KARACABEY WIND POWER PROJECT, TURKEY

Document Prepared By Life İklim ve Enerji Ltd. Şti.

Project Title	Karacabey Wind Power Project
Version	02
Report ID	*1112*
Date of Issue	30/10/2018
Project ID	1569
Monitoring Period	21-10-2016 to 30-09-2018
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1 PROJECT DETAILS

1.1 Summary Description of the Project

The project of **Yalova Rüzgar Enerjisinden Elektrik Üretim Anonim Şirketi** (hereafter referred to as "**Yalova**"), **Karacabey Wind Power Project** (hereafter referred to as the "Project" or "**Karacabey WPP**"), involves installation and operation of 33.3 MWm/27.9 MWe[1] large-scale wind power plant by Energy Market Regulatory Authority (EMRA) and this licence was issued on 12th of November 2015.

The aim of the project is to generate electricity by the efficient utilization of the available wind energy by project activity replace the grid electricity, which is constituted of different fuel sources, mainly fossil fuels. The electricity produced by project activity result in emission reduction. Thus, the project has a significant contribution to climate protection and to sustainable development in the region.

The project activity contributed further dissemination of wind energy and extension of national power generation. Construction work started in 01/04/2016 and operation of the plant started on 21st October 2016 and have an operational life of 49 years[2]. The 1st phased implementation of the 6 wind turbines was on 21/10/2016, 2nd phased implementation of the 7 th - 10th wind turbines was on 07/12/2016. The 3rd and last phased implementation 11th and 12th wind turbine were on 16/03/2017.

First crediting period was started on 21/10/2016. Date of end of the first monitoring period was on 30/09/2018.

Total emission reduction achieved during this monitoring period is 96,378 tCO2e (for 21/10/2016-30/09/2018, 710 days). Generated net electricity achieved during this monitoring is 174,569 MWh.

Project has 12 turbines with unit capacity of 2500 Kw. The key parameters about the technical design of the selected model Nordex N100 are listed below in table.

Table 1: Technical specifications of Nordex N100 Turbines[3]

Specifications	**NORDEX N100/2.5**
Rated Power (kW)	2500
Rotor Diameter (m)	99.8
Num. of Blades	3
Swept Area (m²)	7823

[1] See; EIA Not Required Decision for 12 turbines
[2] Karacabey Generation License for 12 turbines
[3] See, Nordex Technical Description Document

1.2 Sectoral Scope and Project Type

The respective sectoral scope is scope 1: “Energy Industry – Renewable/Non-renewable Sources”. The installed capacity of the project is 27.9 MWe, thus it falls into a large scale project activity.

The project is not a grouped project.

1.3 Project Proponent

Yalova is the developer and owner of the Project.

Organization name	Yalova Rüzgar Enerjisinden Elektrik Üretim Anonim Şirketi
Contact person	Çağdaş Karakurt Ülkebay
Title	Project Manager
Address	Koru Mahallesi Akmeşe Sokak No:4 06810 Çankaya Ankara/Turkey
Telephone	+90 312 466 60 70 +90 549 466 60 73
Email	info@artienerji.com.tr cagdas@artienerji.com.tr

1.4 Other Entities Involved in the Project

The project documentation at hand was defined by Yalova in cooperation with Life İklim ve Enerji (PD consultancy).

Organization name	Life İklim ve Enerji Ltd. Şti.
Role in the project	Carbon Consultant
Contact person	Kerem Ziya Akdemir
Title	Assistant Expert
Address	Address: Oğuzlar Mah. 1377. Sk. No:19/9 Balgat, Çankaya/Ankara
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1.5 Project Start Date

The anticipated project start date was 21st of October 2016 which the project began generating GHG emission reductions or removals.

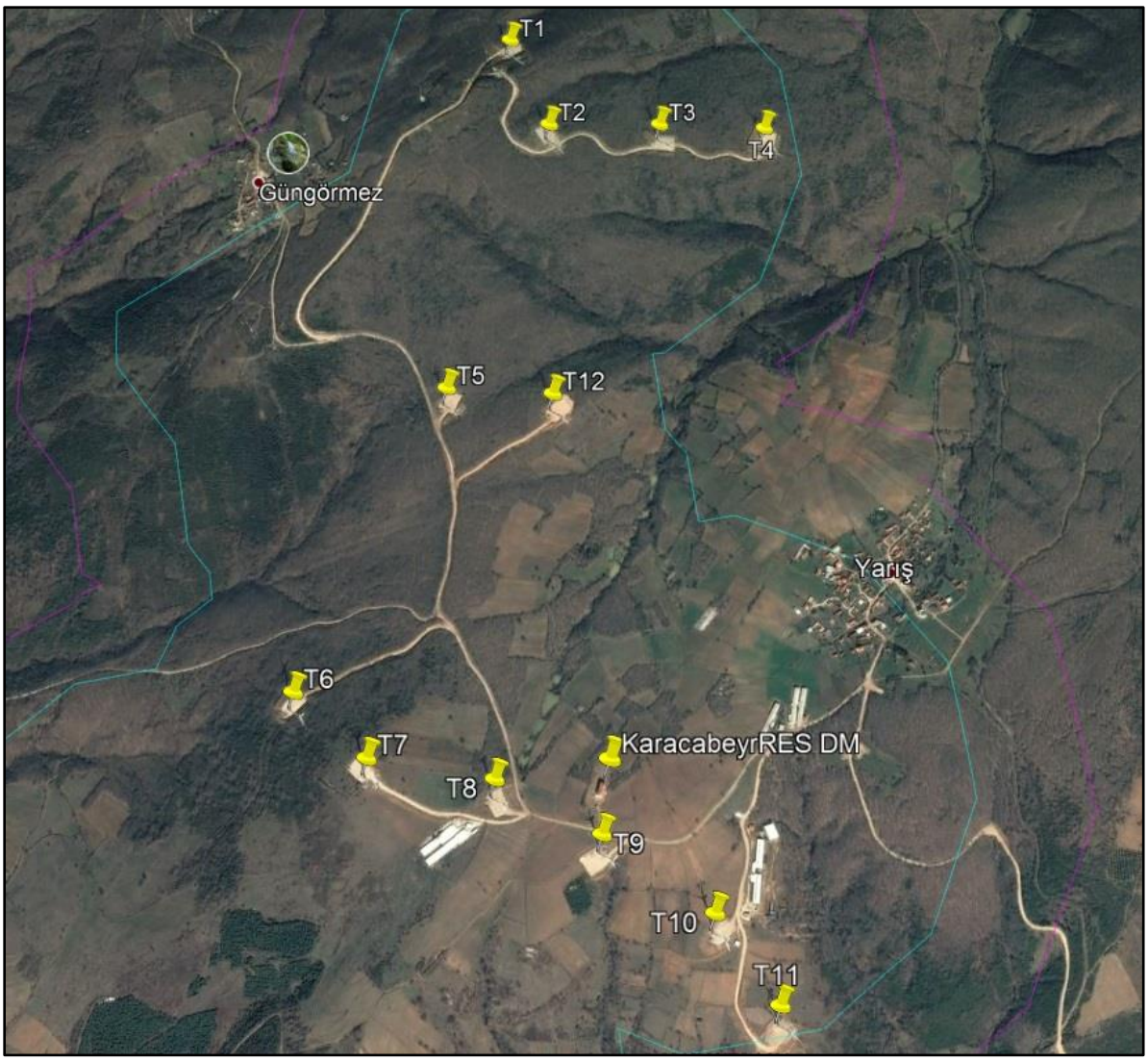
1.6 Project Crediting Period

A two times renewable crediting period of 10 years 0 month shall apply. First, verifiable emission reductions achieved on 21st October 2016. Thus the first crediting period shall last from 21st of October 2016 until 20th of October 2026.

1.7 Project Location

The project area is in Marmara region, Bursa province. The project is located in Karacabey and Kıranlar Village; Pelitdüzü, Çalbayır, Çataltepe. Moreover, the site of the project is located at Kıranlar Village and is situated on several hills, between Pelitdüzü, Çalbayır, Çataltepe. The closest settlement is Yarış Village by 743 m[4]. The project location is taken from the accepted licence. The Project description was prepared with the pre-license. Because of the technical problem and legislation, these coordination of the project is different than the project description.

[4] See, According to the distance between T10 and Yarış Village



Map 1: Location of Karacabey Wind Power Plant Project[5]

[5] See; Deutsche Wind Guard Consulting, Wind Assessment Report page 7

Table 2: Geographical coordinates of the wind turbines of the project activity[6]

Wind Turbine No.	Latitude (N)	Longitude (E)
1	40º 19' 09.6420''	28º 21' 30.8147''
2	40º 19' 00.8148''	28º 21' 36.9930''
3	40º 19' 02.3124''	28º 21' 50.1576''
4	40º 19' 03.3312''	28º 22' 02.9313''
5	40º 18' 34.6392''	28º 21' 28.8422''
6	40º 18' 07.0524''	28º 21' 16.8525''
7	40º 18' 02.0736''	28º 21' 26.2838''
8	40º 18' 01.3320''	28º 21' 39.8237''
9	40º 17' 57.7212''	28º 21' 51.7386''
10	40º 17' 52.3860''	28º 22' 04.2113''
11	40º 17' 45.7800''	28º 22' 11.6598''
12	40º 18' 35.0820''	28º 21' 40.9673''

1.8 Title and Reference of Methodology

For the determination of the baseline, the official methodology ACM0002 version 17.0.0, "Large-scale Grid-connected electricity generation from renewable sources"[7], is applied, using conservative options and data as presented in the following section. This methodology refers to five Tools, which are:

1. Tool to calculate the emission factor for an electricity system (Version 05.0.0)[8];

2. Tool for the demonstration and assessment of additionality (Version 07.0.0)[9];

[6] See, Generation License for Karacabey Wind Power Project (Convert UTM to Lat/Lon Coordinates), for unit conservation see; http://www.rcn.montana.edu/resources/tools/coordinates.aspx?nav=11&c=UTM&md=83&mdt=NAD83/WGS84&z=35&e=591938&n=4469295&h=N

[7] ACM0002 Version 17: (https://cdm.unfccc.int/filestorage/D/5/Y/D5YFS9I3VKBT18MQNGX0LPZ6U7AWCO/ACM0002_%28v17%200%29_clean.pdf?t=cEt8bzhodnhmfDB9LEc_AfNqpHkBqVvBVoqp)

[8] See; https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf

[9] See; http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

3. Combined tool to identify the baseline scenario and demonstrate additionality (Version 06.0.0)[10];

4. Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (Version 02.0.0)[11].

5. Tool to determine the remaining lifetime of the equipment[12]

For baseline calculation the first tool, for additionality assessment, the second tool is used. As the third tool is the combination of the first and second tool, it is not used. Since no project emission or leakage calculation is required for the wind power project fourth tool is not used, and finally to determine the remaining lifetime of the equipment fifth tool is used.

1.9 Other Programs

- The project does not participate/has not participated in any Emission Trading Programs and Other Binding Limits.

- The project does not participate/has not participated in any other GHG program.

1.10 Sustainable Development

The project helps Turkey to stimulate and commercialise the use of grid-connected renewable energy technologies and markets. Furthermore, the project demonstrates the viability of grid-connected wind farms which can support improved energy security, improved air quality, alternative sustainable energy futures, improved local livelihoods and sustainable renewable energy industry development. The specific goals of the project are to:

- reduce greenhouse gas emissions in Turkey compared to the business-as-usual scenario;
- help to stimulate the growth of the wind power industry in Turkey;
- create local employment during the construction and the operation phase of the wind farm;
- reduce other pollutants resulting from power generation industry in Turkey, compared to a business-as-usual scenario;
- help to reduce Turkeys increasing energy deficit;
- differentiate the electricity generation mix and reduce import dependency;
- contribute to the development of landscaping, reforestation, making investments, such as roads, various supports for village schools.

As the project developer, **Yalova** believes that efficient utilization of all kinds of natural resources with a harmony coupled with responsible environmental considerations is vital for the sustainable development of Turkey and the World. This has been a guiding factor for the shareholders towards the concept of designation and installation of a wind power project. Other than the objective of climate change mitigation through a significant reduction in greenhouse gas (GHG) emissions, the project has been carried out to provide a social and economic contribution to the region in a sustainable way. The benefits that are gained

[10] See; https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v6.0.pdf
[11] See; http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf
[12] See; http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf

by the realization of the project compared to the business-as-usual scenario can be summarized under some main indicators.

- For Environmental aspect, the project activities replace the grid electricity and avoid the greenhouse gas emissions (CO2, CH4) and other pollutants (SOX, NOX, particulate matters).

- In addition, the project helps to develop the wind power industry and encouraged to the investment in the industry. Thus, for economical aspect, Turkey's increasing energy deficit and import dependency are reduced.

- For social aspect, during the construction and operation of the wind farm, local employment is enhanced and local poverty and unemployment can be partially eliminated by increasing job opportunities and project business activities.

- Implementation of the project contributes to wider deployment and acceleration of the wind technology in local and national level.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

Karacabey WPP started to generate and provide electricity to the Turkish National Grid on 21/10/2016. During the monitoring period, there was no event or situation that occurred, which may impact the applicability of the methodology.

Table 1: Project Milestones

Date(DD/MM/YYYY)	Milestone
02/12/2011	Agreement with Carbon consultant (Life İklim ve Enerji)
28/12/2012	EIA Not Required Certificate for 15 turbines
11/07/2013	Wind Farm Energy Yield Assessment- Amendment (Karacabey)
08/11/2013	EIA Not Required Decision for 12 turbines
22/04/2014	Loan Agreement Date
01/04/2016	The date for start of construction (Field delivery record)
12/11/2015	Issuance of the Licence
25/11/2015	Nordex Agreement
21/10/2016	Start date of operation, the first crediting period and also the first monitoring period
22/02/2017	The registration date of the project
30/09/2018	End of the first monitoring period

2.2 Deviations

There are no project deviations in the monitoring plan of PD.

2.2.1 Methodology Deviations

N/A

2.2.2 Project Description Deviations

N/A

2.3 Grouped Project

N/A

2.4 Safeguards

2.4.1 No Net Harm

N/A

2.4.2 Local Stakeholder Consultation

During the registration of this project, there was no obligation to conduct a stakeholder consultation. As a result, the registered PD has no information regarding the stakeholder consultation nor no net harm.

N/A

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	**Gross electricity generation**
Data unit	MWh
Description	Gross Electricity supplied to the grid by relevant sources (2012-2014)
Source of data	Turkish Electricity Transmission Company (TEİAŞ), Annual Development of Turkey's Gross Electricity Generation of Primary Energy Resources (2012-2014) TEİAŞ http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/istatistik2014.htm
Value applied	See Validated VCS-PD, Table 11.
Justification of choice of data or description of measurement	TEIAS is the national electricity transmission company, which makes available the official data of all power plants in Turkey.

methods and procedures applied	
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	**$EF_{grid, CM, y}$**
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor for the project electricity system in the year 2014
Source of data	As per "Tool to calculate the emission factor for an electricity system"
Value applied:	0.5521 tCO_2/MWh
Justification of choice of data or description of measurement methods and procedures applied	As per "Tool to calculate the emission factor for an electricity system" Calculated from data provided by the TEIAS for Turkish Power Sector; Operating Margin = 0.6285 KgCO2e/KWh Build Margin = 0.3230 KgCO2e/KWh Combined Margin = 0.5521 KgCO2/KWh
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	**$EG_{facility,y}$**
Data unit	MWh/yr
Description	The quantity of net electricity generation by the project plant in a year
Source of data	Turkish Electricity Transmission Company (TEIAS), Annual Development of Electricity Generation- Consumption and Losses in Turkey (1984-2014) TEIAS, see http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/istatistik2014.htm (excel file number 35, 38, 28 are used for the calculation of the net electricity generated by relevant sources)
Value applied:	See Validated VCS-PD, Table 12 and Table 13.
Justification of choice of data or description of	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.

measurement methods and procedures applied	This data is used to find a relation between the gross and net electricity delivered to the grid by fossil fuel-fired power plants. (See **Error! Reference source not found.** in VCS-PD) Import and Export data is used to identify total net electricity fed into the grid in the years of 2012, 2013 and 2014. (See Table 13 in VCS-PD)
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$EF_{CO2,i,y}$
Data unit	tCO_2/GJ
Description	CO_2 emission factor of fuel type i used in year y
Source of data	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the IPCC Guidelines on National GHG Inventories. See http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Value applied:	See Table 16 and Table 19 in VCS-PD
Justification of choice of data or description of measurement methods and procedures applied	No plant-specific and national emission factor data is available in Turkey. So, IPCC default data is used. For Fuel Oil Power Plants: 'Gas/Diesel Oil' data is used for conservativeness. For Coal Power Plants: In the 205th page of official document given in the link below, it is stated that Çolakoğlu and İçdaş utilizes 'Taşkömürü' (Hardcoal). And at the Table-2 in page 157 of the same document, Taşkömürü is dived in two groups: Bituminous and Antharcite. Since Sub-Bituminous Coal is under Brown Coal in the same table and since Other Bituminous Coal has lower EF than Anthracite in 1.4 of IPCC Guidelines, EF for 'Other Bituminous Coal' is used. See: http://www.dpt.gov.tr/DocObjects/Icerik/4225/Enerji_Hammaddeleri_(Linyit_Taskomuru-Jeotermal)
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	**Sample Group for BM emission factor**
Data unit	Name of the plants, MW capacities, fuel types, annual electricity generations and dates of commissioning.
Description	Most recent power plants which compromise 20% of total generation
Source of data	Annual Development Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, TEIAS: http://www.teias.gov.tr/YayinRapor/APK/projeksiyon/KAPASITEPR SIYONU2011.pdf http://www.teias.gov.tr/YayinRapor/APK/projeksiyon/KAPASITEPR SIYONU2012.pdf http://www.teias.gov.tr/YayinRapor/APK/projeksiyon/KAPASITEPR SIYONU2013.pdf
Value applied:	See Table 21 in VCS-PD.
Justification of choice of data or description of measurement methods and procedures applied	TEIAS is the national electricity transmission company, which makes available the official data of all power plants in Turkey. The latest data available during PD preparation was for 2013.
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$\eta_{m,y}$
Data unit	-
Description	Average energy conversion efficiency of power unit m in year y
Source of data	Annex I the “Tool to calculate the emission factor for an electricity system”
Value applied:	See Table 16 in VCS-PD.
Justification of choice of data or description of measurement methods and procedures applied	For efficiency rates of Coal and Lignite Power Plants See Annex-1 of the Tool (highest rate is applied to be conservative)

	For Natural Gas and Oil plants efficiencies, default value given in the tool is applied: http://cdm.unfccc.int/methodologies/Tools/EB35_repan12_Tool_grid_emission.pdf
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	**$HV_{i,y}$**
Data unit	Mass or volume unit
Description	Heating Values of fuels consumed for electricity generation in the years of 2012, 2013 and 2014
Source of data	Heating Values Of Fuels Consumed In Thermal Power Plants In Turkey By The Electric Utilities, TEİAŞ. See: http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/istatistik2014.htm (excel file 52)
Value applied:	There is no national NVC data in Turkey. However, TEİAŞ announces Heating values of fuels. This data is used to calculate annual NCVs for each fuel type
Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	**$FC_{i,y}$**
Data unit	Mass or volume unit
Description	Amount of fuel type i consumed in the project electricity system in year y
Source of data	Annual Development of Fuels Consumed In Thermal Power Plants In Turkey by The Electric Utilities, TEİAŞ. See: http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2014/istatistik2014.htm (excel file 50)

Value applied:	See Table 18 in Validated VCS-PD.
Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	**$NCV_{i,y}$**
Data unit	TJ/Gg
Description	Net Calorific Value of fuel types in the years of 2012, 2013 and 2014
Source of data	Calculated by using HVi,y to FCi,y as Net Calorific Values of fuel types are not directly available in Turkey.
Value applied:	See Table 19 in Validated VCS-PD.
Justification of choice of data or description of measurement methods and procedures applied	TEİAŞ is the national electricity transmission company, which makes available the official data of power plants in Turkey.
Purpose of Data	Calculation of baseline emissions
Comments	-

3.2 Data and Parameters Monitored

Data / Parameter	**$EG_{facility,y}$**
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied to the grid in year y
Source of data	The data from the Electricity Meters are the basis for the settlement notification of PMUM. Data are gathered electronically from the meters by TEIAS and stored in secured website of PMUM, which is accessible to project developer with a private password. For monitoring, web screenshots of PMUM are used as source of data.
Description of measurement methods	• Two electricity meters are placed (one main and one reserve) at the substation. These meters are sealed by TEIAS and intervention

<table>
<tr><td>and procedures to be applied</td><td>by project proponent is not possible. The fact that two meters are installed in a redundant manner keeps the uncertainty level of the only parameter for baseline calculation low. High data quality of this parameter is not only in the interest of the emission reduction monitoring, but paramount for the business relation between the plant operator and the electricity buyers.

• Monthly settlement notifications of PMUM (Piyasa Mali Uzlaştırma Merkezi) consist hourly electricity production and withdrawn from the grid.

• Since the meters are reading electricity supplied to the system and withdrawn from the system separately, the net electricity amount supplied to the grid is calculated by electricity supplied minus electricity withdrawn which is taken from monthly settlement notifications.

The above-described measurement method follows Article 81 of the official regulation “Electricity Market Balancing And Settlement Regulation”[13]</td></tr>
<tr><td>The frequency of monitoring/recording</td><td>Annually</td></tr>
<tr><td>Value applied:</td><td>174,569.190 MWh

<table>
<tr><th colspan="2">Vintage</th><th>Electricity supplied to the grid (MWh)</th><th>Electricity consumption from the grid (MWh)</th><th>Net electricity supplied to the grid[MWh]</th></tr>
<tr><td>21/10/2016</td><td>31/12/2016</td><td>10,573.81</td><td>15.68</td><td>10,558.13</td></tr>
<tr><td>1/01/2017</td><td>31/12/2017</td><td>90,064.48</td><td>146.42</td><td>89,918.06</td></tr>
<tr><td>1/01/2018</td><td>30/09/2018</td><td>74,213.21</td><td>120.21</td><td>74,093.00</td></tr>
<tr><td colspan="2">Total</td><td>174,851.500</td><td>282.310</td><td>174,569.190</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment</td><td>Meters are in compliance with the communiqué for Metering Devices to be used in Electricity Market.</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>According to the Article 2 of the Communiqué of Meters in Electricity Sector[14]: ‘The meters to be used in the electricity market shall be compliant with the standards of Turkish Standards Institute or IEC and have obtained “Type and System Approval” certificate from the Ministry of Science, Industry and</td></tr>
</table>

[13] See, http://www.epdk.gov.tr/documents/elektrik/mevzuat/yonetmelik/elektrik/dengeleme_uzlastirma/DUYson.doc page 55

[14] See, http://www.epdk.gov.tr/documents/elektrik/mevzuat/teblig/elektrik/sayaclar_hakkinda/Elk_Tblg_Sayaclar.doc

Technology.' Therefore, Ministry of Science, Industry and Technology (Ministry) is responsible for control and calibration of the meters. Also according to Article 11 of this Communiqué, meters shall be in a class of 0.5s, which means error interval for measuring is in +-0.5% range which is well acceptable according to rules.

Paragraph b) of the Article 9 of the 'Regulation of Metering and Testing of Metering Systems'[15] (Regulation) of Ministry states that: ' b) Periodic tests of meters of electricity, water, coal gas, natural gas and current and voltage transformers are done **every 10 years**.' Therefore periodic calibration of the meters are done every 10 years.

Also according to Article 67 (page 20) of this regulation, the calibration shall be done in calibration stations which have been tested and approved by Ministry of Science, Industry and Technology. Article 10 d) of Communiqué requires the meters shall be three phase four wire and Article 64 of Regulation clearly states how calibration shall be performed for this kind of meters.

As above mentioned, the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan. In addition to that, the quantity of net electricity delivered to the grid is cross-checked with the meter reading records (OSF forms) provided to the company by TEIAS and internal reports provided to the head of the company by the plant manager.

The specification of meters are provided below:

Table 3: Specification of the electricity meters

Name	Serial Number	Brand - Model	Accuracy Class	Rated Frequency
Main Meter	51118076	Landis+Gyr - ZMD402CR4 4.0457.c2 S3	0.2 S	50 Hz
Backup meter	51118077	Landis+Gyr - ZMD402CR4 4.0457.c2 S3	0.2 S	50 Hz

First protocol date is 21/10/2016 for both of the meters.

Calibration date of the metering devices are 26/03/2015.

[15] See, http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.6381&MevzuatIliski=0&sourceXmlSearch=

Purpose of data	Calculation of baseline emissions
Calculation method	The net electricity is calculated by: a) Subtracting self consumption value from gross generation value for each month to find the net electricity supplied to the grid. b) Adding up all monthly net electricity values to calculate the total net electricity supplied to the grid during the monitoring period. c) Multiplying the total net electricity value with the CM emission factor.
Comments	-

3.3 Monitoring Plan

As the necessary baseline emission factors are all defined ex ante (Operating and Built Margin, see baseline description), the most important information to be monitored is the amount of electricity fed into the grid by Karacabey WPP. This value will be monitored continuously by metering devices, one of them being the main one in the substation, which provides the data for the monthly invoicing to TEİAŞ.

The collected data will be kept by Yalova during the crediting period and until two years after the last issuance of VERs for the Karacabey WPP activity for that crediting period.

Given a data vintage based on ex ante monitoring and selection of a renewable 10 year crediting period, the Combined Margin will be recalculated at any renewal of the crediting period using the valid baseline methodology.

Potential leakage emissions in the context of power sector projects are emissions arising due to activities such as power plant construction, fuel handling and land inundation. However, according to the methodology, those emission sources do not need to be taken into account.

Operational and Management Structure

As described before, there are two main factors important for the calculation of emission reductions. The only relevant data that have to be monitored is only net electricity generation ($EG_{facility,y}$) per year. Since project emission is zero no additional monitoring is required. The generation data are subject to the strict internal quality control systems of both parties.

As illustrated in Figure 6, a biologist, an administrative officer, electrical technicians, a forest engineer and mechanical technicians work under operation manager.

There are five electrical technicians working in the plant. They are responsible for monitoring the system, tracking the electricity generation and continuity, conducting electrical works like medium voltage and maintenance of electrical systems. At the end of the months, invoices are sent directly to head office and stored since accounting is carried out there. Invoice and agreement values are issued by EPİAŞ on the 15th of each month. In addition, invoice on distribution price is issued mutually with EPİAŞ.

There is a 10 year service agreement with Nordex whom provides mechanical technicians to the plant. Mechanical technicians are responsible for numerous aspects of turbines including maintenance, providing spare parts, repair works and SCADA remote monitoring system.

At the end of each monitoring period, from the invoices the net electricity generation amounts as calculated by electricity supplied to the grid minus withdrawn from the system, is added up to the yearly net electricity generation and total project emissions is subtracted from this amount and result data will be multiplied with the combined margin emission factor with the help of an excel spread sheet that also contains the combined margin calculation. Thus, the complete baseline approach is always transparent and traceable. For the elaboration and quality assurance of the monitoring report, Life Enerji, an expert in the project mechanisms who already supported in the project design, is assigned. However, in order to continue improving the monitoring procedures and therefore also the future monitoring reports, internal quality check shall be fulfilled by Life İklim ve Enerji. The monitoring reports are checked and in cases of mistakes and inconsistencies in the monitoring report, revisions with improvements shall be done. Furthermore, external year verification assures that the emission reductions calculations are transparent and traceable.

For the operation of Karacabey WPP, below hierarchy is planned:

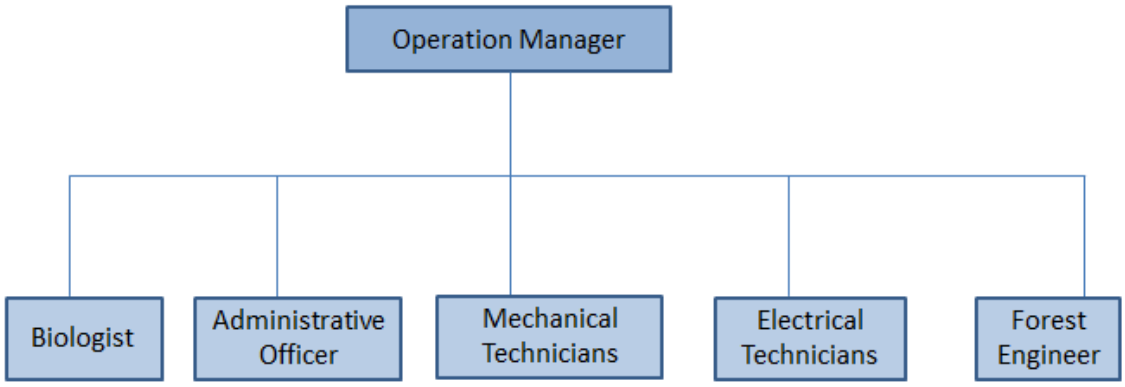


Figure 1: Operation and Management diagram

Yalova keeps all the data needed for the calculation of emission reductions during the crediting period and until two years after the last issuance of VCS for Karacabey WPP

Because of the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan. Dedicated emergency procedures are not provided, as there is no possibility of overstating emission reductions due to emergency cases.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline scenario is identified according to the "Baseline Methodology Procedure" of ACM0002 ver.17 (page 10). The project activity is the installation of a new grid-connected wind farm with 12 turbines and is not modification/retrofit of an existing grid-connected power plant. So, the first identification of this procedure is selected for proposed project activity, which is described as:
Used Formulas:
The total emission reductions can be calculated with the results of the below described equations. The emission reduction is equal to the baseline emissions minus project emissions and leakage emissions. Leakage emissions in this project are considered to be negligible. There are no project emissions in this kind of project. The general equation is as follows:

$$ER_y = BE_y - PE_y - L_y \quad \textbf{(1)}$$

Where:
ER_y = Emission reduction
BE_y = Baseline emissions
PE_y = Project emissions
L_y = Leakage
y = Refers to a given period

The electricity meters are measuring two parameters: The electricity supplied to the grid (EGexport) and the electricity consumption from the grid (EGimport). To achieve the net amount of supplied electricity, the difference has to be calculated:

$$GEN_y = EGexport - EGimport \quad \textbf{(2)}$$

Where:
GEN_y = Net electricity supplied to the Grid in MWh
EGexport = Electricity supplied to the Grid in MWh
EGimport = Electricity consumption from the Grid in MWh

According to the applied methodology version the emission reduction is the baseline emissions calculated as the net electricity supplied to the grid multiplied by the grid emission factor.

$$BE_y = GEN_y * EF \quad \textbf{(3)}$$

Where:
BE_y = Baseline emissions in tonnes CO_2e
EF = Grid emission factor for the electricity displaced due to the project activity during the year y [tCO_2e/MWh].
GEN_y = Net electricity supplied to the Grid in MWh (ID 1)
y = Refers to a given period

4.2 Project Emissions

The proposed project activity involves the generation of electricity by development of a wind farm. The generation of electricity does not result in greenhouse gas emissions and therefore is taken as 0 tCO2/year

4.3 Leakage

LEy is 0, as it is not considered according to ACM0002. PEy is 0 because project is a wind power generation activity (Only for geothermal and Hydro project activities, it should be considered according to ACM0002).

4.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
21/10/2016	455	0	0	455
Nov.16	2,068	0	0	2,068
Dec.16	3,307	0	0	3,307
Sum 2016*	5,829	0	0	5,829
Jan.17	4,797	0	0	4,797
Feb.17	4,714	0	0	4,714
Mar.17	3,876	0	0	3,876
Apr.17	2,017	0	0	2,017
May.17	3,876	0	0	3,876
Jun.17	2,050	0	0	2,050
Jul.17	6,152	0	0	6,152
Aug.17	7,685	0	0	7,685
Sep.17	3,319	0	0	3,319
Oct.17	2,894	0	0	2,894

Nov.17	2,416	0	0	2,416
Dec.17	5,848	0	0	5,848
Sum 2017*	49,643	0	0	49,643
Jan. 18	4,290	0	0	4,290
Feb. 18	4,858	0	0	4,858
Mar.18	4,643	0	0	4,643
Apr.18	2,832	0	0	2,832
May.18	3,640	0	0	3,640
Jun.18	3,927	0	0	3,927
Jul.18	2,677	0	0	2,677
Aug.18	8,604	0	0	8,604
Sep.18	5,435	0	0	5,435
Sum 2018*	40,906	0	0	40,906
TOTAL SUM	96,378	0	0	96,378

* Summation of 2016, 2017 and 2018 are rounded down.