



Final Report

Mid Size Sustainable Energy Financing Facility (MidSEFF)

Karadere Wind Power Plant: Non Technical Summary (NTS)

January 2014

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European Bank for Reconstruction and Development

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The European Bank for Reconstruction and Development (EBRD) launched in January 2011 a financing facility aimed at scaling up Renewable Energy and Energy Efficiency investments in Turkey, to increase the country's energy savings and decrease its carbon emissions. The Turkish Mid Size Sustainable Energy Financing Facility (MidSEFF) launched by the EBRD with support from the European Investment Bank (EIB) and European Commission (source of the Technical Cooperation funds) will provide a total of EUR 1 billion in loans through 7 Turkish banks for on-lending to private sector borrowers.

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1. Project Description

The 15 MW Gunaydin wind farm is located in District Kırklareli Province of Turkey in the Marmara Region. The Project site is located on a series of low hills at the South-East of Karadere Village and West of Armutveren Village. The Project site is approximately 5 km far from the Bulgarian borderline and approximately 30 km from the Kırklareli city centre.

It is planned to generate an annual average of about 53.214 GWh/year with a total installed power of about 15 MW based on a 10 x 1.6 MW generators configuration

The wind farm will be connected to the Pınarhisar 154kV substation with an overhead line with a length of 33.7 km.

The construction was planned to start at the beginning of November 2012 while the plant starting operation date is expected to occur on 1st September 2013.

The electricity generation from the renewable plant will replace electricity from the national grid and enable reduction of 31,811 tonnes of CO₂ equivalent per year, as calculated for the base case scenario.

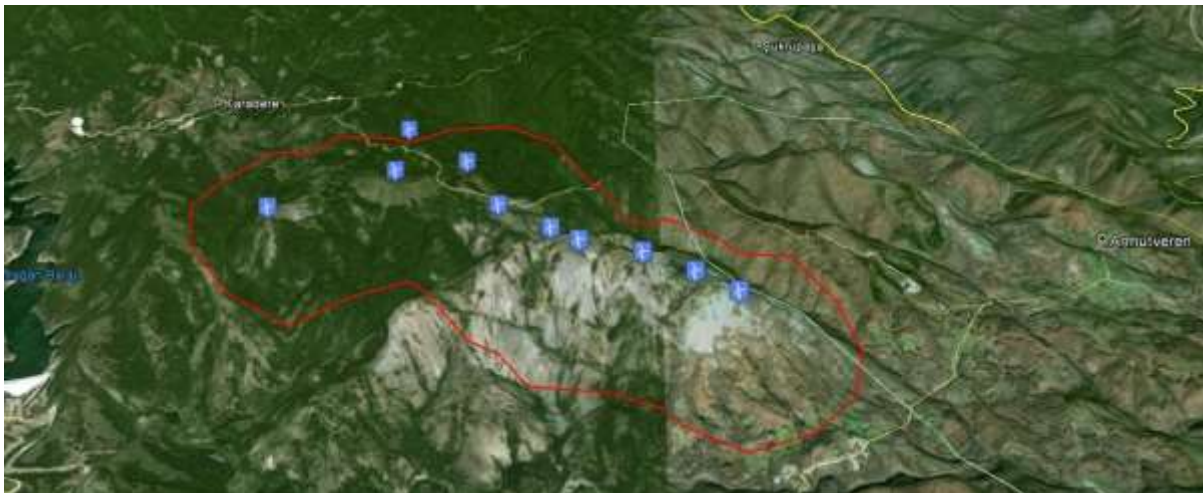


Figure 1.1: Territorial Framework and Karadereozbeyli Wind Power Plant Project Layout

1-1: Key project summary data

Project Name	Karadere Wind Power Project
Project Borrower	Aysu Elektrik Sanayi ve Ticaret A.Ş.
Project Sponsors	Fina Holding
EBRD Transaction	The total project cost is EUR 24,435,696 including capitalized financing costs. The proposed financial scheme includes debt financing in the amount of EUR 5,800,000 from MIDSEFF and EUR 14,000,000 as an ECA Loan and the borrower's own contribution in the amount of EUR 4,635,696. The debt to equity ratio is approximately 81:19. The investment will be completed in August 2013.
Project Description / Business Purpose:	<p>The Karadere Wind Power Plant (WPP) is planned to be constructed in Kırklareli Province of Turkey in the Marmara Region. The Project site is located on a series of low hills at the South-East of Karadere Village and West of Armutveren Village.</p> <p>The Karadere WPP will produce 53.214 GWh/year of net electricity based on a probability level of 75%. The overall capacity factor of the Karadere WPP is 41.3%.</p> <p>The electricity generation from the renewable plant will replace electricity from the national grid and enable reduction of 31,811 tones of CO2 equivalent per year, as calculated for the base case scenario.</p>
Installed Power	16 MWe curtailed at 15 MWe
Annual Electricity Production	53.214 GWh/year

2. Environmental and Social Baseline

2.1 Environmental description of the project area

The general terrain at the plant location and its surrounding can be described as complex owing to significant variation in orography across the site. The site lies in a hilly region with relatively cleared land on the hill top and areas of forestry and vegetation along the slopes and valleys. The presence of forestry across the site is significant.

No endemic, threatened or endangered flora and fauna species were identified in the Project site and its vicinity as a result of literature study. Since the Thrace Region is the connection point between Europe and Asia at the Bosphorus, an ornithological study and monitoring will be conducted in order to determine the potential effects of the Project on the population and the behavior of bird species during their migration both for the construction and the operation phases.

In accordance with the national environmental legislation, there are no national parks no reserves, natural monuments, wildlife protection/improvement area.

The project is located between a major and secondary migration route that crosses the Thrace and the Anatolian Peninsula from the North-West to the South-East as shown in Figure 2.1.



Figure 2.1: Wide Scale Bird Migration Routes

Table 2-1: Environmental characteristic

ENVIRONMENTAL ASPECTS	PRESENCE/DISTRIBUTION	COMMENTS
Land use	The project located within the forest area	Permits are received.
Waters surface	N.A	-
Protected area	N.A	-
Flora and Fauna	Shrubs and scrub vegetation dominate the project site and surrounding area. Located between mayor and secondary birds migration route.	70 km far away

2.2 Social condition of the project area

According to the year 2007 census the total population of the Kırklareli province were approximately 333,256 people, respectively.

The plant location is within the forest areas and there is no residential area in the project area. The closest receptor, Armutlu Village, is 4.06 km far away from the nearest turbine. Other residential areas close to the project site are Şükrüpaşa Village (5.41 km), Armağan Village (6.7 km), Çukurpınar Village (6.8 km), Sarpdere Village (7.48 km) and Karadere Village(7.6 km).

There is not a directly affected community as the Project site is located on a rural area.

At the project site and in close vicinity there is no place which is important historically, culturally and archeologically.

3. Social and Environmental Impact

3.1 Land Use

The Project will be located within forest areas. There are no private owned lands within the Project, no expropriation will be carried out; therefore there will be no resettlement.

All the lands belong to the MEoF of Turkey and no settlement on the project area. The first “Forest Permit” was received and the final “Forest Permit” will be received from Forestry General Directorate.

3.2 Water

There should be household waste waters both during construction and operation phase. This is generally employees’ daily waste. Based on the assumption that the daily domestic water requirement is 200 litres per capita, considering 40 employees during the construction phase and 12 employees during the operation phase, the domestic water requirement are respectively estimated to be 8 m³/day and 2.4 m³/day. Domestic waste waters generated by project workers will be collected in impermeable septic tanks constructed in line with Turkish regulation. These wastewaters will be collected by vacuum trucks of the Municipality of Kırklareli.

According to the above information the WPP project will not affect the water component.

3.3 Waste

The solid waste that is expected to be generated at Karadere WPP is excavation waste (from preparation of tower foundations) and domestic solid waste (paper, plastics, glass etc.). Daily domestic solid waste production is 1.34 kg per capita, for a total of 53.6 kg/day and 12 kg/day taking into account respectively 40 project workers during construction phase and 12 project workers during operation phase. The excavation waste (app. 12,708 ton) will be kept under cover during laying of the foundations (to prevent dust generation) and used as filling material for the same excavation holes. The domestic solid waste that cannot be re-used will be stored in containers on site and sent to Kırklareli Municipality’s disposal site regularly.

As maintenance for construction machinery and equipment will be carried out at the technical services, no waste oil is expected to be generated at the construction site.

Medical waste that may be generated on site due to accidents etc will be handling in compliance with the “Regulation of the Medical Wastes Control” dated 22.07.2005.

3.4 Birds and other species

The project is located between a major and secondary migration route. The selected turbines are designed in such a way that they minimize the impacts on the migrating or nesting birds and bats, as well as the feeding ones. Monitoring campaign on bird community for at least the first 2 years will be put in place.

3.5 Emissions: Noise and Particulate

Noise emissions will be generated during construction due to equipment/machinery operation. Noise emissions are expected during operation due to turbines working. A detailed study in the Project Information Report shows that the noise level for the nearest settlement, Armutveren Village which is abt. 4 km away from the nearest turbine, is acceptable. According to the PIR the level of noise is also acceptable for the other nearest receptors. Monitoring campaign could be put in place during operation in case.

Dust is generated from earth-moving and material storage, and air emission from the operation of construction machinery and equipment. The air-emissions are at acceptable levels and the sponsor is obliged to work under the related Turkish regulation (Evaluation and Management of Air Quality).

During operation minimal emissions can be appear not directly associated with plant operation but with traffic, maintenance etc. So it can be easily said that no relevant aspects both construction and operation phases for emissions.

3.6 Landscape

Landscape is usually a sensitive aspect for this kind of project. Although Karadere WPP is far enough from the visible/residential points, the sponsor ordered a photomontage to assess the impact on landscape from the points of view of the closest receptors/points. The result of this study was presented in the ESIA. At the end of this study no visual impacts were considered as significant.

Table 3-1: Impact Quantification

COMPONENT	IMPACT	QUANTIFICATION
Land use	<u>Different use of the land</u>	10.74 km ²
Water	<u>Utilization and Discharge</u>	8 m ³ /day during construction phase 2.4 m ³ /day during operation phase
Waste	<u>Production of solid waste</u>	1.34 kg/person/day (40 workers during construction and 12 workers during operation)
	<u>Excavation waste</u>	737 ton/turbine (vast amount of excavation waste is reused)
Birds and other fauna and flora species	<u>Interference with migration routes/interference with protected species-</u>	The project is located in between a major and secondary migration route. The selected turbines are designed in such a way that they minimize the impacts on the migrating or nesting of the birds and bats, as well as the feeding ones. Monitoring activity will be put in place.
Emissions	<u>Noise</u>	Construction phase < 70dBA (law limit = 70dBA) Operational phase=40dBA (law limit = 50dBA)
	<u>Particulate</u>	0.47 kg/h (law limit = 1.5 kg/h)
Landscape	<u>Changing in the aspect of the area</u>	A visual impact assessment and the photo-impact simulations supplied by the sponsor demonstrate as the impact of the project is negligible.

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