Project design document form

(Version 10. 1)

BASIC INFORMATION	
Title of the project activity	AY-YILDIZ 15 MW WPP
Scale of the project activity	☒Large-scale ☐Small-scale
Version number of the PDD	12
Completion date of the PDD	30/05/2018
Project participant(s)	Akenerji Elektrik Uretimi A.Ş. (Project Owner, Private Entity) GTE Carbon (Project Developer, Private Entity)
Host Party	TURKEY
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	ACM0002 - "Grid connected electricity generation from renewable sources" - Version 17.0
Sectoral scope(s) linked to the applied methodology(ies)	Sectoral Scope 1 "Energy Industry – Renewable Sources"
Estimated amount of annual average GHG emission reductions	56,176 tonnes of CO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The AY-YILDIZ Wind Power Project is located within the boundaries of Bandırma District of Balıkesir province of Turkey. Project has been commissioned in 01/09/2009 with 5 turbines, each having 3 MWe capacity and 15MWe total installed capacity. In 20/01/2017, request for upgrading installed capacity to 28.2 MW has been approved by Ministry of Energy and Natural Resources (#EÜ/973-2/739) and extended part was commissioned in 27/01/2017. Thus, addition of four new turbine each having 3.3MW capacity has been approved and permission for increasing total installed capacity to 28.2MWe has been granted. Construction of the new turbines has started in 2016 and commissioning of new turbines has been approved in January 2017[1]

In final layout of the project, total number of turbine installed has been 9 turbines (5×3MWe+4×3.3MWe) with total installed capacity of 28.2 MWm/MWe. Total expected generation has increased from 51.32 GWh to 98.7 GWh after extension. With this extension, expected total emission reduction has increased from 30,997 tCO_2e to 56,176 tCO_2e.

Project areas has been rented from Bandırma Municipality for 30 years via the agreement dated 29/04/2016. The land is grassland owned by Municipality and total area of the land is 6,320,357.09 m^2, out of which around 100,830m^2 has been allocated to the project which corresponds to total boundary of the turbine. Actual land use will be limited to turbine basements and access roads for new turbines and thus remaining land will be accessible by locals for grazing activities.

Specific goals of the AY-YILDIZ Project include;

- Utilization of the wind potential of Turkey in order to meet increasing electricity demand and guarantee the energy security.
- Increase share of WPPs in electricity generation mix of Turkey and reduction of GHG emissions.
- Contribute to the national economic development by creating direct and indirect job opportunities during construction and operation phases.
- Reduce import dependency of fossil fuel dominated electricity sector and diversify generation mix through use of local resources.
- Enabling and promoting agricultural activity in the region through newly built irrigation channels and thus contributing to economic development both locally and nationwide.

In terms of sustainable development project not only contributes to emission reduction through use of renewable resources, but also creates new job opportunities and contributes to local economy through supply of equipment and needs from the region. This is also in compliance with the Government Policy and MDG goals of Turkey and contributes in reducing poverty and providing better conditions for local people. Assessment of project activities in terms of sustainable development has been carried out according to GS toolkit , details of which are given in GS Passport. In terms of environmental impact, project is considered to have positive impact on air quality due to avoided NOx, PM and SOx emissions whereas no negative impact on water quality other pollutants and biodiversity has been identified.

Table 1. Ayyildiz Project Milestones

Main milestones of the project is given in table below.

Milestone	Date

[1] Renewed Generation Licence, page 5

License Issuance	09/11/2006
Carbon Certification Agreement	10/06/2008
License Amendment	23/10/2008
Equipment Purchase Contract	05/11/2008
Start of Construction	01/03/2009
LSC Meeting	19/09/2008
Commissioning Date/Start of 1st Crediting Period	01/09/2009
Ministry approval for capacity extension	23/01/2017
License Issuance for capacity extension	20/01/2017
Commissioning of extension part	27/01/2017
End date of first crediting period	31/08/2016
Expected start date of 2nd crediting period	23/11/2017

A.2. Location of project activity

Ayyıldız Wind Power Plant Project is located at Ayyıldız Hill near the town of Bandırma in the province of Balıkesir. The project will consist of 9 turbines in total (with four new turbines addition to the capacity).

A.2.1. Host Party

Turkey

A.2.2. Region/State/Province etc.

Marmara Region, Balıkesir Province.

A.2.3. City/Town/Community etc.

Edincik town of Bandırma district.

A.2.4. Physical/Geographical location

The turbine coordinates are given in Table below.

Turbine No.	Turbine coordinates (UTM ED 50)	
	Easting	Northing
T1	574.923	4.467.686
T2	575.171	4.467.514
T3	575.482	4.468.079
T4	575.774	4.467.996
T5	576.023	4.467.825
T6	574655	4.467.279
T7	575542	4.468.554
T8	576049	4.468.376
T9	576361	4.468.359

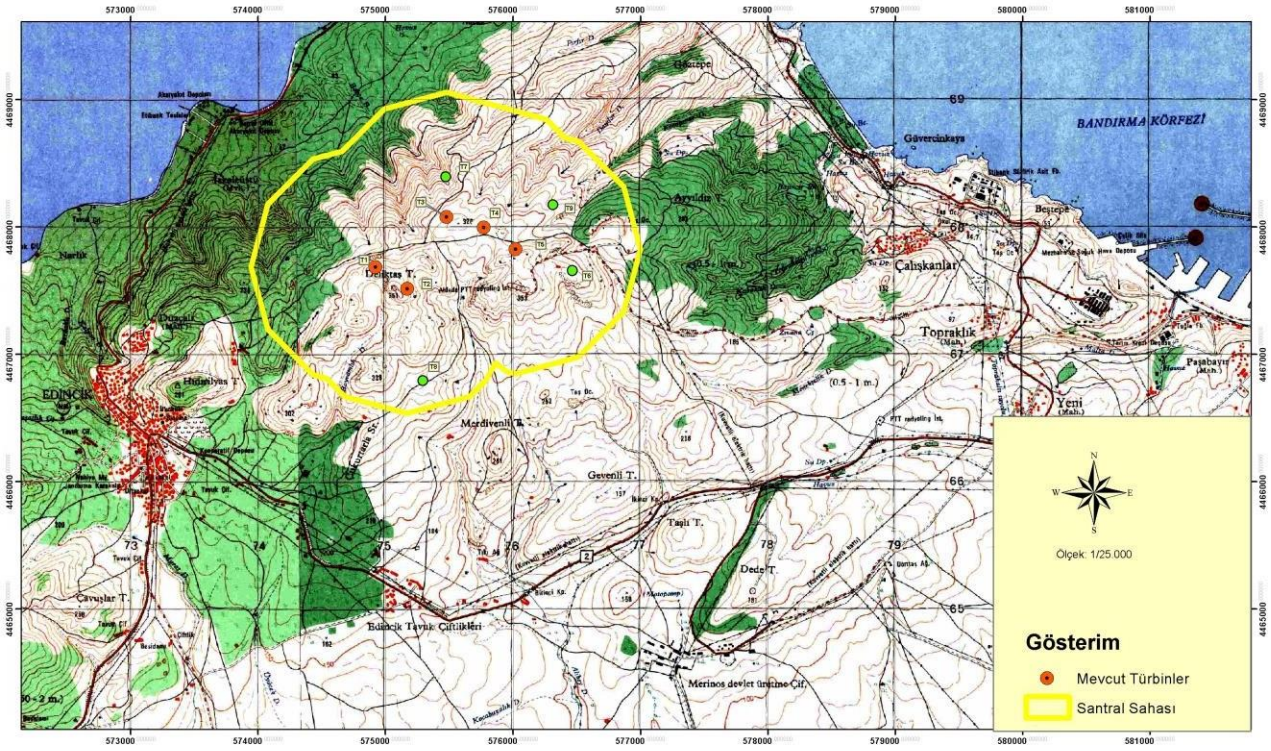


Figure 1. Existing turbines (red) and new turbines (green)

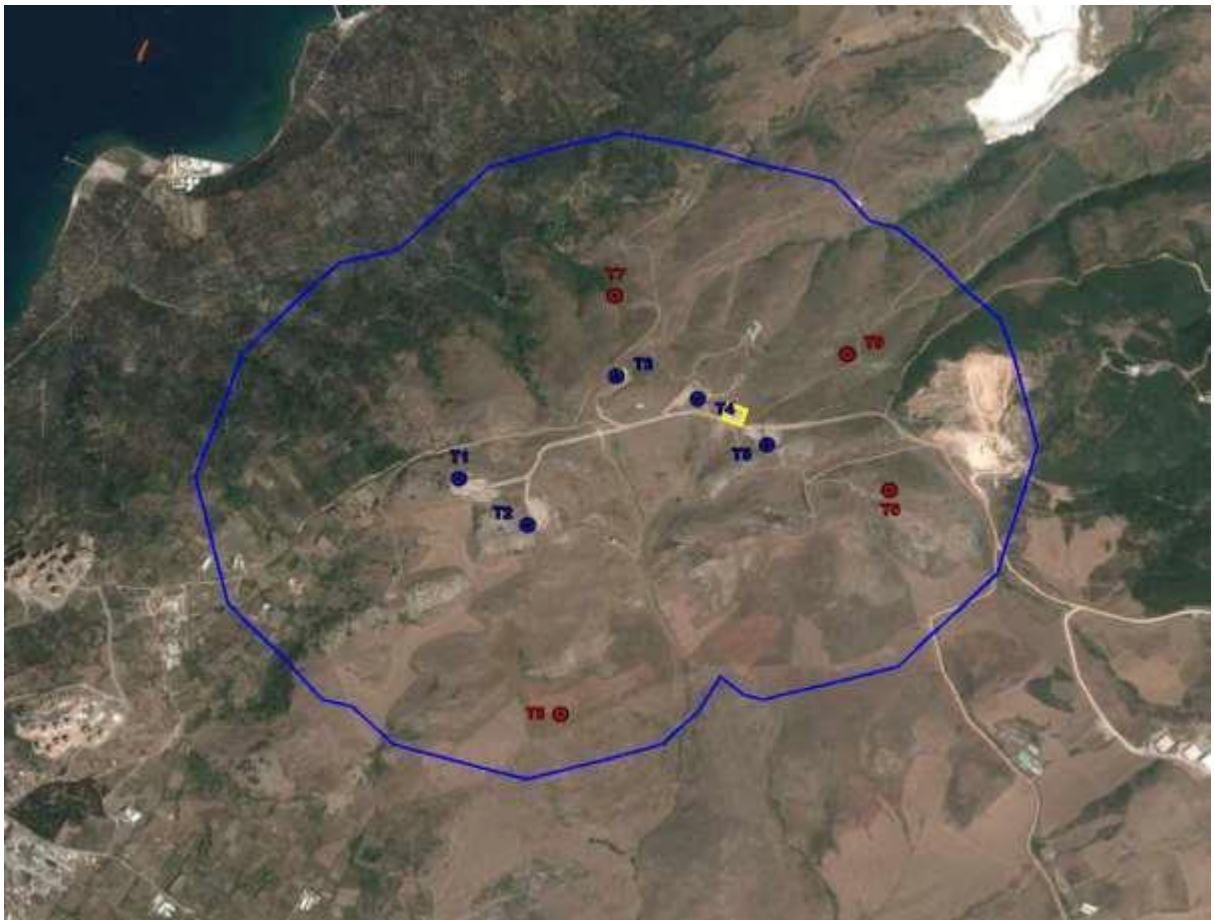


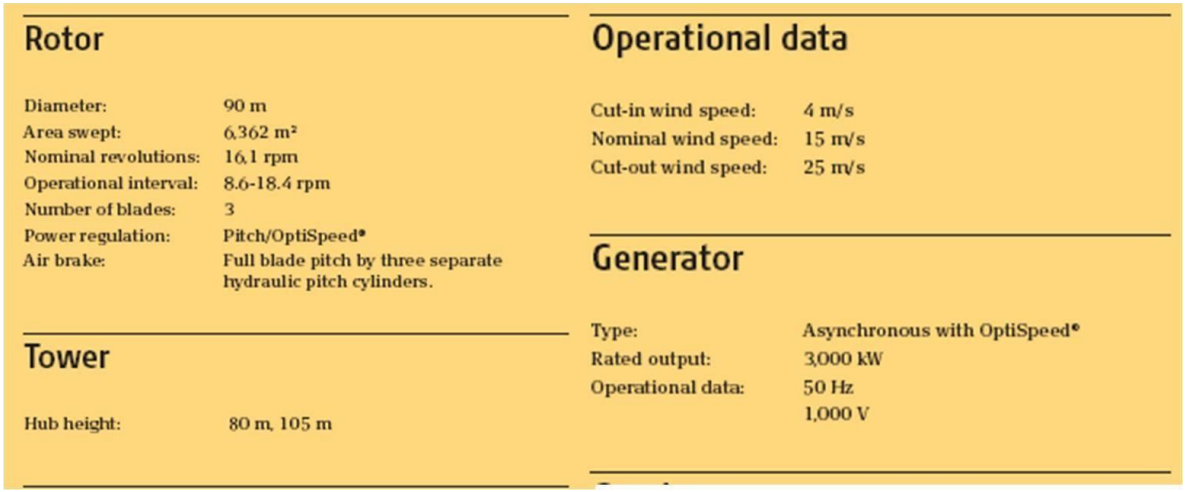
Figure 2. Satellite view for existing turbine locations (blue) and new turbines(red)

A.3. Technologies and/or measures

Wind Power Plants use wind energy converters (WEC), called wind turbines to convert the wind energy into electrical energy. These turbines usually have usable lifetime of 20-25 years.[2] The project uses 5 WEC's of 3 MW each, with 90 meters rotor diameter and 4 four turbines with 3.3MW each . The average net capacity factor is calculated as 38.48% as per the feasibility report (page 6-2) submitted to DOE and annual electricity generation from these turbines are estimated to be 98.7 GWh. This energy is converted to 34.5 kV at the site switchyard and connected to the national grid.

The technical data of Vestas V90/3000kW and V112–3.3 MW used at site are given below.

[2] http://www.amdee.org/FAQRetrieve.aspx?ID=51526



Rotor

Diameter:	90 m
Area swept:	6,362 m²
Nominal revolutions:	16,1 rpm
Operational interval:	8.6-18.4 rpm
Number of blades:	3
Power regulation:	Pitch/OptiSpeed®
Air brake:	Full blade pitch by three separate hydraulic pitch cylinders.

Tower

Hub height:	80 m, 105 m

Operational data

Cut-in wind speed:	4 m/s
Nominal wind speed:	15 m/s
Cut-out wind speed:	25 m/s

Generator

Type:	Asynchronous with OptiSpeed®
Rated output:	3,000 kW
Operational data:	50 Hz 1,000 V

Rotor	
Diameter	112 m
Swept Area	9852 m^2
Speed, Dynamic Operation Range	6.2-17.7
Rotational Direction	Clockwise (front view)
Orientation	Upwind
Tilt	6°
Blade Coning	4°
Number of Blades	3
Aerodynamic Brakes	Full feathering
Blades	
Type Description	Airfoil shells bonded to supporting beam
Blade Length	54.65 m
Material	Fibreglass reinforced epoxy, carbon fibres and Solid Metal Tip (SMT)
Blade Connection	Steel roots inserted

Figure 3. Technical data of turbines used in the first phase (Vestas V90) and second phase (Vestas V112).

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)

Turkey	AKENERJİ Elektrik Üretim A.Ş. (Project Owner, Private Entity)	No
	GTE Carbon (Project Developer, Private Entity)	

A.5. Public funding of project activity

N/A

A.6. History of the project activity

First crediting period of the project was between 01/09/2009-31/08/2016.

A.7. Debundling

N/A

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

The United Nations approved consolidated baseline methodology applicable to this project is ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources", Version -17[3].
ACM0002 refers to the following tools:

- "Tool for the demonstration and assessment of additionality", Version 7, [4]and
- ''Tool to calculate the emission factor for an electricity system'', Version 6[5].
- "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", Version 03.0.1[6]

B.2. Applicability of methodology and standardized baseline

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

- The 28.2 MWe AY-YILDIZ WPP; Project activity consists of grid connected renewable electricity generation,
- The Project does not involve switching from fossil fuel use to renewable energy at the site of the project activity; and
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

[3] http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_YOYKBRCBIK7TSPSB7MQT75SPX75PE8

[4] http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf

[5] http://cdm.unfccc.int/methodologies/Tools/EB35_repan12_Tool_grid_emission.pdf

[6] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

B.3. Project boundary

GHG gases included in the project boundary and used in calculation of emission reduction by the project activity are given in table below.

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Electricity generation in baseline (Turkey Grid)	CO_2	Yes	Main Emission Source
		CH_4	No	Minor emission source. Excluded for simplification
		N_2O	No	Minor emission source. Excluded for simplification
Project scenario	Emission from the reservoir of the proposed project is excluded as per the tool applied.	CO_2	No	Zero-emission electricity generation
		CH_4	No	Zero-emission electricity generation
		N_2O	No	Zero-emission electricity generation

Table 2. Main gases included in the project boundary

The project boundary is limited by the National Electricity Grid of Turkey. The Geographical and physical boundaries of the Turkish grid and location of the power plants are clear. Import data obtained from related the relevant government agencies have been included in the calculations of the combined margin emissions.

B.4. Establishment and description of baseline scenario

This project follows the methodology described in the ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version17. Selected methodology has been applied together with the "tool to calculate the emission factor for an electricity system, version6" and "tool for assessment and demonstration of additionality, version7". Since this is the second crediting period,assessment of validity of the baseline scenario in first crediting period has been carried out as per the methodological tool referred above. Steps for implementation of the tool are given below;

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

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

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

Since the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period, Step 1.2 is applied.

Step 1.2: Assess the impact of circumstances

The most recent data at time of previous validation was for year 2007 whereas the latest data available at time of renewal is for the year 2015. During the 8 year period, electricity generation

has increased from 191,558. GWh to 261,788.3 GWh, which means around 37% increase.[7] . In terms of market characteristics, due to increase in USD/TL rate and low electricity prices in free market, nearly all renewable energy investors have preferred to benefit from feed-in-tariff which is 7.3 USD cents/kWh for wind projects. Also, the regulation on local and import coal power plants, natural gas vs electricity price and policies on electricity price regulations has caused changes in conditions with respect to initial validation period. Incentives on local coal power plants and taxes on import coal has shifted balance towards local coal power generation.

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

Not applied as per the tool

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

Due to changing conditions in electricity market and significant change in generation and installed capacity in Turkey, baselinehas been updated. Most recent values have been used in updating the baseline calculations.

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

Step 2.1: Update the current baseline

Baseline emissions have been updated, based on the latest approved version of the methodology applicable to the project activity.

Step 2.2: Update the data and parameters

Since the data used at first crediting period are not valid anymore, new data has been used based on the most recent figures available.

The baseline scenario has been identified as "*Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system v.6"*

Since Turkey is a developing country, there is an increasing National demand for electricity which is expected to continue in the foreseeable future. Turkish electricity generation is mainly composed

[7] https://teias.gov.tr/sites/default/files/2017-06/Grafik%20III.IV%20-%20T%C3%BCrkiye%20Br%C3%BCt%20Elektrik%20Enerjisi%20%C3%9Cretimi%20ve%20Br%C3%BCt%20Talep%20Geli%C5%9Fimi%20%282005-2015%29.docx

of fossil fuelled thermal power plants. Share of renewable resources, especially hydroelectric power plants have decreased significantly in recent years. Due to the increasing demand for electricity, new power plants need to be established to meet demand. In the absence of the proposed project activity, same amount of electricity is required to be supplied via either the grid or thermal power plants which will increase GHG emissions. Since the proposed plant generates electricity using wind power, it will not create any GHG emissions.

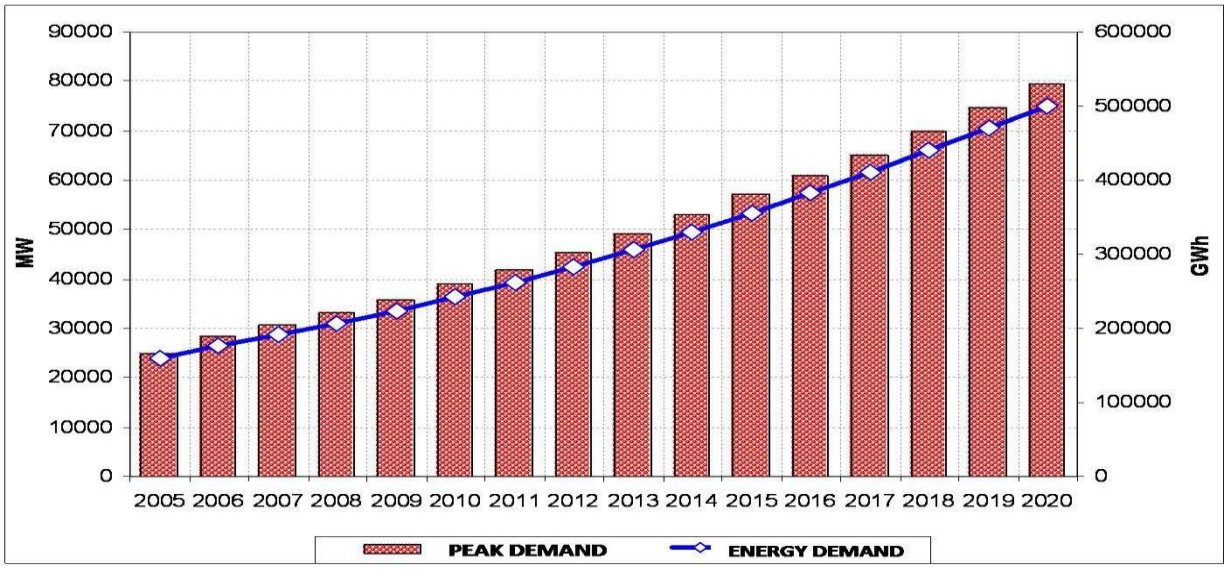


Figure 4. Peak Load and consumption projection for Turkish electricity system between 2005-2020[8]

B.5. Demonstration of additionality

Since the project involves renewal of the crediting period and capacity extension, all steps of additionality assessment is not carried out. Due to capacity extension, only *Step 2-Investment Analysis* carried out based on latest design of the project and financial figures as below.

Step 2 - Investment analysis

The investment analysis has been based on financial analysis validated during first crediting period. On top of existing validated figures, additional investment costs and income from additional electricity generation after commissioning has been added. Start date determined for investment analysis for capacity extension is 15/02/2016 (finalized day of Energy Yield Assessment Report)

For electricity sales price, since the feed-in-tariff price ends after 10th year of the project, average market price for last 5 years in Turkish electricity market has been used as estimate for electricity price after 10th year as in **shown.** below.

Annual Weighted Average						
Date	PTF Weighted Average	PTF Average	SMF Weighted Average	SMF Average	Average Exchange Rate (USD/TRY)	Ortalama PTF (USD/MWh)
2012	156.28	149.59	143.63	138.96	1.7826	87.6697
2013	157.59	150.11	155.89	144.01	2.1343	73.83686
2014	167.29	164	173.12	163.98	2.3189	72.14196

8 http://www.teias.gov.tr/apkuretimplani/veriler.htm

2015	143.97	138.03	143.02	137.52	2.9076	49.51506
2016	148.32	140.6	142.79	132.2	3.5318	41.99558
2017	165.2	160.68	168.12	154.13	3.6148	45.70101
Average	**156.4417**	**150.5017**	**154.4283**	**145.1333**	**2.715**	**61.81003**

Table 3. Average market price in Turkish electricity Market 2012-2017[9]

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

Since Project generates economic benefits from sales of electricity benchmark analysis for evaluation of the project investment.

Sub-step 2b. Option III. Apply benchmark Analysis

For benchmark analysis, figure defined by World Bank for similar project types have been used which has been given as 15% [10] (pre-tax) by a report generated in May 2009. For the proposed project, in order to reach this equity IRR values, average electricity tariff must be above 8.3 $c/kWh in the absence of carbon revenue and assuming that initial investment figures are realized so that the investment will become reasonable.

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

Parameters	Unit	Data Value
Installed Capacity[11]	MW	28.2
Grid Connected output[12]	GWh	98.7
Capital Investment[13]	Million $	~27,770
Income tax rate	%	20
Feedi n Tariiff/Market price after 10th years	$ Cents/kWh	7.3/6.18
Expected VERs price	$/ tCO_2e	3.3

Table 7. Main financial parameters used for investment analysis

Internal Rate of Return (IRR) of the Ayyildiz Wind Power Plant has been calculated as 9.81 % based on the parameters given above without considering the carbon revenue and assuming that no bank loan is used. Project does not use any ODA or government incentive. Electricity tariff has been used as $7.3 Cent/kWh for first 10 years and 6.18$ Cent/kWh after 10 year. Annual generation has been taken as 51.32 GWh before extension and 98.7 after extension, although detailed analysis show that actual generation will be lower. Considering carbon revenue and the carbon price same (3.3€/t CO_2e) as during the first crediting period, IRR increases to 10.32% and becomes more feasible with the expectation that electricity tariff will increase due to increasing electricity demand of Turkey and project will benefit from increasing price at the market.

[9] https://rapor.epias.com.tr/rapor/xhtml/ptfSmfListeleme.xhtml

[10] Project Appraisal Document for a proposed IBRD Loan (page 81)

[11] Generation License

[12] Micrositing Report

[13] Equipment&Subcontractor agreements

Acceptable IRR values for energy investments in Turkey are, given the present global financial crisis and economic uncertainty, are expected at yields in excess of 15% per annum. Even if we include the carbon revenue in the cash flow (which is, equity IRR increases to 10.32 % which is still lower than the accepted benchmark rates.

Considering the market price risk, it can be concluded the extension will make the investment more feasible however, it will still be below the benchmark IRR. After extension of the capacity, IRR is expected to increase from 6.19% to 9.81% in the absence of carbon revenue.

Sub-step 2d - Sensitivity Analysis

Sensitivity analysis had been carried out for three main parameters identified for the first phase of the project. However, since the investment cost for extension is based on signed agreements and operating cost is not changed after extension, which is a conservative approach, only impact of change in tariff has been included in sensitivity analysis.

- Investment Cost
- Operating Cost
- Electricity Sales revenue

For a range of ±10% fluctuations in parameters above, table below has been obtained.

% Fluctuation	**-10**	**-5**	**-2.5**	**0**	**2.5**	**5**	**10**
Investment Cost							
Operating Cost							
% Fluctuation	**-10**	**-5**	**-2.5**	**0**	**-2.5**	**5**	**10**
Electricity Sales Revenue	8.70	9.25	9.53	9.81	10.09	10.38	10.96

Table 8. Sensitivity analysis for Ayyildiz Wind Power Plant Project after extension (without carbon revenue)

Outcome of Step 2:

The investment and sensitivity analysis shows that the capacity extension will significantly improve the financial indicators of the project. VER revenue will still be important for the project. Although the market price for VER is far from the expected VER price estimated during first phase of the crediting period, increasing project size will increase the revenue of the project. Considering that figures above are based on average price rather than guaranteed price, optimistic estimations for yearly generation and that those figures do not reflect the risk for investment, role of carbon income is a significant number to enable the project to proceed and favourable investment and funding decision taken. Based on the above information, it is seen that project is not the most attractive option. Therefore project is considered as additional to the baseline scenario.

Step 3. Barrier analysis

This step is not applied as per the tool.

Step 4. Common Practice Analysis

According to the “Tool for the demonstration and assessment of additionality”, Version 07.0.0”, the common practice shall provide an analysis of any other activities that are similar to the Project Activity. 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.

Currently more than 1700 generation licenses issued by EMRA . However, according to latest statistics published by TEIAS (National Energy Transmission Company) in July 2017, total installed capacity of wind energy is 4,503.7 MW and there are 37 wind power projects developed or had additional capacity in 2015. Plants which has additional capacity more than one in 2015 are coded as "Repetition" in Common Practice Analysis of Ayyıldız WPP. Otherwise, 73 plants are appeared when the only filtration criteria is provisional acceptance date) became operational in 2015.

Annex-8, Guidelines on Common Practice version 03.1 has been followed .

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

The total capacity of the proposed project is 28,2 MWe. Therefore, the applicable output range is from 14,1 MW to 42,3 MW.

Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:
(a)The projects are located in the applicable geographical area;
(b) The projects apply the same measure as the proposed project activity;
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Applicable geographical area has been selected as the whole host country (Turkey) as per paragraph 1 of Guidelines on Common Practice version 02.0. Projects which apply the same measure as the proposed project have been determined and wind energy projects are selected as the same energy source type of projects. All of the selected plants deliver the same service which is the electricity generation. Applicable output range has been determined and all of the power plants are taken from the latest available year 2015. General Directorate of Energy Affairs and EMRA Electricity Production Licence Database have been used as a main resource. Therefore all of the compared power plants have been operational before the implementation of the project activity.

Below is a list of operational wind power plants as given by the General Directorate of Energy Affairs indicates that 2015 ınvestments (counted as 37):

NO	PLANT	INSTALLED CAPACITY (MWe)	FIRM CAPACITY (GWh)
1	ÇERÇİKAYA RES	57,0	101,9
2	KOCADAĞ 2 RES	17,5	33,0
3	SOMA RES	100,0	43,5
4	PİTANE RES	5,0	1.294,3
5	SEBENOBA RES	60,0	14,4
6	BANDIRMA	60,0	16,6

	RES		
7	KIYIKÖY RES	44,0	154,0
8	SEYİTALİ RES	30,0	110,0
9	HARMANLIK RES	50,0	166,0
10	BOREAS I ENEZ RES	15,0	52,7
11	KORU RES	50,0	137,0
12	ORTAMANDIRA RES	11,2	37,9
13	ÇEŞME RES	16,0	39,0
14	MUT RES	50,0	153,0
15	EDİNCİK RES	56,4	180,0
16	ÖDEMİŞ RES	20,0	66,0
17	DİLEK RES	27,5	60,3
18	ZİYARET RES	75,0	
19	KUYUCAK RES	25,6	112,8
20	SÜLOĞLU RES	60,0	226,0
21	POYRAZGÖLÜ RES	30,0	105,0
22	BAĞARASI RES	46,0	121,0
23	GERES RES	27,5	91,7
24	ADARES RES	10,0	24,8
25	EGE RES	7,0	24,5
26	İÇDAŞ BİGA RES	60,0	168,0
27	AKBÜK RES	10,0	18,0
28	ADA 2 RES	4,6	13,0
29	YAHYALI RES	52,5	125,4
30	HİLAL-2 RES	7,0	24,8
31	KANİJE RES	48,0	129,6
32	FUATRES RES	30,0	92,0
33	KANGAL RES	78,0	136,0
34	DÜZOVA RES	30,0	118,6
35	İNCESU RES	10,0	36,0

36	SARES RES	22,5	90,5
37	SÖKE RES	45,0	175,0

Power plants which are in the applicable range of Ayyıldız WPP (i.e. 14,1 MW to 42,3 MW) are highlighted (counted as 12).

NO	PLANT	INSTALLED CAPACITY (MWe)	FIRM CAPACITY (GWh)	Project Status
1	KOCADAĞ 2 RES	17,5	33,0	Issued
2	SEYİTALİ RES	30,0	110,0	Issued
3	BOREAS I ENEZ RES	15,0	52,7	Issued
4	ÇEŞME RES	16,0	39,0	-
5	ÖDEMİŞ RES	20,0	66,0	Validated
6	DİLEK RES	27,5	60,3	Validated
7	KUYUCAK RES	25,6	112,8	Registered
8	POYRAZGÖLÜ RES	30,0	105,0	-
9	GERES RES	27,5	91,7	Issued
10	FUATRES RES	30,0	92,0	Validated
11	DÜZOVA RES	30,0	118,6	Issued
12	SARES RES	22,5	90,5	Issued

Step 3: within the projects identified in Step2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number Nall

Properties of the power plants are also indicated in this excel sheet. After excluding the VER projects, there exists only 2 power plant being operated in Turkey. (Çeşme RES and POYRAZGOLU RES)

Therefore;

Nall = 2

Step 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number Ndiff

There is no different scale and different to the technology project therefore Ndiff=0

Step 5: calculate factor F=1-Ndiff/Nall representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

F=1-Ndiff/Nall=1-(0/2) = 1 (> 0.200)
Nall – Ndiff = 2 – 0 = 2 (< 3)

According to "Tool for the demonstration and assessment of additionality", Version 07.0.0, if the factor F is greater than 0.2 and Nall-Ndiff is greater than 3, then the proposed project is a "common practice".

For the proposed project, F=1 but Nall-Ndiff=2, therefore, the proposed project is not a common practice within the applicable geographical area. Hence, the proposed project is additional.

Given the fact that all there is no plants similar to the proposed project and built without carbon revenue, the proposed type of project should not be considered as a common practice in Turkey. In addition, plant load factor is is the ratio between the actual energy generated by the plant to the maximum possible energy that can be generated with the plant working at its rated power and for a duration of an entire year.calculated as 39.9 % ([97,800 MWh/365*24*Total Capacity (28.2 MWe)]*100=39,9 %)

B.6. Emission reductions

B.6.1. Explanation of methodological choices

Emission factor has been calculated in a conservative as requested by the methodology. Instead of the calculated and registered emission factor value of first crediting period (0,576 tCO2/GWh) a new emission factor calculation was done by using updated data from years 2013-2015. Basic assumptions made are;

- Emission factor will remain same over the crediting period,
- Emission factor of fuels sources is "0" or the lowest value in the references when there is no information.

The Additionality Assessment of the project activity has been demonstrated using the latest version of the 'Tool for Assessment and Demonstration of Additionality'.

According the "Tool to Calculate the Emission Factor for an Electricity System", ver.6, the following four methods are applicable to calculate the operating margin:

a) Simple OM,
b) Simple adjusted OM,
c) Dispatch Data Analysis OM and
d) Average OM.

Since the share of low-cost / must-run sources is below 50% (32.2 % as showed in Table 7 below), method (d) is eliminated. Also due to insufficient data available, methods (b) and (c) are not considered and thus (a) simple OM method is used in calculations. The following table is used for demonstrating the share of low cost/must run resources.

ANNUAL DEVELOPMENT OF RENEWABLE ELECTRICITY GENERATION SHARE IN TURKEY TOTAL ELECTRICITY GENERATION **(2000-2016)**

YEARS	*HYDRO*	*GEOTERMAL*	*WIND*	*SOLAR*	*RENEW.WASTES + WASTE HEAT*	*RENEWABLE GENERATION*	*TOTAL GENERATION*	*RENEWABLE SHARE %*
2011	52.338,6	694,4	4.723,9		469,2	58.226,1	229.395,1	25,4
2012	57.865,0	899,3	5.860,8		720,7	65.345,8	239.496,8	27,3
2013	59.420,5	1.363,5	7.557,5		1.171,2	69.512,7	240.154,0	28,9
2014	40.644,7	2.364,0	8.520,1	17,4	1.432,6	52.978,8	251.962,8	21,0
2015	67.145,8	3.424,5	########	194,1	1.758,2	84.175,1	261.783,3	32,2

Table 4. Breakdown by source of the electricity generation for the five most recent years[14]

The methodology has been applied in a conservative manner. Tools addressed by the applied methodology have been used to calculate baseline, project and leakage emissions. The equations used are:

Emission Factor

$EF_{grid,\ BM,\ y} = \Sigma_m EG_{m,y} . EF_{ELm,y} / \Sigma_m EG_{m,y}$
$EF_{grid,\ CM,\ y} = (W_{OM} . EF_{grid}, OM, y) + (wBM . EFgrid, BM, y)$

Where:

EF_{grid},BM,$_y$ = Build margin CO_2 emission factor in year y (t CO_2/MWh)
EF_{grid},OM,$_y$ = Operating margin CO_2 emission factor in year y (t CO_2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y (t CO_2/MWh) m
= Power units included in the build margin
Y = Most recent historical year for which electricity generation data is available
W_{OM} = Weighting of operating margin emission factor (per cent)
W_{BM} = Weighting of build margin emission factor (per cent)

Baseline Emission BEy

$= EG_{Pj,\ y} . EF_{grid,CM,y}$

Where:

BEy = Baseline emissions in year y (t CO_2 /yr)
$EG_{Pj,\ y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EF_{grid,CM,y}$ = Combined margin CO_2 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" (t CO_2/MWh)
PD = Power density of the project activity (W/m^2)

These emissions shall be accounted for as project emissions by using the following equation:
$PEy = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$

Where:

PEy = Project emissions in year y (t CO_2 /yr)
$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO_2/yr)
$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (t CO_{2e}/yr)
$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO_{2e}/yr)

The proposed project activity involves the generation of electricity by a wind power plant, therefore parameters $PE_{GP,y}$ and $PE_{HP,y}$are not applicable. According to the applied methodology: "For all renewable energy power generation projectactivities, emissions due to the use of fossil fuels for the backup generator can be neglected."Since the project is classified as a renewable energy project, parameter $PE_{FF,y}$ is neglected.

Therefore;
PEy = 0

Leakage Emissions:

The energy generating equipment is not transferred from or to another activity. Therefore leakage is also considered as "0".
LEy = 0

Emission Reductions:

Emission reductions are calculated as follows:
ERy = BEy - PEy- LEy
Where:
ERy = Emission reductions in year y (t CO_2 /yr)
BEy = Baseline emissions in year y (t CO_2/yr) PRy = Project emissions in year y (t CO_{2e}/yr)
LEy = Leakage emissions in year y (tCO_2/yr)
Since PEy = 0, LEy = 0

ERy = BEy

B.6.2. Data and parameters fixed ex-ante

Data / Parameter	EG_y
Unit	MWh
Description	Net electricity generated by power plant/unit m, k or n (or in the project electricity system in case of EGy) in year y
Source of data	For gross generation, imported values, internal consumption and net generation which not including low-cost/must run power plants in year y followed documents are used which can be checked via shared link: https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 “Türkiye Brüt Elektrik Enerjisi Üretiminin Üretici Kuruluşlar ve Birincil Enerji Kaynaklarına göre Yıllar İtibariyle Gelişimi (2006-2015)” “Türkiye Elektrik Enerjisinin Üretim-İthalat-İhracat ve Brüt Talebinin Yıllar İtibariyle Aylık Dağılımı (2003-2015)” “Türkiye Elektrik Enerjisi Üretim Tüketim ve Kayıplarının Yıllar İtibariyle Gelişimi (1993-2015)” For 2013: 171,166,713 For 2014: 198,349,070 For 2015: 178,430,451 547,946,234 MWh net electricity generation between 2013-2015
Measurement procedures (if any)	Data from Grid Operator has been used
Monitoring Frequency	Once for each crediting period
QA/QC procedures	-

14 http://www.teias.gov.tr/sites/default/files/2017-10/60.xlsx

Additional comment	Detailed calculation of applied values are given in the CM calculation excel sheet in "OM Calculations" Tab.

Data / Parameter	**EF $_{CO2,i,y}$**
Unit	tCO_2/GJ
Description	CO_2 emission factor of fuel type i used in year y
Source of data	For EF of fossil fuels, IPCC values at the lower limit have been used[15]
Measurement procedures (if any)	-
Monitoring frequency	Once for each crediting period
QA/QC procedures	-
Additional comment	According to the applied tool, IPCC default values at lower limit of 95% confidence interval can be used. Although, the actual emission reduction is expected to be higher due to high EF of fuels consumed in existing power plants, IPCC values have been used for conservativeness as requested by the methodology.

FUEL SOURCE	**EF (tCO_2/Tj)**
Coal	89.5
Lignite	90.9
Fuel Oil	75.5
Diesel	72.6
LPG	61.6
Naphtha	69.3
Natural Gas	54.3

Data / Parameter	**FCi,y**
Unit	Tons or 1000 m^3 for gases
Description	Amount of fuels consumed by thermal power plants for electricity generation in terms of fossil fuel type i in year y
Source of data	TEIAS Statistics[16]
Value(s) applied	Values applied and presented in Section B.6.3 (Table 5)
Choice of data or Measurement methods and procedures	Data from Grid Operator has been used
Monitoring frequency	Once for each crediting period
QA/QC procedures	-

[15] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

[16] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Termik Santrallarında Kullanılan Yakıt Miktarlarının Üretici Kuruluşlara Dağılımı (2006-2015)

Additional comment	-

Data / Parameter	**$NCV_{i,y}$**
Unit	GJ/t or GJ/m^3 (for gas)
Description	Net calorific value (energy content) of fossil fuel type i in year y
Source of data	Own calculation based on data source from National Electricity Transmission Company (TEIAS) Statistics

Fuel Type	***NCV***
	GJ/t or Gj/1000 m^3 (for gas)
Hard Coal	23.95
Lignite	7.17
Fuel Oil	42.53
Diesel Oil	43.79
LPG	0.00
Naphta	0.00
Natural Gas	37.48

Measurement procedures (if any)	Data has been calculated from Grid Operator's (TEIAS) statistics. The calculation is done by dividing heating values of the fuel type i consumed over its quantity. Heating value of fuel consumed: https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Termik Santrallarında Kullanılan Yakıtların Isı Değerlerinin Üretici Kuruluşlara Dağılımı (2006-2015) Quantity of fuel consumed: https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Termik Santrallarında Kullanılan Yakıt Miktarlarının Üretici Kuruluşlara Dağılımı (2006-2015)
Monitoring frequency	Once for each crediting period
QA/QC procedures	-
Additional comment	Data used for OM and BM calculation . Detailed calculation of applied values are given in the CM calculation excel sheet in "NCV" Tab.

B.6.3. Ex ante calculation of emission reductions

As per the tool, the following six steps for calculation of emission reductions have been applied:

Step 1: Identify the relevant electricity systems

According to the ''Tool to calculate the emission factor for an electricity system'', Version 06.0, 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. 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 73,146.7MWh and gross generation about 261,783.3GWh by 2015[17]

For imports from connected electricity systems located in another host country (ies), the emission factor is taken as "0" tCO_2/MWh as requested by the methodology.

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

Option I has been chosen by the project developer hence only grid power plants are included in calculations.

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

The Simple Operating Margin (OM) emission factor ($\mathbf{EF}_{grid, OM, y}$) is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all the generating plants serving the system, excluding low-cost/must-run power plants. As electricity generation from solar and low cost biomass facilities are insignificant and there are no nuclear plants in Turkey, the only low cost /must run plants considered are hydroelectric, wind and geothermal facilities.

The tool gives two options for the calculation of $\mathbf{EF}_{grid, OM, y}$;

- **Ex-ante option**

A three-year generation-weighted average, based on the most recent data available at the time of submission of the VER-PDD to the DOE for validation, without the 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, with the requirement to update emissions factor annually during monitoring.

[17] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015

For this project the ex-ante approach is selected. Data for calculating the three year average is obtained from the period 2013 – 2015,

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 CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must run plants / units. The Simple OM has been calculated using option B which is 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. Option B has been selected since;

• Generation and CO_2 data for individual power units are not available

• Only renewable are considered as low cost/must run resources

• Off-Grid power plants are not included in calculations.

As fuel consumption and average efficiency data for each power plant / unit are not available, Option B is used for simple OM calculation. Under Option B, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must run power plants / units, and based on fuel type(s), and total fuel consumption of the project electricity system, as follows:

$$EF_{Grid,OM\ simple,y} = \Sigma FC_{i,y} * NCV_{i,y} * EF_{CO2,i,y/} EG_y \quad (1)$$

where:

$EF_{grid,OM,y}$: Simple operating margin CO_2 emission factor in year “y” (tCO_2/GWh)

$FC_{i,y}$: Amount of fossil fuel type “i” consumed in the project electricity system in year “y” (mass or volume unit)

$NCV_{i,y}$: Net calorific value (energy content) of fossil fuel type “i” in year “y” (GJ / mass or volume unit)

$EF_{CO2,i,}$: CO_2 emission factor of fossil fuel type “i" in year “y” (tCO_2/GJ)

EG_y : Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must run power plants / units, in year “y” (MWh)

i : All fossil fuel types combusted in power sources in the project electricity system in year “y”

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

For the calculation of the Simple OM, the amount of fuel consumption ($FC_{i,y}$) and heating values of fuels are taken from website of TEIAS, the official source of related data. Fuel consumption values for the relevant years are given in table below:

Table 5 Amount of fuels used for electricity generation[18]

Fuel Type	Fuel Consumption ($FC_{i,y}$)			
	2013	2014	2015	Total 2013-2015
	Ton or 1000 m_3 (for gas)			
Hard Coal	12,105,930	14,501,934	16,629,492	43,237,356
Lignite	47,120,306	57,696,139	49,940,131	154,756,576
Fuel Oil	573,534	754,283	516,912	1,844,729
Diesel Oil	129,359	119,988	238,388	487,735
LPG	0	0	0	0
Naphtha	0	0	0	0
Natural Gas	22,909,746	25,426,014	20,914,868	69,250,628

The NCV of the fuels consumed have been calculated using data from the TEIAS web page. The emission factors required for calculation of CO_2 emission coefficient have been obtained through IPCC 2006 guidelines for GHG inventories for fuels. Table 6 shows the total emissions generated in 2013-2015 per fuel type. If we sum up all emissions from each fuel type, then the total emissions in 2013-2015 is **341,923,967**tCO_2.

Fuel Type	Net Calorific Value ($NCV_{i,y}$)	Emission Factor ($EF_{CO2,i}$)[19]	Total Fuel Consumption 2013-2015 ($FC_{i,y}$)	Total Emissions 2013-2015
	Gj/t or Gj/1000 m^3 (for gas)	tCO_2/Gj	Ton or 1000 m^3 (for gas)	tCO_2
Hard Coal	23.9	0.0895	43,237,356	92,661,494
Lignite	7.2	0.0909	154,756,576	100,857,343
Fuel Oil	42.5	0.0755	1,844,729	5,923,843
Diesel Oil	43.8	0.0726	487,735	1,550,435

[18] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Termik Santrallarında Kullanılan Yakıt Miktarlarının Üretici Kuruluşlara Dağılımı (2006-2015)

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

LPG	0.0	0.0616	0	0
Naphtha	0.0	0.0693	0	0
Natural Gas	37.5	0.0543	69,250,628	140,930,851
TOTAL				**341,923,967**

Table 6 Calculation of Total Emissions Generated (2013-2015)

Net electricity generated and supplied to the grid by thermal plants has been calculated by excluding internal consumption values from gross thermal generations[20]. The ratio between gross and net generation has been calculated first, and assuming that the same ratio is valid for thermal plants; gross generation by thermal power plants has been multiplied by this ratio in order to find net generation by thermal plants. The calculation of $EF_{grid,OM,y}$ requires the inclusion of electricity imports with an emission factor of 0 tCO_2/GWh. By including the imports in the electricity production this requirement is fulfilled. Summing up this with the imported electricity, total supply excluding low cost / must run sources are determined as given in table below.

Year	**Internal Consumption[21]**	**Gross Thermal Generation[22]**	**Net Thermal Generation**	**Import[21]**	**Total (EG_y)**
	GWh	**GWh**	**GWh**	**GWh**	**GWh**
2013	4.7%	171,812.50	163,737.31	7,429.40	171,166.71
2014	5.0%	200,416.60	190,395.77	7,953.34	198,349.11
2015	4.5%	179,366.44	171,294.95	7,135.50	178,430.45
TOTAL					**547,946.23**

Having calculated the total fuels emissions and net generation by thermal power plants as given in previous two tables, The $EF_{grid,\ OM\ ,y,}$ is calculated by simply dividing total emission by total net thermal electricity generation as defined in equation (1) above;

EFgrid, OM, y = **341,923.967** tCO_2 / **574,946.23** GWh

= 0.624 tCO_2/MWh.

[20] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Elektrik Enerjisi Üretim Tüketim ve Kayıplarının Yıllar İtibariyle Gelişimi (1993-2015)

[21] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Elektrik Enerjisi Üretim Tüketim ve Kayıplarının Yıllar İtibariyle Gelişimi (1993-2015)

[22] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Brüt Elektrik Enerjisi Üretiminin Üretici Kuruluşlar ve Birincil Enerji Kaynaklarına göre Yıllar İtibariyle Gelişimi (2006-2015)

In calculating the EFgrid, OM, y, data for NCV has been calculated using weighted average values for each fuel.

Step 5: Calculate the build margin (BM) emission factor

The calculation of Build Margin (BM) emissions is applying 2013-2015 values. In terms of vintage of data, project participants can choose between one of the following two options to calculate

$EF_{grid,BM,y}$:

Option 1. For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of 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.

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

In this PDD, *Option1* is chosen to calculate the build margin emission factor. The sample group of power unit m is used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently (SET5-units) and determine their annual electricity generation (AEGSET-5-units, in MWh);

The commission dates of the recent plants that supplies electricity to the grid is publicly available in the Energy Ministries' database; however generation capacity of the thermal power plants no longer provided for all plants[23]. For this reason, electricity generations from fossil fuels such as natural gas, lignite have been calculated through capacity factor estimation from the available data provided by TEİAŞ[24].

Table 7 The latest Plants Capacity 2015[25]

Name of Plant	Type of Fuel	Commissioning Date	Generation Capacity (GWh)
ALPERTEKS SANTRALİ	**NG**	**25.12.2015**	**28**
HANAK HES	**HEPP**	**29.12.2015**	**12**

[23] http://www.enerji.gov.tr/tr-TR/EIGM-Raporlari

[24] TEIAS 2014, Generation Units Put Into Operation In 2014.

[25] 2014 energy investments, www.enerji.gov.tr

ITC-KA ELAZIĞ ÜRETİM TESİSİ	**Biogas (Landfill Gas)**	**30.12.2015**	**20**
UMURLU JES	**Geothermal**	**30.12.2015**	**75**
İÇDAŞ BİGA RES	**WPP**	**31.12.2015**	**36**
			Total: 171

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG total, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG total (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) (SET≥20%) and determine their annual electricity generation (AEGSET-≥20%, in MWh);

For determination of plants that comprise 20% of the system's generation, gross generation in year 2015 which is 261,783.3 GWh has been taken as reference and its 20% has been determined as about 44,499.1 GWh. Since 20% of the most recent year's generation does not fall partly on capacity of a plant, total capacity included in BM calculation is 44,499.1 GWh.

(c) From SET5-units and SET≥20% select the set of power units that comprises the larger annual electricity generation (SET sample); Identify the date when the power units in SET sample started to supply electricity to the grid. If none of the power units in SET sample started to supply electricity to the grid more than 10 years ago, then use SET sample to calculate the build margin. In this case ignore steps (d), (e) and (f).

SET≥20% is selected as (SET sample) because the set of power units that comprises the larger annual electricity generation. There is no power units in SET sample started to supply electricity to the grid more than 10 years ago. Therefore the steps (d), (e) and (f) are ignored.

The Build Margin emission factor EFgrid, BMs, y is calculated as the generation-weighted average emission factor of a sample of power plants "m" for a specific year, as follows:

$$EFgrid, BM, y = \Sigma EG,m,y \; . \; EFEL,m,y \; / \; \Sigma EG,m,y \qquad (2)$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year "y" (tCO_2/MWh)

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit "m" in year "y" (MWh)

$EF_{EL,m,y}$ = CO_2 emission factor of power unit "m" in year "y" (tCO_2/MWh)

m = Power units included in the build margin

y = Most recent historical year for which power generation data is available

"Tool to Calculate the Emission Factor for an Electricity System v.6" has been used for plant efficiency data although this approach is very conservative. Since tool does not contain any specific data for plants with LPG, Naphtha etc. all of the plants consuming liquid fuels have been considered as open cycle plants. Plants using lignite and coal have been assumed as using subcritical technology, whereas natural gas plants have been assumed as combined cycle plants. The assumptions have been based on TEIAS statistics which gives heating values of fuels consumed in thermal power plants[26] and corresponding electricity generation which shows that values used are very conservative compared to actual situation.

Table 8 Calculation of emission factors

Fuel Type	Emission Factor ($EF_{CO2,i}$)	Generation Efficiency[27] ($\eta_{m,y}$)	Emission Factor of Power Unit ($EF_{EL,m,y}$)
	tCO_2/Gj	**%**	**tCO_2/MWh**
Coal	0.0895	45%	0.716
Lignite	0.0909	35,5%	0.922
Fuel Oil	0.0755	46%	0.591
Diesel Oil	0.0726	46%	0.568
LPG	0.0616	39.5%	0.561
Naphtha	0.0693	39.5%	0.632
Natural Gas	0.0543	60.0%	0.326

The build margin emission factor has been determined for the most recent capacity additions as shown in table below. The Build margin emission factor in the last column has been determined by multiplying each EF value with the corresponding electricity generation value for that fuel and dividing it by the total generation by the most recent capacity additions.

26

27 "Tool to calculate the emission factor for an electricity system" version 06.0

Table 9 Most recent capacity additions corresponding to 20% by fuel source

Fuel Type	Electricity Generated (EGm,y)				Emission Factor of Power Unit ($EF_{EL,m,y}$)	Share in Total Generation	Emission by Source
	2013 (MWh)	2014 (MWh)	2015 (MWh)	TOTAL	tCO_2/MWh	%	tCO_2
Coal	0.0	19,702	1,067.1	20,769.1	0.716	38.0%	14,870.7
Lignite	0.0	394.0	436.9	830.8	0.922	1.5%	765.9
Fuel Oil	0.0	0.0	0.0	0.0	0.591	0.0%	0.0
Diesel Oil	0.0	0.0	0.0	0.0	0.568	0.0%	0.0
LPG	0.0	0.0	0.0	0.0	0.561	0.0%	0.0
Naphtha	0.0	0.0	0.0	0.0	0.632	0.0%	0.0
Natural Gas	10,226.8	8,755.1	878.1	19,860.0	0.326	36.3%	6,470.4
Renewable (Biomass, wastes, Hydro, wind, geothermal)	1,341	4,578	7,258.2	13,177.8	0.0	24.1%	0.0
Total	**11,567.9**	**33,429.1**	**9.640,2**	54,637.7		**100.0%**	22,106.9

Finally, by summing up the weighted EF values, overall build margin emission factor have been calculated as:

$EF_{grid,\ BM,\ y}$ = 22,106.9.2 tCO_2 / 54,637.7 MWh

= 0.405 tCO_2/MWh

STEP 6: Calculate the combined margin (CM) emission factor

Weighted average baseline emission factor is calculated as follows;

$$\mathbf{EF_{grid,\ CM,\ y} = w_{OM} * EF_{grid,\ OM,\ y} + w_{BM} * EF_{grid,\ BM,\ y}} \quad (3)$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year "y" (tCO_2/MWh) as calculated from equation (2) above.

$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year "y" (tCO_2/MWh) as calculated from equation (1) above.

w_{OM} = Weighting of operating margin emissions factor (%)

w_{BM} = Weighting of build margin emissions factor (%)

The default values of the weights, w_{OM} and w_{BM}, as recommended by the selected methodology are 0.5 for both components. These default values have been used in calculating CM emission factor together without rounding the values of EF_{OM} and EF_{BM}.

Based on the formula above (3), baseline emission factor is calculated as;

$EF_{grid, CM, y}$ = 0.75 *0.624 + 0.25 * 0.405 = 0.569

The combined margin emission factor is therefore 0.569 tCO_2/MWh.

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

ERy = BEy – PEy - LEy **(4)**

Where:

ERy = Emission reductions in year y (tCO_2)

BEy = Baseline emissions in year y (tCO_2)

PEy = Project Emissions in year y (tCO_2)

LEy = Leakage emissions in year y (tCO_2)

Baseline emissions

Baseline emission is calculated according to the formula

BEy = EGy x EFy

Where:

EGy = Net electricity delivered to the grid by the project activity in year y excluding transmission losses of the grid (data is gathered from final form of generation licence of the project which is 98,700 MWh and the official document can be seen in Appendix).

EFy = Emission factor calculated according to selected methodology

BEy = 98,700MWh × 0.569 tCO_2e/MWh = 56,176 tCO_2e

Project emissions

Since the project is classified as a renewable energy project, parameter PEFF,y is neglected.

Therefore;
PEy = 0

Leakage

The energy generating equipment is not transferred from or to another activity. Therefore leakage is also considered as "0".

$$LEy = 0$$

As a result, Total Emission Reduction is:

$$ERy = BEy$$

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

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2017 (23/11/2017-31/12/2017)	5,865	0	0	5,865
2018	56,176	0	0	56,176
2019	56,176	0	0	56,176
2020	56,176	0	0	56,176
2021	56,176	0	0	56,176
2022	56,176	0	0	56,176
2023	56,176	0	0	56,176
2024 (01/01/2024-22/011/2024)	50,312	0	0	50,312
Total	393,233	0	0	393,233
Total number of crediting years	7 years			
Annual average over the crediting period of estimated reductions (tons of CO2e)	56,176	0	0	56,176

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

The project applied the approved consolidated baseline methodology ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources", Version 17.

Data / Parameter	$EG_{facility,y}$
Unit	MWh
Description	Net Electricity generated and delivered to the grid by the power plant in year y
Source of data	Electricity meter(s)
Value(s) applied	Estimated annual generation forming the basis for emission reduction calculation is 98,700

Measurement methods and procedures	EGy calculation is used by EPIAS (which is one of the TEIAS association) records and which are more conservative than the site records. ID specifications of the metering device using at transformer center are; Model: Actaris Serial Number: 53031785Type: SL761B Moreover, two meters (Elster A1500) are in use in project site whose serial numbers are 00391095 2009 (main meter) and 00391097 2009 (auxiliary meter) are present at site and the records are gathered monthly. Records of these meters are used to compare the records of meters at transformer center.
Monitoring frequency	Continuous measurement / Monthly recording
QA/QC procedures	Maintenance and calibration of the metering devices (located at the project site) has been made on 24/10/2009 and sealed by Başkent Elektrik Dağıtım A.Ş.. In case of significant different between two devices, maintenance will be done before waiting for periodical maintenance according to regulations of TEIAS. No maintenance/calibration has been required during monitoring period. Meters used in the plant is 0.5S class. As per the regulations, meters should not require calibration before 10 years.
Purpose of data	Baseline emission calculation
Additional comment	-

B.7.2. Sampling plan

No sampling plan will be necessary

B.7.3. Other elements of monitoring plan

Monitoring is a key procedure to verify the real and measurable emission reductions from the proposed project. To guarantee the proposed project's real, measurable and long-term GHG emission reductions, the
monitoring plan is established.

In order to demonstrate the emission reduction, only the required data is the net electricity delivered to the grid by the project activity and consumption for the auxiliary diesel generator. IPCC guidelines will be used as data source for calculating the project emissions due to diesel fuel consumption.

Net electricity generation will be measured and recorded by both grid operator and project owners for billing purposes therefore no new additional protocol will be needed monitoring emission reduction. Power Plant Manager, will be responsible for the electricity generated, gathering all relevant data and keeping the records. He will be informed about VER concepts and mechanisms and how to monitor and collect the data which will be used for emission reduction calculations.

Generation data collected during crediting period will be submitted to GTE who will be responsible for calculating the emission reduction subject to verification. Generation data will be used to prepare monitoring reports which will be used to determine the vintage from the project activity. These reports will be submitted to the duly authorized and appointed Designated Operational Entity 'DOE' before each verification period.

The monitoring system organization chart is shown in Figure below, in which the authority and responsibility of project management are defined.

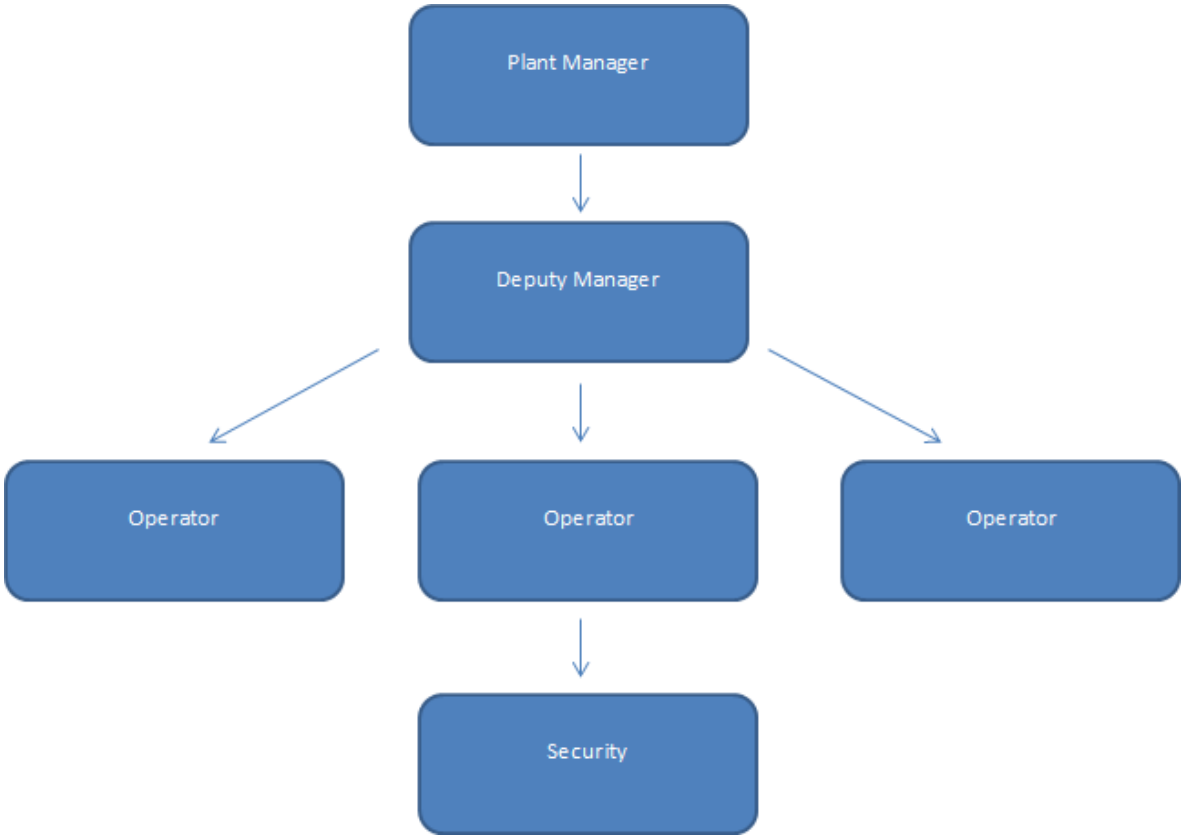


Figure 8. Operational structure of the Hamzali HEPP

VER Team Members is expected to include;

Plant Manager
Overall responsibility of compliance with VER monitoring plan and keeping data about power sales, invoicing and purchasing.
Deputy Manager (Electrical engineer)
Responsible for day to day running of plant, recording and monitoring of relevant data and periodic reporting

Control Operators
Staff will responsible for day to day operation and maintenance of the plant and equipments. All staff will be trained and have certificated for working with high voltage equipments

GTE Carbon

Responsible for emission reduction calculations, preparing monitoring report and periodical verification process.

Installation of meter and data monitoring will be carried out according to the regulations by TEIAS. Two metering devices (one of them used as spare) will be used for monitoring the electricity generated. Readings will be done using main metering devices and spare metering device will be used for comparison only. Emission reduction calculation is done by EPIAS (which is one of the TEIAS associations) records which are accessible using a password provided to electricity

generation companies. The records of EPIAS are prepared by using metering device using at transformer centre. There are also two more metering device in power plant and these devices (one of them used as spare) can be used to crosscheck the results of EPIAS records. All data will be kept for at least two years after the crediting period for QA/QC purposes.

The calibration and maintenance of the meters will be carried out in line with the By law on Metering and Metering Devices[28]. Accordingly, the meters are calibrated and sealed by TEIAS before the commissioning of the power plant. The meters will be calibrated by TEIAS when there is an inconsistency between two devices.

In addition to emission reductions, sustainable development indicators given in passport will be monitored by the project developer also as given in GS Passport.

B.8. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

Mehmet Kemal Demirkol (Date of Completion: 07/08/2017
GTE Carbon (http://www.gtecarbon.com)

Telephone:+90 312 472 35 00
Fax:+90 312 472 33 66
E-mail: kemal@gtecarbon.com

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

11/04/2016 (capacity extension construction agreement date)

C.1.2. Project implementation has started in 01/03/2009 (start date of construction).

C.1.3. Expected operational lifetime of project activity

The expected economic lifetime of the project is more than 50 years; however, as per the generation license issued, project will be operated by project proponent for about 45 years after the construction and delivered to Government at the end of license period.

C.2. Crediting period of project activity

C.2.1. Type of crediting period

Renewable crediting period is chosen for the project activity.

C.2.2. Start date of crediting period

This is the second crediting period of the project. Crediting period will start on 23/11/2017and end on22/11/2024**.**

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

EIA assessment for first phase of Ayyildiz Wind Power Plant Project has been prepared and submitted as defined by the regulations. The report has been approved by Ministry of Environment and Forestry (MoEF) on 18/09/2007. EIA assessment for second phase of the project has been

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

compelted and submitted to Ministry of Environment and Urbanization on 14/12/2015 and approved on 21/12/2015.

This report prepared for the project covers all aspects of the project including capacity, interaction with other plants in the vicinity, natural resources used, waste management, social and economical impacts, technology and materials used, current land use in the region, any historical or protected site within the project boundaries, geological assessment of the project site and any communities affected with the project.

There exists no settlement or agricultural activity in the project site. Project site is currently used as grassland for grazing activities by the local community. Grassland area has been expropriated partially for the project however; however it is still available to the local community for grazing activities.

After evaluation of the project and comments of local agencies, Ministry of Environment and Forestry has concluded that the project does not have significant environmental effects and approved the "EIA Exemption Letter".

As an electricity generation from renewable resources project, in addition to contributions to local community and sustainable development in the region, project will also contribute to environment and economic growth internationally since it will provide greenhouse gas emission reduction and create income for many people working in manufacturing of the turbines and validation process of the project.

D.2. Environmental impact assessment

No negative impact of the project activities has been identified. Land use, grazing or agricultural activities will not be affected negatively by the project activity. All necessary permissions including, environmental, health and safety, have been acquired from relevant agencies and all precautions have been applied strictly by Akenerji Elektrik Uretim AS.

Although the project is not on bird migration routes, impact of project on birds has been monitored and reported after commissioning of first phase which have been submitted during verification. No risk for birds have been identified as per the expert reports.

SECTION E. Local stakeholder consultation

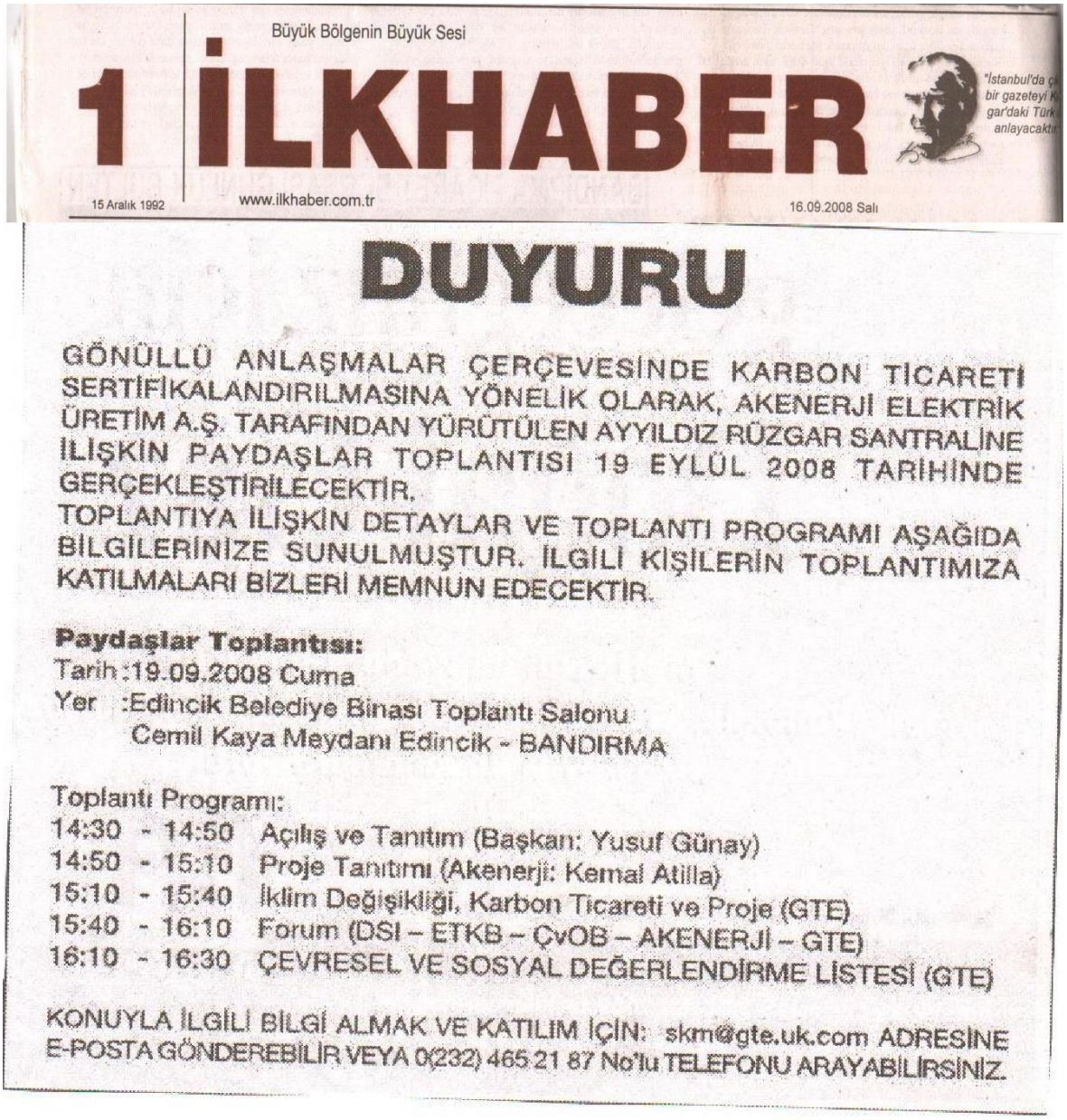
E.1. Solicitation of comments from local stakeholders

No new stakeholder meeting has been held as there exist no expropriation and new turbines are already within the vicinity of the existing project area.

For the first phase of the project, consultation meeting had been carried out as described below.

Local Stakeholder meeting of the project was held on September 19th, 2008 in Edincik Municipality Hall, in Bandirma, Balikesir. Stakeholders were invited through invitation letters sent by mail, newspaper announcements and thorough village heads.

Ministry of Environment and Forestry and Ministry of Energy and Natural Resources have been invited as representatives of National Government. In addition to local and national authorities, local, national and international NGOs have been invited and informed about the meeting by mail.



Büyük Bölgenin Büyük Sesi

1 İLKHABER

15 Aralık 1992 www.ilkhaber.com.tr 16.09.2008 Salı

"İstanbul'da ç... bir gazeteyi K... gar'daki Türk... anlayacakt...

DUYURU

GÖNÜLLÜ ANLAŞMALAR ÇERÇEVESİNDE KARBON TİCARETİ SERTİFİKALANDIRILMASINA YÖNELİK OLARAK, AKENERJİ ELEKTRİK ÜRETİM A.Ş. TARAFINDAN YÜRÜTÜLEN AYYILDIZ RÜZGAR SANTRALİNE İLİŞKİN PAYDAŞLAR TOPLANTISI 19 EYLÜL 2008 TARİHİNDE GERÇEKLEŞTİRİLECEKTİR.
TOPLANTIYA İLİŞKİN DETAYLAR VE TOPLANTI PROGRAMI AŞAĞIDA BİLGİLERİNİZE SUNULMUŞTUR. İLGİLİ KİŞİLERİN TOPLANTIMIZA KATILMALARI BİZLERİ MEMNUN EDECEKTİR.

Paydaşlar Toplantısı:
Tarih :19.09.2008 Cuma
Yer :Edincik Belediye Binası Toplantı Salonu
Cemil Kaya Meydanı Edincik - BANDIRMA

Toplantı Programı:
14:30 - 14:50 Açılış ve Tanıtım (Başkan: Yusuf Günay)
14:50 - 15:10 Proje Tanıtımı (Akenerji: Kemal Atilla)
15:10 - 15:40 İklim Değişikliği, Karbon Ticareti ve Proje (GTE)
15:40 - 16:10 Forum (DSİ – ETKB – ÇvOB – AKENERJİ – GTE)
16:10 - 16:30 ÇEVRESEL VE SOSYAL DEĞERLENDİRME LİSTESİ (GTE)

KONUYLA İLGİLİ BİLGİ ALMAK VE KATILIM İÇİN: skm@gte.uk.com ADRESİNE E-POSTA GÖNDEREBİLİR VEYA 0(232) 465 21 87 No'lu TELEFONU ARAYABİLİRSİNİZ.

Figure 6. Newspaper announcement dated on 16th of September for first SC meeting of Ayyildiz WPP

Ayyildiz WP's Local Stakeholder Meeting was held on 19th of September, 2008 in Edincik at Municipality Hall. The meeting has been held between 14:00 and 16:00 and some 70 minutes dedicated to the presentation. Content of the meeting: presentation about the project, climate change and carbon markets.
After opening speech, Mr. Ahmet HATIPOGLU, Project Manager of Ayyildiz WPP introduced the project and gave detailed info. Later, Ms. Sevilay TOPCU, Carbon Trade Project Coordinator of GTE, made a presentation related to climate change, carbon trade and contribution of the project to environment and sustainable development. At the end of presentations, participants' questions have been replied by Mr. Ahmet HATIPOGLU, Ms. Sevilay TOPCU and Mr. Kemal ATILLA, Projects Coordinator of Akenerji and Mr. Brian P de Thorpe Millard from GTE.

Figure 7. Stakeholder Meeting / Presentation by Ahmet HATIPOGLU

Local Stakeholder consultation meeting has been recorded on video and minutes have been noted. Comments have also been requested from government agencies and invitees by letters sent by mail.

E.2. Summary of comments received

The comments from stakeholder have been positive in general. Details of the questions and comments raised during the meeting will be submitted together with the PDD during validation. The main concern was related to the located grassland project. Other main issue was about icing of blades which has been replied during the meeting also.

E.3. Report on consideration of comments received

AKENERJI ELEKTRIK URETIM AS. has taken into account all comments and in general replied positively to the concerns and comments by the participants. Project owner has declared the intention for use of the project site as a grassland for grazing activities. This has also been confirmed during site visits and also pictures taken after commissioning of the project.

Figure 4. Grazing in project site after commissioning of the project

About icing of the blades in winter times and harming the animals during grazing, it has been stated by the project owners considering the average temperatures of the project site, that there has never been a case where such an event has happened. Also, since in very cold weathers there won't be any grazing activity in the outdoor and animals will be kept in sheds in winter times. Also, after commissioning of the plant, no such

SECTION F. Approval and authorization

Project is already registered as a GS-VER project and first crediting period has been completed. Since Turkey does not have a cap and trade system or issue approval letter, no authorization or approval is needed.

Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	AKENERJI ELEKTRIK URETIM AS.
Street/P.O. Box	Miralay Sefik Street
Building	15
City	Istanbul
State/Region	-
Postcode	-
Country	Turkey
Telephone	(0090) 212 249 82 82
Fax	(0090) 212 249 73 55
E-mail	info@akenerji.com.tr
Website	http://www.akenerji.com.tr
Contact person	
Title	Manager
Salutation	Mrs.
Last name	Palabıyık
Middle name	-
First name	Özlem
Department	Strategy
Mobile	-
Direct fax	(0090) 212 249 82 82
Direct tel.	(0090) 212 249 73 55
Personal e-mail	-

Project participant and/or responsible person/ entity	☐ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	GTE CARBON
Street/P.O. Box	Ehlibeyt Mah 1259. Sokak
Building	7/2
City	Ankara
State/Region	-
Postcode	06520
Country	Turkey
Telephone	+90 312 472 35 00
Fax	+90 312 472 33 66
E-mail	gte@gtecarbon.com
Website	www.gtecarbon.com
Contact person	Mehmet Kemal Demirkol

Title	Director
Salutation	Mr.
Last name	Demirkol
Middle name	Kemal
First name	Mehmet
Department	Management
Mobile	-
Direct fax	+90 312 472 35 00
Direct tel.	+90 312 472 33 66
Personal e-mail	kemal@gtecarbon.com

Appendix 2. Affirmation regarding public funding

No public funding is used for the project activity

Appendix 3. Applicability of methodology and standardized baseline

Applicability of project activity is given in Section B.2

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

Data used in calculation of OM for Turkish Electricity Grid gathered by TEIAS and all the relevant data is shared both in report (related parts) and also in emission reduction calculation excel sheet.

Table 1. Emission factor, net calorific value, generation efficiency and total emission for between 2013 and 2015 of fossil fuel data

Fuel Type	Emission Factor ($EF_{CO2,i}$)	Generation Efficiency[29] ($\eta_{m,y}$)	Emission Factor of Power Unit ($EF_{EL,m,y}$)	Net Calorific Value
	tCO_2/Gj	%	tCO_2/MWh	GJ/t or Gj/1000 m3 (for gas)
Coal	0.0895	45.0%	0.716	23.95
Lignite	0.0909	35.5%	0.922	7.17
Fuel Oil	0.0755	46.0%	0.591	42.53
Diesel Oil	0.0726	46.0%	0.568	43.79
LPG	0.0616	39.5%	0.561	0.00
Naphtha	0.0693	39.5%	0.632	0.00
Natural Gas	0.0543	60.0%	0.326	37.48

Table 2. Net electricity generated and delivered to the grid by all power sources serving the system (low-cost/must run power plants are not included)

2013	171,166,713
2014	198,349,070
2015	178,430,451
Total between 2013-2015	547,946,234

[29] "Tool to calculate the emission factor for an electricity system" version 06.0

Table 3. Amount of fuels used for electricity generation

Fuel Type	Fuel Consumption ($FC_{i,y}$)			
	2013	2014	2015	Total 2013-2015
	Ton or 1000 m_3 (for gas)			
Hard Coal	12,105,930	14,501,934	16,629,492	43,237,356
Lignite	47,120,306	57,696,139	49,940,131	154,756,576
Fuel Oil	573,534	754,283	516,912	1,844,729
Diesel Oil	129,359	119,988	238,388	487,735
LPG	0	0	0	0
Naphtha	0	0	0	0
Natural Gas	22,909,746	25,426,014	20,914,868	69,250,628

Table 4. Imported electricity, internal consumption, net and gross thermal generation for the years 2013, 2014 and 2015

Year	Internal Consumption[30]	Gross Thermal Generation[31]	Net Thermal Generation	Import[21]	Total (EG_y)
	GWh	GWh	GWh	GWh	GWh
2013	4.7%	171,812.50	163,737.31	7,429.40	171,166.71
2014	5.0%	200,416.60	190,395.77	7,953.34	198,349.11
2015	4.5%	179,366.44	171,294.95	7,135.50	178,430.45
TOTAL					**547,946.23**

Table. Most recent capacity additions corresponding to 20%

[30] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Elektrik Enerjisi Üretim Tüketim ve Kayıplarının Yıllar İtibariyle Gelişimi (1993-2015)

[31] https://teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri/2015 Türkiye Brüt Elektrik Enerjisi Üretiminin Üretici Kuruluşlar ve Birincil Enerji Kaynaklarına göre Yıllar İtibariyle Gelişimi (2006-2015)

Fuel Type	Electricity Generated (EGm,y)	Emission Factor of Power Unit ($EF_{EL,m,y}$)	Share in Total Generation
	Total for between 2013-2015 (MWh)	tCO_2/MWh	%
Coal	20,769.1	0.826	38.0%
Lignite	830.8	0.839	1.5%
Fuel Oil	0.0	0.688	0.0%
Diesel Oil	0.0	0.662	0.0%
LPG	0.0	0.561	0.0%
Naphtha	0.0	0.632	0.0%
Natural Gas	19,860.0	0.326	36.3%
Renewable (Biomass, wastes, Hydro, wind, geothermal)	13,177.8	0.0	24.1%
Total	54,637.7		**100.0%**

Appendix 5. Further background information on monitoring plan

N/A

Appendix 6. Summary of post registration changes

N/A

Appendix 7. Generation Licence

T.C.
ENERJİ PİYASASI DÜZENLEME KURUMU

E P D K

ÜRETİM LİSANSI

Bu Lisans kapsamındaki üretim tesisi Yenilenebilir Enerji Kaynağı kullanmaktadır.

Lisans No : EÜ/973-2/739

Tarih : 09/11/2006

Bu Lisans, **Akenerji Elektrik Üretim Anonim Şirketi'**ne, Balıkesir İli, Bandırma İlçesi'nde kurulacak olan **Ayyıldız RES** üretim tesisinde 09/11/2006 tarihinden itibaren 49 yıl süreyle, üretim faaliyeti göstermek üzere 4628 sayılı Elektrik Piyasası Kanunu ve ilgili mevzuat uyarınca Enerji Piyasası Düzenleme Kurulu'nun 09/11/2006 tarihli ve 973-2 sayılı Kararı ile verilmiştir.

Hasan KÖKTAŞ
Başkan

Bu lisans, genel ve özel hükümleri ile ayrılmaz bir bütündür.

ÖZEL HÜKÜMLER

1- Üretim tesisine ilişkin bilgiler

Bu lisans, **Akenerji Elektrik Üretim Anonim Şirketi**'ne ait ve bilgileri aşağıda yer alan üretim tesisi için verilmiştir:

İli	: Balıkesir
İlçesi	: Bandırma
Bildirim adresi	: Nispetiye Cad., Akmerkez Tic. Mrk., E-3 Blok, Kat:14-15, Etiler - İSTANBUL
Tesis tipi	: Yenilenebilir
Enerji kaynağı	: Rüzgar
Ünite sayısı	: 9 adet
Ünite kurulu gücü	: 5×3.000 kW 4×3.300 kW
Tesis toplam kurulu gücü	: 28,2 MWm/28,2 MWe
Öngörülen ortalama yıllık üretim miktarı	: 98.700.000 kWh/yıl
Sisteme bağlantı noktası ve gerilim seviyeleri	: Bandırma II TM, 34,5 kV bara
Tesis tamamlanma süresi	: 15 MWe işletmede, 29/12/2015 tarihinden itibaren 30 ay
Tesis tamamlanma tarihi	: 15 MWe işletmede, 29/06/2018

2- Lisansın yürürlüğe girmesi

Bu lisans, 09/11/2006 tarihinde yürürlüğe girer ve lisans sahibinin bu Lisans kapsamındaki hak ve yükümlülükleri, lisansın yürürlük tarihinden itibaren geçerlilik kazanır.

3- Lisansın süresi

Bu lisans, yürürlük tarihinden itibaren 49 yıl süreyle geçerlidir.

4- Tüzel kişilikte yüzde on ve üzerinde doğrudan pay sahibi olan tüzel kişiler

Doğrudan Pay Sahibi Ortaklar:	Hisse oranı (%)
Akkök Sanayi Yatırım ve Geliştirme A.Ş.	40,86
Ömer DİNÇKÖK	11,57
Ali Raif DİNÇKÖK	11,57
Emniyet Ticaret ve Sanayi A.Ş.	10,38
Dolaylı Pay Sahibi Ortaklar:	Hisse oranı (%)
A.R.D Holding A.Ş.	13,62
Ö.D Holding A.Ş.	13,62
N.D.Ç Holding A.Ş.	13,62
Ömer DİNÇKÖK (Eşi Ayşegül ile çocukları Gamze, Ayça ve Mutlu DİNÇKÖK'ün ortaklık payları dahil)	25,1
Ali Raif DİNÇKÖK (Çocukları Raif Ali ve Alize DİNÇKÖK'ün ortaklık payları dahil)	25,2
Nilüfer ÇİFTÇİ (Çocukları Melis ve Mehmet Emin ÇİFTÇİ'nin ortaklık payları dahil)	13,6
Erol LODRİK (Çocukları İzer ve Vedat LODRİK'in ortaklık payları dahil)	8,1

5- Tesis yerine ait pafta adı/adları ile ünite koordinatları

1/25000'lik pafta adı: Bandırma-H19-b3

Ünite koordinatları:

	E	N
T1	574923	4467686
T2	575171	4467514
T3	575482	4468079
T4	575774	4467996
T5	576023	4467825

	E	N
T6	574655	4467279
T7	575542	4468554
T8	576049	4468376
T9	576361	4468359

Appendix 8. EIA-Exemption Document

Karar Tarihi : 21.12.2015
Karar No : 10383

T.C.
ÇEVRE ve ŞEHİRCİLİK BAKANLIĞI
Çevresel Etki Değerlendirmesi, İzin ve Denetim Genel Müdürlüğü

BALIKESİR VALİLİĞİ
Çevre ve Şehircilik İl Müdürlüğü

"ÇEVRESEL ETKİ DEĞERLENDİRME BELGESİ"

25 Kasım 2014 tarih ve 29186 sayılı Resmi Gazetede yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliğinin Ek-II listesinde yer alan "**Ayyıldız Rüzgar Enerji Santrali Kapasite Artışı**" projesi ile ilgili olarak inceleme-değerlendirme yapılmış ve Proje Tanıtım Dosyasında çevresel etkilere karşı alınması öngörülen önlemler yeterli görülmüştür. Ayrıca ÇED Raporu hazırlanmasına gerek bulunmadığı tespit edilmiş olup, söz konusu projeye ÇED Yönetmeliğinin 17. Maddesi gereğince Valiliğimizce "**Çevresel Etki Değerlendirmesi Gerekli Değildir**" Kararı verilmiştir.

Ahmet YILMAZ
Vali a.
Vali Yardımcısı

Proje Sahibi : Akenerji Elektrik Üretim A.Ş.
Projenin Yeri : İlimiz, Bandırma İlçesi Aldede Deliklitaş Mevkiinde (Mevcut 5 türbine 4 türbin ilavesi, toplam 9 adet türbin, Kapasitenin 15MWm'den 28,2MWm'ye çıkarılması