstration and assessment of additionality"
(c) Version 02 of "Tool to calculate emission factor of electricity system"

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

ACM0002 methodology defines the baseline scenario for the proposed project as:

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 in the Tool to calculate the emission factor for an electricity system (v. 02).

The choice of methodology ACM0002, Version 12.1.0, is justified as the project activity meets its applicability criteria:

- The Soma Wind Power Plant Project is a grid-connected renewable power generation project that generates electricity from wind power.
- The project does not involve switching from fossil fuels to renewable energy at the site of the project activity, ,neither is it a biomass fired power plant nor a hydro power plant that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m^2.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

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

Table 5 shows the main gases included in the project boundary. CO_2 emission is included in baseline but the project activity does not emit any gases listed.

Table 5- Main gases included in the project boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Electricity generation in baseline (Turkey Grid)	CO_2	Yes	Main Emission Source
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
Project Activity	Not applicable to wind power projects as per ACM0002 version 12.1.0			

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

The Proposed project is the installation of a new grid-connected renewable power plant and the baseline scenario is the following as per ACM0002 (Version 12.1.0):

> *"Electricity delivered to the grid by the project activity 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 in the .Tool to calculate the emission factor for an electricity system." (v2.0).*

The proposed project is connected to the Turkish National Grid. Therefore the baseline scenario of the proposed project is the provision of the equivalent amount of annual power output by the Turkish Grid which is the continued operation of existing power plants and the addition of new sources to meet electricity demand.

According to ACM002, baseline emissions are equal to power generated by the project that is delivered to the Turkish Grid, multiplied by the baseline emissions factor. This baseline emissions factor (EFy) is calculated as the Combined Margin (CM). The analysis and description in B.5. and B.6. supports the baseline scenario selected above.

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):

The project activity reduces GHG emissions by substituting fossil fuel based electricity generation by renewable resources (wind) based electricity generation

This section refers to the Tool to for the Demonstration and Assessment of Additionality Version 5.2 and the numbering in this section reflect the Tool's Guidelines provided at EB 39.

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

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

Project activities that apply the tool in context of approved consolidated methodology ACM0002 only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity. The following two alternatives to the Project activity are considered here in detail:

Scenario (a): The proposed Project activity undertaken without being registered as a GS VER project activity, i.e. the construction of a new wind electricity generation plant with an installed capacity of 90 MW, connected to the local grid, and implemented without considering Carbon revenues.

Scenario (b): Continuation of the current situation, i.e. electricity will continue to be generated by the existing generation mix operating in the Turkey regional grid.

Outcome of Step 1a: Since the electricity demand of Turkey is increasing, and since there are no private sector wind farms constructed without VER revenue, the only realistic and credible alternative scenario to the project activity is Scenario (b) Supply of equal amount of electricity by the existing grid.

Sub-step 1b. Consistency with mandatory laws and regulations:
The alternative Scenario (b) is in compliance with all mandatory applicable and legal and regulatory requirements. New power generation capacity is regulated by Electricity Market Regulation Authority (EMRA) who issues the licenses for electricity generation and is responsible for ensuring that new capacity applies with its rules and regulations.

Outcome of Step 1b: The alternative scenario to the project activity is the supply of electricity by the existing grid with additional capacity is in compliance with mandatory legislation and regulations.

Step 2 - Investment analysis

"The proposed project activity is not (a) the most economically and financially attractive" has been demonstrated below:

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

(1)There are three options for investment analysis method:

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

Simple Cost Analysis is not applicable, because, the project generates economical benefits from sale of electricity to grid. Investment Comparison Analysis is also eliminated since the baseline for the project is generation of electricity by the grid and no similar investment alternatives exist. Therefore, Benchmark Analysis is the most appropriate approach for the evaluation of the project investment.

Sub-step 2b - Option III-Apply benchmark analysis
The IRR on capital employed is the most appropriate financial indicator for analysing the project The Tool for the Demonstration and Assessment of Additionality Version 5.2 and its Guidelines issued at EB 39 state that "Discount rates and benchmarks shall be derived from a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or project type . . . or documented by official publicly available financial data".

In this analysis, we use the return on Turkish government issued Eurobonds at the time the investment decision for the project was made, increased by a suitable risk premium that reflects an equity investment in a wind energy project. The premium is determined using the Capital Asset Pricing model and the Weighted Average Cost of Capital Model.
In line with the Tool for the Demonstration and Assessment of Additionality Version 5.2, the Eurobond rate from Government issued bonds is taken to be the benchmark or most basic and low risk return available to Turkish Investors. Investment in the Project is made primarily in Euros (not Turkish Lira), therefore, the investment analysis is done by comparing the return on the Project to returns relatively risk free government Eurobonds.
On the investment decision date, June 3rd, 2008, Turkish Government issued Euro denominated Eurobonds maturing in 2019 were yielding 7.16%[13]

[13] See web page http://www.ziraat.com.tr/tr/bankamiz/faiz-ve-ucretler/aspx/eurobond.aspx and enter 2nd June 2008 in the drop down boxes.

Capital Asset pricing Model

The Capital Asset Pricing Model (CAPM)[14] provides the asset-appropriate required return rate and can be utilised as a bench mark to compare the IRR value of the project since the model provides us with the rate at which future cash flows produced by the asset should be discounted given that asset's relative risks. The model is expressed by the following formula:

$$\frac{E\ (R_i) - R_f}{\beta_i} = E(R_m) - E(R_f)$$

Where, $E(R_i)$ strands for the expected return on the capital asset
R_f stands for the risk-free rate of interest such as interest arising from government bonds
$E(R_m)$ stands for the expected return of the market
$E(R_m)$-$E(R_f)$ is also 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).
And,
Bi stands for the sensitivity of the expected excess asset returns to the expected excess market returns, formulated as :

$$\beta_{i=}\frac{Cov\ (R_i,R_m)}{Var\ (R_m)}$$

Since beta reflects asset-specific sensitivity to non-diversifiable, i.e. market risk, the market as a whole, by definition, has a beta of "one". In our case as it is not possible to derive a Beta value specific to renewable energy investments with Turkey, it is reasonable to assume Beta as one and expect that this investment will behave parallel to the entire risk behaviour of the Turkish market.

Turkish Equity Risk Prem. = U.S. ERP (5.0%) x Istanbul Stock Exchange Volatility[15] (37%) / Volatility of S&P500 22%[16]
= 8.64%

And where Cost of Equity = EuroBond (7.16) + Beta (1) x Equity Risk Premium (8.64%)
= 15.80%

Weighted Average Cost of Capital

The Weighted Average Cost of Capital is a measure of the returns required from a project that is funded by both debt and equity. It may be formulated as:

$WACC=(W_d.C_d) +(W_e.C_e)$

[14] Black, Fischer., Michael C. Jensen, and Myron Scholes (1972). *The Capital Asset Pricing Model: Some Empirical Tests*, pp. 79-121 in M. Jensen ed., Studies in the Theory of Capital Markets. New York: Praeger Publishers.

[15] From Bloomberg for the investment decision date

16 http://www.tcmb.gov.tr/kurlar/200806/02062008.html

Where:

W_d = % of debt (71.5%)
C_d = Cost of Debt (9.75%)
W_e = % of Equity (28.5%)
C_e = Cost of Equity (15.80%)

Solving using the figures above:

WACC = (28.5 * 15.80) + (71.5 * 9.75)

WACC = 11.48%

Based on these external factors, the project requires an Internal Rate of Return of 11.48% to exceed the benchmark.

Based on the Eurobond rates (7.16%[17]) for the date of investment decision, cost of equity, cost of loan, and the risk premiums, the benchmark is calculated to be 11.48% for this project. The detail of how benchmark was calculated is provided to the DOE.

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

The main parameters used for evaluation of the investment are given in Table 7. and further parameters given in the Investment Analysis workbook provided to the DOE.

Table 6 . Financial parameters used in investment analysis

Installed Capacity	***90 MW***	***Evidence or Reference***	***Date***
Expected Electricity Generation	*275,422 MWh*	*Garrad Hassan Feasibility Report P75 Value*	*19/08/2007*
Emission Reduction(ER)	*163,566 tCO_2e*	*Calculated based on the Combined Margin Emission Factor*	
ER sales price	*8.25 Euro/t CO_2e*	*ERPA between JPMorgan ClimateCare and* Bilgin Rüzgar Enerjisi Santrali Elektrik Üretim A.Ş.	*8.10.2008*
Total Investmentinclu ding the loan premium	108,652,920*Euro*	Total elctro-mechanical equipment cost estimate taken from purchase of similar turbines shortly before the investment decision date as evidenced to DOE with Quotation no. NTR-MAZI-01	*04.03.08*
		Construction Quotation Alpike Inşaat Construction	10.04.2009
		Electrical Works Contract ,ABB Electric Areva Cabling and Switchyard Transformer Contract 1	*17.11.2009 and*15.5.2009,

[17] www.ziraat.com.tr/tr/bankamiz/faiz-ve-ucretler/aspx/eurobond.aspx

		and 2	
		Transmission Line (154 kVa) Kar-PA Transmission line Contract	21.01.2010
		Insurence Insurance quotation	05.07.2010
Loan	81,590,000 *Euro*	*ECA Loan Agreement and Commercial Loan Agreement*	7/8/2009 and 12/8/2009
Loan Period	*12.5 years*	*ECA Loan Agreement and Commercial Loan Agreement*	7/8/2009 and 12/8/2009
Electricity Sales Price	*0.055 Euro*	*Renewable Energy Law (number 5346)*	*10.5.2005 (*http://www.resmi-gazete.org/sayi/12554/5346-yenilenebilir-enerji-kaynaklarinin-elektrik-enerjisi-uretimi-amacli-kullanimina-iliskin-kanun.html*)*
VAT	*18%*	*Turkish V.A.T Regulation*	http://www.gib.gov.tr/index.php?id=830

The turbines have a life of 20 years. The value of the investment has been depreciated over 20 years as a result. The value applied at the end of the 20 year period (as required by the Guidelines) is an estimate of the scrap value of the metals included and is taken as EUR 864,000 (EUR 24,000 per turbine pylon). This is a nominal value, as it is difficult to predict with any degree of certainty what the actual value will be.

Wind power investments are highly capital intensive projects. The initial investment (costs for the Wind Turbine itself, foundations, electrical equipment and grid-connection) constitutes more than 75% of the electricity production cost. Therefore, the major factor for determining the return of investment in wind power projects is the cost of capital[18].

For the Soma WPP project, the Internal Rate of Return (IRR) on Capital is calculated as **9.25%** without the carbon credit income. As the cost of financing expenditures (i.e. loan repayments and interests) is not included in calculations of IRR on Capital, it is comparable with to the benchmark[19] value of 11.48%.

Sub-step 2d - Sensitivity Analysis

(11) In order to determine whether investment decision is the most attractive alternative financially, a sensitivity analysis has been done. four parameters used for analysis;

- Operating Cost
- Electricity Sales revenue
- Amount of electricity generation
- Capital Cost

For a range of ±10% fluctuations in parameters above, Table 8 and Figure.6 below have been obtained, and compared to the benchmark value of 11.48%.

[18] Wind Energy-The Facts, Volume 2-Costs&Prices p. 103, (http://www.ewea.org/index.php?id=33)

[19] Benchmark value is the weighted average cost of capital

Table 7- Sensitivity analysis for the IRR on Capital without carbon revenue for the project

	-10%	-5%	5%	10%	Exceed ?
Operating Cost	9.54%	9.39%	9.10%	8.95%	**No**
Electricity Price	7.50%	8.38%	10.09%	10.92%	**No**
Generation (kWh)	7.33%	8.30%	10.17%	11.07%	**No**
Capital Costs	10.83%	10.00%	8.55%	7.91%	**No**

Table 8 and the following Figure 6 shows the change in IRR on capital by fluctuations in operating cost, electricity sales revenue, amount of electricity generation and capital cost.. In all scenarios the IRR on Capital stays below the benchmark without the carbon revenue.

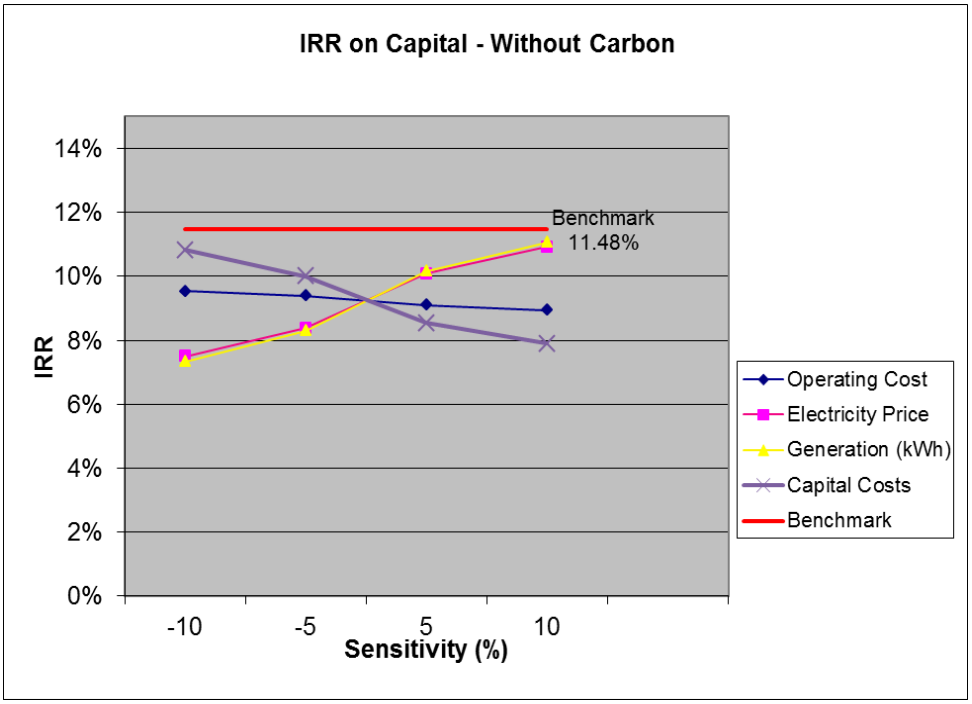

Figure 6: Sensitivity analysis without VER revenue.

The guaranteed electricity sale prices for renewable energy power plants have been fixed in accordance with Renewable Energy Law and therefore any change in electricity revenue is unlikely. On the other hand, a high portion of the investment cost will be spent on the purchase of turbines which are exported from Europe and the prices are generally fixed with the generation capacity. As a result, fluctuations in both expenditures are unlikely to be realised.

To exceed the benchmark, Investment costs must be reduced by 23%% or the income must increase by about 24% over the life of the project. As the Renewable energy law only guaranties a minimum price of EUR0.055 per kWh, the former is unlikely. As wind farms typically *underperform* compared to design, an increased generation of 24% is also unlikely

Adding in carbon revenues to the project increases the IRR on capital to 9.25%. While this is lower than the benchmark, it is closer to it than when carbon is not considered. The carbon finance is therefore required in order to make a positive investment decision.

Outcome of Step 2: The project activity is not financially attractive compared to the benchmark but the addition of carbon revenue significantly improves the performance.

Step 3 - Barrier Analysis

The "Tool for the demonstration and assessment of additionality" states that project participants may choose to apply Step 2 (Investment Analysis), OR Step 3 (Barrier Analysis) to demonstrate Project additionality. Given the low IRR on capital of the Project, Step 3 is not used to demonstrate additionality of the proposed Project.

Step.4. Common practice analysis
Sub-step 4a: Analyse other activities similar to the proposed project activity:

According to the Tool for the demonstration and assessment of additionality, projects are taken to be similar if they are,

> "in the same country . . . are of a broadly similar technology, are of a similar scale . . . and a comparable investment climate. . . other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis."

The wind power plant projects in Turkey, under operation are listed in Table.8.with the basic information. The investments to wind power have increased in 2006 and populated in 2008 as it can be seen from the table. The capacities of the plants which became operational in 2006 are much higher than the plants previously commissioned in 1998 and 2000.

In the past, the very few wind farms that were built in Turkey were developed as Build and Operate (BO) or Build Operate and Transfer (BOT) protocols with the government in accordance with Energy Market Law. This model is no longer available and the reduced risk that the government-backed contracts provided is not longer available. Most of the projects constructed in 2006 and thereafter have been registered as either Gold Standard (GS) or Verified Emission Reduction (VER) projects and are benefiting from carbon finance to make them financially attractive and overcome the other barriers they face.

Table 8.- Wind Projects in Turkey[20]

*awaiting GS validation

NO	*Location*	*Company*	*Comm. Date*	*Installed capacity (MW)*	*Developed as*	*Turbine capacity*
CAPACITY UNDER OPERATION				***146.25***		
1	*İzmir-Çeşme*	*Alize A.Ş.*	*1998*	*1.5*	*BOT*	*3 turbines, 500 kW*

[20] "Türkiyedeki Rüzgar Santralleri, EPDK: (http://www.epdk.org.tr/lisans/elektrik/yek/ruzgarprojeleriningelisimi.doc)

2	*İzmir- Çeşme*	*Güçbirliği A.Ş.*	*1998*	*7.2*	*BOT*	*12 turbines, 600kW*
3	*Çanakkale-Bozcaada*	*Bores A.Ş.*	*2000*	*10.2*	*BOT*	*17 turbines, 600kW*
4	*İstanbul- Hadımköy*	*Sunjüt A.Ş.*	*2003*	*1.2*	*BOT*	*2 turbines, 600kW*
5	Balıkesir-Bandırma	Bares A.Ş.	I/2006	30	VER+	20 turbines, 1500 kW
6	*İstanbul-Silivri*	*Ertürk A.Ş.*	*II/2006*	*0.85*	*BO*	*1 turbine, 850 kW*
7	İzmir-Çeşme	Mare A.Ş.	I/2007	39.2	GS638	49 turbines, 800 kW
8	Manisa-Akhisar	Deniz A.Ş.	I/2007	10.8	VCS66	6 turbines, 1800 kW
9	Çanakkale-İntepe	Anemon A.Ş.	I/2007	30.4	GS347	38 turbines, 800 kW
10	Çanakkale-Gelibolu	Doğal A.Ş.	II/2007	14.9	GS439	13 turbines, 800 kW+ 5 turbines 900 kW

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

Following the guidelines in "*The tool for the demonstration and assessment of additionality",* there are no "similar" activities that are occurring as all projects are not comparable to the project activity in terms of scale. Further, the project under operation being closest the project capacity amongst those listed are 7, 9 and 10 have all been implemented after taking Carbon Revenues into consideration. Thus the project activity is not a common practice in the region._

The below table outlines an overview of the key events in the development of the project activity.

Table 9:Overview of major events in the development of the Project Activity.

Date	Major Event
03/06/08	The project owner decided that they can only invest on the project if the project is developed as a Gold Standard VER project and gets carbon revenue
17/07/08	Electricity production Licenceis granted to the project owner by EMRA:
08/10/08	Project owner Signed an ERPA with J. P. Morgan Climatecare
10/11/08	A Local Stakeholders Consultation Meeting is held in the project location
07/04/09	Some final Modifications are made in the electricity production licence
06/07/09	Project owner signed a turbine Supply and Installation Agreement with the Turbine manufacturer Nordex.
21/05/09	J.P. Morgan Climatecare contracted the DOE for validation
20/08/09	The project owner and its sub contractors started to Recruit workers to start up the construction.
25/08/09	DOE made a Visit to the site as part of the validation plan
22/01/09	LSC Report Uploaded to APX/GS Registry
18/09/09	LSC Feedback report uploaded
13/08/10	The project has got Partial Commissioning for the first 32.5 MW capacity (Turbine numbers T1 to T13 has become operational)
23/09/10	The project has got Partial Commissioning for the next 27.5 MW capacity (Turbine numbers T14 to T24 has become operational)

11/11/10	The project has got Full Commissioning by the addition of the last 30 MW capacity (Turbine numbers T25 to T36 has become operational)

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to the latest version (version 12.1.0) of ACM0002 and the "Tool to calculate the emission factor for electricity system, (version 02)" since the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

Electricity delivered to the grid by the project activity 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 in the " (version 02) to calculate the emission factor for an electricity system".

The Project therefore applies the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" version 02 (EB50) as follows:

Step 1 -*Identify the relevant electric power system*

As the host country is not participating in the compliance markets hence does not have a DNA, a delineation of the project electricity system and connected electricity systems has not been published yet. For such cases, the tool suggests using the following criteria to determine the existence of significant transmission constraints:

1. *"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."* This criteria is not applicable as there is no spot electricity market in the host country.
2. *"The transmission line is operated at 90% or more of its rated capacity during 90% percent or more of the hours of the year"*: The transmission line operator (TEIAS) or any other offical source has not published the capacity usage figures for the Turkish grid, hence this criterion can not be proved.

According to the tool, where the application of these criteria does not result in a clear grid boundary, a regional grid definition in the case of large countries with layered dispatch systems (e.g. provincial / regional / national) shall be used. A provincial grid definition may indeed in many cases be too narrow given significant electricity trade among provinces that might be affected, directly or indirectly, by a CDM project activity. In other countries, the national (or other largest) grid definition should be used by default.

Therefore, for the case of the subject project activity "the project electricity system" and "the connected system" are same, and the Turkish National Grid is used as the "project electricity system". It is also confirmed by TEIAS that the Turkish grid is interconnected. There isn't any independent or regional grid system in any region of Turkey. The map of the Turkish Electricity Grid is given in the below figure (Figure 14):

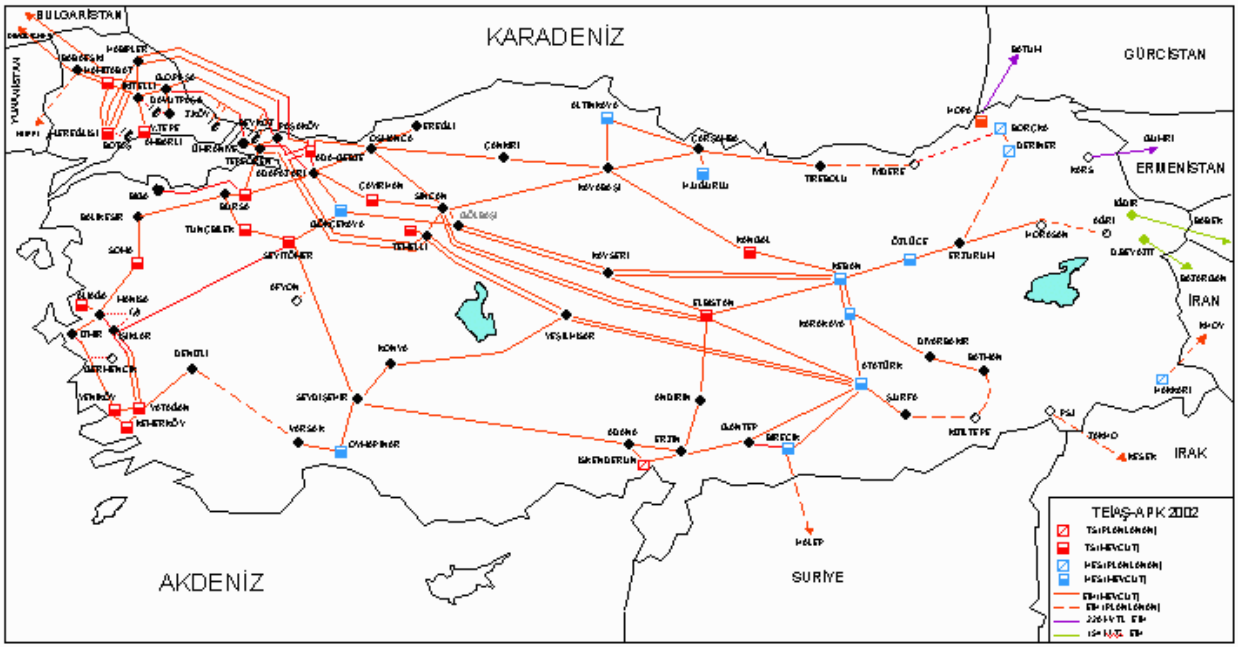

Figure 7: **The Map showing the boundaries of Turkish Electricity Grid (http://geni.org/globalenergy/library/national_energy_grid/turkey/turkishnationalelectricitygrid.shtml)**

All the calculations details of which are given below are made for the entire Turkish Grid.

Step 2 - Choose whether to include off-grid power plants in the project electricity system

Option I has been selected for the calculation of grid emission factor

Step 3 – Select an operating margin (OM) method

As the share of "low cost/must run" resources are below 50% for the five most recent years (Table 10), therefore, in accordance with the Tool, (a) Simple OM method will be used in the calculations.

Table 10: **Share of primary sources in electricity generation, 2002 – 2007**[21]

	2004	2005	2006	2007	2008
Thermal	69.32	75.48	74.78	81.02	82.72
Hydro	30.58	24.43	25.10	18.72	16.77
Wind & Geothermal	0.10	0.09	0.12	0.26	0.51
Total	100.0	100.0	100.0	100.0	100.0

[21] Annual Development of Installed Capacity and Generation in Turkey (1970-2008) (http://www.teias.gov.tr/istatistik2008/13.xls)

For the calculation of the Simple OM, the Ex-Ante option is selected, at the time of PDD submission to the DOE, the data vintages that were most recent at the start of valdiation, belongs to the years 2006, 2007 and 2008. All the data used in calculation of the Simple OM are taken from the TEIAS website, details of which are given below.

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

The following data are available from the Turkish Electricity Transmission Company (TEİAŞ) web site:

- **Annual fuel consumption by fuel type[22],**
- **Annual heating values for fuels consumed for electricity generation[23],**
- **Annual electricity generation by fuel type, import and export[24]**

Taking into consideration the available data Simple OM method Option B is the applicable method for the project activity. Option A requires data on net electricity generation of each power plant / unit and a CO2 emission factor of each power unit, both of which are not publicly available.

$EF_{grid,OMsimple,y}$, using option B is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{grid,y}} \quad (7)$$

Step 5 - Identify the cohort of power units to be included in the build margin

The sample group of power units m used to calculate the build margin consists of either:

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 is option (b), hence the set of capacity additions in the electricity system that comprise 20% of the system generation is used.

According to the tool in terms of vintage of data, project participants can choose either the ex-ante option or the ex-post option. Among these two options, Option 1 is selected. For the first crediting period, the build margin emission factor is calculated ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor will be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build

[22] Fuel Consumed in thermal P.P.in Turkey by the Electric Utilities (2006-2008) (http://www.teias.gov.tr/istatistik2008/44.xls)

[23] Heating Values Of Fuels Consumed In Thermal P.Ps In Turkey By The Electric Utilities (2006-2008), (http://www.teias.gov.tr/istatistik2008/46.xls).

[24] Turkey's Gross Electricity Generation by Primary Energy Resources and The Electric Utilities (2006-2008) / (http://www.teias.gov.tr/istatistik2008/37(06-08).xls)/ Annual Development of Electricity Generation-Consumption and Losses in Turkey (1984-2008), ((www.teias.gov.tr/istatistik2008/30(84-08).xls).

margin emission factor calculated for the second crediting period will be used. This option does not require monitoring the emission factor during the crediting period.

Step 6 - Calculate the build margin emission factor

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

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

According to the tool, the CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance in step 4 (a) for the simple OM, using options A1, A2 or A3, using for y the most recent historical year for which power generation data is available, and using for m the power units included in the build margin. Taking into consideration the available data on the capacity additions, the formula given under Option A2 of the Simple OM option A is used to calculate $EF_{EL,m,y}$. For this calculation the generation efficiencies are taken from Annex 1 of the Tool.

The CO2 emissions from the most recent capacity additions are calculated by multiplying the $EF_{EL,m,y}$ values calculated for each fuel source by the annual generation of that fuel source (Table 15). The emission factor has been taken as "zero" for the renewable and wastes and the generation efficiencies for the thermal power plants type of which are not known are taken as 60% which is generation efficiency for the combined cycle natural gas power plants. The Build Margin Emission Factor for each year is calculated by dividing the total CO_2 Emissions of the subject year by the total generation from the capacity additions of the same year.

The Build Margin Emission Factor of the grid is then calculated as a generation weighted average for the years 2004, 2005, 2006, 2007 and 2008.

Step 7 - Calculation of the combined margin emissions factor

Finally, the combined margin grid emission factor ($EF_{grid,CM,y}$) is expressed as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$):

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

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 (%)

Where weights w_{OM} and w_{BM} are by default 0.75 and 0.25 according to the selected methodology. And EF_{OM} and EF_{BM} are calculated as described in the previous steps.

Then baseline emissions (BE_y) are obtained as:

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

BE$_y$ = Baseline emissions in year *y* (tCO_2/yr)

EG$_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

EF$_{grid,CM,y}$ = Combined margin CO_2 emissions factor in year *y* (tCO_2/MWh)

And

$$EG_{facility,y} = EG_{a,yc}$$

EG$_{facility,y}$ = **Quantity of net electricity generation supplied by the project plant to the grid in year *y* (MWh/yr)**

The *ex-ante* emission reductions (ER_y) are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year *y* (tCO_2)

BE_y = Baseline emissions in year *y* (tCO_2)

$PE_{,y}$ = Project Emissions in year *y* (tCO_2)

L_y = Leakage emissions in year *y* (tCO_2)

As methodology states the PEy and Ly in case of a wind power project to be zero hence ERy = BEy

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

Data / Parameter:	$FC_{i,y}$
Data unit:	Mass or Volume Unit (Tonnes or cubic meter)
Description:	Amount of fuel *i* consumed by relevant power plants in Turkey in years, 2006, 2007, 2008
Source of data used:	Turkish Electrical Distribution Company Web Site (http://www.teias.gov.tr/istatistik2008/44.xls)
Value applied:	Please see Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used is taken from the TEIAS website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEIAS website is the most up-to date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,OM,Simple,y}$

Data / Parameter:	NCV
Data unit:	GJ/Mass or Volume Unit
Description:	Net Calorific Values for fossil fuels in years 2006, 2007 and 2008
Source of data used:	Turkish Electrical Distribution Company Web Site (http://www.teias.gov.tr/istatistik2008/46.xls http://www.teias.gov.tr/istatistik2008/44.xls)
Value applied:	Please see Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used is taken from the TEIAS website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEIAS website is the most up-to date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,OM,Simple,y}$. As data on the NCV is not published directly on the TEIAS website, this data is calculated using the heating values of fuels and the volume or mass of fuels consumed for each year.

Data / Parameter:	$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of fossil fuel type *i* in year *y*
Source of data used:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied:	Please see Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the "Tool to calculate the emission factor for an electricity system" version 02, if values provided by the fuel supplier of the power plants in invoices or regional or national average defaults values are not available the IPCC default values at the lower limit of uncertainty must be used.
Any comment:	Data used both for the calculation of $EF_{grid,OM,Simple,y}$ and $EF_{EL,m,y}$

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y
Source of data used:	Turkish Electrical Distribution Company Web Site http://www.teias.gov.tr/istatistik2008/37(06-08).xls www.teias.gov.tr/istatistik2008/30(84-08).xls
Value applied:	Please see Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used is taken from the TEIAS website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEIAS website is the most up-to-date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,OM,Simple,y}$

Data / Parameter:	$EG_{m,y}$
Data unit:	MWh
Description:	*Net quantity of electricity generated and delivered to the grid by power unit m in year* y
Source of data used:	Turkish Electrical Distribution Company Web Site (www.teias.gov.tr). Statistical Reports are taken for the years 2004 and 2005 and capacity projection reports are used for the years 2006, 2007 and 2008.
Value applied:	Please see Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used is taken from the TEIAS website, which is the website of the Turkish Electricity Distribution Company. The data published on the TEIAS website is the most up-to-date and reliable data available for the Turkish grid.
Any comment:	Data used for the calculation of $EF_{grid,BM,y}$

Data / Parameter:	$\eta_{m,y}$
Data unit:	-
Description:	Average net energy conversion efficiency of power unit m in year y
Source of data used:	The default values provided at the annex 1 of the "Tool to calculate emission factor for an electricity sector version 02" are used
Value applied:	Please see Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the "tool to calculate emission factor for an electricity system if documented manufacturer's specifications or data from the utility, the dispatch center or official records are not available then the default values given in annex 1 of the tool shall be used. The first two options are not available for the power plants supplying the Turkish grid, therefore the default values are used.
Any comment:	Data used for the calculation of $EF_{grid,BM,y}$

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

Simple Operating margin (OM)

For the calculation of the Simple OM, the Ex-Ante option is selected, at the time of PDD submission to the DOE, the data vintages that were most recent, belongs to the years 2006, 2007 and 2008. All the data used in calculation of the Simple OM are taken from the TEIAS website, details of which are given below. Taking into consideration the available data Simple OM method Option B is the applicable method for the project activity. TEIAS publishes the annual heating values**Error! Bookmark not defined.** of the fuels consumed in the power plants, the heating

values are directly related to fuel consumption and are used to calculate average Net Calorific Values (TJ/kt) (Table.10).

The heating values of fuels consumed in thermal power plants are announced by TEIAS, the unit of the heating values are Tcal. Tcal is converted to GJoule by using the conversion factor 1cal = 4.1868 Joule. Then the heating values in GJ are divided by Fuel Consumption ($FC_{i,y}$) to get the Net Calorific Values of the fuels consumed in TJ/kton as follows:

Table 11: Net Calorific Values for each fuel type for Turkey

Fuel Type	NCV (TJ/kt)		
	2006	**2007**	**2008**
Hard Coal+ Imported Coal	21.99	22.30	22.24
Lignite	6.95	6.86	6.83
Fuel Oil	40.20	39.87	39.70
Diesel Oil	42.68	43.09	42.38
LPG	0.00	0.00	0.00
Naphtha	43.88	43.18	44.61
Natural Gas	37.01	36.76	36.63

The emission factors of fuels required are taken from IPCC 2006 guidelines for GHG inventories[25]. All data used for the calculations can be found in Annex 3. Table 11 shows total CO_2 emission by fuel types calculated using lower IPCC emission factors and available data from the TEIAS website.

Table 12: **Calculation of emission by electricity generation (2006-2008)**

	Default CO_2 Emissions (tCO_2)		
	2006	**2007**	**2008**
Hard Coal+Imported Coal	11,463,337.82	12,477,802.81	12,942,102.18
Lignite	31,942,850.63	38,179,797.64	41,189,044.65
Fuel Oil	5,300,737.91	6,775,360.28	6,513,942.76
Diesel Oil	190,583.97	157,148.19	403,661.11
Lpg	0.00	0.00	0.00
Naphta	40,910.48	34,237.14	32,786.41
Natural Gas	34,235,163.83	40,838,575.57	42,980,830.92
TOTAL	**83,173,584.64**	**98,462,921.62**	**104,062,368.04**

Net electricity generated and supplied to the grid by thermal power plants has been calculated using data obtained from TEİAŞ web page[31]. The ratio between total gross and total net generation (including low-cost/must run plants) has been calculated for each year. The same ratio is assumed to be valid for all thermal plants and total net

[25] Table 2.2.Default Emission Factors for Stationary Combustion in the Energy Industries, Vol.2. Energy, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)

generation by the plants has been calculated accordingly. Summing up total net generation with the imported electricity, total supply excluding low cost / must run sources for each year is determined and given in Table 12.

Table 13: **Net Electricity Generation from thermal power plants (units in GWh)**

Year	Gross generation	Net generation	Net/Gross	Gross Gen. Thermal	Net Gen Thermal	Import	Total Supply to the grid
2006	176,299.8	169,543.1	0.96167	131,835.1	126,782.51	573.20	127,355.716
2007	191.558.1	183,339.7	0.95709	155,196.2	148,537.80	864.30	149,402.10
2008	198,418.0	189,761.9	0.95637	164,139.3	156,978.63	789.40	157,768.03

The OM Emission Factor for the years 2006, 2007 and 2008 are calculated by dividing the total CO_2 emissions for those years (Table 11) to the Net Electricity Generation (Table 12) for the subject year. The annual OM emission factors are calculated as follows (Table 13):

Table 14: **Annual OM Emission Factors**

Year	*OM Emission Factor*
2006	0.65308
2007	0.65905
2008	0.65959

Finally, OM emission factor is calculated as a generation weighted average for the three most recent years. The resulting OM Emission Factor is;

$$EF_{grid,OMsimple} = 0.65750$$

Build margin

The gross electricity generation in year 2008 is taken as reference for determination of plants that comprise 20% of the system generation. The gross generation was 198,418.0 GWh (Table 12) in 2008 and 20% of that amount is calculated as 39,683.60 GWh. Summing up all the plants build in 2008, 2007, and 2006, the total generation is 31,030.15. Therefore, the most recent power plants added in 2005 and 2004 are also included in the calculations, which rose the total generation up to 43,849.59 GWh. According to the tool "If 20% falls on part capacity of a unit, that unit is fully included in the calculation" hence for the year 2004, Ankara D.G (Baymina) Natural Gas Power Plant is fully included in the calculations.

The lists of most recent capacity additions to the grid by year and their average and firm generation capacities are available at the TEİAŞ web page for the years 2004[26] and 2005[27]. However, for the years 2008, 2007 and 2006, the annual generation capacity data for each plant is not available on the statistics page of TEIAS. The data for the years 2006[28], 2007[29] and 2008[30] are taken from the TEIAS Capacity Projection Reports which are also available in another

[26] Generation Units Put Into Operation and Out of Operation in 2006,(http://www.teias.gov.tr/istat2004/7.xls)

[27] Generation Units Put Into Operation and Out of Operation in 2005, (http://www.teias.gov.tr/istatistik2005/7.xls)

[28] TEIAS Capacity Projection Report 2007-2016 (http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf)

[29] TEIAS Capacity Projection Report 2008-2017 (http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf)

section of the TEIAS website. For the capacity additions, the firm generation capacities of the power plants are used. The units that are taken out of the grid are not taken into consideration. All the data used for calculations could be found in Annex.3.

According to the tool in terms of vintage of data, project participants can choose either the ex-ante option or the ex-post option. Among these two options, Option 1 is selected. For the first crediting period, he build margin emission factor is calculated ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor will be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period will be used. This option does not require monitoring the emission factor during the crediting period.

The calculation of $EF_{EL,m,y}$ is shown in Table 14 below:

Table 15: **Calculation of EF_{EL} using default generation efficiencies**

	EF (tCO2/TJ)	(EF*3,6)	Generation Efficiency %	$EF_{EL,m,y}$ tCO2/MWh
Coal	92.80	334,080	39.0%	0.857
Lignite	90.90	327,240	39.0%	0.839
Fuel Oil	75.50	271,800	39.5%	0.688
Diesel	72.60	261,360	39.5%	0.662
LPG	61.60	221,760	60.0%	0.370
Naphta	69.30	249,480	60.0%	0.416
Natural Gas	54.30	195,480	60.0%	0.326

The CO2 emissions from the most recent capacity additions are calculated by multiplying the $EF_{EL,m,y}$ values calculated for each fuel source by the annual generation of that fuel source (Table 15). The emission factor has been taken as "zero" for the renewable and wastes and the generation efficiencies for the thermal power plants type of which are not known are taken as 60% which is generation efficiency for the combined cycle natural gas power plants. The Build Margin Emission Factor for each year is calculated by dividing the total CO_2 Emissions of the subject year by the total generation from the capacity additions of the same year.

Table 16 Annual CO_2 Emissions for Capacity Additions and Annual BM Emission Factors

Capacity Additions in 2004 (GWh)		CO_2 Emissions	$EF_{grid,BM,2004}$
Natural Gas	8,810.42	2,870.43	
Naphta	322.94	134.28	
Coal	337.50	289.11	
Fuel Oil	466.23	320.81	

[30] TEIAS Capacity Projection Report 2009-2018 (http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf)

Renewables and wastes	46.00	0.00	
TOTAL 2004	**9,983.09**	**3,614.63**	**0.36208**
Capacity Additions in 2005 (GWh)		**CO_2 Emissions**	**$EF_{grid,BM,2005}$**
Coal	1,125.00	963.69	
Lignite	4,420.00	3,708.72	
Fuel Oil	99.09	68.18	
Natural Gas	7,117.67	2,318.94	
Renewables and wastes	871.00	0.00	
TOTAL 2005	**13,632.76**	**7,059.53**	**0.51784**
Capacity Additions in 2006 (GWh)		**CO_2 Emissions**	**$EF_{grid,BM,2006}$**
Lignite	6,597.75	5,536.02	
Natural Gas	3,300.62	1,075.34	
Renewables and wastes	537.13	0.00	
TOTAL 2006	**10,435.50**	**6,611.36**	**0.63355**
Capacity Additions in 2007 (GWh)		**CO_2 Emissions**	**$EF_{grid,BM,2007}$**
Lignite	4.77	4.00	
Naphta	6.90	2.87	
Fuel Oil	806.16	554.72	
Natural Gas	3,109.86	1,013.19	
Renewables and Wastes	988.57	0.00	
TOTAL 2007	**4,916.26**	**1,574.78**	**0.32032**
Capacity Additions in 2008 (GWh)		**CO_2 Emissions**	**$EF_{grid,BM,2008}$**
Fuel Oil	103.18	71.00	
Natural Gas	2,981.89	971.50	
Renewables and Wastes	1,796.91	0.00	
TOTAL 2008	**4,881.98**	**1,042.50**	**0.21354**

The Build Margin Emission Factor of the grid is then calculated as a generation weighted average for the years 2004, 2005, 2006, 2007 and 2008. The resulting BM Grid is:

$$EF_{grid,BM} = 0.40287$$

Where weights w_{OM} and w_{BM} are by default 0.75 and 0.25 according to the selected methodology. And $\mathrm{EF}_{\mathrm{OM}}$ and $\mathrm{EF}_{\mathrm{BM}}$ are calculated as described in the previous steps.

Based on the formula above, baseline emission factor is calculated as;

$$EF_y = 0.75 * 0.65750 + 0.25 * 0.40287 = 0.59384\ tCO_2/MWh$$

$ERy = BEy = EG_{facility,y} * EF_y$

$= 275{,}422\ MWh * 0.59384\ tCO_2/MWh = 163{,}566 tCO_{2e}$

Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emission data (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2010 (16th August to 31st December)	0	59,761	0	59,761
2011	0	163,556	0	163,556
2012	0	163,556	0	163,556
2013	0	163,556	0	163,556
2014	0	163,556	0	163,556
2015	0	163,556	0	163,556
2016	0	163,556	0	163,556
2017 (1 Jan - 15 August)	0	103,795	0	103,795
Total (tCO2e)	0	1,144,892	0	1,144,892

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG^{Facility}_{y}$
Data unit:	MWh
Description:	Net Electricity supplied to the Grid by the proposed project
Source of data to be used:	Plant records/logbooks e.i. the "meter reading document"
Value of data applied for the purpose of calculating expected emission reductions in section B.5	275,422 MWh
Description of measurement methods and procedures to be applied:	The electricity generated will be metered by TEİAŞ by two meters placed on the switchgear station where the plant is connected to national grid.
QA/QC procedures to be applied:	There will be two ammeters that will backup each other. Generated electricity will also be monitored by the operator using software for internal monitoring.
Any comment:	The collected data will be kept by Bilgin RES Elektrik Üretim A.Ş. During the crediting period and until two years after the last issuance of VERs for the Soma WPP project activity for that crediting period. The data collection, preparation of the monitoring report, and the QA/QC procedures that are going to be applied are detailed in

B.7.2. Description of the monitoring plan:

The Monitoring Plan for the project includes the net electricity generation by the project activity.

The electricity generated will be metered by TEİAŞ by two meters placed on the switchgear station where the plant is connected to national grid. Those meters will provide official data which will be read and recorded monthly by TEİAŞ officers for invoicing. The maintenance and calibration are also done by TEİAŞ; which ensures the accuracy and quality of the measurements.

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):

16.01.2009
JPMorgan Ventures Energy Corporation, Project Participant, see Annex.1 for contact details.
Bilgin RES Enerji Üretim A.Ş., Project Participant, see Annex.1 for contact details.

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:

Construction of the project and thus the starting date of the project activity is 20.August 2009. First commissioning date is 13.August 2010.The commissioning of the project is evidenced by the commissioning protocol signed on site by the EMRA[31] commissioning committee.

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

20 years, and "0" months[32]

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

C.2.1. Renewable crediting period:

Renewable crediting period of 7 years, renewable twice..

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

13/08/2010

C.2.1.2. Length of the first crediting period:

7 years

[31] EMRA: Energy Market Regulatory Agency, the government body that issues the electricity production licenses and approves comissioning of newly added power plants.

[32] The servicelife of each turbine is 20 years. To be conservative we have considered the lifetime of the project to be equal to the service life of the project.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

N/A

C.2.2.2. Length:

N/A

SECTION D. Environmental impacts

Environmental Impact Assessment (EIA) is not mandatory for wind power plants according to the national legislations. Ministry of Environment and Forestry (MoEF) has evaluated the project to have no significant environmental impacts and approved that EIA is not required for the project activity after reviewing the project documents for the Soma Wind Power Project

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

In the context of Environmental Plan submitted within the project documents to Ministry of Environment and Forestry; the following measures will be adopted in order to minimise the impacts during construction and operational periods:

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

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

The waste oil will be collected in impermeable containers and transferred to recycling centres in accordance with Hazardous Waste Control Regulations and Waste Oil Control Regulations.

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

Biodiversity: Necessary precautions will be taken for the species under conservation by international conventions, if any found on the site. Also, the security patrol of the wind farm, will look for any dead bird and bat body, any incident will be recorded

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:

No significant environmental impact is determined.

SECTION E. Stakeholders' comments

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

Two separate Stakeholder Consultation Meetings for Soma Wind Power Plant have been held on 10. November. 2008 at 10:30 in Gökçukur Village and at 15:30 in Hecizköy Village. All the stakeholders including central and local governmental agencies, local NGOs and GS endorsed NGOs were invited by faxes and emails. The mukhtars of the villages (Gökçukur and Hamidiye in Kırkağaç; Kızılören, Kozluören, Hecizköy, Beyçe and Göktaş in Soma) effected were visited and invited to the meeting before. The meeting date and place was announced in a local (Soma Kurtuluş, published on 7th of November, at year 4;issue1120) and a nationwide newspaper (Posta, published on 6th of November 2008 all over Turkey).

The meeting has opened with the introducing the project partners. The impacts of climate change were described briefly and the emission reduction concept was clarified. Gold Standard procedures were also explained to the participants in order to explain the aim of the meeting (Figure.8 and 9)

Afterwards, the project is described shortly while the non-technical summaries were being distributed to the attendees. Foreseen environmental impacts which are noise pollution and particulate matter emission during construction and noise pollution during operation are mentioned. It is stated that necessary precautions, such as watering the roads, careful loading and unloading the trucks and covering the top of loaded trucks by hammock; will be taken to avoid dust during construction. It is also explained that the noise of heavy machinery was determined to be negligible during construction as well as the noise of turbines during operation. Afterwards, comments and questions are requested.

Figure 8. Stakeholder Consultation Meeting at Gökçukur Village

Figure 9: Stake Holder Consultation Meeting at Hecizköy

The Sustainable Development Matrixes and the questionnaires about the meeting were distributed afterwards. The parameters of the matrix were explained and the attendees are requested to fill down the form.

The project is generally perceived positively particularly in terms of air pollution, clean energy services and income generation. The villagers also added that they could work in the construction of the project and would be happy if the workers are hired from the residents of nearby villages within the project site. The project owner replied positively to that request.

The meeting is closed by giving information how the feedback will be given. The villagers are requested to follow up the feedback by the minutes of meeting send to the muhtar. It is also indicated that the minutes will also be faxed to the governmental agencies and NGO as well.

E.2. Summary of the comments received:

The questions asked by the participants and answers are as follows:

Q1: How will the turbines be brought up to the hills?

The project owner clarified the renovations will be done on the roads to be able to transfer the turbines.

The villagers requested the rehabilitation of existing roads.

Q2: We have already limited area here. Will the turbines be surrounded by fences? May our livestock graze in the area when the turbines are in operation?

Each turbine will be surrounded by separate fences to avoid closing all the area. The animals still can graze between the turbines. Turbines will give no harm to them.

The villagers said that a period of time, not longer than a year, will be required for animals to get used to the turbines. In order to mitigate this, they requested micro reservoirs to be built upland.

The questions raised in the second meeting are as follows:

Q3: What will be the job opportunities for the local people?

There will be temporary job opportunities for local residents during construction period. For the permanent positions available during operational phase, priority will be given to the local residents as well.

Q4: What will be the size of excavation? Will there be a lot of dust during construction? Will there be any rehabilitation on roads for the machinery for construction?

The size of the excavation will be (20x20x3)1200m^3 for basement of each turbine. There may be renovation works on the land as well. Necessary precautions like watering the roads, careful loading and unloading the material, covering the trucks with hammock, will be undertaken by the workers. The muck will be carried to the landfill area.

Q5: How will the fauna be affected by the turbines? We have heard that the bees may lose their sense of direction. What may be the other impacts? How will the natural habitats and environment change by the implementation of the project?

As part of the environmental process, the flora and the fauna of the region is studied and reported. No endemic species has been determined. As the habitats are continuous and complimentary through the area, no negative impacts are expected on terrestrial fauna. The effect on migrating birds is expected to be negligible as the vegetation on top of the hills is rare and the birds generally prefer the area around for breeding.

Q6: What precautions are taken for the risk of fire? Is it possible to build a reservoir nearby for fire fighting?

Although the fire risk is low in wind power plants, an emergency plan will be included in the environmental management plan. There is no reservoir planned to be built but this comment will be evaluated by the construction company.

Q7: How many trees will be cut for the project?

The number of trees is not exact at the moment but the turbines will be placed on top of the hills where the trees are rare, therefore; the number is not expected to be high.

A fixed amount of fee determined by Forestry Management will be paid for each tree to be cut. The trees are sold by the Management. This amount of fund is used for rehabilitation of forests and new plantation.

Q8: What is the size of the area? What kind of precautions has been taken for human and animals entering the site?

The total area is about 150 hectares but the area will not be closed for other activities. Each turbine will be surrounded by separate fences to avoid humans and animals to enter in.

Q9: Have the noise pollution caused by the turbines been researched? How will be residential areas and animals affected by that level of noise?

The noise level has been researched and the results are submitted by the Project Presentation Report to the Ministry of Environment and Forestry. The nearest residential area to the project is 1 kilometre away and the noise level will not be disturbing the local people.

Q10: What are the electromagnetic effects of the turbines? Will the transmitters for radio and TV be affected?

The sources of low electromagnetic radiation are the electrical generator and medium voltage transformer in wind power plant. The wiring system will be underground between the turbines to keep the exposure to minimal. The electromagnetic field of a wind turbine is weak and effective only to short distances and at a height of 80ms. For this reason, no significant exposure is possible at ground level or away from the turbine.

With regard to interference with radio and TV transmitters, this effect was more of a problem with turbines with metal blades. The new generation blades are made of synthetic materials which have minimal effects on transmission of electromagnetic waves.

Q11: What about the aesthetic and visual effects of the turbines? Will there be any planning activities?

The wind turbines are generally perceived as picturesque by the local people in Turkey. They are perceived as sign of environmental friendly development. On the other hand, red lights will be placed on top of each turbine to be lightened up at dark hours for security reasons.

Q12: The lubricants used for the maintenance of turbines may cause water and soil pollution. How will they be disposed?

The lubricants will be collected in impermeable containers and be sent to the recycling centre. There is no risk of water or soil pollution.

The Sustainable Development Matrixes and the questionnaires about the meeting were distributed afterwards. The parameters of the matrix were explained and the attendees are requested to fill down the form. The project is generally perceived positively particularly in terms of air pollution, clean energy services and income generation. The villagers also added that they could work in the construction of the project and would be happy if the workers are hired from the residents of nearby villages within the project site. The project owner replied positively to that request.

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

Comments by the participants were noted during meeting and Sustainable Development Matrixes are evaluated. No significant effects which would require a revision in the project has been determined. Requests of local people about employment have been positively responded by the construction firm, Bilgin RES Elektrik Üretim A.Ş.

Although, no alteration to the main aspects of the project has been offered by the stakeholders, the following addition will be improving the sustainability aspects of the project:

- Micro reservoirs to be built upland for livestock. These reservoirs will be built during construction period.
- Rehabilitation of the existing roads These roads will be rehabilitated during construction period.
- Reservoir for risk of fire: Such a reservoir will be built during construction period.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding will be used in this Project

Annex 3

BASELINE INFORMATION[33]

TÜRKİYE TERMİK SANTRALLARINDA KULLANILAN YAKIT MİKTARLARININ ÜRETİCİ KURULUŞLARA DAĞILIMI
(BİRLEŞİK ISI-ELEKTRİK SANTRALLARINDA ISI ÜRETİMİ İÇİN KULLANILAN YAKITLAR DAHİL)
FUELS CONSUMED IN THERMAL POWER PLANTS IN TURKEY BY THE ELECTRIC UTILITIES
(FUELS USED FOR HEAT PRODUCTION IN CHP PLANTS INCLUDED)

Birim(Unit):Ton/Gaz(gas) 10^3 m^3

			2006	2007	2008
EÜAŞ VE BAĞLI ORTAKLIKLARI *EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ*	**Taşkömürü**	*Hard Coal*	1.567.333	1.707.037	1.636.566
	Linyit	*Lignite*	45.130.071	55.232.102	60.284.929
	TOPLAM	*TOTAL*	**46.697.404**	**56.939.139**	**61.921.495**
	Fuel-Oil *Fuel Oil*	**Asıl Yakıt** *Main Fuel*	258.313	551.217	832.635
		Yrd. Yakıt *Auxiliary Fuel*	156.814	166.815	154.307
		TOPLAM *TOTAL*	**415.127**	**718.032**	**986.942**
	Motorin *Diesel Oil*	**Asıl Yakıt** *Main Fuel*	7.792	3.617	0
		Yrd. Yakıt *Auxiliary Fuel*	45.483	46.354	83.041
		TOPLAM *TOTAL*	**53.275**	**49.971**	**83.041**
	TOPLAM	*TOTAL*	**468.402**	**768.003**	**1.069.983**
	Doğal Gaz	*Natural Gas*	3.185.327	4.932.282	5.789.269
MOBİL SANTRALLAR *MOBILE POWER PLANTS*	**Fuel-Oil**	*Fuel Oil*	91.384	170.285	67.762
	Motorin	*Diesel Oil*	0	0	0
	TOPLAM	*TOTAL*	**91.384**	**170.285**	**67.762**
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ* *AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ*	**Taşkömür+İthal kömür**	*Hard Coal+Imported Coal*	4.050.530	4.322.106	4.633.442
	Linyit	*Lignite*	5.453.739	5.991.719	6.089.191
	TOPLAM	*TOTAL*	**9.504.269**	**10.313.825**	**10.722.633**
	Fuel-Oil	*Fuel Oil*	1.239.859	1.362.369	1.118.667
	Motorin	*Diesel Oil*	8.226	262	48.165
	LPG	*LPG*	33	0	0
	Nafta	*Naphta*	13.453	11.441	10.606
	TOPLAM	*TOTAL*	**1.261.571**	**1.374.072**	**1.177.438**
	Doğal Gaz	*Natural Gas*	13.849.221	15.525.511	15.818.366
TÜRKİYE *TURKEY*	**Taşkömür+İthal kömür**	*Hard Coal+Imported Coal*	5.617.863	6.029.143	6.270.008
	Linyit	*Lignite*	50.583.810	61.223.821	66.374.120
	TOPLAM	*TOTAL*	**56.201.673**	**67.252.964**	**72.644.128**
	Fuel-Oil	*Fuel Oil*	1.746.370	2.250.686	2.173.371
	Motorin	*Diesel Oil*	61.501	50.233	131.206
	LPG	*LPG*	33	0	0
	Nafta	*Naphta*	13.453	11.441	10.606
	TOPLAM	*TOTAL*	**1.821.357**	**2.312.360**	**2.315.183**
	Doğal Gaz	*Natural Gas*	**17.034.548**	**20.457.793**	**21.607.635**

CO2 emission factor (tCO2/TJ)	
Hard Coal+Imported coal	92,80
Lignite	90,90
Fuel Oil	75,50
Diesel Oil	72,60
Lpg	61,60
Naphta	69,30
Natural Gas	54,30

[33] The information provided in Annex 3 is mainly taken from the TEİAŞ Capacity Projection Reports:
TEIAS Capacity Projection Report 2007-2016 (http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf)
TEIAS Capacity Projection Report 2008-2017 (http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf)
TEIAS Capacity Projection Report 2009-2018 (http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf)
,and IPCC data ,s used for CO' emission factors and for the determination of calorific values. .

TÜRKİYE TERMİK SANTRALLARINDA TÜKETİLEN YAKITLARIN KURULUŞLARA GÖRE ISI DEĞERLERİ
(BİRLEŞİK ISI-ELEKTRİK SANTRALLARINDA ISI ÜRETİMİ İÇİN KULLANILAN YAKITLAR DAHİL)
HEATING VALUES OF FUELS CONSUMED IN THERMAL POWER PLANTS IN TURKEY BY THE ELECTRIC UTILITIES
(FUELS USED FOR HEAT PRODUCTION IN CHP PLANTS INCLUDED)

Birim(Unit): Tcal

			2006	2007	2008
EÜAŞ	**Taşkömürü**	*Hard Coal*	5.569	6.065	5.514
VE	**Linyit**	*Lignite*	70.067	85.681	94.045
BAĞLI	**TOPLAM**	*Total*	**75.636**	**91.746**	**99.559**
ORTAKLIKLARI	**Fuel-Oil** *Fuel Oil*	**Asıl Yakıt** *Main Fuel*	2.480	5.292	7.993
		Yrd. Yakıt *Auxiliary Fuel*	1.505	1.601	1.481
		TOPLAM *TOTAL*	**3.985**	**6.893**	**9.474**
EÜAŞ	**Motorin** *Diesel Oil*	**Asıl Yakıt** *Main Fuel*	80	37	0
AND		**Yrd. Yakıt** *Auxiliary Fuel*	468	477	855
AFFILIATED		**TOPLAM** *TOTAL*	**548**	**514**	**855**
PARTNERSHIPS OF EÜAŞ	**TOPLAM**	*TOTAL*	**4.533**	**7.407**	**10.329**
	Doğal Gaz	*Natural Gas*	**26.349**	**40.649**	**47.744**
	TOPLAM	*TOTAL*	**106.518**	**139.802**	**157.632**
MOBİL SANTRALLAR	**Fuel-Oil**	***Fuel Oil***	876	1.631	649
MOBIL POWER	**Motorin**	***Diesel Oil***			
PLANTS	**TOPLAM**	***TOTAL***	**876**	**1.631**	**649**
	Taşkömür+İthal kömür	*Hard Coal+Imported Coal*	23.935	26.050	27.796
OTOPRODÜKTÖRLER	**Linyit**	*Lignite*	13.865	14.639	14.182
ÜRETİM ŞİRKETLERİ	**TOPLAM**	*Total*	**37.800**	**40.689**	**41.978**
İŞLETME HAKKI DEVİR	**Fuel-Oil**	*Fuel Oil*	11.908	12.910	10.484
ADÜAŞ	**Motorin**	*Diesel Oil*	79	3	473
AUTOPRODUCERS	**Lpg**	*Lpg*	0	0	0
PRODUCTION COMP.	**Nafta**	*Naphta*	141	118	113
TOOR	**TOPLAM**	*TOTAL*	**12.128**	**13.031**	**11.070**
ADÜAŞ	**Doğal Gaz**	*Natural Gas*	**124.239**	**138.985**	**141.313**
	TOPLAM	*TOTAL*	**162.039**	**179.674**	**183.291**
	Taşkömür+İthal kömür	*Hard Coal+Imported Coal*	29.504	32.115	33.310
	Linyit	*Lignite*	83.932	100.320	108.227
	TOPLAM	*Total*	**113.436**	**132.435**	**141.537**
TÜRKİYE	**Fuel-Oil**	*Fuel Oil*	16.769	21.434	20.607
TURKEY	**Motorin**	*Diesel Oil*	627	517	1.328
	Lpg	*Lpg*	0	0	0
	Nafta	*Naphta*	141	118	113
	TOPLAM	*TOTAL*	**17.537**	**22.069**	**22.048**
	Doğal Gaz	*Natural Gas*	**150.588**	**179.634**	**189.057**
	TOPLAM	*TOTAL*	**281.561**	**334.138**	**352.642**

TÜRKİYE TERMİK SANTRALLARINDA TÜKETİLEN YAKITLARIN KURULUŞLARA GÖRE ISI DEĞERLERİ
(BİRLEŞİK ISI-ELEKTRİK SANTRALLARINDA ISI ÜRETİMİ İÇİN KULLANILAN YAKITLAR DAHİL)
HEATING VALUES OF FUELS CONSUMED IN THERMAL POWER PLANTS IN TURKEY BY THE ELECTRIC UTILITIES
(FUELS USED FOR HEAT PRODUCTION IN CHP PLANTS INCLUDED)
1cal = 4,1868 Joule

Birim(Unit): Gjoule

			2006	2007	2008
EÜAŞ VE BAĞLI ORTAKLIKLARI *EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ*	**Taşkömürü**	*Hard Coal*	23.316.289	25.392.942	23.086.015
	Linyit	*Lignite*	293.356.516	358.729.211	393.747.606
	TOPLAM	*Total*	**316.672.805**	**384.122.153**	**416.833.621**
	Fuel-Oil *Fuel Oil*	**Asıl Yakıt** *Main Fuel*	10.383.264	22.156.546	33.465.092
		Yrd. Yakıt *Auxiliary Fuel*	6.301.134	6.703.067	6.200.651
		TOPLAM *TOTAL*	**16.684.398**	**28.859.612**	**39.665.743**
	Motorin *Diesel Oil*	**Asıl Yakıt** *Main Fuel*	334.944	154.912	0
		Yrd. Yakıt *Auxiliary Fuel*	1.959.422	1.997.104	3.579.714
		TOPLAM *TOTAL*	**2.294.366**	**2.152.015**	**3.579.714**
	TOPLAM	*TOTAL*	**18.978.764**	**31.011.628**	**43.245.457**
	Doğal Gaz	*Natural Gas*	**110.317.993**	**170.189.233**	**199.894.579**
	TOPLAM	*TOTAL*	**445.969.562**	**585.323.014**	**659.973.658**
MOBİL SANTRALLAR *MOBIL POWER PLANTS*	**Fuel-Oil**	***Fuel Oil***	3.667.637	6.828.671	2.717.233
	Motorin	***Diesel Oil***	0	0	0
	TOPLAM	***TOTAL***	**3.667.637**	**6.828.671**	**2.717.233**
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ *AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ*	**Taşkömür+İthal kömür**	*Hard Coal+Imported Coal*	100.211.058	109.066.140	116.376.293
	Linyit	*Lignite*	58.049.982	61.290.565	59.377.198
	TOPLAM	*Total*	**158.261.040**	**170.356.705**	**175.753.490**
	Fuel-Oil	*Fuel Oil*	49.856.414	54.051.588	43.894.411
	Motorin	*Diesel Oil*	330.757	12.560	1.980.356
	Lpg	*Lpg*	0	0	0
	Nafta	*Naphta*	590.339	494.042	473.108
	TOPLAM	*TOTAL*	**50.777.510**	**54.558.191**	**46.347.876**
	Doğal Gaz	*Natural Gas*	**520.163.845**	**581.902.398**	**591.649.268**
	TOPLAM	*TOTAL*	**678.424.885**	**752.259.103**	**767.402.759**
TÜRKİYE *TURKEY*	**Taşkömür+İthal kömür**	*Hard Coal+Imported Coal*	123.527.347	134.459.082	139.462.308
	Linyit	*Lignite*	351.406.498	420.019.776	453.124.804
	TOPLAM	*Total*	**474.933.845**	**554.478.858**	**592.587.112**
	Fuel-Oil	*Fuel Oil*	70.208.449	89.739.871	86.277.388
	Motorin	*Diesel Oil*	2.625.124	2.164.576	5.560.070
	Lpg	*Lpg*	0	0	0
	Nafta	*Naphta*	590.339	494.042	473.108
	TOPLAM	*TOTAL*	**73.423.912**	**92.398.489**	**92.310.566**
	Doğal Gaz	*Natural Gas*	**630.481.838**	**752.091.631**	**791.543.848**
	TOPLAM	*TOTAL*	**1.178.839.595**	**1.398.968.978**	**1.476.441.526**

NET CALORIFIC VALUES OF FUELS CONSUMED IN THE THERMAL POWER PLANTS

Unit: TJ/KT

			2006	2007	2008
EÜAŞ VE BAĞLI ORTAKLIKLARI *EÜAŞ AND AFFILIATED PARTNERSHIPS OF EÜAŞ*	**Taşkömürü**	*Hard Coal*	14,88	14,88	14,11
	Linyit	*Lignite*	6,50	6,49	6,53
	TOPLAM	*TOTAL*	**6,78**	**6,75**	**6,73**
	Fuel-Oil *Fuel Oil*	**Asıl Yakıt** *Main Fuel*	40,20	40,20	40,19
		Yrd. Yakıt *Auxiliary Fuel*	40,18	40,18	40,18
		TOPLAM *TOTAL*	**40,19**	**40,19**	**40,19**
	Motorin *Diesel Oil*	**Asıl Yakıt** *Main Fuel*	42,99	42,83	0,00
		Yrd. Yakıt *Auxiliary Fuel*	43,08	43,08	43,11
		TOPLAM *TOTAL*	**43,07**	**43,07**	**43,11**
	TOPLAM	*TOTAL*	**40,52**	**40,38**	**40,42**
	Doğal Gaz	*Natural Gas*	34,63	34,51	34,53
MOBİL SANTRALLAR *MOBILE POWER PLANTS*	**Fuel-Oil**	*Fuel Oil*	40,13	40,10	40,10
	Motorin	*Diesel Oil*			
	TOPLAM	*TOTAL*	**40,13**	**40,10**	**40,10**
OTOPRODÜKTÖRLER ÜRETİM ŞİRKETLERİ İŞLETME HAKKI DEVİR ADÜAŞ* *AUTOPRODUCERS PRODUCTION COMP. TOOR ADÜAŞ*	**Taşkömür+İthal kömür**	*Hard Coal+Imported Coal*	24,74	25,23	25,12
	Linyit	*Lignite*	10,64	10,23	9,75
	TOPLAM	*TOTAL*	**16,65**	**16,52**	**16,39**
	Fuel-Oil	*Fuel Oil*	40,21	39,67	39,24
	Motorin	*Diesel Oil*	40,21	47,94	41,12
	LPG	*LPG*	0,00	0,00	0,00
	Nafta	*Naphta*	43,88	43,18	44,61
	TOPLAM	*TOTAL*	**40,25**	**39,71**	**39,36**
	Doğal Gaz	*Natural Gas*	37,56	37,48	37,40
TÜRKİYE *TURKEY*	**Taşkömür+İthal kömür**	*Hard Coal+Imported Coal*	21,99	22,30	22,24
	Linyit	*Lignite*	6,95	6,86	6,83
	TOPLAM	*TOTAL*	**8,45**	**8,24**	**8,16**
	Fuel-Oil	*Fuel Oil*	40,20	39,87	39,70
	Motorin	*Diesel Oil*	42,68	43,09	42,38
	LPG	*LPG*	0,00	0,00	0,00
	Nafta	*Naphta*	43,88	43,18	44,61
	TOPLAM	*TOTAL*	**40,31**	**39,96**	**39,87**
	Doğal Gaz	*Natural Gas*	37,01	36,76	36,63

Summary of NCV data:

Fuel Type	**NCV (TJ/kt)**		
	2006	**2007**	**2008**
Hard Coal+ Imported Coal	21.99	22.30	22.24
Lignite	6.95	6.86	6.83
Fuel Oil	40.20	39.87	39.70
Diesel Oil	42.68	43.09	42.38
LPG	0.00	0.00	0.00
Naphtha	43.88	43.18	44.61
Natural Gas	37.01	36.76	36.63

TÜRKİYE BRÜT ELEKTRİK ENERJİSİ ÜRETİMİNİN ÜRETİCİ KURULUŞLAR VE BİRİNCİL ENERJİ KAYNAKLARINA DAĞILIMI

TURKEY'S GROSS ELECTRICITY GENERATION BY PRIMARY ENERGY RESOURCES AND THE ELECTRIC UTILITIES

Birim(Unit) : GWh

ÜRETİM KARAKTERİSTİĞİ *Generation Characteristics*			**2006**	**2007**	**2008**
	TAŞKÖMÜRÜ	***Hard Coal***	1.909,4	2.072,5	1.882,4
E	**LİNYİT**	***Lignite***	16.664,3	20.862,1	22.433,3
	KÖMÜR TOPLAMI	***Coal Total***	**18.573,7**	**22.934,6**	**24.315,7**
Ü	**FUEL-OİL**	***Fuel Oil***	1.035,9	2.224,4	3.365,1
	MOTORİN	***Diesel oil***	21,7	12,2	0,4
A	**SIVI TOPLAMI**	***Liquid Total***	**1.057,6**	**2.236,6**	**3.365,5**
	DOĞAL GAZ	***Natural Gas***	**12.677,7**	**17.635,6**	**18.818,5**
Ş	**TERMİK TOPLAM**	***Thermal Total***	**32.309,0**	**42.806,8**	**46.499,7**
	HİDROLİK +JEOTERMAL+RÜZGAR TOPLAM	***Hydro+Jeothermal+Wind Total***	**38.773,4**	**31.032,4**	**28.419,4**
	TOPLAM	***Total***	**71.082,4**	**73.839,2**	**74.919,1**
BAĞLI ORTAKLIKLAR	**LİNYİT**	***Lignite***	11.365,2	12.875,9	14.802,7
Affiliated partnerships Of EÜAŞ	**DOĞAL GAZ**	***Natural Gas***	2.268,5	5.612,3	7.995,1
	TERMİK TOPLAM	***Thermal Total***	**13.633,7**	**18.488,2**	**22.797,8**
MOBİL SANTRALLAR	**FUEL-OİL**	***Fuel Oil***	**418,0**	**797,3**	**330,5**
MOBILE P.P.	**MOTORİN**	***Diesel oil***			
	TERMİK TOPLAM	***Thermal Total***	**418,0**	**797,3**	**330,5**
	TAŞKÖMÜRÜ+İTHAL KÖMÜR	***Hard Coal+Imported Coal***	12.307,2	13.063,7	13.975,1
	LİNYİT	***Lignite***	4.403,4	4.556,7	4.622,1
	KÖMÜR TOPLAMI	***Coal Total***	**16.710,6**	**17.620,4**	**18.597,2**
	FUEL-OİL	***Fuel Oil***	2.778,5	3.447,9	3.513,0
OTOPRODÜKTÖRLER	**MOTORİN**	***Diesel oil***	36,0	1,1	265,9
ÜRETİM ŞRK.	**LPG**	***LPG***	0,1	0,0	0,0
İŞLETME HAKKI DEV.	**NAFTA**	***Naphtha***	50,2	43,9	43,6
	SIVI TOPLAMI	***Liquid Total***	**2.864,8**	**3.492,9**	**3.822,5**
Autoproducers	**DOĞAL GAZ**	***Natural Gas***	**65.745,0**	**71.776,9**	**71.871,7**
Production Comp.	**YENİLENEBİLİR+ATIK**	***Renewables and wastes***	**154,0**	**213,7**	**219,9**
TOOR	**TERMİK TOPLAM**	***Thermal Total***	**85.474,4**	**93.103,9**	**94.511,3**
	HİDROLİK +JEOTERMAL+RÜZGAR TOPLAM	***Hydro+Jeothermal+Wind Total***	**5.691,3**	**5.329,5**	**5.859,3**
	TOPLAM	***Total***	**91.165,7**	**98.433,4**	**100.370,6**
	TAŞKÖMÜRÜ+İTHAL KÖMÜR	***Hard Coal+Imported Coal***	14.216,6	15.136,2	15.857,5
	LİNYİT	***Lignite***	32.432,9	38.294,7	41.858,1
	KÖMÜR TOPLAMI	***Coal Total***	**46.649,5**	**53.430,9**	**57.715,6**
	FUEL-OİL	***Fuel Oil***	4.232,4	6.469,6	7.208,6
	MOTORİN	***Diesel oil***	57,7	13,3	266,3
T Ü R K İ Y E	**LPG**	***LPG***	0,1	0,0	0,0
	NAFTA	***Naphtha***	50,2	43,9	43,6
TURKEY	**SIVI TOPLAMI**	***Liquid Total***	**4.340,4**	**6.526,8**	**7.518,5**
	DOĞAL GAZ	***Natural Gas***	**80.691,2**	**95.024,8**	**98.685,3**
	YENİLENEBİLİR+ATIK	***Renewables and wastes***	**154,0**	**213,7**	**219,9**
	TERMİK TOPLAM	***Thermal Total***	**131.835,1**	**155.196,2**	**164.139,3**
	HİDROLİK +JEOTERMAL+RÜZGAR TOPLAM	***Hydro+Jeothermal+Wind Total***	**44.464,7**	**36.361,9**	**34.278,7**
	TÜRKİYE TOPLAMI	***TURKEY'S TOTAL***	**176.299,8**	**191.558,1**	**198.418,0**

TÜRKİYE ELEKTRİK ENERJİSİ ÜRETİM - TÜKETİM VE KAYIPLARININ YILLAR İTİBARİYLE GELİŞİMİ
ANNUAL DEVELOPMENT OF ELECTRICITY GENERATION- CONSUMPTION AND LOSSES IN TURKEY
(1984-2008)

YILLAR *YEARS*	BRÜT ÜRETİM *GROSS GEN.*	ARTIŞ % *INCREASE*	İÇ İHTİYAÇ *INTERNAL CONSUMPTION*	%	NET ÜRETİM *NET GEN.*	İTHALAT *IMPORTS*	ŞEBEKEYE VERİLEN[1] *SUPPLIED TO THE NETWORK* [1]	ŞEBEKE KAYBI / *NETWORK LOSSES* İLETİM *TRANSMISSION*	%	DAĞITIM *DISTRIBUTION*	%	TOPLAM *TOTAL*	%	İHRACAT[2] *EXPORTS* [2]	NET TÜKETİM *NET CONS.*	ARTIŞ % *INCREASE*
1984	30613,5	11,9	1890,7	6,2	28722,8	2653,0	31375,8	1577,4	5,0	2163,2	6,9	3740,6	11,9		27635,2	13,0
1985	34218,9	11,8	2306,8	6,7	31912,1	2142,4	34054,5	1611,4	4,7	2734,5	8,0	4345,9	12,8		29708,6	7,5
1986	39694,8	16,0	2815,0	7,1	36879,8	776,6	37656,4	1344,3	3,6	4102,4	10,9	5446,7	14,5		32209,7	8,4
1987	44352,9	11,7	2607,7	5,9	41745,2	572,1	42317,3	1627,4	3,8	3992,6	9,4	5620,0	13,3		36697,3	13,9
1988	48048,8	8,3	2400,0	5,0	45648,8	381,2	46030,0	2016,6	4,4	4291,9	9,3	6308,5	13,7		39721,5	8,2
1989	52043,2	8,3	3234,5	6,2	48808,7	558,5	49367,2	1544,0	3,1	4703,2	9,5	6247,2	12,7		43120,0	8,6
1990	57543,0	10,6	3311,4	5,8	54231,6	175,5	54407,1	1787,2	3,3	4893,1	9,0	6680,3	12,3	906,8	46820,0	8,6
1991	60246,3	4,7	3655,2	6,1	56591,1	759,4	57350,5	1437,8	2,5	6123,4	10,7	7561,2	13,2	506,4	49282,9	5,3
1992	67342,2	11,8	4237,3	6,3	63104,9	188,8	63293,7	1342,9	2,1	7651,9	12,1	8994,8	14,2	314,2	53984,7	9,5
1993	73807,5	9,6	3943,1	5,3	69864,4	212,9	70077,3	1634,9	2,3	8616,7	12,3	10251,6	14,6	588,7	59237,0	9,7
1994	78321,7	6,1	4539,1	5,8	73782,6	31,4	73814,0	1800,3	2,4	10042,7 *	13,6	11843,0	16,0	570,1	61400,9 *	3,7
1995	86247,4	10,1	4388,8	5,1	81858,6	0	81858,6	2034,9	2,5	11733,9 *	14,3	13768,8	16,8	695,9	67393,9 *	9,8
1996	94861,7	10,0	4777,3	5,0	90084,4	270,1	90354,5	2461,7	2,7	13393,1 *	14,8	15854,8	17,5	343,1	74156,6 *	10,0
1997	103295,8	8,9	5050,2	4,9	98245,6	2492,3	100737,9	2935,5	2,9	15646,4 *	15,5	18581,9	18,4	271,0	81885,0 *	10,4
1998	111022,4	7,5	5523,2	5,0	105499,2	3298,5	108797,7	3337,1	3,1	17457,8 *	16,0	20794,9	19,1	298,2	87704,6 *	7,1
1999	116439,9	4,9	5738,0	4,9	110701,9	2330,3	113032,2	2985,1	2,6	18559,9 *	16,4	21545,0	19,1	285,3	91201,9 *	4,0
2000	124921,6	7,3	6224,0	5,0	118697,6	3791,3	122488,9	3181,8	2,6	20574,1 *	16,8	23755,9	19,4	437,3	98295,7 *	7,8
2001	122724,7	-1,8	6472,6	5,3	116252,1	4579,4	120831,5	3374,4	2,8	19954,3 *	16,5	23328,7	19,3	432,8	97070,0 *	-1,2
2002	129399,5	5,4	5672,7	4,4	123726,8	3588,2	127315,0	3440,7	2,7	20491,2 *	16,1	23931,9	18,8	435,1	102948,0 *	6,1
2003	140580,5	8,6	5332,2	3,8	135248,3	1158,0	136406,3	3330,7	2,4	20722,0 *	15,2	24052,7	17,6	587,6	111766,0 *	8,6
2004	150698,3	7,2	5632,6	3,7	145065,7	463,5	145529,2	3422,8	2,4	19820,2 *	13,6	23243,0	16,0	1144,3	121141,9 *	8,4
2005	161956,2	7,5	6487,1	4,0	155469,1	635,9	156105,0	3695,3	2,4	20348,7 *	13,0	24044,0	15,4	1798,1	130262,9 *	7,5
2006	176299,8	8,9	6756,7	3,8	169543,1	573,2	170116,3	4543,8	2,7	19245,4 *	11,3	23789,2	14,0	2235,7	144091,4 *	10,6
2007	191558,1	8,7	8218,4	4,3	183339,7	864,3	184204,0	4523,0	2,5	22123,6 *	12,0	26646,6	14,5	2422,2	155135,2 *	7,7
2008	198418,0	3,6	8656,1	4,4	189761,9	789,4	190551,3	4388,4	2,3	23093,1 *	12,1	27481,5	14,4	1122,2	161947,6 *	4,4

PLANT NAME	ELECTRICITY UTILITIES	FUEL TYPE	INSTALLED CAPACITY (MW)	FIRM GENERATION CAPACITY (GWh)
				2004 CAPACITY ADDITIONS
ÇOLAKOĞLU(KAPASİTE ARTIRIMI)	Autoproducer	Coal	45,00	337,50
GÜL ENERJİ GR-II	Autoproducer	Fuel Oil	12,50	96,50
KARKEY-II 3+3 DGM	Prod. Comp.	Fuel Oil	54,30	369,73
BEREKET EN.(Feslek Hes) Gr-1-2	Autoproducer	HEPP	9,48	25,00
ELTA ELK(DODURGA) GR-I-II-III-IV	Autoproducer	HEPP	4,14	0,00
ERE(BİR KAPILI HES) GRUP-I	Prod. Comp.	HEPP	48,50	17,00
İSKUR TEKSTİL(SÜLEYMANLI) GR I-II	Autoproducer	HEPP	4,60	4,00
ENERJİ-SA ADANA 1 BT	Autoproducer	Naphta	49,77	322,94
ALTINMARKA GIDA GR I-II-III	Autoproducer	Natural Gas	3,60	28,77
ANKARA D.G.(BAYMİNA) GR-I-II-III	BOO	Natural Gas	798,00	6.500,00
ATATEKS 2 GM	Autoproducer	Natural Gas	5,63	45,04
AYEN OSTİM ENERJİ ÜRETİM	Prod. Comp.	Natural Gas	31,08	264,06
AYEN OSTİM ENERJİ ÜRETİM(BT)	Prod. Comp.	Natural Gas	9,89	84,04
BESLER GR-2, BT (5,2+7,5)	Autoproducer	Natural Gas	12,70	97,70
BİS ENERJİ 2 GT	Prod. Comp.	Natural Gas	73,04	602,65
ÇELİK ENERJİ ÜR.ŞTİ. 2 GM	Prod. Comp.	Natural Gas	2,42	18,64
ENTEK GR-IV	Prod. Comp.	Natural Gas	31,13	255,73
HABAŞ ALİAĞA GRUP I-II	Autoproducer	Natural Gas	89,23	713,86
KOMBASSAN KAĞ. MATBAA GIDA	Autoproducer	Natural Gas	5,50	35,71
KOMBASSAN KAĞIT GIDA VE TEKS	Autoproducer	Natural Gas	5,50	38,13
STANDART PROFİL 3 GM	Autoproducer	Natural Gas	6,74	49,23
ŞAHİNLER ENERJİ 1 GM	Autoproducer	Natural Gas	3,20	22,15
TANRIVERDİ 4 GM	Autoproducer	Natural Gas	4,66	38,67
TEKBOY TEKSTİL 1 GM	Autoproducer	Natural Gas	2,25	16,04
TOTAL 2004			**1.312,84**	**9.983,09**

				2005 CAPACITY ADDITIONS
İÇDAŞ ÇELİK GR-I	Autoproducer	Coal	135,00	1.080,00
KAHRAMANMARAŞ KAĞIT GR-I	Autoproducer	Coal	6,00	45,00
KARKEY(SİLOPİ-4) GR-IV	Prod. Comp.	Fuel Oil	6,15	47,24
KARKEY(SİLOPİ-4) GR-V	Autoproducer	Fuel Oil	6,75	51,85
İÇTAŞ ENERJİ(Yukarı Mercan) GR I-II	Prod. Comp.	HEPP	14,19	20,00
MURATLI GR I-II	EUAS	HEPP	115,00	400,00
TEKTUĞ(Kargılık) GR I-II	Prod. Comp.	HEPP	23,90	19,00
YAMULA GRUP I-II	BOT	HEPP	100,00	345,00
BEREKET EN.(DALAMAN) GR XIII-XIV-XV	Prod. Comp.		7,50	0,00
ÇAN GR I	EUAS	Lignite	160,00	1.040,00
ÇAN GR II	EUAS	Lignite	160,00	1.040,00
ELBİSTAN-B GR I	EUAS	Lignite	360,00	2.340,00
AK ENERJİ(K.paşa) GR- III	Prod. Comp.	Natural Gas	40,00	256,90
AK ENERJİ(K.paşa) GR I-II	Prod. Comp.	Natural Gas	87,20	560,10
AKBAŞLAR GR-II(İZOLE)	Autoproducer	Natural Gas	8,83	73,00
AKÇA ENERJİ GR-III	Autoproducer	Natural Gas	8,73	65,40
ALTEK ALARKO GR I-II	Prod. Comp.	Natural Gas	60,10	420,00
AYKA TEKSTİL GR-I	Autoproducer	Natural Gas	5,50	40,00
BAYDEMİRLER GR IV-V-VI	Autoproducer	Natural Gas	6,21	51,42
BİS ENERJİ GR VII	Prod. Comp.	Natural Gas	43,70	360,78
BOSEN GR-III	Autoproducer	Natural Gas	50,00	350,00
CAN ENERJİ GR-I	Prod. Comp.	Natural Gas	3,90	28,00
ÇEBİ ENERJİ BT	Prod. Comp.	Natural Gas	21,00	164,90
ÇEBİ ENERJİ GT	Prod. Comp.	Natural Gas	43,37	340,06
ÇUMRA ŞEKER	Autoproducer	Natural Gas	16,00	40,00
ENTEK ELK.A.Ş.KOÇ ÜNİ.GR I-II	Prod. Comp.	Natural Gas	2,33	19,00
EVYAP GR I-II	Autoproducer	Natural Gas	5,12	30,00
GRANİSER GRANİT GR-I	Autoproducer	Natural Gas	5,50	42,00
HABAŞ ALİAĞA (DÜZELTME)	Autoproducer	Natural Gas	6,16	49,26
HABAŞ ALİAĞA GR III	Autoproducer	Natural Gas	47,69	381,55
HABAŞ ALİAĞA GR IV	Autoproducer	Natural Gas	47,69	381,55
HABAŞ ALİAĞA GR-V	Autoproducer	Natural Gas	24,60	196,80
HAYAT KAĞIT GR-I	Autoproducer	Natural Gas	7,53	56,00
KAREGE GR IV-V	Prod. Comp.	Natural Gas	18,06	141,87
KORUMA KLOR GR I-II-III	Autoproducer	Natural Gas	9,60	77,00
KÜÇÜKÇALIK TEKSTİL GR I-II-III-IV	Autoproducer	Natural Gas	8,00	64,00
MERCEDES BENZ TURK GR I-II-III-IV	Autoproducer	Natural Gas	8,28	68,00
METEM ENERJİ(Hacışıramat) GR I-II	Prod. Comp.	Natural Gas	7,83	58,00
METEM ENERJİ(Peliklik) GR I-II-III	Prod. Comp.	Natural Gas	11,75	89,00
MODERN ENERJİ GR-II	Autoproducer	Natural Gas	6,72	50,40
MODERN ENERJİ GR-III	Autoproducer	Natural Gas	8,38	62,90
MOSB GR I-II-III-IV-V-VI-VII	Autoproducer	Natural Gas	84,83	434,00
NOREN ENERJİ GR-I	Prod. Comp.	Natural Gas	8,73	70,00
NUH ENERJİ-2 GR I	Prod. Comp.	Natural Gas	46,95	319,66
ORS RULMAN	Autoproducer	Natural Gas	12,42	99,40
PAK GIDA(Kemalpaşa) GR-I	Autoproducer	Natural Gas	5,67	45,00
TEZCAN GALVANİZ GR I-II	Autoproducer	Natural Gas	3,66	29,00
YONGAPAN(KAST.ENTG) GR-II	Autoproducer	Natural Gas	5,20	32,70
ZEYNEP GİYİM SAN. GR-I	Autoproducer	Natural Gas	1,17	9,00
ZORLU ENERJİ KAYSERİ GR-I-II-III	Prod. Comp.	Natural Gas	149,87	1.144,11
ZORLU ENERJİ KAYSERİ GR-IV	Prod. Comp.	Natural Gas	38,63	294,90
ZORLU ENERJİ YALOVA GR I-II	Prod. Comp.	Natural Gas	15,93	122,00
ETİ MAD.(BAN.ASİT)GR-I	Autoproducer	Waste	11,50	85,00
SUNJÜT(RES) GR I-II	Autoproducer	WPP	1,20	2,00
TOTAL 2005			**2.100,04**	**13.632,76**

				2006 CAPACITY ADDITIONS
ADANA ATIK SU ARITMA TESİSİ	Autoproducer	Waste	0,80	6,00
MENDERES ELEKTRİK GR I	Prod. Comp.	Geothermal	7,95	56,00
BEREKET EN.(Mentaş Reg) GR I - II	Prod. Comp.	HEPP	26,60	93,33
BEREKET EN.(Mentaş Reg) GR III	Prod. Comp.	HEPP	13,30	46,67
BEREKET ENERJİ GÖKYAR HES 3 Grup	Prod. Comp.	HEPP	11,62	23,00
EKİN (Başaran Hes) (Nazilli)	Prod. Comp.	HEPP	0,60	5,00
ERE(AKSU REG.ve ŞAHMALLAR HES) GR I-II	Prod. Comp.	HEPP	14,00	7,00
ERE(Sugözü rg. Kızıldüz hes) GR I - II	Prod. Comp.	HEPP	15,43	8,00
MOLU EN. Zamantı Bahçelik GR I - II	Prod. Comp.	HEPP	4,22	30,00
SEYHAN I-II	EUAS	HEPP	0,30	0,28
SU ENERJİ (Balıkesir) GR I - II	Prod. Comp.	HEPP	4,60	4,00
ŞANLIURFA GR I-II	EUAS	HEPP	51,80	85,00
TEKTUĞ(Kalealtı) GR I - II	Prod. Comp.	HEPP	15,00	11,00
ELBİSTAN B GR II	EUAS	Lignite	360,00	2.199,25
ELBİSTAN B GR III	EUAS	Lignite	360,00	2.199,25
ELBİSTAN B GR IV	EUAS	Lignite	360,00	2.199,25
AKMAYA (Lüleburgaz) GR I	Autoproducer	Natural Gas	6,91	48,00
AMYLUM NİŞASTA (ADANA)	Autoproducer	Natural Gas	14,25	80,00
ANTALYA ENERJİ GR I - II - III - IV	Prod. Comp.	Natural Gas	34,92	244,57
AYDIN ÖRME GR-I	Autoproducer	Natural Gas	7,52	60,00
BOZ ENERJİ GR I	Prod. Comp.	Natural Gas	8,73	60,00
BURGAZ (Lüleburgaz) GR I	Prod. Comp.	Natural Gas	6,91	55,00
CAM İŞ ELEKTRİK (Mersin) GR I	Prod. Comp.	Natural Gas	126,10	1.008,00
ÇERKEZKÖY ENERJİ GR I	Prod. Comp.	Natural Gas	49,16	327,00
ÇIRAĞAN SARAYI GR I	Autoproducer	Natural Gas	1,32	11,00
EKOTEN TEKSTİL GR-I	Prod. Comp.	Natural Gas	1,93	15,00
ELSE TEKSTİL (Çorlu) GR I - II	Autoproducer	Natural Gas	3,16	25,00
ENTEK (Köseköy) GR IV6	Prod. Comp.	Natural Gas	47,62	411,41
ENTEK (Köseköy) GR V	Prod. Comp.	Natural Gas	37,00	319,66
ERAK GİYİM GR-I	Autoproducer	Natural Gas	1,37	12,00
EROĞLU GİYİM (Çorlu) GR I	Autoproducer	Natural Gas	1,17	9,00
HAYAT TEM. VE SAĞLIK GR I - II	Autoproducer	Natural Gas	15,04	94,00
KASTAMONU ENTEGRE (Balıkesir) GR I	Autoproducer	Natural Gas	7,52	48,00
MARMARA ELEKTRİK (Çorlu) GR I	Prod. Comp.	Natural Gas	8,73	63,00
MARMARA PAMUK (Çorlu) GR I	Autoproducer	Natural Gas	8,73	71,00
SÖNMEZ ELEKTRİK (Çorlu) GR I - II	Prod. Comp.	Natural Gas	17,46	134,62
ŞIK MAKAS (Çorlu) GR I	Autoproducer	Natural Gas	1,58	13,00
YILDIZ ENT. AĞAÇ (Kocaeli) GR I	Autoproducer	Natural Gas	6,18	40,00
ALARKO ALTEK GR-III	Prod. Comp.	Thermal	21,89	151,36
EKOLOJİK EN. (Kemerburgaz) GR I	Prod. Comp.	Waste	0,98	8,00
ITC-KA EN. MAMAK TOP.M. GR I-II-III	Autoproducer	Waste	4,24	29,97
BARES IX GRUP	Prod. Comp.	WPP	13,50	42,75
BARES X. ve XX. GRUPLAR	Prod. Comp.	WPP	16,50	52,25
ERTÜRK ELEKTRİK Tepe RES GR I	Prod. Comp.	WPP	0,85	2,55
MARE MANASTIR RÜZGAR (X GRUP)	Prod. Comp.	WPP	8,00	26,33
TOTAL 2006			**1.725,50**	**10.435,50**

				2007 CAPACITY ADDITIONS
AKTEKS	Autoproducer	Fuel-Oil	0,80	5,35
İDİL 2 (PS3 A- 2)	Prod. Comp.	Fuel-Oil	24,40	180,00
KAREN	Prod. Comp.	Fuel-Oil	24,30	180,00
Mardin Kızıltepe	Prod. Comp.	Fuel-Oil	34,10	250,00
SİİRT	Prod. Comp.	Fuel-Oil	25,60	190,00
SÜPER FİLMCİLİK	Autoproducer	Fuel-Oil	0,10	0,80
BORÇKA HES	EUAS	HEPP	300,60	600,00
İSKUR TEKSTİL (SÜLEYMANLI HES)	Prod. Comp.	HEPP	4,60	4,00
KURTEKS Tekstil A.Ş./Kahramanmaraş(KARASU HES-Andırın)	Prod. Comp.	HEPP	2,40	19,00
ÖZGÜR ELK.AŞ.(K.MARAŞ)(Tahta)	Prod. Comp.	HEPP	6,30	27,00
ÖZGÜR ELK.AŞ.(K.MARAŞ)(Tahta)(İlave)	Prod. Comp.	HEPP	6,30	27,00
TEKTUĞ(Keban Deresi)	Prod. Comp.	HEPP	5,00	20,00
YPM Ener.Yat.AŞ.(Altıntepe Hidro.)(Sivas/Suşehir)	Prod. Comp.	HEPP	4,00	10,00
YPM Ener.Yat.AŞ.(Beypınar Hidro.)(Sivas/Suşehir)	Prod. Comp.	HEPP	3,60	9,00
YPM Ener.Yat.AŞ.(Konak Hidro.)(Sivas/Suşehir)	Prod. Comp.	HEPP	4,00	10,00
UŞAK ŞEKER (NURİ ŞEKER)	Autoproducer	Lignite	1,70	4,77
DENTAŞ	Autoproducer	Naphta	0,30	2,28
DESA	Autoproducer	Naphta	0,70	4,62
Acıbadem Sağlık Hiz.ve Tic.A.Ş(Kadıköy Hast.)	Autoproducer	Natural Gas	0,50	4,00
Acıbadem Sağlık Hiz.ve Tic.A.Ş(Kozyatağı Hast.)	Autoproducer	Natural Gas	0,60	5,00
Acıbadem Sağlık Hiz.ve Tic.A.Ş(Nilüfer/BURSA)	Autoproducer	Natural Gas	1,30	11,00
AKATEKS Tekstil Sanayi ve Ticaret A.Ş.	Autoproducer	Natural Gas	1,80	14,00
Aliağa Çakmaktepe Enerji A.Ş.(Aliağa/İZMİR)	Prod. Comp.	Natural Gas	34,80	278,00
ALTINMARKA GIDA	Autoproducer	Natural Gas	0,10	0,81
ARENKO	Autoproducer	Natural Gas	0,70	5,57
ATAER ENERJİ	Autoproducer	Natural Gas	0,10	0,57
BİL ENERJİ	Autoproducer	Natural Gas	0,10	0,70
BİS Enerji Üretim AŞ.(Bursa)(İlave)	Prod. Comp.	Natural Gas	43,00	354,80
BİS Enerji Üretim AŞ.(Bursa)(İlave)	Prod. Comp.	Natural Gas	48,00	396,06
BOSEN ENERJİ ELEKTRİK AŞ.	Prod. Comp.	Natural Gas	142,80	1.071,00
ESKİŞEHİR END.ENERJİ	Autoproducer	Natural Gas	3,50	26,81
FLOKSER TEKSTİL SAN.AŞ.(Çatalça)(Poliser Tesisi)	Autoproducer	Natural Gas	2,10	17,00
FLOKSER TEKSTİL SAN.AŞ.(Çatalça)(Süetser Tesisi)	Autoproducer	Natural Gas	2,10	17,00
FRİTOLAY GIDA SAN.VE TİC. AŞ.	Autoproducer	Natural Gas	0,50	3,33
HABAŞ (Aliağa-ilave)	Autoproducer	Natural Gas	9,10	72,80
İGSAŞ	Autoproducer	Natural Gas	2,20	15,20
KARTONSAN	Autoproducer	Natural Gas	5,00	40,00
KIVANÇ TEKSTİL SAN.ve TİC.A.Ş.	Autoproducer	Natural Gas	3,90	33,00
KİL-SAN KİL SAN.VE TİC. A.Ş	Autoproducer	Natural Gas	3,20	25,00
MODERN ENERJİ	Autoproducer	Natural Gas	5,20	36,53
NUH ENERJİ-2(Nuh Çim.)	Autoproducer	Natural Gas	73,00	514,00
SAYENERJİ ELEKTRİK ÜRETİM AŞ. (Kayseri/OSB)	Prod. Comp.	Natural Gas	5,90	47,00
SÜPERBOY BOYA SAN.ve Tic.Ltd.Şti.(Büyükçekmece)	Autoproducer	Natural Gas	1,00	8,00
SWİSS OTEL(Anadolu Japan Turizm A.Ş (İstanbul)	Autoproducer	Natural Gas	1,60	11,00
T ENERJİ ÜRETİM AŞ.(İSTANBUL)	Prod. Comp.	Natural Gas	1,60	13,00
TAV Esenboğa Yatırım Yapım ve İşetme AŞ./ANKARA	Autoproducer	Natural Gas	3,90	33,00
TEKBOY ENERJİ	Autoproducer	Natural Gas	0,10	0,73
ZORLU EN.Kayseri (İlave 1 GT)	Prod. Comp.	Natural Gas	7,20	54,96
ITC-KA Enerji Üretim Aş.(Mamak)(İlave)	Prod. Comp.	Waste	1,40	9,90
ANEMON EN.ELEK.ÜRETİM.AŞ.	Prod. Comp.	WPP	8,00	21,84
ANEMON EN.ELEK.ÜRETİM.AŞ.(İlave)	Prod. Comp.	WPP	15,20	41,50
ANEMON EN.ELEK.ÜRETİM.AŞ.(İlave)	Prod. Comp.	WPP	7,20	19,66
BURGAZ RES (Doğal Enerji Üretim A.Ş.)	Prod. Comp.	WPP	4,00	11,54
BURGAZ RES (Doğal Enerji Üretim A.Ş.)	Prod. Comp.	WPP	10,90	31,46
DENİZ ELEK. ÜRETİM Ltd.Şti.(karakurt)	Prod. Comp.	WPP	10,80	24,00
MARE MANASTIR RÜZGAR ENERJİ(ilave)	Prod. Comp.	WPP	11,20	36,86
MARE MANASTIR RÜZGAR ENERJİ(ilave)	Prod. Comp.	WPP	20,00	65,82
TOTAL 2007			**942,40**	**4.916,26**

				2008 CAPACITY ADDITIONS
KARKEY(SILOPI-5) (154 kV) (Addition)	Prod. Comp.	Fuel Oil	14,78	103,18
SARAYKOY JEOTERMAL (Denizli)	Prod. Comp.	Geothermal	6,85	42,00
AKKOY ENERJI (AKKOY I HEPP)	Prod. Comp.	HEPP	101,94	263,00
ALP ELEKTRIK (TINAZTEPE) ANTALYA	Prod. Comp.	HEPP	7,69	17,00
CALDERE ELK.(CALDERE HEPP)Dalaman-MUGLA	Prod. Comp.	HEPP	8,74	25,00
CANSU ELEKTRIK (Murgul/ARTVIN)	Prod. Comp.	HEPP	9,18	31,00
DAREN HEPP ELKT. (SEYRANTEPE BARAJI VE HEPP)	Prod. Comp.	HEPP	49,70	161,00
DEGIRMENUSTU EN. (KAHRAMANMARAS)	Prod. Comp.	HEPP	25,70	40,00
H.G.M. ENERJI (KEKLICEK HEPP) (YeSIlyurt)	Prod. Comp.	HEPP	8,67	11,00
HAMZALI HEPP (TURKON MNG ELEKTRIK)	Prod. Comp.	HEPP	16,70	66,00
HIDRO KNT.(YUKARI MANAHOZ REG.VE HEPP)	Prod. Comp.	HEPP	22,40	45,00
IC-EN ELK.(CALKISLA REGULATORU VE HEPP)	Prod. Comp.	HEPP	7,66	11,00
KALEN ENERJI (KALEN II REGULAT. VE HEPP)	Prod. Comp.	HEPP	15,65	28,00
MARAS ENERJI (FIRNIS REGULATORU VE HEPP)	Prod. Comp.	HEPP	7,22	23,00
SARMASIK I HEPP (FETAS FETHIYE ENERJI)	Prod. Comp.	HEPP	21,04	54,00
SARMASIK II HEPP (FETAS FETHIYE ENERJI)	Prod. Comp.	HEPP	21,58	61,00
TORUL	EUAS	HEPP	105,60	130,00
YESIL ENERJI ELEKTRIK (TAYFUN HEPP)	Prod. Comp.	HEPP	0,82	4,00
AKSA ENERJI (Antalya)	Prod. Comp.	Natural Gas	183,80	1.290,00
AKSA ENERJI (Manisa)	Prod. Comp.	Natural Gas	52,38	370,00
ANTALYA ENERJI (Addition)	Prod. Comp.	Natural Gas	17,46	122,29
ATAC INSAAT SAN. A.S.B.(ANTALYA)	Autoproducer	Natural Gas	5,40	37,00
BAHCIVAN GIDA (LULEBURGAZ)	Autoproducer	Natural Gas	1,17	8,00
CAN ENERJI (Corlu-TEKIRDAG) (Addition)	Prod. Comp.	Natural Gas	52,38	304,23
FOUR SEASONS OTEL (ATIK PASHA TUR.A.S)	Autoproducer	Natural Gas	1,17	7,00
FRITOLAY GIDA SAN.VE TIC.AS.(Addition)	Autoproducer	Natural Gas	0,01	0,07
MB SEKER NISASTA SAN. A.S. (Sultanhani)	Autoproducer	Natural Gas	8,80	60,00
MELIKE TEKSTIL (GAZIANTEP)	Autoproducer	Natural Gas	1,58	11,00
MISIS APRE TEKSTIL BOYA EN. SAN.	Autoproducer	Natural Gas	2,00	14,00
MODERN ENERJI (LULEBURGAZ)	Autoproducer	Natural Gas	13,40	680,00
POLAT TURZ. (POLAT RENAISSANCE IST.OT.)	Autoproducer	Natural Gas	1,60	11,00
SONMEZ Elektrik (Addition)	Prod. Comp.	Natural Gas	8,73	67,31
ITC-KA Enerjl Uretlm A.S.(Mamak)(Addition)	Prod. Comp.	Waste	14,13	99,91
BAKI ELEKTRIK SAMLI RUZGAR	Prod. Comp.	WPP	21,00	92,00
DATCA RES (Datca)	Prod. Comp.	WPP	8,10	19,00
ERTURK ELEKTRIK Catalca RES	Prod. Comp.	WPP	60,00	180,00
GOZEDE HEPP (TEMSA ELEKTRIK) BURSA	Prod. Comp.	WPP	2,40	6,00
INNORES ELK YUNTDAG RUZG. (AliaGa)	Prod. Comp.	WPP	42,50	145,00
LODOS RES (Tasoluk)(G.O.P./ISTANBUL)	Prod. Comp.	WPP	24,00	69,00
SAYALAR RUZGAR (Dogal Enerji)	Prod. Comp.	WPP	30,60	88,00
SEBENOBA (DENIZ ELK.) (Samandag-HATAY)	Prod. Comp.	WPP	31,20	86,00
TOTAL 2008			**1.035,73**	**4.881,98**

Annex 4

MONITORING INFORMATION

The Monitoring Plan (MP) builds on the baseline scenario described in Project Design Document and is consistent with the applied methodology ACM0002 "Consolidated baseline methodology for grid connected electricity generation from renewable sources, v.12.1.0".

The MP will be implemented by Bilgin RES Elektrik Üretim A.Ş. who will also be responsible for operating the wind power plant. The monitoring plan will be implemented based on the detailed monitoring manual that will be prepared for the use of Bilgin RES Elektrik Üretim A.Ş..

The main parameter that will be monitored on site will be electricity generation The electricity generated by each turbine is recorded by the help of SCADA system. The final output of the turbines are recorded by the main meters and the auxiliary meters that belongs to the distribution company,TEİAŞ. The electricity will be measured by those meters and stored in the system. These measurements will be compiled into monthly memoranda co-signed between the electricity distribution company and the Bilgin RES Elektrik Üretim A.Ş.The official, data which will be obtained from the meters placed in the control room and read by TEİAŞ officers, will be crosschecked by the PMUM/MFRC[34] data, that can be accessed by a specific user ID and Password by the project owner. This data will be provided to the verifier in the form of screenshots for cross checking and comparison of the monthly electricity production indicated in the signed memoranda.

Other parameters that will be monitored and reported in the monitoring report:

Quality of employment: This parameter is going to be ensured by providing a safe and clean working environment to the workers and will be shown by pictures, trainings provided to the employee and the Health and Safety rules applied in the facility.

Quantitative employment: Employee records gathered from the project owner including, gender, the city they inhabit and the position.

Biodiversity The project has EIA-exemption letter from Ministry of Environment and Forest.

The low resolution bird migration map of Turkey shows that there is a bid migration route with 50 km of the site. Therefore minimal impact on migrating birds is expected. Notwithstanding this, the following precautions are taken:

I. The tips of the blades are painted a bright red colour to improve their visibility, in contracts to the base colour of the blade, which is white.

II. Regular patrols of the site are made by the company's security guards on each shift. The guards are instructed to look out for any dead birds that may have been struck by the turbines. If such birds are found, these are photographed and recorded in a book that is kept at the site office. If no birds are found on a shift, that will also be recorded.

[34] PMUM-Piyasa Mali Uzlaştırma Merkezi/MFRC-Market Financial Reconciliation Center

At the time of the Initial Verification, as assessment will be made of the following,

- Delivery of turbines did not cause significant disruption to local residents
- That there is a Fire Action Plan in Place
- That mini reservoirs were built during construction save water for dry periods
- That dust was contained during construction
- That the roads would be renewed and improved during the construction period
- That during construction, drinking water was brought on site in tankers and waste water disposed of in accordance with the Water Pollution Control Regulations.
- That waste oil is disposed of correctly in line with the Waste Oil Guidelines
- That waste lubricants are taken to recycling facilities
- That suitable precautions were taken during construction