THE GOLD STANDARD:
Project Design Document for Gold Standard
Voluntary Offset projects

(GS-VER-PDD)

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Steptember 2009

Gold Standard version 2.1

VOLUNTARY OFFSET PROJECTS
LATEST UNFCCC PROJECT DESIGN DOCUMENT FORM
used as per Gold Standard Version 2.1 documentation (GSv2.1) - Toolkit and Annexes

Latest UNFCCC PDD Version 03 - in effect as of: 28 July 2006

CONTENTS

SECTION A. General description of project activity

A.1. Title of the project activity:

60 MW Bandırma Wind Power Plant Project, Turkey

Date	Version Number
04/09/2012	08

A.2. Description of the project activity:

The purpose of the proposed VER Gold Standard project is to generate zero emission renewable energy from a 60 MW wind farm. Bandırma Enerji ve Elektrik Üretim A.S. (Bandırma Enerji)[1] is the owner of the 60 MW Bandırma Wind Power Plant Project in Turkey. The project activity is developed as Gold Standard VER project.

The wind farm includes a total of 20 VESTAS V 90 turbines at an installed capacity of 3 MW each, 60 MW in total. Technical feasibility, namely wind speed measurements and power output estimations site condition analysis was done between April 2007 and October 2008. Predicted mean wind speed is 8.6 m/sec, which qualifies the site as suitable for the erection and operation of a wind park.

The expected power generation for 60 MW installed capacity is 10.4 GWh/a for each turbine or 207.9 GWh/a (gross) for the entire wind park.[2] Net power generation is expected to be 182.7 GWh/a. The wind park will result in reducing CO_2 emissions in the range that the same amount of fossil fuel grid connected would be replaced. The calculated Combined Margin CO_2 emission factor is 0.5949 tCO_2/MWh. The annual expected net CO_2 emission reductions are 108,688**tCO_2.**

Before the project implementation started no energy generation from wind or any other energy source occurred at the proposed site. The project area is located 100% on forestry land. The land has been rented from the authority for 49 years. The area located in the project boundary but not used for turbines, transformer station and social buildings can still be used for forestry purposes.

The proposed project activity will be connected to the national grid(Akcalar Transformer Station). 46.5 km new transmission line will be built to connect the wind park to the national grid system.

Bandırma Enerji is a subsidiary of Borusan EnBW Enerji under Borusan Group. Borusan Group is one of the leading industrial conglomerates in Turkey and has extended its operations in the energy sector. Borusan Enerji established a Joint Venture with German company Energie Baden-Würtemberg AG (EnBW) in July 2009 to work together on the development and construction of power plant capacities in Turkey. Borusan EnBW intends to become a leading investor in the energy sector, developing, owning and operating electricity production plants to meet the ever increasing demand for energy in Turkey. The focus of operation will be renewable energy projects through completion of investments in its current portfolio as well as pursuing further growth opportunities.
The company currently has an electricity generation portfolio of 980 MW with projects under construction and advanced stages of licensing. 2,200 MW in generation capacity is the long-term target for the company.

[1] The name of the license holder company was recently changed from Borasco Enerji ve Kimya Sanayi A.Ş. to Bandırma Enerji Yatırımları ve Elektrik Üretim A.Ş. with a court decision on 17/12/2010. Herewith in this report, only the name Bandırma Enerji will be used as the participant of the Bandırma Wind Power Plant project.

[2] Garrad Hassan Feasibility Study dated 20 March 2008

Development of the project started in 2006. At that time Borasco Enerji developed and owned the project. Two feasibility studies were conducted. Originally, the project was planned with 45 MW installed capacity (Garrad Hassan Feasibility Study dated April 2007). A second feasibility study considered apart of 45 MW also a design of 60 MW (Garrad Hassan Feasibility Study dated March 2008). In the same time, acquisition talks between Borasco Enerji and Borusan Enerji were held that resulted in April 2008 in a Board Decision from Borusan Enerji to buy Borasco Enerji. Consequently, Borusan Enerji bought Borasco Enerji in May 2008.

Following this acquisition, Borusan Enerji decided to increase the installed capacity to 60 MW and therefore applied EMRA (Energy Market Regulatory Authority) for extension from 45 MW to 60 MW in June 2008. The official approval from EMRA has been obtained in April 2010.

The construction of the power plant started in October 2008. The project is being partially taken into operation since September 2009. Currently, the project is in operation with 57 MW capacity. Below are some pictures from the project during construction (Figure 1) and operation (Figure 2).

Figure 1 Pictures from the Bandırma WPP site during installation of turbines, July 2009

Figure 2 A picture from the Bandırma WPP project site, October 2010

After the acquisition, Bandırma Enerji studied in detail the Bandırma Wind Power Plant project and became aware that the power output expectations were originally estimated too high which has an overall implication on the economic situation of the project. Bandırma Enerji started to investigate potential for VER project development and initiated an eligibility study in autumn 2008 before deciding to invest into PDD development for the proposed VER project activity under the Gold Standard.

The Baseline scenario is identified as the continuation of power generation using mainly fossil fuels. CO_2 emission reductions will occur in the range as conventional power generation will be avoided by the wind park.

The project contributes in several ways to sustainable development:

Environmental aspect

- Improvement of air quality and soil conditions compared to fossil fuel power plants, where SOx, NOx, mercury and particulate emissions would occur
- Reduction on CO_2e emissions in Turkey as project activity will replace fossil fuel power generation
- Contribute to increase the share of renewable power generation in the national grid

Economic aspects

- Creation of local employment during construction and operation phase.
- Stimulating local economy as all auxiliary technical components like cablesand construction equipment are produced locally
- Reducing dependency on fossil fuel imports, savings in foreign currency
- Increasing the financial attractiveness of the project by directly using the returns from sale of VERs thus further strengthening local capability and competence to pursue such projects
- The project proponent works and operates under consideration of internationally proclaimed human rights

Social aspects

- The project does not involve any resettlements
- The project provides additional work places for people securing a stable income generation for those families

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	Bandırma Enerji Yatırımları ve Elektrik Üretim A.Ş.	No
Turkey	Fichtner GmbH & Co. KG (Consultant)	No

Host country is Turkey. Turkey has ratified the Kyoto Protocol in February 2009. There exists no official DNA yet. However, Ministry of Environment and Forestry is the Turkish National Focal Point.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

The proposed Bandirma Wind Power Plant Project is located 15 km east of the town and port of Bandirma and is situated along a highly complex ridge running east-west along the edge of Bandirma Bay.

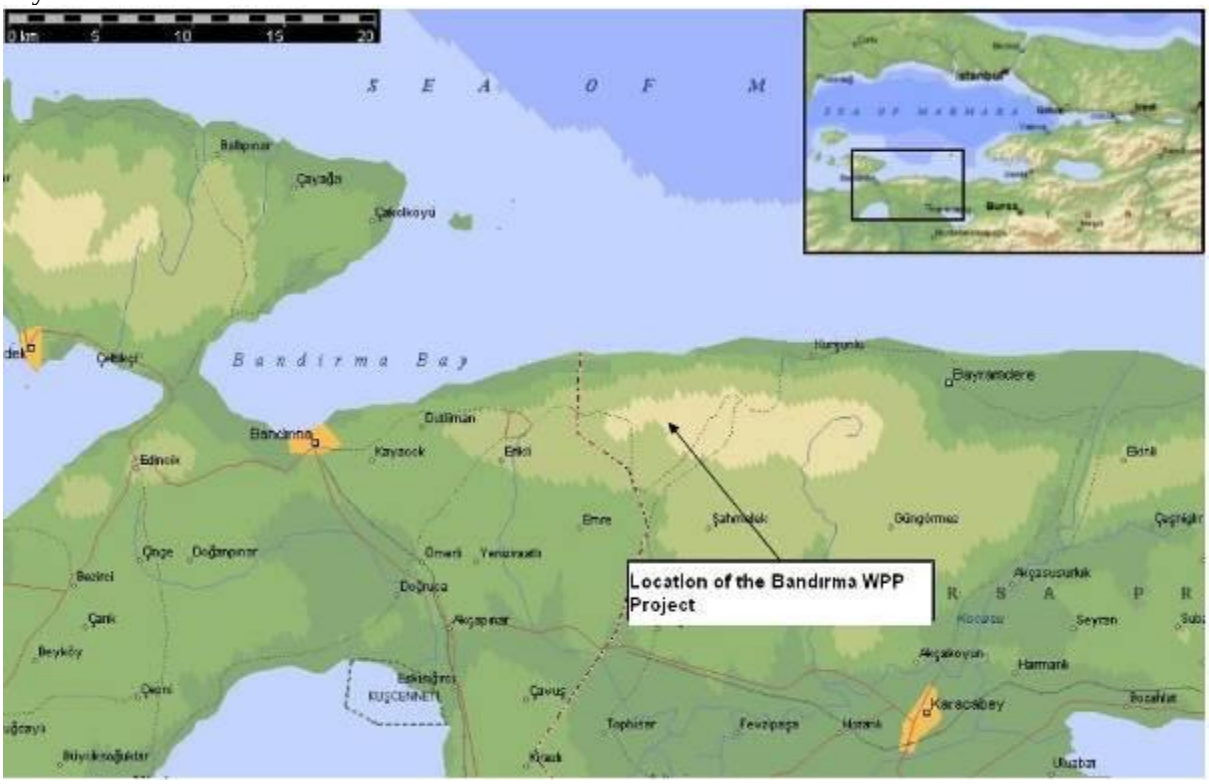


Figure 3: Location of the Bandirma Wind Power Plant

A.4.1.1.	Host Party(ies):

Turkey

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

Western Turkey, Marmara Region, Balikesir Province. The project location is shown in Figure 3, Figure 4 and Figure 5.

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

15 km from Bandirma District.

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

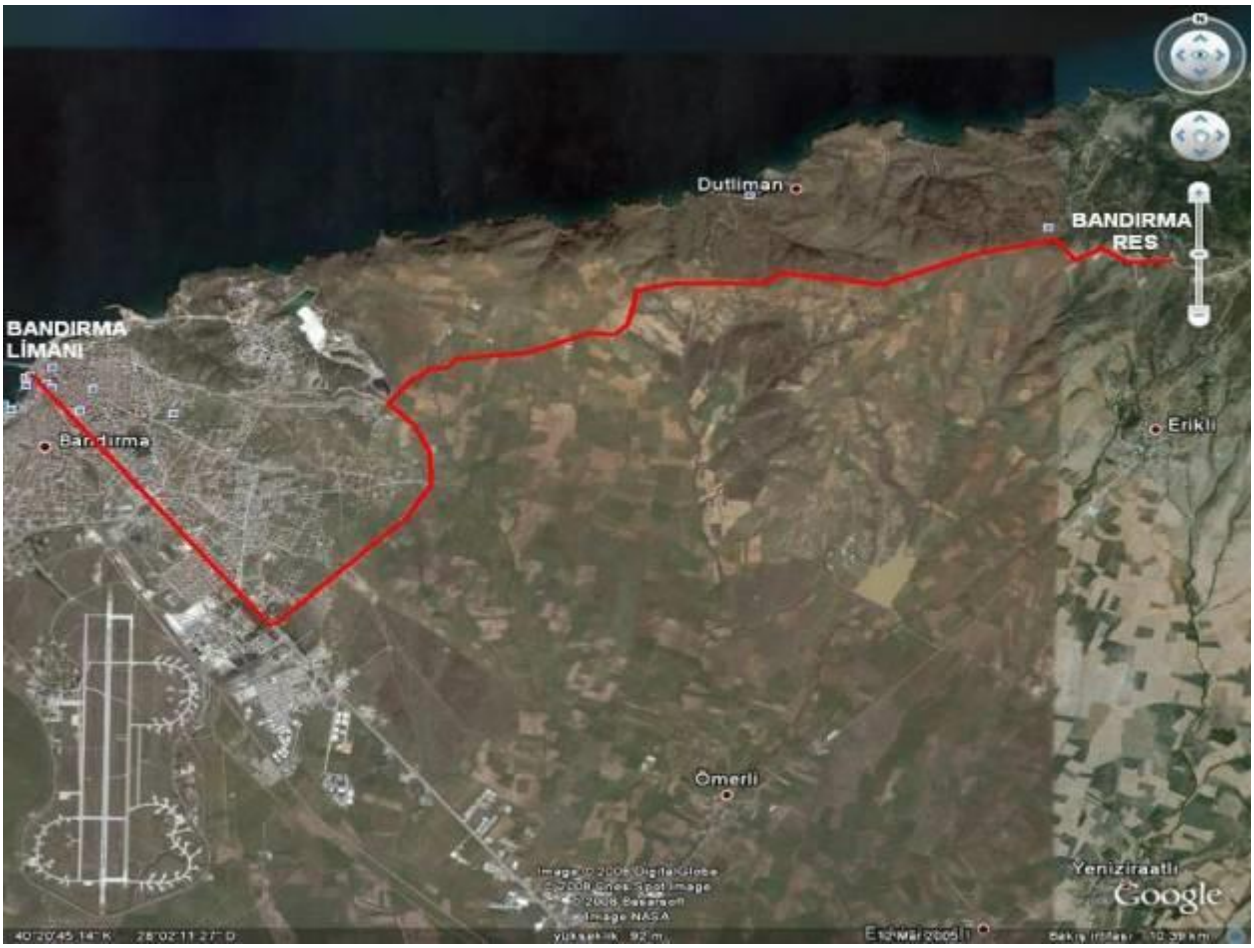


Figure 4: Location of the Bandirma Wind Power Plant

The sheet numbers of the project location are H20-A3 and H20-A4. The project is located on forestry land. Nearest villages to the project site are Çakılköy(2500 m), Erikli (1800 m), Sahil Yenice(2500 m), Emre(3000 m) and Dedeoba(4000 m). The exact coordinates of the turbines are given below.

Turbine No	E	N
T1	595133	4468791
T2	595371	4468651
T3	596062	4469355
T4	596385	4469329

T5	596738	4469446
T6	597090	4469542
T7	597073	4469022
T8	597428	4469160
T9	597646	4468932
T10	598076	4469173
T11	600319	4469668
T12	598680	4469142
T13	598955	4469113
T14	599254	4469093
T15	599995	4469615
T16	599529	4469041
T17	599858	4468995
T18	600435	4468993
T19	600583	4469582
T20	600989	4469968

The site is located at the neighbourhood of Bares 2 WPP (in operation) and Sah WPP (at construction phase).

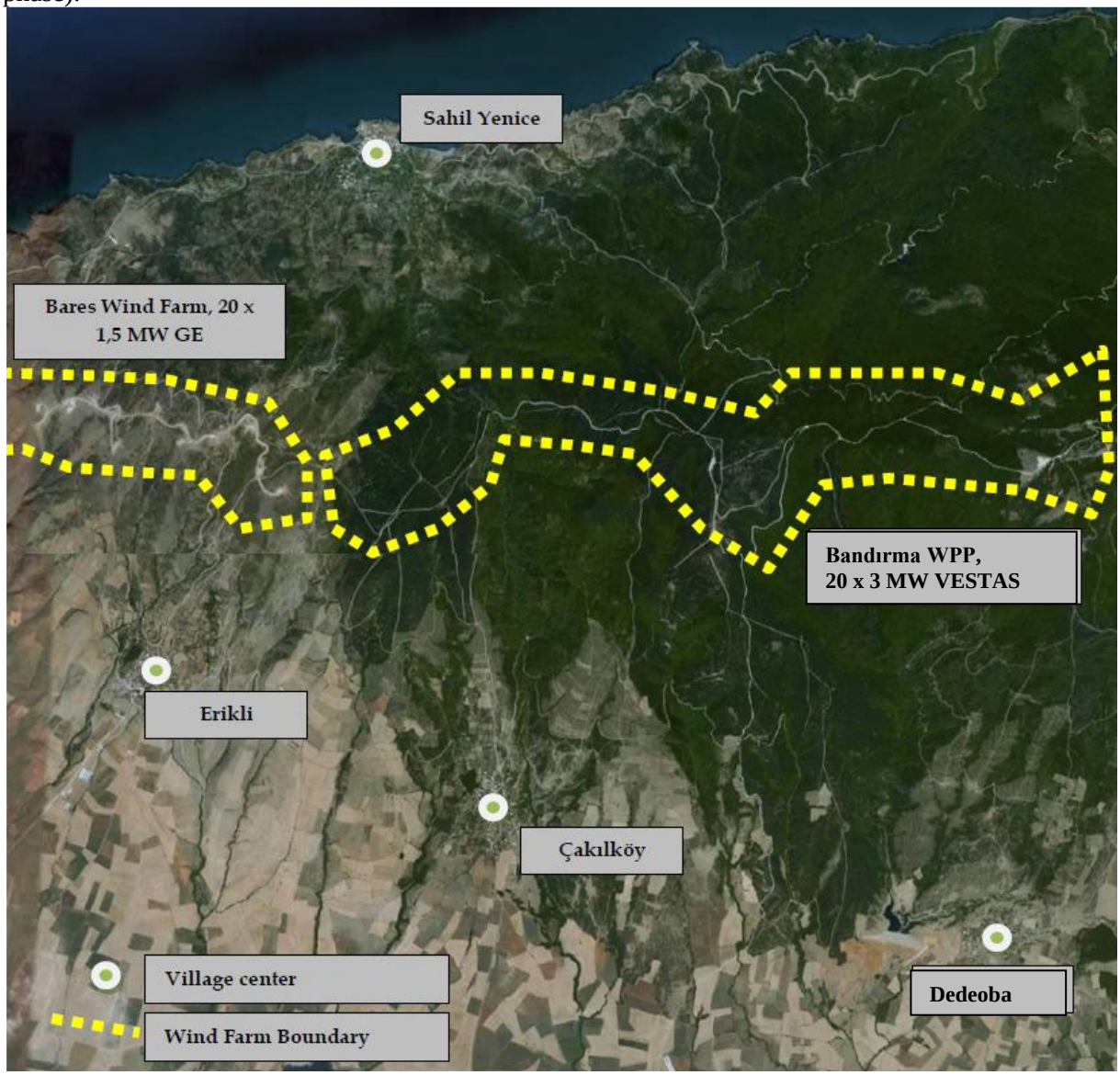


Figure 5 : Satellite image of the Bandırma WPP, neighbour villages and neighbourhood BARES WPP

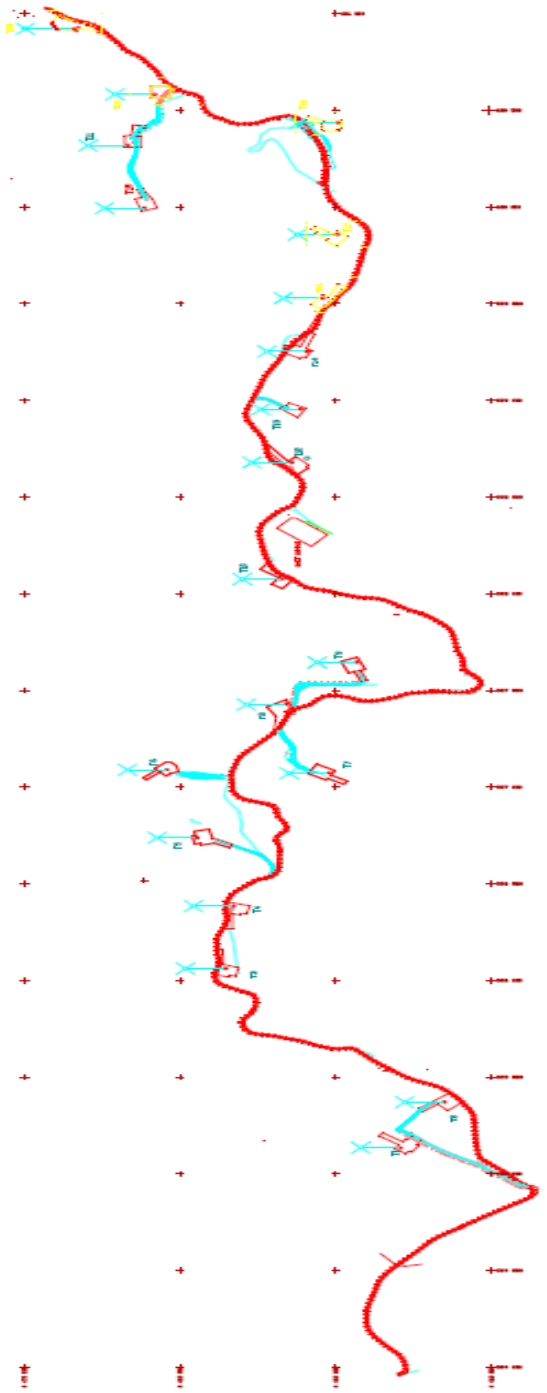


Figure 6 Genetal layout map showing the turbine locations and the swithchyard

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

According to UNFCCC sectoral scope definition the proposed project activity belongs to sectoral scope number 1, Energy industries (renewable and non-renewable sources). Wind energy is a renewable energy source.

According to Annex C of Gold Standard Toolkit, no specific project type eligibility criteria are outlined for wind power projects for which compliance would need to be checked. Since the project is larger than 15 MW installed capacity, the project qualifies as a large wind power project.

The project will not be de-bundled and will not be converted into micro-scale projects in the future.

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

The Bandırma Wind Power Plant is located 15 km east of the town and port of Bandirma city and is situated along a highly complex ridge running east-west along the edge of Bandirma Bay. The proposed site is located at the neighbourhood of BARES 2 wind farm. The prevailing wind direction is northeast to which the site is well exposed. The site is free of any buildings and technical installations and equipment. Towards west of the site the ground cover comprises rocky terrain with areas of small scrub and ferns. The ground cover on the Bandirma site itself is predominantly wooded with trees ranging from 5 m to 12 m in height. This is the situation prior to project implementation.

The project activity includes erection and operation of a wind park. 20 VESTAS V 90 turbines with a total installed capacity of 60 MW (20 x 3 MW) will be installed. The project is connected to the national grid via Akcalar Transformer Station. The project results in the transfer of environmentally safe and sound technology and know-how to the host country.

In the absence of the wind park, power would be generated by all power plants and units being commissioned and operating forming the Turkish power grid.

In the absence of the project activity, the amount of electricity would be delivered through the grid, which to a large extent is fed by fossil sources, leading to carbon dioxide emissions.

The baseline scenario is “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 Electricity generation in Turkey is mainly composed of thermal power plants. In the absence of the proposed project activity, the same amount of electricity is required to be supplied by the grid by the thermal power plants that will increase GHG emissions. Since the proposed project generates electricity using wind power, it will not create any GHG emissions.

The VESTAS V 90 turbines to be implemented are newly made and are expected to have a technical lifetime of 25 years. The technical data of V90 turbines used at the project site are:

Table 1 Technical Specifications of VESTAS V90/3000kW

Parameter	Value
Rated Power	3000 kW
Concept	Variable speed, DFIG generator with pitch control
Rotor diameter	90 metres (300 ft)
Speed control	Independent pitch control to each blade

Generator	Water cooled, various suppliers
Gearbox	Hansen, two planetary and one helical, 1:100 step up (approx)
Cut In	4 m/s
Rated	15 m/s
Cut Out	25 m/s

For building the 46.5 km 154 kV transmission line to connect the wind park to the national grid (Akcalar Transformer Station), an agreement was made between Borasco (the former owner of the wind park) and Güngör Electric. The agreement was made on 17 March 2008 and is still valid under the new ownership of the wind power plant.

On 15 April 2008 the supply and installation agreement for 45 MW VESTAS wind turbines was made and after the acquisition of Borasco Enerji, Borusan Enerji made a supplementary turbine delivery agreement for another 15 MW VESTAS wind turbine. The Supply and Installation Agreement includes mainly transportation of the "Plant"(Wind Turbine Generators (WTG), Towers, Switchgears, SCADA and Foundation Sections) to Bandırma Port, unloading the "Plant" to the project site, assembling, erecting and installation of the "Plant" at its planned location (on Tower Foundations). Following the installation, VESTAS shall test and commission each WTG and the SCADA (only if Borusan completes his preceding necessary work).

Construction of the project stared in October 2008. The wind power plant has been partially taken into operation as given in the below:

- First 8 turbines (24MW capacity) on 18.09.2009
- Additional 7 turbines (21 MW) on 16.10.2009
- Additional 4 turbines (12 MW) on 30.06.2010
- Last 1 turbine (3 MW) on 11.08.2011

The project consists of the following main technical parts. All parts are newly manufactured.

- Wind turbines: 20 units at 3 MW installed capacity each, VESTAS V90, international supplier (Denmark/Italy)
- Main power transformers: local supplier
- Switchgear breakers: local supplier
- Switchgear disconnectors: local supplier
- Switchgear, panels: local supplier
- Underground / internal cabling: local supplier
- Energy transmission line-cables: local supplier
- Energy transmission line-mast: local supplier
- Energy transmission line-insulator: local supplier
- Internal roads: locally built
- 154kV feeder in Akçalar transformer substation (TS); 154kV Bandırma WPPSwitchyard, Bandırma WPP TS Energy Transmission Line, 154kV, 46.5 km long, single circuit, 1272 MCM (in accordance with the TEIAS agreement), Power plant, transmission line and substation cabling (+construction works), Telecommunication system between the Bandırma WPP TS and Akçalar TS; all arranged by local firm

Table 2: CO_2 emission reduction estimation**Table 2** shows the expected annual power generation of the entire wind farm as well as individual turbines. CO_2 emissions are included as greenhouse gas, while the emission sources involved in the project activity incorporate the total number of electricity generation plants connected to the national power grid. Since the project is a Greenfield project only forecast energy generation data exists.

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

Emission reductions are calculated based on the supplied electricity to the national grid. Bandırma Wind Power Plant was partially taken into operation as summarized in the below:

- First 8 turbines (24MW capacity) on 18.09.2009
  - Turbine number; 1, 2, 3, 4, 5, 6, 7, 9
- Additional 7 turbines (21 MW) on 16.10.2009
  - Turbine number; 8, 10, 11, 12, 13, 14, 15
- Additional 4 turbines (12 MW) on 30.06.2010
  - Turbine number; 16, 17, 18, 19
- Last 1 turbine (3 MW) on 11.08.2011
  - Turbine number; 20

The project activity will use a renewable crediting period. The estimated amounts of emission reductions for the first crediting period are listed in the following table.

The crediting period is calculated beginning with October 2009 according to the turbines which are in operation. To ensure a 7 year, the end of the crediting year is expected to be September 2016.

Table 2: CO_2 emission reduction estimation

Year	**Annual estimation of emission reductions in tonnes of CO_2 e**
2009	20,413
2010	92,534
2011	108,688
2012	108,688
2013	108,688
2014	108,688
2015	108,688
2016	77,720
Total estimated reductions (tonnes of CO_2 e)	734,107
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	108,688

A.4.5. Public funding of the project activity:

The project will not use any ODA. An ODA Declaration is submitted to Gold Standard by the project owner of the project.

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:

The proposed project activity has applied approved CDM methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources". Version 12.1.0, EB 58 (26 November 2010).

The methodology will be used in conjunction with the following tools:

- Tool to calculate the emission factor for an electricity system, Version 02, EB 50
- Tool for the demonstration and assessment of additionality, Version 05.2 , EB 39

The "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", Version 02, EB 41 will not be applied as it is not relevant in the context of the proposed project activity.

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

ACM0002 outlines the following applicability criteria. Compatibility of the project activity with each applicability criteria is assessed.

Table 3: Assessment of compliance with applicability criteria

Applicability criteria	**How proposed project activity meets the applicability criteria**
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	The project is a new installation of a wind power plant. Wind energy is a renewable energy source.
In case of hydro power plants: o The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; o The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; o The project activity results in new reservoirs and the power density of the power plant, as per definition given in the Project Emissions section, is greater than 4 W/m^2.	Not applicable. The project is not a hydropower project.
The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available;	The relevant electricity grid is Turkey national grid. Information and characteristics of the grid can be provided. Further details and references are provided in Section B and Annex 3.
Applies to grid connected electricity generation from landfill gas to the extent that it is combined with the approved "Consolidated baseline methodology for landfill gas project activities" (ACM0001); and	Not applicable. The project is not a landfill gas project.
5 years of historical data (or 3 years in the case of non hydro project activities) have to be available for those project activities where modification/ retrofit measures are implemented in an existing power plant.	Not applicable. The project is not a modification retrofit measure.
The project is not applicable for • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants; • Hydro power plants 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 project does not involved fuel switching, is not a biomass or hydro power plant and thus non-applicability criteria are fulfilled.
In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.	Not relevant, as project activity is not a retrofit, replacement or capacity addition.

The proposed wind power project meets all the applicability criteria of ACM0002, Version 12.

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

The project boundary includes

- The physical delineation of 20 wind turbines;
- The national electricity grid of Turkey; and
- CO_2 emissions from the national electricity grid of Turkey.

Table 4: Sources and gases included in the project boundary

Source		**Gas**	**Included?**	**Justification / Explanation**
Baseline	Grid electricity production	CO_2	**Yes**	Main emission source, included to be compatible with ACM0002
		CH_4	No	Minor emission source, excluded for simplification
		N_2O	No	Minor emission source, excluded for simplification
Project activity	Wind electricity production	CO_2	No	As the project activity uses renewable energy sources, no greenhouse gas emissions from the operation of the wind power plant are caused.
		CH_4	No	
		N_2O	No	

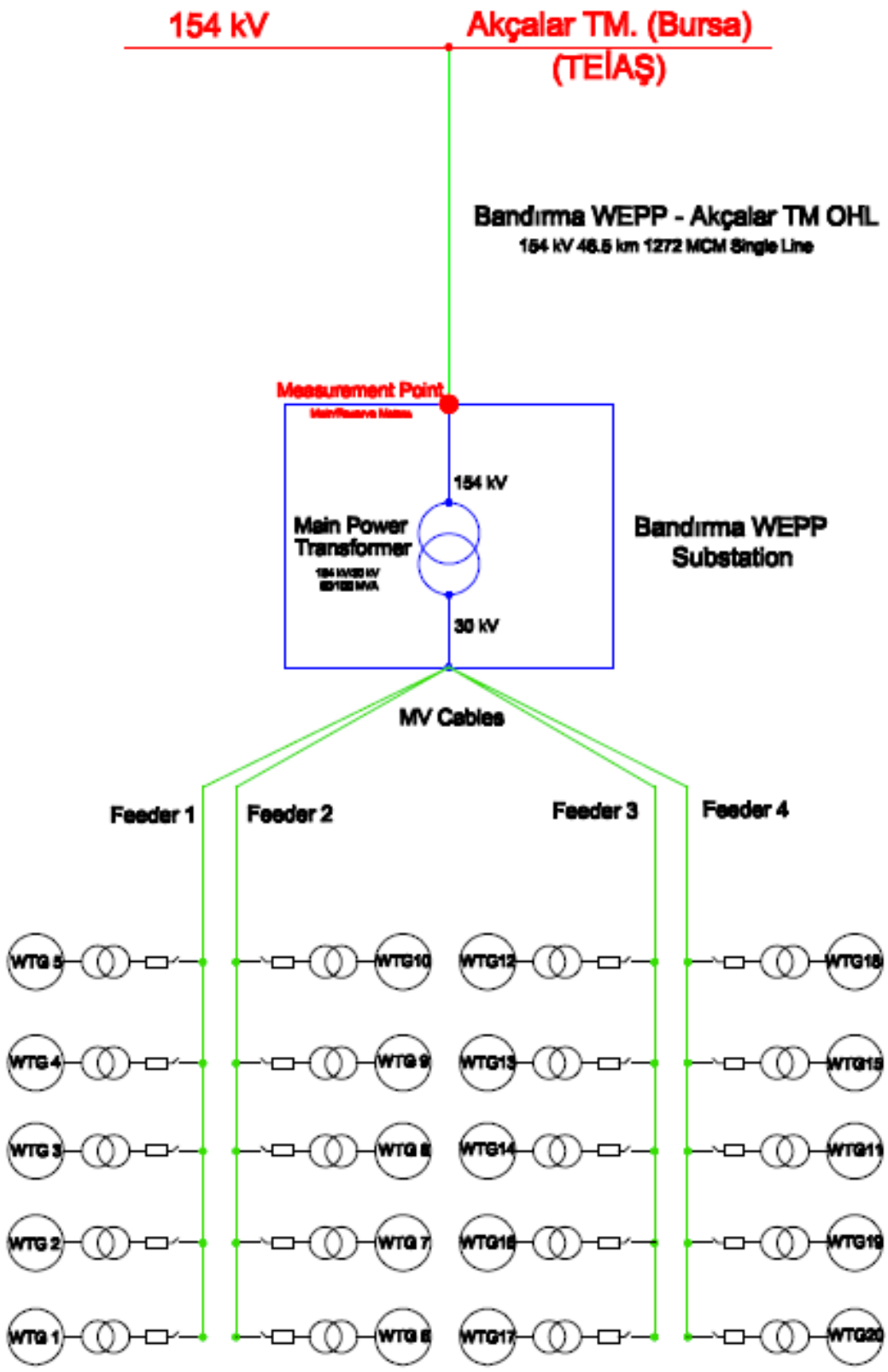


Figure 7: Project boundary showing emission sources included

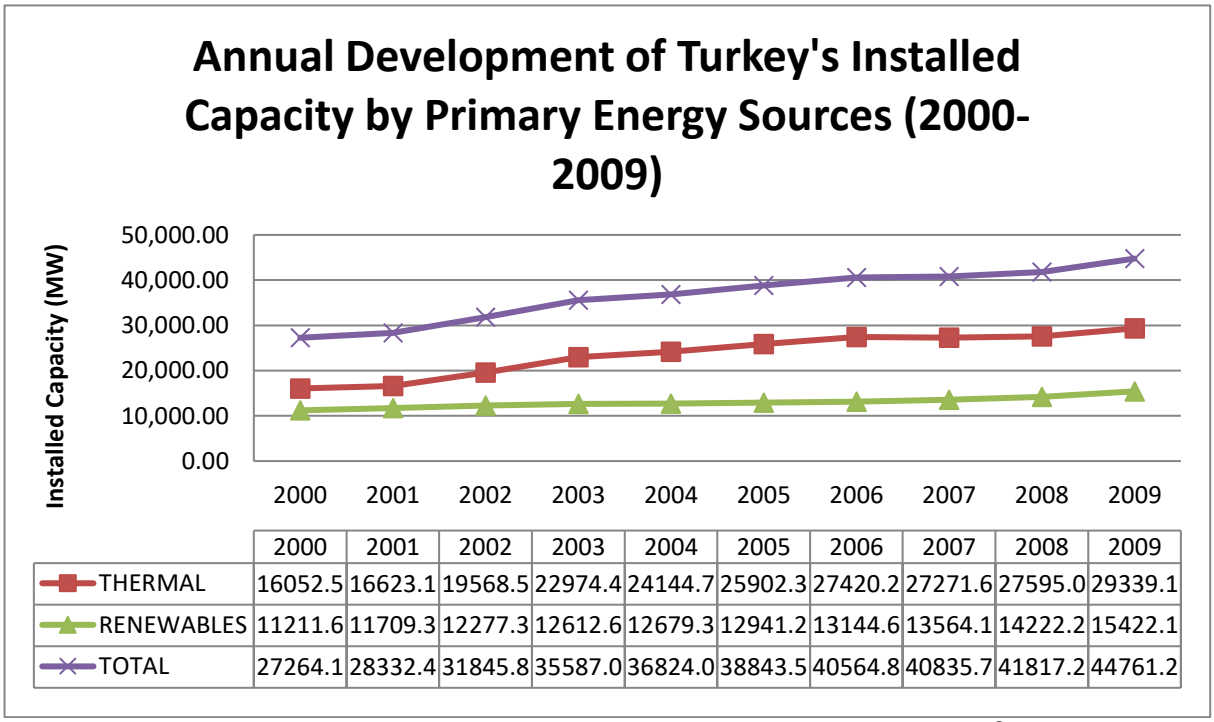
B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

This project follows the methodology described in the ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 12.1.0. The project activity is installation of a new grid-connected wind farm and is not modification/retrofit of an existing grid-connected power plant.

In the absence of the project activity, the amount of electricity would be delivered through the grid, which to a large extent is fed by fossil sources, leading to carbon dioxide emissions.

The baseline scenario is "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 ìTool to calculate the emission factor for an electricity system."

As can been seen in Figure 8, electricity generation in Turkey is mainly composed of thermal power plants whereas wind power only accounts 1-2 percent of the total installed capacity.

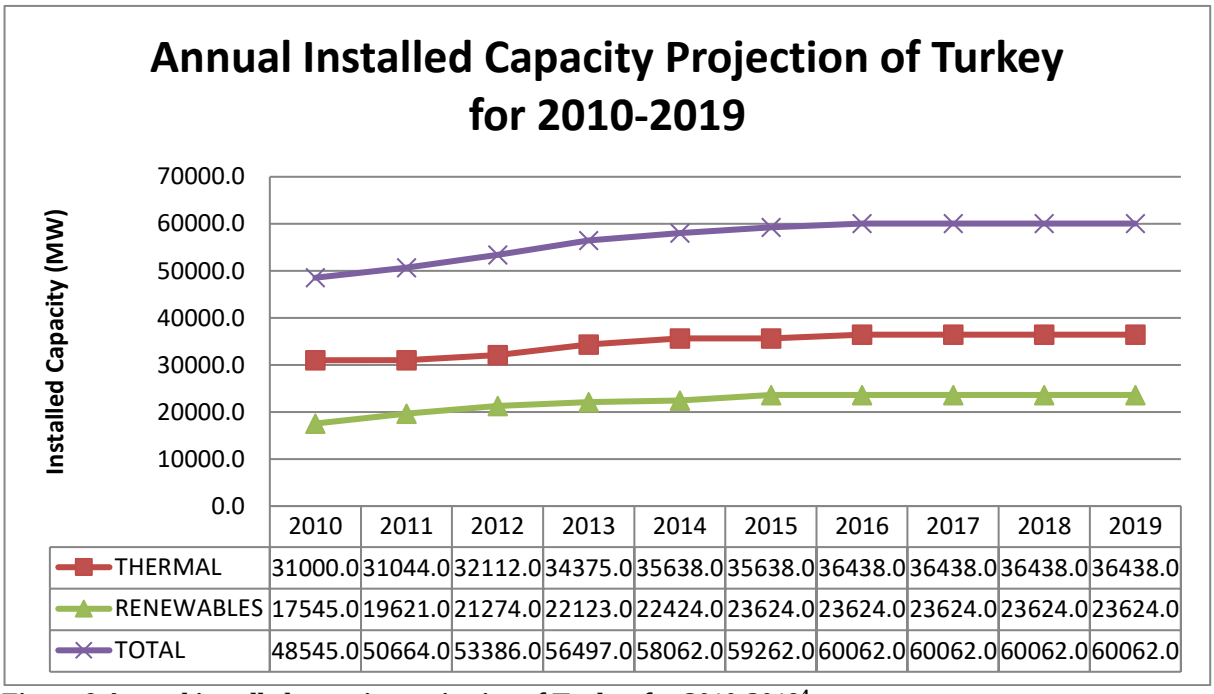


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
THERMAL	16052.5	16623.1	19568.5	22974.4	24144.7	25902.3	27420.2	27271.6	27595.0	29339.1
RENEWABLES	11211.6	11709.3	12277.3	12612.6	12679.3	12941.2	13144.6	13564.1	14222.2	15422.1
TOTAL	27264.1	28332.4	31845.8	35587.0	36824.0	38843.5	40564.8	40835.7	41817.2	44761.2

Figure 8 Annual development of Turkey's installed capacity by primary energy sources[3]

[3] http://www.teias.gov.tr/istatistik2009/3.xls

From the ten year projection plan of TEİAS for the years 2010-2019, it can be understood that fossil fuels will continue to be the main source for the electricity generation of Turkey in the upcoming years (Figure 9).



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
THERMAL	31000.0	31044.0	32112.0	34375.0	35638.0	35638.0	36438.0	36438.0	36438.0	36438.0
RENEWABLES	17545.0	19621.0	21274.0	22123.0	22424.0	23624.0	23624.0	23624.0	23624.0	23624.0
TOTAL	48545.0	50664.0	53386.0	56497.0	58062.0	59262.0	60062.0	60062.0	60062.0	60062.0

Figure 9 Annual installed capacity projection of Turkey for 2010-2019[4]

It can be concluded that, in the absence of the proposed project activity, the same amount of electricity is required to be supplied by the grid by the thermal power plants that will increase GHG emissions. Since the proposed project generates electricity using wind power, it will not create any GHG emissions.

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 "Tool for the demonstration and assessment of additionality", Version 5.2 outlines a procedure how to prove additionality of the project. The following steps are applied.

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

Step 1a - Define alternatives to the project activity.
All credible and realistic alternatives are identified, namely:

- Alternative 1: The proposed project activity not undertaken as VER project. The 60 MW wind farm would be installed and connected to the national electricity grid of Turkey without the revenues accruing from the sales of VERs.
- Alternative 2: Construction of a thermal power plant with the same installed capacity or the same annual output (60 MW or 182.7 GWh/a).
- Alternative 3: Construction of another renewable energy plant using solar, biomass, hydro or geothermal with the same capacity or annual output not being developed as VER project.

[4] http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf, page 77

- Alternative 4: Continuation of the current situation. Electricity will continue to be provided by the national electricity system of Turkey.

Alternative 2 and 3 are not credible and realistic scenarios. Alternative 2 is not realistic because Bandırma Enerji is not active in the conventional power sector business. Alternative 3 is not realistic because, by acquiring Borasco Enerji, Borusan Enerji bought the Bandırma wind power project, which was at that time already in an advanced project development stage. Alternative 1 (the project activity without VERs) and alternative 4 (the continuation of grid electricity generation) remain as two credible and realistic scenarios at this stage of investigation.

Step 1b - Consistency with mandatory laws and regulations.
Remaining alternative 1 and 4 are in line with all relevant applicable laws and regulations in Turkey. The following references were checked and applicability assessed as follows:

(1) **Electricity Market Law (EML)** [5] [Law Number: 4628 Ratification Date: 20.02.2001 Enactment Date: 03.03.2001]. This law sets up a path towards a free market in power generation, distribution, transmission, and wholesale, retailing services, import and export of electricity. The state-owned Turkish Electricity Generation and Transmission Corporation (TEAS) are split into separate generation, distribution, and trade companies, with eventual privatization of the generation and trade companies. It is expected that transmission of electricity will continue to be run by the State. The new law also set the stage for a new organization, the Energy Market Regulation Agency (EMRA) that will oversee the power and natural gas markets, including setting tariffs, issuing licenses, and assuring competition.

(2) **Amendment to Electricity Market Law** [Amending Law Number 5784 dated July 26, 2008, published in the Official Gazette under No 26948]. Energy Market Legislation can be found on EMRA website. Currently, only the latest version of the EML law is present at the website. No previous versions (e.g. from 2001) and the separate amendment are available. The amendment provides a clearer definition of "distribution facility", enables distribution companies to provide *side services* and requires distribution companies, as of 1 January 2013, to carry out generation and retail sales activities under separate legal entities.

Applicability assessment: By EML law, independent power producers like Bandırma Enerji are allowed to operate in the market. In this particular context, participation will be in energy generation segment.

(3) **Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy** [6] [Law Number: 5346 Ratification Date: 10.05.2005 Enactment Date: 18.05.2005, last amendment on 02.05.2007]. The aim of the law is to expand the utilization of RER for generating electricity in a dependable and economic manner, to increase the diversification of energy resources, to protect the environment and to develop the related manufacturing sector for the realization of these objectives. The Law encompasses wind, solar, geothermal, biomass, biogas, wave, current and tidal energy resources, canal and river type hydroelectric generation facilities and hydroelectric generation facilities with a reservoir area of less than fifteen square kilometres. According to the EML, "EMRA" is authorized to take the necessary measures to encourage the utilization of Renewable energy resources.

[5] Latest version of EML can be downloaded from
http://www.emra.gov.tr/mevzuat/kanun/elektrik/elektrik_piyasalari_kanunu.pdf

[6] Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy, see e.g. http://projects.wri.org/sd-pams-database/turkey/utilization-renewable-energy-resources-generating-electricity and http://www.cakmak.av.tr/pdf/32785_1.pdf

The renewable energy law guarantees a fixed electricity tariff of 5.5c€/kWh over 10 years as of start of renewable power plant generation. The tariff is paid subject to receipt of a Renewable Energy Certificate issued by EMRA and requires signing off a PPA.

All other renewable energy projects not holding a Renewable Energy Certificate do not require a PPA but would sell the power according to a balancing and settling method to the private sector as defined and put in place by National Load Dispatch Centre, NLDC, ("Milli Yük Tevzi Merkezi"), which is the unit under the body of TEIAS in charge of real-time balancing of electricity demand and supply and Market Financial Settlement Centre, MFSC, ("PMUM"), which is another unit of TEIAS that operates the settlement side of balancing and settlement system by calculating amounts payable or receivable by legal entities operating in the market based on differences between actual purchases and sales as a result of the real time physical balancing of energy supply and demand by TEIAS/NLDC. Typically, achievable tariffs may be higher than guaranteed renewable fed in tariff of 5.5 c€/kWh.

Applicability assessment: By this law, wind power project are explicitly encouraged. The project is in line with this law.

(4) Environment Law [7] [Law Number: 2827 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983]. The objective of this Law is to protect and improve the environment which is the common asset of all citizens; make better use of, and preserve land and natural resources in rural and urban areas; prevent water, land and air pollution; by preserving the country's vegetative and livestock assets and natural and historical richness, organize all arrangements and precautions for improving and securing health, civilization and life conditions of present and future generations in conformity with economical and social development objectives, and based on certain legal and technical principles.

(5) By-law on Environmental Impact Assessment (EIA) [8] [By-Law Number 26939, Date: July 17, 2008]. This by-law referring to Environmental Law sets the framework for conducting Environmental Impacts Assessment. Wind power projects above 10 MW installed capacity are part of Annex II to this by-law and need to prepare a Project Presentation File (PPF) instead of a full EIA.

Applicability Assessment: A PPF was prepared for the Bandırma Wind Park project and a "EIA Not Required" letter from the local authority was received. The project thus complies with applicable environmental legislation. A translation of the "EIA Not Required" letter will be made available to the DOE at Validation stage.

It's been shown that Alternative 1 and 4 comply with all legal regulations and therefore remain at this stage for further investigation.

Step 2: Investment analysis

Bandırma Enerji decided to apply investment analysis.

This step includes an analysis whether

- the proposed project activity is not the most economically or financially attractive one, or
- Whether it is not economically and financially feasible, without the revenue from the sale of VERs.

[7] Environment Law: www.cevreorman.gov.tr/yasa/k/2872.doc

[8] EIA Regulation: www.cevreorman.gov.tr/yasa/y/26939.doc

The investment analysis depends on the IRR analysis done in April 2008 during the time that Borusan Enerji decided to buy Borasco Enerji (currently Bandırma Enerji). The investment decision date is the date of the related Executive Board Decision which is April 7, 2008.

Sub-step 2a: Determine appropriate analysis method
The following three options are available as per the methodological tool:

Option I - simple cost analysis
Option II - investment comparison analysis
Option III - benchmark analysis

Option 1 cannot be used since the project generates financial benefits (revenues from power sales) in addition to VER related income. As per guidance provided by the EB on the assessment of Investment Analysis (Annex 58 of EB 51, serving as Annex to the Methodological Tool), benchmark analysis is allowed if the alternative to the project activity is the supply of electricity from a grid, as this alternative is not considered to be an investment and further is outside of the control of the project developer. In this particular context investment comparison cannot be applied. Option III is therefore applied in the following.

Sub-step 2b: Option III. Apply benchmark analysis
The most suitable economic indicator for the proposed project is IRR (Internal Rate of Return). The project proponent intended to use internal company benchmark, weighted average cost of capital (WACC) as these rates would be the best indicator for a private sector investment. The WACC is calculated as 9.9% which is given in the Input sheet of the IRR calculation of the project during validation. .

A project IRR calculation was conducted for the project. The following input parameters were used in the IRR model.

Table 5: Key information and data used to determine the Baseline scenario

Parameter	**Applied value**
IRR type calculated	Project IRR
Net annual power generation	182.7 GWh/a
Installed capacity	60 MW
PLF	3045 h/a
Project lifetime	25 years, 0 months

The following guidance on the assessment of investment analysis was respected as it has relevance for the selected approach and project type (EB51, Annex 58).

- **Period of assessment:** The period of assessment should not be limited to the crediting period but should reflect the expected operating period (technical lifetime). 25 years technical lifetime is expected and has been used for project IRR calculation.
- **Fair value:** Fair value of the project activity asset shall be included at the end of the assessment period as a cash inflow. The fair value should be calculated in accordance with local accounting regulations where available or international best practices. Fair value for this project is defined zero ‘0’. Depreciation of electric equipment is 10 years and is based on valid legislation and laws (Turkish Tax legislation).
- **Major maintenance and/or rehabilitation**: The IRR calculation may include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment. For this project IRR calculation, costs for major maintenance are not separately shown but included in regular maintenance costs. Costs for rehabilitation are not expected for this project.

- **Depreciation:** Depreciation and other non-cash items which have been deducted in estimating gross profits on which tax is calculated, should be added back to net profits for calculating IRR, NPV. This guidance was applied.
- **Taxation:** Taxation can only be considered a relevant expense if the indicator used for comparison purposes is intended for post tax comparison. Since the selected benchmark represents a post-tax benchmark, tax is treated as an expense in the IRR calculation.
- **Validity of input values:** Input values used should be valid at the time of the investment decision taken by the project participants. It requires a validation of input values with timing. The presented IRR calculation used input values as were relevant when Borusan Enerji bought Borasco Enerji. The Electricity tariff was taken from the Renewable Energy Law in Turkey.. The installed capacity and electricity output was taken from 2008 Feasibility Study. Currency conversion factors were taken fromthe Central Bank of Turkey. All other input values, like CAPEX, OPEX, OPEX inflation rate etc. represent confirmed values from Borusan Enerji valid at the time of decision making to buy Borasco Enerji.
- **Appropriateness of benchmark:** The type of benchmark selected should be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate, benchmarks supplied by relevant returns. The project activity has applied aWACC as per the year 2008.

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:

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

W_d= % of debt (50%)
C_d= Cost of Debt (9%)
W_e= % of Equity (50%)
C_e = Cost of Equity

C_e is calculated as;

C_e = Risk Free Rate for Turkey + (Market Risk Premium * Beta)
C_e = 7 + (5 * 1.1) = 12.6%

Solving using the figures above:

WACC = (50 * 9) + (50 * 12.6)

WACC = 9.9%

Based on these external factors, the project requires an Internal Rate of Return of 9.9% to exceed the benchmark.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

The IRR was calculated by considering investment costs, operation and maintenance costs, and revenues (excluding the revenues from sales of VERs). The free cash flow to shareholders was then determined and used for determining the IRR, which resulted in **6.8%.** This IRR is substantially lower than the identified benchmark (WACC) of 9.9%.

Indicators used in the IRR analysis:

Parameter (Unit)	Value
Installed Capacity	60 MW
Expected Electricity Generation	182.7 GWh/a
Technical lifetime	25 years
Total Investment	136,211,510 $
Loan (€)	82,969,178 $
Loan Period	7 years
Operational Cost	2.667,029 per year
Electricity Price	5.5 €cent/kWh
VER Price	0.7 $cent/kWh
Project developed without VER, IRR	%6.8
Project developed with VER, IRR	%7.8

Sub-step 2d: Sensitivity analysis (only applicable to Options II and III):

A sensitivity analysis was conducted for the following parameters:

- Variation of equipment costs;
- Variation of OPEX;
- Variation of revenues (by electricity tariff, and by electricity generation)

The results of the sensitivity analysis presenting the IRRs for such situations are shown in the below table.

Table 6: IRR Sensitivity analysis

Parameter/Variation	-10%	-5%	0 (base case)	+5%	+10%
Equipment costs	7.6 %	7.2 %	6.8 %	6.4 %	6.1 %
OPEX	7.0 %	6.9 %		6.7 %	6.6 %
Electricity Tariff	5.5 %	6.2 %		7.4 %	8.0 %
Electricity Generation	5.5 %	6.2 %		7.4 %	8.0 %

The outcome of Step 2 clearly confirms the project would be economically not attractive. Even changes in above discussed parameters will not result in exceeding the benchmark.

Finally, an analysis was done on the overall impact of VER revenues on the project IRR. The IRR analysis including VERs sales from 7€/VER results in an IRR in the range of 7.8 %The price is selected conservatively given the recent market value of VERs. This analysis was done solely for the base case. It can been seen that after considering the VER revenues the project IRR is still lower than the benchmark (WACC) of 9.9% and economically not viable.

The investment and sensitivity analysis show that the VER revenues will improve the financial indicators of the project and make the project more attractive for investors. It is seen that project is not the most attractive option. Therefore project is considered as additional to the baseline scenario and eligible for VERs.

Step 3: Barrier analysis
Barrier analysis was not conducted. Step 3 is skipped.

Step 4: Common practice analysis
The project type is not first of its kind in Turkey. Therefore, an analysis is added to determine the extent to which the proposed project type (technology type) has already diffused in the relevant sector and region. As a credibility check it complements investment analysis conducted in Step 2.

There are several Gold Standard, VER+, VCS VER wind power projects in Turkey. These projects are dependent on VER revenues as additional income stream to power sales.

Despite the wind power project pipeline as of to date, the share of wind power in the entire installed electricity remains underrepresented as compared to conventional power generation. While applicable with all relevant laws and regulations, the calculated IRR is fairly low without the VERs. This analysis clearly shows that it is not economically attractive project compared to a suitable benchmark.

Sub-step 4a: Analyze other activities similar to the proposed project activity:
At the time of writing the PDD (February 2011), installed capacity of wind power plants and their details was available in the web site of Energy Market Regulatory Authority[9]. The projects were checked with the commonly used standard's registries like APX Gold Standard and Markit. Accordingly **Table 8:** Chronology of activities was created.

[9] http://www2.epdk.org.tr/lisans/elektrik/yek/ruzgarprojeleriningelisimi.xls

Table 7: Installed wind energy capacity in Turkey

Location	Company	Installed Capacity (MW)	Comm. Date	Turbine Manufacturer	Turbine Capacity (MW)	Number of WTGs	VER Status
İzmir-Çeşme	Alize Enerji Elektrik Üretim A.Ş.	1.50	1998	Enercon	0.5	3	-
İzmir-Çeşme	Ares Alaçatı Rüzgar Enerjisi Sant.San. ve Tic. A.Ş.	7.20	1998	Vestas	0.6	12	BOT
İstanbul-Hadımköy	Sunjüt Sun'i Jüt San. ve Tic. A.Ş	1.20	2003	Enercon	0.6	2	-
Balıkesir-Bandırma	Yapısan Elektrik Üretim A.Ş.	30.00	2006	GE	1.5	20	VER+ (Issued)
İzmir-Çeşme	Mare Manastır Rüzgar Enerjisi Santralı San. ve Tic. A.Ş.	39.20	2006	Enercon	0.8	49	GS VER (Issued)
İstanbul-Silivri	Teperes Elektrik Üretim A.Ş.	0.85	2007	Vestas	0.85	1	-
Çanakkale-İntepe	Anemon Enerji Elektrik Üretim A.Ş.	30.40	2007	Enercon	0.8	38	GS VER (Issued)
Manisa-Akhisar	Deniz Elektrik Üretim Ltd. Şti.	10.80	2007	Vestas	1.8	6	VCS (Issued)
Çanakkale-Gelibolu	Doğal Enerji Elektrik Üretim A.Ş.	14.90	2007	Enercon	0.8 ve 0.9	13 * 800 kW + 5 *900 kW	GS VER (Issued)
Manisa-Sayalar	Doğal Enerji Elektrik Üretim A.Ş.	34.20	2008	Enercon	0.9	38	GS VER (Issued)
İstanbul-Çatalca	Ertürk Elektrik Üretim A.Ş.	60.00	2008	Vestas	3	20	GS VER (Issued)
İzmir-Aliağa	İnnores Elektrik Üretim A.Ş.	57.50	2008	Nordex	2.5	23	GS VER (Issued)
İstanbul-Gaziosmanpaşa	Lodos Elektrik Üretim A.Ş.	24.00	2008	Enercon	2	12	GS VER (Issued)
Muğla-Datça	Dares Datça Rüzgar Enerji Santralı Sanayi ve Ticaret A.Ş.	29.60	2008	Enercon	0.9	37	GS VER (Issued)
Hatay-Samandağ	Deniz Elektrik Üretim Ltd. Şti.	30.00	2008	Vestas	2	15	GS VER (Listed)
Aydın-Didim	Ayen Enerji A.Ş.	31.50	2009	Suzlon	2.1	15	GS VER (Issued)
Balıkesir-Şamlı	Baki Elektrik Üretim Ltd. Şti.	90.00	2009	Vestas	3	30	GS VER (Listed)
Hatay-Belen	Belen Elektrik Üretim A.Ş.	30.00	2009	Vestas	3	10	GS VER (Validated)
Tekirdağ-Şarköy	Alize Enerji Elektrik Üretim A.Ş.	28.80	2009	Enercon	2 ve 0.9	14 * 2000 kW + 1* 800 kW	GS VER (Validated)
İzmir-Urla	Kores Kocadağ Rüzgar Enerji Santralı Üretim A.Ş.	15.00	2009	Nordex	2.5	6	GS VER (Validated)
Çanakkale-Ezine	Alize Enerji Elektrik Üretim A.Ş.	20.80	2009	Enercon	2 ve 0.8	10 *2000 kW + 1 * 800 kW	GS VER (Registered)
Balıkesir-Susurluk	Alize Enerji Elektrik Üretim A.Ş.	20.70	2009	Enercon	0.9	23	GS VER (Issued)

İzmir-Bergama	Ütopya Elektrik Üretim Sanayi ve Ticaret A.Ş.	15.00	2009	GE	2.5	6	GS VER (Registered)
İzmir-Çeşme	Mazı-3 Rüzgar Enerjisi Santrali Elektrik Üretim A.Ş.	30.00	2009	Nordex	2.5	12	GS VER (Registered)
Balıkesir-Bandırma	Akenerji Elektrik Üretim A.Ş.	15.00	2009	Vestas	3	5	GS VER (Registered)
Balıkesir-Bandırma	Borasco Enerji ve Kimya Sanayi ve Ticaret A.Ş.	45.00	2009	Vestas	3	15	GS VER (Listed)
Osmaniye-Bahçe	Rotor Elektrik Üretim A.Ş.	95.00	2010	GE	2.5	54	GS VER (Issued)
Manisa-Soma	Soma Enerji Elektrik Üretim A.Ş.	49.50	2010	Enercon	0.9	55	GS VER (Listed)
Balıkesir-Bandırma	As Makinsan Temiz Enerji Elektrik Üretim San. ve Tic. A.Ş.	24.00	2010	Nordex	3	10	GS VER (Registered)
Mersin-Mut	Akdeniz Elektrik Üretim A.Ş.	33	2010	Vestas	3	11	GS VER (Listed)
Çanakkale-Bozcaada	BoresBozcaadaRüzgarEnj.Sant.San. ve Tic. A.Ş.	10.2	2010	Enercon	0.6	17	BOT
İzmir-Aliağa	Bergama RES Enerji Üretim A.Ş.	90	2010	Nordex	2.5	36	GS VER (Listed)
Edirne-Enez	Boreas Enerji Üretim A.Ş.	15	2010	Nordex	2.5	6	GS VER (Listed)
Hatay-Belen	Bakras Enerji Elektrik Üretim ve Tic. A.Ş.	15	2010	Vestas			GS VER (Registered)
Hatay-Samandağ	Ziyaret RES Elektrik Üretim San. ve Tic. A.Ş.	35	2010	GE	2.5	14	GS VER (Listed)
Manisa-Soma	Bilgin Rüzgar Santrali Enerji Üretim A.Ş.	90	2010	Nordex	2.5	36	GS VER (Listed)
Manisa-Kırkağaç	Alize Enerji Elektrik Üretim A.Ş.	25.6	2010	Enercon	2 + 0.8	12 + 2	GS VER (Validated)
Çanakkale-Ezine	Garet Enerji Üretim ve Ticaret A.Ş.	15	2010	GE	2.5	6	GS VER (Listed)
Aydın-Çine	Sabaş Elektrik Üretim A.Ş.	22	2010	Vestas	2	11	GS VER (Listed)
TOTAL OPERATING CAPACITY			**1329.15 MW**				

As per the additionality tool guidelines:

- Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.

- 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 latter guideline and applicability to VER projects is interpreted as follows: registered or any other published VER project are not to be considered in the assessment.

If this interpretation would apply for VER projects, it can be concluded that the only projects to compare with would be those projects and that are in a range of 0.85 to 7.2 MW installed capacity or operated as a BOT (Build Own Operate) type of power plant. These projects differ from the proposed projects in terms of total installed capacity and size and per unit. This comparison and application of Step 4a to VER projects would clearly conclude that no similar activities have already diffused in the relevant region (Turkey) and thus Step 4 is completed and project re-confirmed 'additional'.

If alternatively registered or any other published VER project are to be considered in the assessment.
It can be concluded that similar projects have already diffused in the relevant region as major applications are between 15 and 90 MW installed capacity and Sub-step 4b has then to be conducted.

Sub-step 4b: Discuss any similar Options that are occurring:
As can be seen from the above table there are three other wind power plant projects operating in the Bandırma region with capacities 30 MW, 15 MW, 24 MW. All of the projects are developed as VER projects. While several VER projects have been developed in similar like the Bandırma wind power plant project, the proposed project activity differs in the following way from comparable projects as follows:

- At the time of acquisition of the previous owner, Borusan Enerji identified mistakes in the calculation of net electricity output. Consequently, a decrease in revenues became apparent and a new barrier to project implementation was suddenly realised, which resulted in a decision of the Board to further develop this project as VER project to secure a fairly good economic situation of the project. Any similar situation (project acquisition and corrections of feasibility study at advanced project development stage) are not known to have occurred for other registered or published VER projects and thus represent an essential distinction.

It therefore can be concluded that for both assumptions (VER projects excluded or included in the analysis) the project does not represent common practice.

Implementation timeline of the proposed project / serious consideration of the project as VER project

The **starting date** of the project activity is **15 April 2008.** On that date the supply and installation agreement between Borasco Enerji and Vestas for 45 MW wind turbines was signed. This represents a real action towards project implementation. Soon after, Borusan has acquired Borasco and project implementation was further pursued.

Table 8 summarises the scope of activities and measures that were implemented within the proposed project activity. It includes activities taken by previous owner Borasco Enerji and subsequent owner Borusan Enerji in relation to feasibility studies, seeking VER status of the project, arranging financing and negotiating equipment purchase contracts.

Table 8: Chronology of activities

Date	Activities related to Bandırma wind power plant project development & acquisition of Borasco	Activities related to seeking VER status
05 April 2007	Feasibility study for Borasco Enerji on the wind farm project by Garrad Hassan Consultancy (Feasibility Study no. 1). The wind park was originally planned at 45 MW installed capacity.	

Date	Activities related to Bandırma wind power plant project development & acquisition of Borasco	Activities related to seeking VER status
31 December 2007	Electricity generation license received by EMRA[10] for 45 MW to supply electricity to the grid.	
January 2008	First official application to EMRA for amendment of the electricity generation license from 45 MW to 60 MW **by the old project owner**	
17 March 2008	Agreement between Borasco and Güngör Electrik on building 46.5 km of 154 kV transmission line and associated facilities (e.g. communication system, transformers) (**by the old project owner)**	
20 March 2008	Preliminary assessment report of the energy production by Garrad Hassan Consultancy (Feasibility Study no. 2). This report includes an investigation for 45 MW and 60 MW as an extension of capacity was envisaged.	
1 April 2008		Borusan Enerji Financial analysis of Bandırma wind farm showing that the project is dependent on carbon income. This is mainly due to a downward correction of expected net power generation as outlined in Feasibility Study no. 2)
07 April 2008	Borusan Board Decision as a result of analysis to buy Borasco Enerji: • Borusan Enerji will buy Borasco Enerji • The signed/or to be signed contracts for material and service investment for Bandırma Wind Farm shall be accelerated	• Carbon income was finally decided to have a positive impact on project feasibility of Bandırma Wind Farm • Carbon income of the wind farm is a supporting element for the decision to purchase shares by Borusan Enerji • Borusan Enerji decided that Carbon certification application process shall be started
15 April 2008	Supply and installation agreement between Borasco Enerji and Vestas for 45 MW wind turbines (**by the old project owner)**	
15 April 2008	Vestas Service & Availability Agreement signed (**by the old project owner)**	
1 May 2008		Borusan Enerji Board presentation on Bandırma WPP Carbon income
12 May 2008	Borusan Enerji bought 100% of Borasco Enerji shares (Turkey Trade Registry Gazette, page 511, no. 7060	
02 June 2008	Borusan Enerji applied EMRA for extension from 45 MW to 60 MW	
06 June 2008	Supplementary turbine delivery agreement for another 15 MW to increase the overall wind farm capacity to 60 MW	
17 June 2008	Engineering Contract of Borusan Mühendislik (Borusan Engineering Company) to Borasco Enerji (foundation soil study, tendering of road construction, supervision of road construction, reporting)	

[10] Energy Market Regulatory Authority of Turkey (EMRA)

Date	Activities related to Bandırma wind power plant project development & acquisition of Borasco	Activities related to seeking VER status
13 August 2008	Foresty permission by Ministry of Environment and Forestry	
18 August 2008		Borusan received Camco/Gaia proposal for VER consultancy services
21 August 2008		Borusan received South Pole proposal for VER consultancy services
13/17 Sep 2008		Borusan received Global Tan proposal for VER consultancy services & purchasing of carbon certificates
09 October 2008		Borusan received South Pole complementary proposal for purchasing of VERs
21 October 2008	Agreement Borasco/Lahmeyer for Technical Advisory Services	
22 October 2008	Agreement on foundations work, start of construction	
30 October 2008		Borusan received Camco/Gaia complementary proposal for purchase of carbon certificates
19 November 2008		Borusan awarding Fichtner to undertake VER eligibility analysis
27 November 2008		Borusan received Swiss carbon proposal for VER consultancy services
31 December 2008	Establishment of bridge financing (valid until January 2009)	
January 2009 February 2009	Social Impact Analysis Report Flora - Fauna Report Both as part of part of Environmental and Social Impact Assessment	
20 February 2009	Project Presentation File submitted to the Balıkesir Provincal Department of Environment and Forestry describing the project	
25 February 2009	Loan agreement 60 MW	
3 April 2009	Decision of Balıkesir Provincal Department of Environment and Forestry that "Environmental Impact Assessment Report is not necessary".	
9 April 2009		Fichtner submitted VER Eligibility Analysis for Bandırma Wind Farm Project to Borusan Enerji.
May 2009	Environmental and Social Impact Assessment Report finalised. The report was prepared based on an internal decision despite there is no need to prepare an EIA according to national environmental legislation. Prepared by Fichtner & Tricon. Meant to be used as a supporting document in the negotiations with potential financiers	
15 July 2009	Provisional acceptance of the transmission line	
End of July 2009	Borusan and Energie Baden-Würtemberg AG (EnBW) established a 50 50 Joint Venture	
September 2009	Finalisation of construction of 45 MW	

Date	Activities related to Bandırma wind power plant project development & acquisition of Borasco	Activities related to seeking VER status
9 September2009		Submission of draft PDD to Borusan
18 September 2009	Provisional acceptance of first 8 turbines (24 MW)	
1 October 2009		Submission of draft PDD to Gold Standard for the Pre-assessment.
18 October 2009	Provisional acceptance of additional 7 turbines (21 MW)	
April 2010	Approval for the amendment in the electricity generation license by EMRA for additional 15 MW	
18 May 2010	A positive outcome of Pre-Feasibility Assessment by Gold Standard, having "listed" status in the Gold Standard APX Registry	
June 2010	Finalization of construction of 15 MW	
30 June 2010	Provisional acceptance of additional 4 turbines (12 MW)	
05 October 2010		Award of Bureau Veritas Certification for the validation services of Bandırma Wind Power Plant
06 December 2010		Stakeholder Feedback Round Meeting conducted in the project site
20 December 2010		Submission of final draft versions of project documentation to Bureau Veritas

The above chronology shows that Borusan took the incentives from the sales of VERs seriously into account during the decision to buy Borasco Enerji and to proceed with further development of the project activity. The identified mistake in net electricity generation capacity calculation as was identified during the financial analysis of the project during the acquisition talks played brought back the investigation of the project development under VER as was already initiated earlier by Borasco Enerji. The realised effective loss on the revenue side showed a 4 to 5 % decrease in terms of IRR which is considered quite substantial and moved the project into an economically unattractive situation.

Earlier net power generation for 45 MW (Vestas V 90) was forecasted at 179.7 GWh/a. When correlated to 60 MW power generation of 239.6 GWh/a figure can be reached. The corrected figure as per Garrad Hassan Feasibility Report 2 is 182.7 GWh/a. This gives a total difference of 56.9 GWh/a. Expressed in PLF this would correspond to a decrease of 948 h/a. (239.6 GWh/a corresponds to PLF=3993 h/a and 182.7 GWh/a corresponds to 3045 h/a). Downward corrections therefore are in the range of roughly 31 %.

Assessment studies for development of the project as a VER project started in the beginning of 2009. On April 17, 2009, Borusan decided to go ahead with Gold Standard VER certification as a result of the Eligibility Analysis report of Fichtner. Consequently, Fichtner started preparation of project documentation for Gold Standard and submitted on October 2009. Gold Standard gave a positive decision to go ahead with project validation on May 2010. Consequently, Bandırma Enerji awarded Bureau Veritas Certification for the validation services on October 2009. In that time, the documents have been revised in accordance with the changes in the methodology and related tools, available statistics and with the pre-feasibility assessment results. A stakeholder feedback round meeting together with a site visit was conducted on December 2010 and the documentation have been finalized for validation accordingly.

B.6. Emission Reductions

B.6.1. Explanation of methodological choices:

The emission reduction calculation is based on existing CDM baseline and monitoring methodologies and tools, namely ACM0002 and the Methodological tool (Version 02), "Tool to calculate the emission factor for an electricity system''.

The methodological tool determines the CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the combined margin emission factor (CM) of the electricity system. The CM is the result of a weighted average of two emission factors pertaining to the electricity system: the operating margin (OM) and the build margin (BM).

The operating margin is the emission factor that refers to the group of existing power plants whose current electricity generation would be affected by the proposed VER project activity. The Methodological tool gives the choice of 4 methods to calculate the operating margin emission factor.

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

As explained in t Step 3 average share of "low-cost/must-run" resources comprise below 50% of the Turkish power generation in the last five years, Simple OM method is chosen to calculate operating margin. The most recent data for Simple OM method is for the years **2007, 2008 and 2009** which is available in TEIAS's web site.

The build margin is the emission factor that refers to the group of prospective power plants whose construction and future operation would be affected by the proposed VER project activity.

To be in line with the methodology, grid emission factor has been calculated in a conservative manner. In this baseline study, the ex-ante approach is selected. The Combined Margin Grid CO_2 emission factor will remain valid during the crediting period.

The calculation steps are explained in B.6.3.

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

The following data and parameters are available at validation. The data are taken from TEİAŞ and IPCC and are considered as the most reliable data. Thus there are not data uncertainities.

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:	http://www.teias.gov.tr/istatistik2009/23.xls http://www.teias.gov.tr/istatistik2009/32(75-09).xls
Value applied:	**Table 13**
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available. The data is used to calculate OM.
Any comment:	

Data / Parameter:	*HV*
Data unit:	*Tcal*
Source of data used:	Heating values of fuels consumed in thermal power
Value applied:	Table 19
Justification of the choice of data or description of measurement methods and procedures actually applied :	Heating values of fuels consumed in thermal power plants in Turkey by the electric utilities for 2006-2009. HVs are used to calculate NCV (Net Calorific Values) for fossil fuels in Turkey
Any comment:	

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	*(kton/TJ)*
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 IPCC Guidelines on National GHG Inventories. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied:	Table 20
Justification of the choice of data or description of measurement methods and procedures actually applied :	Emission factors are not available for Turkey, and therefore IPCC guidelines are used instead.
Any comment:	

Data / Parameter:	$FC_{i,y}$
Data unit:	*(mass or volume unit)*
Description:	*Amount of fossil fuel type i consumed in the project electricity system in year y*
Source of data used:	http://www.teias.gov.tr/istatistik2009/44.xls
Value applied:	Table 9
Justification of the choice of data or description of measurement methods and procedures actually applied :	Annual development of fuels consumed in thermal power plants in Turkey by the electric utilities for the years 2006-2009
Any comment:	

Data / Parameter:	**Sample Group for BM emission factor**
Data unit:	MW capacities, fuel types, average annual electricity generations and dates of commissioning.
Description:	Set of power capacity additions in the electricity system that comprise 20% of the system generation (in GWh) and that have been built most recently.
Source of data used:	http://www.teias.gov.tr/istatistik2009/8.xls http://www.teias.gov.tr/istatistik2008/8.xls http://www.teias.gov.tr/ist2007/8.xls http://www.teias.gov.tr/ist2006/8.xls http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2009.pdf http://www.teias.gov.tr/projeksiyon/KAPASITEPROJEKSIYONU2008.pdf

	http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202007.pdf Details of the capacity addition plants are taken from Annex 2 of the Capacity Projection reports for the years 2007, 2008, 2009 and 2010. Only the electricty generation values are taken from Annex 1 of the same reports.
Value applied:	Table 21
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAS (Turkish Electricity Transmission Company) is the official source for this data, providing the most up-to-date and accurate information available.
Any comment:	

Data / Parameter:	$\eta_{i,y}$
Data unit:	-
Description:	Default efficiency factors for power plants
Source of data used:	"Tool to calculate the emission factor for an electricity system", Annex I
Value applied:	Table 15
Justification of the choice of data or description of measurement methods and procedures actually applied :	Efficiency factors for renewable are taken as "0". The data is used for BM calculation.
Any comment:	

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

The below seven steps are applied while calculating the grid emission factor:

STEP 1. Identify the relevant electricity systems

Turkey ratified the Kyoto Protocol to the United Nations Framework on Climate Change Convention (UNFCCC) on February 2009. However a DNA has not been established yet. According to the methodological tool; a project electricity system has to be defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity, and that can be dispatched without significant transmission constraints. In this case, the project electricity system includes the project site and all power plants connected to the Turkish National Grid. Therefore, in this project activity the project electricity system includes the project site and all power plants attached to the Interconnected Turkish National Grid, which has an installed capacity of 44,761.2 MW and gross generation about 194,812.9 GWh for 2009.

Import-export activities take place in the national grid system since there are connections with the neighbouring countries. According to the tool; "For imports from connected electricity systems located in another host country(ies), the emission factor is 0 tons CO_2 per MWh. Electricity exports should not be subtracted from electricity generation data used for calculating and monitoring the electricity emission factors."

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

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

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

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

Due to insufficient data off-grid power plants are excluded in the calculation. Therefore, only grid power plants are included in the calculation (Option I).

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

The Methodological tool gives the choice of 4 methods to calculate the operating margin emission factor (EFgrid,OM,y).

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

As average share of "low-cost/must-run" resources comprise below 50% of the Turkish power generation in the last five years, Simple OM method is chosen to calculate EFgrid,OM,y.

Table 9 The share of Low-cost/Must-run resources for th elast five years[11]

YEARS	GROSS PRODUCTION (GWh)	HYDRO (GWh)	GEOTHERMAL + WIND (GWh)	RENEWABLES + WASTES (GWh)	TOTAL LCR PRODUCTION (GWh)	SHARE OF LCR	AVERAGE OF LAST FIVE YEARS
2005	161956,2	39560,5	153,4	122,4	39836,3	24,60%	
2006	176299,8	44244,2	220,5	154,0	44618,7	25,31%	
2007	191558,1	35850,8	511,1	213,7	36575,6	19,09%	**21,20%**
2008	198418,0	33269,8	1008,9	219,9	34498,6	17,39%	
2009	194812,9	35958,4	1931,1	340,1	38229,6	19,62%	

For the simple OM, the Methodological Tool gives the following two options:

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

In this baseline study, the ex-ante approach is selected. The Combined Margin Grid CO_2 emission factor will remain valid during the crediting period.

The most recent data for Simple OM method is for the years **2007, 2008 and 2009** which is available in TEIAS's web site.

STEP 4. Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated in two ways:

- Option A: Based on the net electricity generation and a CO2 emission factor of each power unit; or
- Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

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

Option B is chosen to calculate Simple OM cause;

1. there is no power plant specific data available
2. renewable power generation is considered as low-cost/must-run power sources and also the quantity of electricity supplied to the grid by these sources is known
3. off-grid power plants are not included in the calculation

Under Option B; the OM emission factor is calculated with the formula given below;

$$EF_{grid,OMsimple,y} = \frac{\sum_i \left(FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}\right)}{EG_y}$$

Where:

$EF_{grid,OMsimple,y}$ = Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$ = Amount of fossil fuel type i consumed in the project electricity system in year y (massor volume unit)
$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volumeunit)
$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
EG_y = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh)
i = All fossil fuel types combusted in power sources in the project electricity system inyear y
y = The relevant year as per the data vintage chosen in Step 3

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

For the calculation of the OM, the fuel consumption amount in thermal power plants and heating values of the fuels for each sources for the years 2007, 2008 and 2009 are taken from TEİAŞ' web site.

Table 10 Annual Development Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, Fci,y[12] (Ton/Gas 10^3 m^3)

Fuel Type	2007	2008	2009
Hard Coal+Imported Coal+Asphaltite	6.029.143	6.270.008	6.621.177
Lignite	61.223.821	66.374.120	63.620.518
Fuel Oil	2.250.686	2.173.371	1.594.321
Diesel Oil	50.233	131.206	180.857
LPG	0	0	111
Naphta	11.441	10.606	8.077
Natural Gas	20.457.793	21.607.635	20.978.040

The heating values (Table 18) are used to calculate the Net Calorific Value (NCV) for Electricity Generation.

[12] http://www.teias.gov.tr/istatistik2009/44.xls

Table 11 Net Calorific Values For Fossil Fuels For Electricity Generation (TJ/million m3) NCVi,y

Fuel type	2007	2008	2009
Coal	22,30	22,24	22,21
Lignite	6,86	6,83	6,43
Fuel Oil	39,87	39,70	39,81
Diesel Oil	43,09	42,38	42,37
Lpg	0,00	0,00	46,47
Naphta	43,18	44,61	43,65
Natural Gas	36,76	36,63	37,17

By using "Default CO2 Emission Factor for Combustion" of IPCC(Table 19), NCV and amount of fuel consumption CO_2 emission is found.

Table 12 CO_2 Emission By Each Fossil Fuel Types (ktonCO$_2$e)

Fuel type	2007	2008	2009
Coal	12477,80	12942,10	13649,14
Lignite	38179,80	41189,04	37164,24
Fuel Oil	6775,36	6513,94	4792,10
Diesel Oil	157,15	403,66	556,32
Lpg	0,00	0,00	0,32
Naphta	34,24	32,79	24,43
Natural Gas	40838,58	42980,83	42346,27
Total	**98462,92**	**104062,37**	**98532,81**

Net electricity generated and supplied to the grid by fossil fuels has been calculated using data obtained from the TEIAS. The ratio between gross and net generation has been calculated.It was accepted that same ratio is valid for fossil fuel power plants. Gross generation by fossil fuels has been multiplied by the ratio to find net generation by fossil fuels

Table 13Gross – Net Electricty Generation Relation[13]

Years	***Gross Electiricity Gen. (GWh)***	***Net Electiricity Gen. (GWh)***	***Relation***
2007	191558,1	183339,7	95,71%
2008	198418,0	189761,9	95,64%
2009	194812,9	186619,3	95,79%

Below table presents the net electricity production data by all the relevant energy sources including electricity imports to the grid. Low-cost/must run resources like hydro, wind, geothermal and biomass do not emit fossil CO_2 and thus are not taken into account in calculations.

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

Table 14 Net electricity Supplied to the Grid by Fossil Fuel Power Plants[14]

Years	*Gross Fossil Fuel Gen. (GWh)*	*Net Fossil Fuel Gen. (GWh)*	*Electricity Import (GWh)*	*Net Electricty Supplied To Grid (GWh)*
2007	154982,5	148333,3	864,3	149197,6
2008	163919,4	156768,3	789,4	157557,7
2009	156583,3	149997,6	812,0	150809,6

By dividing total CO_2 emissions to net electricity supplied to the grid, we obtain OM ($\mathbf{EF}_{grid,OMsimple,y}$) for the years 2007, 2008 and 2009.

Table 15 Simple OM

Years	**2007**	**2008**	**2009**
$\mathbf{EF}_{grid,OMsimple,y}$ [tCO_2/MWh]	0,6599	0,6605	0,6534
Average $\mathbf{EF}_{grid,OMsimple,y}$ [tCO_2/MWh]	**0,6579**		

STEP 5. Identify the group of power units to be included in the build margin (BM)

According to the Methodological Tool, 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.

Option (b) is chosen because this option comprises the larger annual generation of Turkish grid system.

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

For determination of plants that comprise 20% of the system's generation, gross generation in year 2009 which is 194,812.926 GWh has been taken as reference and its 20% has been determined as about 38,962.59 GWh. This value falls partly on capacity of a power plant, so the plant is fully included in the calculation as requested by the methodological tool.

At the time of writing the previous version of the PDD (version 02, dated 20/12/2010) there were no plant specific data available for the power plants put into operation in 2009. Some assumptions were made and BM was calculated in a conservative manner. However, in January 2011, TEIAS published

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

ten year capacity projection plan for 2010-2019 which included necessary missing information. Therefore, the BM calculation has been updated accordingly with the most accurate, up-to-date and reliable data.

STEP 6. Calculate the build margin emission factor

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

Where:

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = CO2 emission factor of power unit m in year y (tCO2/MWh)
m = Power units included in the build margin
y = Most recent historical year for which power generation data is available

Because of only fuel types and electricity generation data are available for the sample group, Option B2 of Simple OM method is used to calculate emission factor. The formulation of emission factor is given below:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \cdot 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$ = CO2 emission factor of power unit m in year y (tCO2/MWh)
$EF_{CO2,m,i,y}$ = Average CO2 emission factor of fuel type i used in power unit m in year y (tCO2/GJ)
$\eta_{m,y}$ = Average net energy conversion efficiency of power unit m in year y (ratio)
m = All power units serving the grid in year y except low-cost/must-run power units
y = The relevant year as per the data vintage chosen in Step 3

There is no plant specific efficiency factor and CO_2 emission factor data in Turkey. Therefore, IPCC data[15] are used for $EF_{CO2,m,i,y}$ and the default values from the Tool (Annex I) are used for plant efficiency factors. The BM emission factor is calculated as given in following table:

[15] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf, page 1.23

Table 16 Build Margin Calculation

Source	Sample Group Total Generation(GWh)	Effective CO2 Emission Factor (kton/TJ)*	Average Efficiency Factors for Power Plants	CO2 Emissions (ktCO2)
NATURAL GAS	22066,0	54,3	0,60	7189,1
LIGNITE	4683,1	90,9	0,39	3929,5
FUEL OIL	3252,7	75,5	0,395	2238,2
COAL	2868,3	92,8	0,39	2457,1
NAPHTA	7,5	69,3	0,395	4,7
HYDRO	5722,4	0	0,00	0,0
WIND	2	0	0,00	0,0
BIOGAS	6,7	0	0,00	0,0
GEOTHERMAL	363	0	0,00	0,0
TOTAL	**38971,7**			**15818,5**
$EF_{grid,BM,y}$		**0,40590**		

STEP 7. Calculate the combined margin (CM) emissions factor

The combined margin emissions factor is calculated as follows:

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

Where:
$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (tCO2/MWh)
w_{OM} = Weighting of operating margin emissions factor (%)
w_{BM} = Weighting of build margin emissions factor (%)

Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods

***$EF_{grid,CM,y}$* = 0.6579 tCO_2/MWh * 0.75 + 0.4059 tCO_2/MWh * 0.25 = 0.5949 tCO_2/MWh**

The combined margin emission factor is therefore **0.5949** tCO2/MWh. Emission factor will remain the same during the first crediting period and will be recalculated for the second crediting period.

According to the ACM 0002 methodology, the emission reduction ER_y by the project activity during a given year y is found as;

$$ER_y = BE_y - PE_y$$

Where:
ERy = Emission reductions in year y (tCO2)
BEy = Baseline emissions in year y (tCO2)
PEy = Project Emissions in year y (tCO2)

PEy; The project does not result in greenhouse gas emissions. The only emission source in the plant is the diesel generator which is used as auxiliary power source when there is no electricity generation in the plant or supply by the grid

BE_y is calculated as;

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

Where:
BEy = Baseline emissions in year y (tCO2/yr).
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EF_{grid,CM,y}$ = Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

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

Where:
$EG_{PJ,y}$ = 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)
$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

The project activity does not result in greenhouse gas emissions, so:

$$PE_y = 0, \text{ then } ER_y = BE_y$$

The actual net electricity output of the wind park is determined by ex-post monitoring. Ex-ante estimate of wind park electricity output is expected to be 182.7 GWh/yr. The capacity factor is defined as 35% according to the feasibility study with the following formula.

182.700 MWh/year / (20 turbines * 3 MW/turbine * 365 days/year * 24 hours/day) = 0,35

The ex-ante calculation of the baseline CO_2 emissions (representing grid generation) is therefore:

ER_y = 182,700 MWh/yr * 0.5949 t CO_2/MWh = **108,688 t CO_2/yr**

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

Table Estimated amount of CO2e emission reductions during first crediting period (7 years)

Years	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2009	0	20,413	0	20,413
2010	0	92,534	0	92,534
2011	0	108,688	0	108,688
2012	0	108,688	0	108,688
2013	0	108,688	0	108,688
2014	0	108,688	0	108,688
2015	0	108,688	0	108,688
2016	0	77,720	0	77,720
Total reductions (tCO2e)				734,107

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

Approved monitoring methodology ACM0002, Version 12.1.0, EB 58, Annex 7 (26 November 2010) is applied (Consolidated monitoring methodology for grid-connected electricity generation from renewable sources. Same applicability criteria as discussed under Section B2 apply and are fully met.

B.7.1 Data and parameters monitored:

Data / Parameter:	**$EG_{facility,y}$,**
Data unit:	MWh/a
Description:	Annual net electricity supplied by the project to the grid
Source of data to be used:	Data measured by the meter are the basis for the monthly invoice. Meter records are the source of data used to monitor net electricity supplied to the grid.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	182.7 GWh/a
Description of measurement methods and procedures to be applied:	Electricity generation data will be monitored continuously. Data will be measured hourly and recorded by two metering devices monthly. The selected meters will be of 0.2S class accuracy and follows TSE (Turkish Standard Institute) and IEC (International Electrotechnical Commission) standard. The records will provide the data for the monthly invoicing to TEIAS. At the end of each month, the generation data will be read and a protocol, which shows the measured data (including electricity amount supplied by the plant and received from the grid) will be signed by Bandırma Enerji and a responsible person from TEİAŞ. Bandırma Enerji will invoice the amount of generated electricity to TEIAS and TEIAS will invoice the purchased electricity from grid to Bandırma Enerji respectively. Electricity generation of the plant and internal consumption amounts will be stated in the invoice in MWh. The data will be crosschecked by the monthly invoices. (The net electricity supplied to the grid will be calculated by electricity supplied minus electricity purchased.)
QA/QC procedures to be applied:	Maintenance and calibration of the metering devices will be made by TEIAS periodically.

Any comment:	

B.7.2. Description of the monitoring plan:

The monitoring has to take place in such a way that the annual net electricity generation delivered to the grid and any power purchased from the grid can be determined exactly as these figures are vital for calculation of the CO_2 e emission reductions. The baseline CO_2 grid emission factor is determined ex-ante and therefore remains unchanged during the first seven years of the renewable crediting period. Electricity delivered to and purchased from the Turkish national grid are key data to be monitored during project implementation. The monitoring plan below describes the following aspects in greater detail:

- Monitoring organization, roles and responsibilities;
- Specification of measurement equipment, calibration;
- Quality assurance / quality control;
- Data management and archiving;
- Verification and frequency;
- Emergency procedures;
- Development of regular VER monitoring Reports, and
- Training procedures

Monitoring organization, roles and responsibilities
Project monitoring will be shared responsibility of Bandırma Enerji, and TEIAS with clearly defined roles and responsibilities as shown below:

Practical data collection will be purely handled by Bandırma Enerji and TEIAS. Bandırma Enerji and TEIAS will implement a data collection unit that manages

- automatic collection of all measured data,
- error handling,
- calibration of the meters installed,
- regular meter readings and
- cross checks with sales invoices.

Specification of measurement equipment, calibration
All the kWh meters shall be in line with TSE (Turkish Standard Institute) and IEC (International Electrotechnical Commission), Active Energy Meter, IEC-EN 60687. One meter is installed at point of fed in to the grid, where TEIAS operates and controls a second meter for cross checks. All measurements are conducted with calibrated measurement equipment according to relevant industrial standards. The meters selected are able to read in both directions as to ensure net power supplied to the grid and any power purchased from the grid can be documented separately. The selected meters are of 0.2S class accuracy and follows TSE (Turkish Standard Institute) and IEC (International Electro technical Commission) standard.

Data management and archiving
Bandırma Enerji archives all monthly. data collected. It is proposed to collect data electronically via an online system where at any time a reading from office is possible. Once a month, Bandırma Enerji undertakes a physical meter reading together with TEIAS representative. All meter readings are stored at Bandırma Enerji and TEIAS, archived electronically and will be kept at least for 2 years after the end of the last crediting period. There is a Data Communication System of TEIAŞ to reach instant data. Electronic files with all meter readings are backed up, and will be kept as along as collected data on TEIAS file server by TEIAS.

Quality assurance / quality control

Quality assurance for the plant operation in general is a main aspect covered in the contract with the VESTAS turbine supplier. The contract with VESTAS turbine supplier covers availability for two years as well as complete maintenance and service procedures for the first 5 years of operation. At the end of the two years Bandırma Enerji will decide how the wind turbine will be operated (by Vestas or another company or Bandırma Enerji).

The overall responsibility with the monitoring will remain with Bandırma Enerji.

Emergency measures, meters out of operation
Dedicated emergency procedures are not provided as there is no possibility to overstating emission reductions due to emergency cases. In case a meter should be broken the meter will be replaced as soon as possible. For the meter reading in such period data will be recorded only from the second meter. In case both meters will be broken at the same time, the amount of power fed into the grid will not be counted towards the emission reduction calculations.

Verification, and Frequency
Bandırma Enerji plans verification of emission reductions once a year according to calendar year cycle. For Verification a DOE will be contracted.

Development of regular VER Monitoring Reports
Regular monitoring reports will be prepared by Bandırma Enerji. Fichtner will possibly support Bandırma Enerji for the first monitoring year. For the rest of the monitoring years Bandırma Enerji will prepare Monitoring Reports as per UNFCCC CDM guidelines and use all documented input values. Any anomaly during a monitoring period (calendar year is proposed) will also be documented and the way of handling described in relation to the emission reduction calculation described in a transparent manner. Bandırma Enerji will also take care of corrections to be made on the Monitoring Report if deemed necessary during the Verification/VER issuance process.

Training
Bandırma Enerji has received trainings about SCADA system and data system management from VESTAS after the commissioning of turbines.

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

The baseline study and monitoring plan was completed on 17/02/2011 Fichtner GmBH & Co. KG. For details, please refer to Annex I.

Name of entity determining the baseline: Ece Akarca
E-mail: ece.akarca@fichtner.com.tr
Tel: +90 212 2171767

Fichtner GmBH & Co. KG is not a project participant.

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:

The start date of the project activity was **15/04/2008**. On that date the supply and installation agreement between Borasco Enerji and Vestas for 45 MW wind turbines was signed. This represents a real action towards project implementation.

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

The expected lifetime of the Bandırma Wind Power Plant project is 25 years, 0 months.

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

A renewable crediting period has been selected for the project.

C.2.1. Renewable crediting period:

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

The first crediting period starts with the commissioning date of the wind power plant which is 18/09/ 2009. (Partial commissioning of 24 MW)

C.2.1.2. Length of the first crediting period:

First crediting period will be valid for 7 years, 0 months. Crediting period will be renewed 2x7 years.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Environmental impacts

According to the Environmental Law and Environmental Impact Assessment Regulation, a Project Presentation File was submitted to the Bandırma Provincal Directorate of Environment and Forestry (PDoEF). Upon examining this PPF, the PDoEF issued an "EIA Not Required" certificate for the Project on April 3, 2009. An official translation of this certificate can be made available to the Validator and Gold Standard during Validation stage of the project.

For the purpose of negotiations with international investors, however, an International Environmental and Social Impact Assessment Report (ESIA) was also prepared for the project activity. The findings of the report can be summarised as follows.

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

The Turkish legislation and international standards have been considered through the preparation of the ESIA report. The ESIA report also meets the requirements of the IFC and the Equator Principles. It has also been developed in such a way as to ensure adherence to the EU Environmental Acquis, notably the EIA European Directive 85/337/EC, as amended by Directives 97/11/EC and 2003/35/EC and the Habitats Directive 92/43/EEC as well as Natural 2000 sites.

According to the ESIA report no significant environmental impacts of the project have been identified. The impacts are inherently positive as the project will generate energy from a renewable resource.

Only a limited number of environmental and social impacts result, which can be either avoided or mitigated by adhering to generally recognized performance standards, guidelines or design criteria.

During the construction phase of the wind farm the following impacts are expected and mitigation measures are proposed according to the ESIA:

Table 17: Environmental impacts and mitigation measures during construction phase

Impact	Mitigation measure
Dust and exhaust gas emissions may occur due to on-site traffic on non-paved roads and transportations of construction materials.	Speed limits for the vehicles and watering the work site under dry and windy weather conditions.
Waste water	Domestic waste water produced by construction personnel will be collected in a watertight septic tank and removed via vacuum truck.
Tree cuts at sites where turbines will be located	For every tree that had been cut Bandırma Enerji paid certain amount of fee for new tree plantings[16]
Increased noise emissions. However, noise levels are not exceeding the limit values of Turkey.	The distance from the nearest residential area to the wind power plant is 2.5 km. The cumulative noise impact of construction activities on the residential areas do not exceed limit values. However, silencer equipment will be implemented to the machinery and permission is necessary in case of work is planned to be done outside of the working hours from 7 a.m. to 7 p.m.
Worker's health and safety risks	Bandırma Enerji enforces its internal HSE procedure to its contractors and will implement safety protocols by project owner. The HSE representative will make regular audits on the site. In addition, the construction staff will be trained and personal protective equipments will be used when necessary.

Table 18: Environmental impacts and mitigation measures during operation phase

Impact	Mitigation measure
Increased noise emissions at project site. However, additional noise emissions are not impacting the noise level at nearest residential area and thus are not exceeding valid upper bound values for such areas.	Periodic maintenance will be carried out, silencer equipment will be implemented to the machinery and the gearboxes will be insulated.
Hazardous waste produced such as lubricant oil	Produced hazardous waste is collected and disposed by a licensed company.

A Social Impact Study was completed in January 2009. This study was also conducted on a voluntary basis as there is no legal requirement for conducting such study. Generally, it was found that the inhabitants in the project area are aware of the strategic importance of wind energy at national and provincial level as well as their environmental friendly characteristics. It is understood that the project will create employment opportunities during both, its construction and operation phases. In addition, it enables the transfer of knowledge as the turbine supplier will train site employees in the installation,

[16] Borasco Enerji Forestry Permission Letter dated August 8, 2008.

operation and maintenance of the wind turbines. However, the first consultations held with villagers in January 2009 show that there were some concerns regarding the wind park. Further information on stakeholder consultation is provided in Section E.

According to the Gold Standard requirements the Sustainable Development Assessment Matrix was developed for this project activity. The indicators of the matrix were assessed and scored on environmental, social, technological and economical issues taking into consideration the findings from the voluntarily prepared ESIA including its attachments such as Flora and Fauna Study, the Socio-Economic Impact Assessment Study, Emission Measurements, Personnel Dust Exposure Measurements, Acoustical Noise Measurements and Modelling, Soil and Water samples Analysis. No negative indicators were identified.

All indicators will be monitored which are scored non-neutral in the SD matrix. An appropriate monitoring plan has been included in the Gold Standard Passport.

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:

>> Not applicable

SECTION E. Stakeholders' comments

At the time Borasco was project owner (before May 2008) and when preliminary feasibility study was done no stakeholder consultation took place as would meet the Gold Standard requirements. The first kind of stakeholder participation was conducted as part of the Social Impact Assessment in January 2009. The villages Erikli, Cakilköy and Sahil Yenice, which are supposed to be affected by the construction and infrastructure works of the wind farm were visited.[17]

The Social Impact Assessment started with a visit of the site and the villages Erili, Cakilköy and Sahil Yenice from 20th to 23th of January 2009, whereas the village Cakilköy was visited on 20th of January, Erikli on the 21th of January and Sahil Yenice on the 22th of January.

The meetings where organised by the socio-economic expert Sibel Okdemir with the help of the elected village leaders (Muhtars) and teachers of the villages. The project owner was not involved in the organisation of the meeting and did not attend the meetings.

Before visiting the survey area, guidelines for discussions were prepared in accordance with the information that needed to be gathered. Focus group meetings with women were mainly held in their homes but in Erikli they were invited to the school of the village. Male groups were contacted in the common village café house and were held spontaneously and discussions were carried out with the available people rather than selected or invited ones. In all villages Muhtars were interviewed in order to gather detailed information about the social life and economy of the villages. In other villages in addition to the Muhtar, members of the village council were also interviewed. In context of these meetings the public was informed about the construction of the wind park nearby.

An attendance list of some of the focus group meetings will be available to the DOE during the validation upon request.

[17] Final Draft Version of Social Impact Assessment Report for villages of Sahil Yenice, Cakirlar and Erikli (January 2009)

The consultation of the local communities as part of conducting the Social Impact Assessment showed that the project is generally accepted among the villages. However, there are certain concerns and misconceptions about the impacts of the wind farm. This includes issues such as noise and air pollution, potential radiation, wood cuttings, decreasing precipitation and harm to fruit plants. Furthermore doubts were voiced that damaged village roads caused by trucks would really be repaired by the project owner at the end of project implementation.

The Social Impact Assessment Report concluded that these concerns and misconceptions result from the lack of information about the project. Partly, the start of construction works surprised villagers as they were not informed in advance. A public consultation process undertaken before implementing the project would have had lead to better acceptance by the local communities.

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

As a result of the Pre-Feasibility Assessment of Gold Standard, GS required to conduct a Stakeholder Feedback Round organized as a live meeting accompanied by a site visit. Therefore, Stakeholder Feedback Round meeting of the project was held on December 6, 2010 in the Bandırma Wind Power Plant project site, in Bandirma, Balikesir. Stakeholders were invited through invitation letters sent by mail, e-mail, hung invitation posters, newspaper announcements and thorough face to face meetings.

The meeting was held between 14:00 and 16:00 including a site visit and a presentation. According to the participant list signed in the beginning of the meeting, 41 people attended the meeting. The attendance was mainly from the neighbourhood villages. Two rounds of meeting were conducted because of the number of the attendees. Half of the participants made a site visit with the employees of Bandırma Enerji whereas the rest attended the presentation made by Fichtner. A second round site visit and presentation was held afterwards.

The necessary Health and Safety instructions have been given to the participants by Bandırma Enerji before the visit to the site. Personal protective equipments (PPE) have been provided and the attendees are trained about how to use the PPEs. The site visit included an introduction about wind energy scheme near one of the turbines and continued with a visit to the switchyard. The presentation included an introduction about global warming and climate change, wind energy, general information about Bandırma WPP and a discussion over the project's environmental and social aspects.

The Stakeholder Feedback Round Meeting is described in detail in the Stakeholder Feedback Round Report.

E.2. Summary of the comments received:

The comments from the stakeholder were positive in general. Questions and comments raised during the meeting are included together with the Stakeholder Feedback Round Report during validation.

In brief, the main concern was related to the fertileness of the fruit trees of the villagers. Other main issue was the carcinogenic effect of wind turbines. The concerns were covered during the meeting. There have not been raised any critical comments nor objections for the project implementation.

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

Bandırma Enerji has taken into account all comments and in general replied positively to the concerns and comments by the participants rose during the meeting. However, SFR consists of a period of at least 60 days before validation is completed in which all stakeholders are able to provide input.

A live meeting has been held on December 6, 2010. During the meeting the participants were informed about the feedback period.

The project documents PDD, Gold Standard Passport, Gold Standard Local Stakeholder Consultation Report (both in Turkish and English) and Environmental and Social Impact Assessment Study are published on Fichtner's web site since 24.12.2010 . (http://www.fichtner.com.tr/2664.htm)

The documents are also available on Gold Standard Registry since 27.12.2010.
Besides, SFR period for the villages has been started by delivering Turkish Local Stakeholder Consultation Report. Start date of the SFR is 30.12.2010 for Sahil Yenice, Emre, Çakıl, Erikli Villages and 04.02.2011 for Dedeoba village.

The documents were open for comments at least two months beginning from their start of SFR dates.
The SFR has been ended on 04.04.2011 and no comments have been received by the stakeholders.
Results of the stakeholder consultation reflect that there is no opposing view about the project.
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Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project will not receive any public funding through ODA. The same is officially stated by the project proponent through a separate duly signed statement.

Annex 3

BASELINE INFORMATION

Please refer to Section B.6 of the PDD

Table 19 Heating Values Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities (Tcal)

Fuel Type	2007	2008	2009
Hard Coal+Imported Coal+Asphaltite	32.115	33.310	35.130
Lignite	100.320	108.227	97.652
Fuel Oil	21.434	20.607	15.160
Diesel Oil	517	1.328	1.830
Lpg	0	0	1
Naphta	118	113	84
Natural Gas	179.634	189.057	186.266

Table 20 Default Co2 Emission Factors For Combustion, IPCC

Fuel type	Effective CO_2 Emission Factor (kton/TJ)*
Coal	92,80
Lignite	90,90
Fuel Oil	75,50
Diesel Oil	72,60
Lpg	61,60
Naphta	69,30
Natural Gas	54,30

Table 21 Sample Group for Build Margin Calculation

Name of Power Plant	Capacity (MW)	Average Generation (GWh)	Fuel Type	Date of Operation
AKGIDA PAMUKOVA	7,5	61	NG	2009
AKÇAY HES ELEKTRİK ÜR. (AKÇAY HES)	28,8	95	HYDRO	2009
AKSA ENERJİ (Antalya)	600	4620	NG	2009
AKSA ENERJİ (Manisa)	62,9	498	NG	2009
AKSA AKRİLİK KİMYA (YALOVA)	70	539	NG	2009
AKUA KAYALIK	5,8	39	HYDRO	2009
ALKİM (ALKALİ KİMYA) (Konya)	0,4	3	LIGNITE	2009
ANADOLU ÇAKIRLAR	16,2	60	HYDRO	2009
ANTALYA ENERJİ (İlave)	41,8	302,1	NG	2009
ARENKO DENİZLİ	12	84	NG	2009

CEYKAR BAĞIŞLI	29,6	99	HYDRO	2009
BEREKET (KOYULHİSAR)	42	329	HYDRO	2009
BEYOBASI (SIRMA)	5,9	23	HYDRO	2009
BİL ENERJİ (Ankara)	36,6	255	NG	2009
CAM İŞ ELEKTRİK (Mersin) (İlave)	126,1	1008	NG	2009
CARGİLL TARIM	0,1	0,7	BIOGAS	2009
CİNDERE DENİZLİ	19,1	58	HYDRO	2009
ÇELİKLER RIXOS ANKARA	2	16	NG	2009
DALSAN ALÇI	1,2	9	NG	2009
DEĞİRMENÜSTÜ EN. (KAHRAMANMARAŞ)	1,2	3,3	HYDRO	2009
DELTA ENERJİ	60	467	NG	2009
DENİZLİ EGE 1	0,9	4	HYDRO	2009
DESA ENERJİ	9,8	70	NG	2009
ESKİŞEHİR ENDÜSTRİ ENERJİ(OSB)	59	452	NG	2009
EGE BİRLEŞİK ENERJİ	12,8	107	NG	2009
ELESTAŞ YAYLABEL	5,1	20	HYDRO	2009
ELESTAŞ YAZI	1,1	6	HYDRO	2009
ERDEMİR(Ereğli-Zonguldak)	39,2	236,7	NG	2009
ERVA KABACA HES	8,5	33	HYDRO	2009
FALEZ ELEKTRİK	11,7	88	NG	2009
GLOBAL ENERJİ (PELİTLİK)	8,6	65,7	NG	2009
GÜL ENERJİ	24,3	170	NG	2009
GÜRMAT EN.	47,4	313	GEOTH	2009
HABAŞ (Aliağa)	224,5	1796	NG	2009
HABAŞ (Bilecik)	18	144	FUEL	2009
HABAŞ (İzmir)	36	288	FUEL	2009
HAYAT KAĞIT SAN.	7,5	56	NG	2009
İÇDAŞ ÇELİK (İlave)	270	1923,3	COAL	2009
KALEN ENERJİ (KALEN I - II HES)	15,7	52,2	HYDRO	2009
KAREL (PAMUKOVA)	9,3	55	HYDRO	2009
KAYEN KALETEPE HES	10,2	37	HYDRO	2009
KASAR DUAL TEKSTİL ÇORLU	5,7	38	NG	2009
KEN KİPAŞ KAREN ELEKTRİK	41,8	180	NG	2009
KISIK	9,6	26	HYDRO	2009

TGT EN. LAMAS III-IV	35,7	150	HYDRO	2009
MAKSİ ENERJİ	7,7	55	NG	2009
MARMARA PAMUKLU MENS. SN.TİC.A.Ş.	34,9	271,5	NG	2009
MAURİ MAYA	2,3	19	NG	2009
MODERN ENERJİ	96,8	680	NG	2009
MANİSA O.S.B.	84,8	434	NG	2009
NUH ÇİMENTO SAN. TİC. A.Ş.(Nuh Çim.) (İlave)	47	329	NG	2009
OBRUK I-II	212,4	473	HYDRO	2009
ÖZGÜR ELEKTR.AZMAK II	24,4	91	HYDRO	2009
ÖZTAY GÜNAYŞE	8,3	29	HYDRO	2009
ÖZYAKUT GÜNEŞLİ HES	1,8	8	HYDRO	2009
ALİAĞA PETKİM	222	1554	FUEL	2009
RASA ENERJİ VAN	78,6	500	NG	2009
TURKON MNG REŞADİYE III	22,3	175	HYDRO	2009
SARITEPE HES DİNAMİK	4,9	20	HYDRO	2009
SELKASAN	9,9	73	NG	2009
SİLOPİ ASFALTİT	135	945	COAL	2009
SİLOPİ ELEKT.ÜRETİM ESENBOĞA	44,8	315	FUEL	2009
SÖNMEZ ELEKTRİK(Uşak) (İlave)	8,7	67,1	NG	2009
ŞAHİNLER ENERJİ(ÇORLU/TEKİRDAĞ)	26	185	NG	2009
ŞİRİKÇİOĞLU KOZAK	4,4	15	HYDRO	2009
TAŞOVA YENİDEREKÖY	2	10	HYDRO	2009
TAV İSTANBUL	9,8	82	NG	2009
TEKTUĞ-ERKENEK	12,5	50	HYDRO	2009
TESKO KİPA İZMİR	2,3	18	NG	2009
TİRE-KUTSAN (Tire)	8	37	FUEL	2009
YURT EN. TOCAK I	4,8	13	HYDRO	2009
TÜM EN. PINAR	30,1	138	HYDRO	2009
TÜPRAŞ ALİAĞA	24,7	170	NG	2009
UZUNÇAYIR	27,3	105	HYDRO	2009
ÜTOPYA ELEKTRİK	15	46	HYDRO	2009
YAPISAN KARICA DARICA	97	328	HYDRO	2009
YEŞİLBAŞ	14	56	HYDRO	2009

YPM GÖLOVA	1,1	3	HYDRO	2009
YPM SEVİNDİK	5,7	36	HYDRO	2009
YURTBAY (Eskişehir)	6,9	50	NG	2009
ZORLU ENERJİ (B.Karıştıran) (İlave)	49,5	395	NG	2009
MB ŞEKER NİŞASTA SAN. A.Ş. (Sultanhanı)	8,8	60	NG	2008
AKSA ENERJİ (Antalya)	183,8	1290	NG	2008
AKSA ENERJİ (Manisa)	52,38	370	NG	2008
ANTALYA ENERJİ (İlave)	17,46	122,3	NG	2008
ATAÇ İNŞAAT SAN. A.S.B.(ANTALYA)	5,4	37	NG	2008
BAHÇIVAN GIDA (LÜLEBURGAZ)	1,165	8	NG	2008
CAN ENERJİ (Çorlu-TEKİRDAĞ) (İlave)	52,38	402,9	NG	2008
FOUR SEASONS OTEL (ATİK PASHA TUR.A.Ş)	1,165	7	NG	2008
FRİTOLAY GIDA SAN.VE TİC.AŞ.(İlave)	0,06	4	NG	2008
KARKEY(SİLOPİ-5) (154 kV) (İlave)	14,78	103,2	FUEL OIL	2008
MELİKE TEKSTİL (GAZİANTEP)	1,584	11	NG	2008
MİSİS APRE TEKSTİL BOYA EN. SAN.	2	14	NG	2008
MODERN ENERJİ (LÜLEBURGAZ)	13,4	94,1	NG	2008
POLAT TURZ. (POLAT RENAISSANCE İST.OT.)	1,6	11	NG	2008
SARAYKÖY JEOTERMAL (Denizli)	6,85	50	GEOTHERMAL	2008
SÖNMEZ Elektrik (İlave)	8,73	67,3	NG	2008
AKKÖY ENERJİ (AKKÖY I HES)	101,94	408	HYDRO	2008
ALP ELEKTRİK (TINAZTEPE) ANTALYA	7,689	29	HYDRO	2008
CANSU ELEKTRİK (Murgul/ARTVİN)	9,18	47	HYDRO	2008
DAREN HES ELKT. (SEYRANTEPE BARAJI VE HES)	49,7	182	HYDRO	2008
DEĞİRMENÜSTÜ EN. (KAHRAMANMARAŞ)	25,7	69	HYDRO	2008
GÖZEDE HES (TEMSA ELEKTRİK) BURSA	2,4	10	HYDRO	2008
H.G.M. ENERJİ (KEKLİCEK HES) (Yeşilyurt)	8,674	18	HYDRO	2008
HAMZALI HES (TURKON MNG ELEKTRİK)	16,7	117	HYDRO	2008
HİDRO KNT.(YUKARI MANAHOZ REG.VE HES)	22,4	79	HYDRO	2008
İÇ-EN ELK.(ÇALKIŞLA REGÜLATÖRÜ VE HES)	7,66	18	HYDRO	2008
KALEN ENERJİ (KALEN II REGÜLAT. VE HES)	15,65	50	HYDRO	2008
MARAŞ ENERJİ (FIRNIS REGÜLATÖRÜ VE HES)	7,22	36	HYD	2008

			RO	
SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ)	21,04	96	HYDRO	2008
SARMAŞIK II HES (FETAŞ FETHİYE ENERJİ)	21,58	108	HYDRO	2008
TORUL	105,6	322	HYDRO	2008
YEŞİL ENERJİ ELEKTRİK (TAYFUN HES)	0,82	5	HYDRO	2008
HABAŞ (Aliağa-ilave)	9,1	35,3	NG	2007
MODERN ENERJİ	5,2	38	NG	2007
ARENKO	0,7	7,3	NG	2007
ALTINMARKA GIDA	0,1	0,8	NG	2007
TEKBOY ENERJİ	0,1	0,7	NG	2007
VELSAN AKRİLİK	0,1		NG	2007
Acıbadem Sağlık Hiz.ve Tic.A.ġ(Kadıköy Hast.)	0,5	4	NG	2007
Acıbadem Sağlık Hiz.ve Tic.A.Ş(Kozyatağı Hast.)(İstanbul/Kadıköy)	0,6	5	NG	2007
Acıbadem Sağlık Hiz.ve Tic.A.Ş(Nilüfer/BURSA)	1,3	11	NG	2007
AKATEKS Tekstil Sanayi ve Ticaret A.Ş.	1,8	14	NG	2007
FLOKSER TEKSTİL SAN.AŞ.(Çatalça/istanbul)(Poliser Tesisi)	2,1	17	NG	2007
FLOKSER TEKSTİL SAN.AŞ.(Çatalça/istanbul)(Süetser Tesisi)	2,1	17	NG	2007
FRİTOLAY GIDA SAN.VE TİC. AŞ.	0,5	4	NG	2007
KIVANÇ TEKSTİL SAN.ve TİC.A.Ş.	3,9	33	NG	2007
KİL-SAN KİL SAN.VE TİC. A.Ş	3,2	25	NG	2007
SÜPERBOY BOYA SAN.ve Tic.Ltd.Şti.(Büyükçekmece/İstanbul)	1	8	NG	2007
SWİSS OTEL(Anadolu Japan Turizm A.Ş (İstanbul)	1,6	11	NG	2007
TAV Esenboğa Yatırım Yapım ve İşetme AŞ./ANKARA	3,9	33	NG	2007
NUH ENERJİ-2(Nuh Çim.)	73	514	NG	2007
AKTEKS	0,8	5,4	FUEL OIL	2007
UŞAK ŞEKER (NURİ ŞEKER)	1,7	5,3	FUEL OIL	2007
BOĞAZLIYAN ŞEKER	16,4		LPG+NG	2007
KARTONSAN	5	40	LPG+NG	2007
ESKİŞEHİR END.ENERJİ	3,5	26,8	LPG+NG	2007
ESKİŞEHİR ŞEKER (KAZIM TAŞKENT)	2,9		LPG+NG	2007
İGSAŞ	2,2	15,2	LPG+NG	2007
DESA	0,7	4,6	NAPHTA	2007
DENTAŞ	0,3	2,3	NAP	2007

			HTA	
SÜPER FİLMCİLİK	0,1	0,8	FUEL OIL	2007
ATAER ENERJİ	0,1	0,6	NAP HTA	2007
BİL ENERJİ	0,1	0,7	NG	2007
BİS Enerji Üretim AŞ.(Bursa)(İlave)	43	354,8	NG	2007
Aliağa Çakmaktepe Enerji A.Ş.(Aliağa/İZMİR)	34,8	278	NG	2007
BİS Enerji Üretim AŞ.(Bursa)(İlave)	48	396,1	NG	2007
BOSEN ENERJİ ELEKTRİK AŞ.	142,8	1071	NG	2007
SAYENERJİ ELEKTRİK ÜRETİM AŞ. (Kayseri/OSB)	5,9	47	NG	2007
T ENERJİ ÜRETİM AŞ.(İSTANBUL)	1,6	13	NG	2007
ZORLU EN.Kayseri (İlave 1 GT)	7,2	59	NG	2007
SİİRT	25,6	190	FUEL OIL	2007
Mardin Kızıltepe	34,1	250	FUEL OIL	2007
KAREN	24,3	180	FUEL OIL	2007
İDİL 2 (PS3 A- 2)	24,4	180	FUEL OIL	2007
BORÇKA HES	300,6	1039	HYD RO	2007
TEKTUĞ(Keban Deresi)	5	32	HYD RO	2007
YPM Ener.Yat.AŞ.(Altıntepe Hidro.)(Sivas/Suşehir)	4	18	HYD RO	2007
YPM Ener.Yat.AŞ.(Beypınar Hidro.)(Sivas/Suşehir)	3,6	18	HYD RO	2007
YPM Ener.Yat.AŞ.(Konak Hidro.)(Sivas/Suşehir)	4	19	HYD RO	2007
KURTEKS Tekstil A.Ş./Kahramanmaraş(KARASU HES-Andırın)	2,4	19	HYD RO	2007
İSKUR TEKSTİL (SÜLEYMANLI HES)	4,6	18	HYD RO	2007
ÖZGÜR ELK.AŞ.(K.MARAŞ)(Tahta)	12,6	54	HYD RO	2007
BURGAZ (Lüleburgaz) GR I	6,91	54	NG	23.12.2006
AKMAYA (Lüleburgaz) GR I	6,91	50	NG	23.12.2006
ERTÜRK ELEKTRİK Tepe RES GR I	0,85	2	WIND	22.12.2006
BEREKET EN.(Mentaş Reg) GR III	13,3	54,4	HYD RO	13.12.2006
ÇIRAĞAN SARAYI GR I	1,324	11	NG	01.12.2006
ERE(AKSU REG.ve ŞAHMALLAR HES) GR I-II	14	26,7	HYD RO	16.11.2006
ELBİSTAN B GR IV	360	2340,0	LIGNITE	13.11.2006

ENTEK (Köseköy) GR V	37	370,6	NG	03.11.2006
ÇERKEZKÖY ENERJİ GR I	49,164	390	NG	06.10.2006
YILDIZ ENT. AĞAÇ (Kocaeli) GR I	6,184	40	NG	21.09.2006
ELBİSTAN B GR II	360	2340,1	LIGNITE	17.09.2006
CAM İŞ ELEKTRİK (Mersin) GR I	126,1	1008	NG	13.09.2006
ERE(Sugözü rg. Kızıldüz hes) GR I - II	15,432	31,6	HYDRO	08.09.2006
EKİN (Başaran Hes) (Nazilli)	0,6	4,5	HYDRO	11.08.2006
EROĞLU GİYİM (Çorlu) GR I	1,165	9	NG	01.08.2006
EKOLOJİK EN. (Kemerburgaz) GR I	0,98	6	BIOGAS	31.07.2006
BEREKET EN.(Mentaş Reg) GR I - II	26,6	108,7	HYDRO	31.07.2006
HAYAT TEM. VE SAĞLIK GR I - II	15,04	108	NG	30.06.2006
TOTAL	**6179**	**38971,7**		

Annex 4

MONITORING INFORMATION

Please refer to Section B.7.2 of the PDD

Annex 5

TRANSLATIONS OF THE ELECTRICITY GENERATION LICENSE AND "EIA NOT REQUIRED" CERTIFICATE

REPUBLIC OF TURKEY

ENERGY MARKET REGULATORY AUTHORITY

GENERATION LICENSE

License No : **EÜ/1447-8/1049**

Date : **31/12/2007**

This license has been granted to Borasco Enerji ve Kimya Sanayi Ticaret Anonim Şirketi in accordance with the decision of Energy Market Regulatory Authority No: 1447-8 dated 31/12/2007 to carry out power generation activities for 45 years starting as of 31/12/2007 in Bandırma District of Balıkesir Province within the scope of Bandırma WPP Project utilizing wind energy.

Yusuf TÜLEK

Deputy Manager

SPECIAL PROVISIONS

1- Information about the generation facility

This License has been granted to the generation plant owned by Borasco Enerji ve Kimya Sanayi Ticaret Anonim Şirketi:

Province	:Balıkesir
District	:Bandırma
Notification address	: Mirgün Mahallesi, Eski Büyükdere Caddesi No:47 Med Marine Plaza Kat:1 Maslak, Şişli- İstanbul
Plant type	:Renewable
Energy resource	:Wind
Number of units	:20 units
Installed capacity per unit	:3,000 kW
Total installed capacity	:60 MW
Estimated annual power generation	:238,000,000 kWh/s
Connection point to the grid and tension levels	:Akçalar Substation, 154 kV bars
Plant completion period	:45 MW at operation, 24 months for additional 15 MW
Plant completion date	: 08/04/2012

2- Validity of the license

This license is valid as of 31/12/2007 and rights and liabilities of the licence owner in the scope of this License becomes effective as of the validity date.

3- License duration

This license is valid for 45 years as of the start of validity date.

4- Real and legal persons within the legal entity who are directly or indirectly entitled to shares above ten percent.

Direct shareholders	Percentage of shares (%)
-Borusan Enerji Yatırımları ve Üretim A.Ş.	99,97

Indirect shareholders	Percentage of shares (%)
-Borusan Holding A.Ş.	48,99
-Yeni Nesil Yönetim ve Danışmanlık A.Ş.	14,7
-EnBW Holding A.Ş.	49,99
-EnBW Energie Baden Württemberg AG	49,98
-Electricite de France International (EDFI)	22,5
-OEW Energie Beteiligungs GmBH	22,5
-Electriticite de France (EDF)	22,5
-State of France	19,04
-Asım Kocabıyık (including spouse and children)	46,66

5- Map section name/s and unit coordinates of the plant

1/25,000 map section name: Bandırma -H20-a3 and Bandırma -H20-a4
Unit Coordinates

RoT

GOVERNORSHIP OF BALIKESIR

PROVINCIAL DIRECTORATE OF ENVIRONMENT AND FORESTRY

Decision Date: 03/04/2009

Decision No: 103

"ENVIRONMENTAL IMPACT ASSESSMENT CERTIFICATE"

The "Wind Power Project" is analyzed and evaluated according to the Annex-II of the Environmental Impact Assessment Regulation dated July 17th, 2008, Official Gazette numbered 26939. The environmental measures defined in the Project Presentation File is found sufficient accordingly. Therefore, it is ascertained that it is not necessary to prepare an EIA report, so aforesaid project is awarded with an "EIA not required decision" in this respect.

Sebahattin KAPUCU

On behalf of the governor

Assistant Governor

Project Owner: BORASCO Enerji ve Kimya San. Tic. A.Ş.

Project Location: Bandırma District, Çakıl village region, map sections H.20.a3-a4