



Final Report

Mid Size Sustainable Energy Financing Facility (MidSEFF)

Ova Wind Power Plant: Non Technical Summary (NTS)

January 2015

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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 975 million in loans through 7 Turkish banks for on-lending to private sector borrowers.

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Table of Contents

1.	General Plant Description.....	4
2.	Environmental and Social Baseline	7
2.1	Environmental description of the project area.....	7
2.2	Social condition of the project area	8
3.	Social and Environmental Impact	9
3.1	Land Use	9
3.2	Water	9
3.3	Waste	9
3.4	Birds and other species.....	9
3.5	Emissions: Noise and Particulate.....	10
3.6	Landscape.....	10

1. General Plant Description

Ova Wind Power Plant (WPP) is a 15 MWe/18 MWm wind farm that is in the proximity of the border dividing the Provinces of İzmir (Ödemiş) and Aydın (Köşk). Ova WPP is located about 10 km southwest of Beydağ town (Ödemiş, İzmir Province) and 20 km north of Köşk (Aydın Province) in Aegean Region. The project area is spread over approximately 3.200 m in west-northwest - east-southeast direction on top of a hills ridge. Within the project area, elevations increase from West at 1.330 m to the eastern part at about 1.430 m.

Ova WPP will produce 43,634 MWh/year of net electricity based on a probability level of 75%. The overall capacity factor of the WPP is 38%.

The plant construction has been started on September 2014 and the operation is planned for June 2015.

The final configuration of the plant consists of 9 Gamesa (G97-2.0 MW) turbines with a selected tower height of 78 m agl, positioned in a single array approximately West/East along the top of a hill ridge.

The wind farm will be connected to the National Grid (at Nazilli TS) through a 31.5 kV overhead line with a length of about 21.2 km. The agreement for the connection to the National Grid was signed with TEİAŞ on March 28th, 2013.



Figure 1.1: General view of the plant layout

Table 1-1: Key project summary data

Project Name	Ova Wind Power Project
Project Borrower	Ayres Elektrik Üretim A.Ş.
Project Sponsors	Kardemir Haddecilik ve Elektrik Üretim Sanayi Ticaret Ltd Şti.
EBRD Transaction	The total project cost is EUR 21,171,141 including VAT, working capital, investment period interest, premiums and arrangement fees. The proposed financial scheme includes debt financing in the amount of EUR 16,357,000 and the borrower's own contribution in the amount of EUR 4,814,141. The debt to equity ratio is approximately 79:21. The investment duration will be 24 months approximately.
Project Description / Business Purpose:	<p>Ova Wind Power Plant (WPP) is a 15 MWe/18 MWm wind farm that will be constructed in the proximity of the border dividing the Provinces of İzmir (Ödemiş) and Aydın (Köşk).</p> <p>Ova WPP will produce 43,634 MWh/year of net electricity based on a probability level of 75%. The overall capacity factor of the WPP is 38%.</p> <p>The wind farm will be connected to the National Grid (at Nazilli TS) through a 31.5 kV overhead line with a length of about 21.2 km. The agreement for the connection to the National Grid was signed with TEİAŞ on March 28th, 2013.</p> <p>Ova WPP will produce green energy to be sold to the market with total expected annual revenues of EUR 3,476,204¹.</p> <p>The electricity generation from the renewable plant will replace electricity from the National Grid and avoid the emission of 24,871 tonnes of CO₂ equivalent per year, as calculated for the base case scenario.</p>
Installed Power	15 MWe/18 MWm
Annual Electricity Production	43,634 MWh/y

¹ Expected revenues for base case scenario. First full year of operation is 2016.

2. Environmental and Social Baseline

2.1 Environmental description of the project area

The project area consists of agricultural and forestry lands. Generally speaking the plant location area is in a natural status with no particular evidence of human structures and infrastructures. Turbine basement areas are mostly bushes and shrubs.

The observed birds are mostly summer time birds and endemic. In the project area, 67 bird species which belongs to 26 family were identified. All of them are listed under IUCN, least concerned (LC) category. Within the project site, no Specially Protected Areas, Natural Protection Areas, nor other significant areas (Special Bird Centres) for special bird species exist. The project site is far away from such special areas.

A map showing the bird migration routes in Turkey (Figure 2-1) shows, the project site is neither on the way of main migration routes of birds nor on the secondary migration routes.

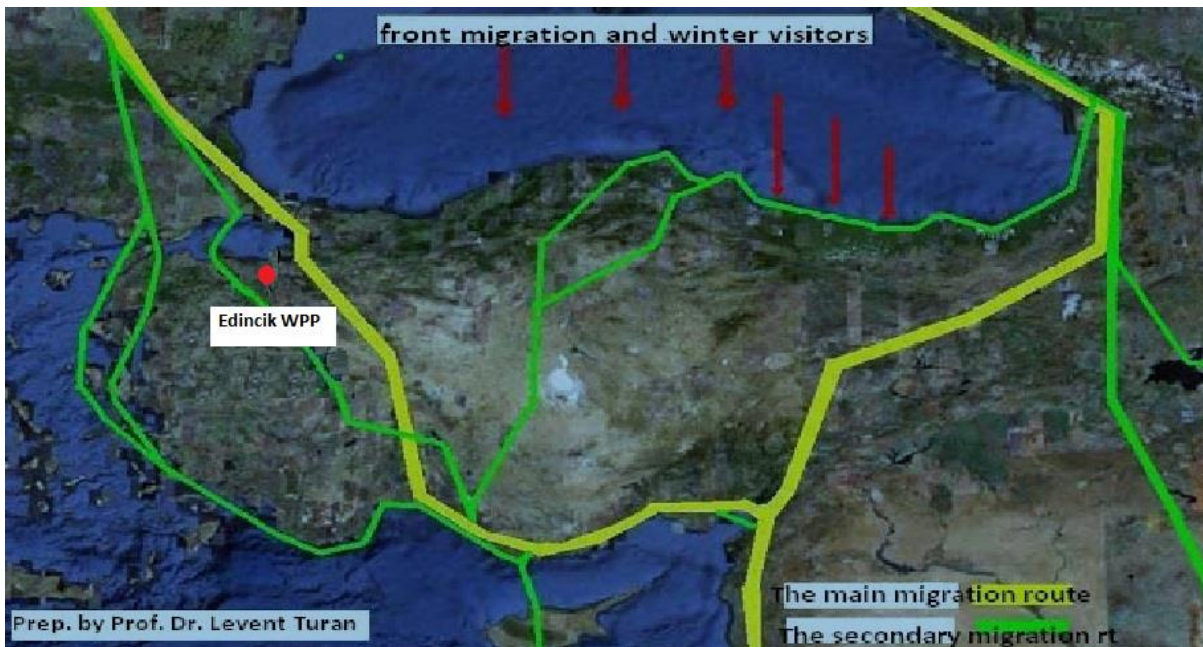


Figure 2.1: Wide Scale Bird Migration Routes (by Prof. Dr. Levent Turan)

Within the project site no Specially Protected Areas, Natural Protection Areas, nor other significant areas (Special Bird Centres) for special bird species exist. The project site is far away from such special areas.

At the project site, 101 flora species which belong to 32 tribes were identified. None of them are endemic. About reptiles and amphibians, 27 species were identified in the project area. One of them is listed in IUCN under VU category and the others are listed under IUCN under LC category.

Table 2-1: Environmental characteristic

ENVIRONMENTAL ASPECTS	PRESENCE/DISTRIBUTION	COMMENTS
Land use	The project area consists agricultural&forestry lands and private lands	Preliminary Forest Permits are received. All private lands had been purchased via bilateral agreements.
Water surface	-	-
Protected area	-	-
Flora and Fauna	101 flora species which	None of which is identified endemic

	belong to 32 tribes and 27 fauna species were identified.	or under protection.
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2.2 Social condition of the project area

Ova Wind Power Plant (WPP) is located in the proximity of the border dividing the Provinces of İzmir (Ödemiş) and Aydın (Köşk) about 10 km southwest of Beydağ town (Ödemiş, İzmir Province) and 20 km north of Köşk (Aydın Province) in Aegean Region. The project area is spread over approximately 3.200 m in west-northwest-east-southeast direction on top of a hills ridge. Within the project area, elevations increase from West at 1,330 m to the eastern part at about 1,430 m.

Sarıçam Village, located in Aydın Province, is the closest settlement to the Project site, located approximately 3,500 m away from closest WTG.

The site area is on hills in the proximity of the border dividing the Provinces of Aydın and İzmir. Vegetation on the site area is mostly shrub and bushes. The terrain of the site is rather plain where the turbines are planned to be located. Considering the surroundings of the site area there are some complexities like valleys, ridges and hills.

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

3. Social and Environmental Impact

3.1 Land Use

The project area consists of agricultural and forestry lands. The agricultural areas are named as “greenhouse” cultivation area, but the lands don’t bring any economic benefit which is emerged from trading. No cultivated area within project land had been observed. The sponsor has already purchased the privately owned lands which are within project area. The acquisition was made via bilateral agreements.

There is one scattered house in close proximity of one turbine (around 30 m) but it is summerhouse, which is used seasonally only daytime. There are no permanent settlements in the close vicinity of the project site. The nearest settlement is located abt. 3500 m far away from the closest wind turbine (Sarıçam Village).

3.2 Water

There should be household wastewater 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 10 employees during the construction phase and 10 employees during the operation phase, the domestic water requirement are estimated to be 2 m³/day. Domestic waste waters generated by project workers will be collected in impermeable septic tanks constructed in line with Turkish regulation.

The Sponsor will supply the needed water from the existing water networks which are available in the mid scale surroundings of the project site and carry via tankers to plant site.

As a consequence, the WPP project is not expected to have adverse effect on the water component.

3.3 Waste

The solid waste expected to be generated at Ova WPP is excavation waste (from preparation of tower foundations, excavation for cabling) and domestic solid waste (paper, plastics, glass etc.). Daily domestic solid waste production is 1.15 kg per capita, for a total of 11.5 kg/day taking into account 10 project workers both for during construction phase and operation phase. The recyclable waste will be displaced in separate waste containers. And will be sent to the Köşk Municipality’s landfill area.

The excavation waste will originate from turbine basement construction and cabling excavation (app. 14,600 m³) 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 will be stored in containers on site and sent to be dumped to an appropriate area guided by the Municipality.

Being the maintenance for construction machinery and equipment 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 Waste Control” dated 22.07.2005.

3.4 Birds and other species

As per Flora, within the project site, there is no species which are listed as endangered or protected under IUCN Red List of Threatened Species 2008 and in scope of Bern Convention and CITES. In the project site, 101 species which belongs to 32 tribes were identified. None of them are endemic.

About, 27 reptile and amphibian species were identified in the project area. In total 19 of them are listed under IUCN, LC category.

About birds, an ornithology study was prepared based on site observation on May 2012. The observed birds are mostly summer time birds and endemic. In the project area, 67 bird species which belongs to 26 families were identified. All of them are listed under IUCN, least concerned (LC) category.

The project site is neither on the way of main migration routes of birds nor on the secondary migration routes. There is no commitment regarding periodic bird monitoring within the supplied documentation.

The PC suggests bird monitoring campaign at least for the first 2-year of operation and the implementation of the measures stated in Ornithology Report.

Within the project site no Specially Protected Areas, Natural Protection Areas, nor other significant areas (Special Bird Centres) for special bird species exist. The project site is far away from such special areas.

During construction works, for the protected species, the migration and spawning periods will be avoided in accordance with what was committed within provided documentation.

3.5 Emissions: Noise and Particulate

Dust is generated from earth-moving and material storage, and pollutant emission to air from the operation of construction machinery and equipment. A study on PIR shows that emissions to air are at acceptable levels and the supplied documentation states that the sponsor will 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. During construction dust emission and exhaust emission will be emitted. Dust emission which will arise from construction activities is foreseen to be 0.33 kg/h. By considering the legal limit for dust emission which was set by Turkish Regulation on Industrial Air Pollution Control Exhaust is 1 kg/h, the expected dust emission during construction is acceptable.

During operation minimal emissions can be appear not directly associated with plant operation but with traffic, maintenance etc. During construction dust emission and exhaust emission will be emitted.

In this regard, it can be concluded that there is no adverse impact in terms of air emissions both during the construction and operation phases.

Noise emissions will be generated during construction due to equipment/machinery operation. During construction period the noise level is expected to be 37.54 dBA at the closest village which is 3500 m far from the project site.

Similarly, a study in the PIR (for 1.25MWx12 WTGs of old configuration) shows that noise emission will be 32.92 dBA during operation at the closest residential area which is at a distance of 3500 m to project site. Although a detailed study was carried out within PIR to forecast noise level in operational phase, no information is available about the noise level for the final configuration (9x2 MW WTGs). Also, during site visit, it was observed that approximately 30 m away from the closest turbine there is a summerhouse which will be affected during operational and construction period as per noise level.

It is recommended to conduct a noise monitoring campaign for taking into account the new capacity by including the nearest receptor both for the construction and operation phases to observe any deviation from standards and to implement necessary measures on time.

3.6 Landscape

Landscape is usually a sensitive aspect for this kind of project. The project area is on hills' ridge and is visible from some distances especially from Ovacık Yaylası Village; the consultant considers this aspect as potentially critical. The houses within the Village are mostly summer houses and the residents are available seasonally.

The consultant suggests to the sponsor the implementation of a dedicated study with regard to the updated configuration which includes the photo impact simulations from sensitive viewpoints (e.g. populated areas, scattered houses, school, hospital, highways etc.). In case of not negligible impact, some compensation/mitigation measures could be prescribed.

Table 3-1: Impact Quantification

COMPONENT	IMPACT	QUANTIFICATION
Land use	<u>Different use of the land</u>	App. 30 km ² (applied for forest permit)
Water	<u>Utilization and Discharge</u>	200 litres per capita daily, considering 10 employees during the construction phase and 10 employees during the operation phase, the domestic water requirements (and, consequently, discharge) are estimated to be 2 m ³ /day.
Waste	<u>Production of solid waste</u>	1.15 kg per capita, for a total of 11.5 kg/day taking into account 10 project workers both for during construction phase and operation phase
	<u>Excavation waste</u>	app. 14,600 m ³ (from turbine basement construction and cabling excavation) part of the waste will be used as filling earth
Birds and other fauna and flora species	<u>Interference with migration routes/interference with protected species-</u>	The plant location area is in a natural status with no particular evidence of human structures and infrastructures. Within the project site no Specially Protected Areas, Natural Protection Areas, nor other significant areas (Special Bird Centres) for special bird species exist. The project site is far away from such special areas. The project site is neither on the way of main migration routes of birds nor on the secondary migration routes. A bird monitoring campaign will be done at least for the first 2-year of operation.
Emissions	<u>Noise</u>	Construction phase: 37.54dBA (Law limit = 70dBA) Operational phase=32.92 dBA (Law limit = 50dBA)
	<u>Particulate</u>	0.33kg/h (law limit = 1.5 kg/h)
Landscape	<u>Changing in the aspect of the area</u>	No photo-simulation supplied by the sponsor demonstrate as the impact of the project is negligible, but in any case the PC requires a photo simulation prepared based on the finalized configuration and turbine coordinates considering significant or sensitive viewpoints.

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