



Final Report

Mid Size Sustainable Energy Financing Facility (MidSEFF)

Söke Wind Power Plant: Non Technical Summary (NTS)

December 2013

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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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00	December 2013	Final Report	S. Demir	M. Solari	M. Mancini

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1. General Plant Description

The 45 MW Söke wind farm is located in Aydın Province, 4 km to the South – West of Söke, at the Samsun Mountain in Aegean Region. The Project area covers the ridge entitled as Samsun Mountain that is peaking at 1,046 m a.s.l (Narlica Hill) on the West. The site is predominantly covered by forest while very few sections are covered by low scrub. The Pine species is the predominant with heights varying from 1 m to 25 m.

The construction of Söke Wind Power Plant (WPP) is planned to start in December 2013. The project is expected to start operation in July 2014.

The selected configuration adopts 15 turbines, each one rated 2,500 kW with a 90 meter rotor diameter mounted on a tower with an 90 meter hub height.

Söke WPP project has been granted with Energy Production License given by the Energy Market Regulatory Office (EMRA) on 04.01.2012. Table 1 presents the key aspects of the project.



Figure 1.1: General view of the area

Table 1-1: Key project summary data

Project Name	Söke WPP
Project Borrower	Söke Rüzgar Enerjisinden Elektrik Üretim Santrali Ltd. Şti
Project Sponsors	Bereket Enerji
EBRD Transaction	Total Project cost is EUR 48,167,325 including VAT, investment period interest, premiums and arrangement fees. The proposed financing scheme includes debt financing of EUR 27,300,000 (all financed through MIDSEFF) and borrower's contribution of EUR 20,867,325. The debt to equity ratio is approximately 57:43. The investment will be completed in the middle of 2014.
Project Description / Business Purpose:	The construction of Söke Wind Power Plant (WPP) will start in December 2013 and the plant is expected to start operation in July 2014. Söke WPP will produce 141.10 GWh/year of net electricity based on a probability level of 75%. The overall capacity factor of the Söke WPP is 38.5%. The electricity generation from the renewable plant will replace electricity from the national grid and enable reduction of 84,840 tonnes of CO ₂ equivalent per year, as calculated for the base case scenario.
Installed Power	45 MW
Annual Electricity Production	141,100,000 kWh

2. Environmental and Social Baseline

2.1 Environmental description of the project area

The plant location's terrain is characterized by a high steepness in the proximity of the turbine locations. The project is within a forestry area partly covered by low scrub and partly by pine trees. Due to the favourable wind conditions in the region, there are 2 licensed wind farms at a distance of 15 km to the proposed project.

Aydın Province and the Project site are located in the 1st Degree Seismic Zone according to the earthquake zones determined by the General Directorate of Disaster Affairs (GDDA).

About birds presence, the project is located abt. 30 km far from a secondary migration route that crosses the Thrace and the Anatolian as shown in the Figure below:



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

Bafa Lake Natural Park is 26 km away from project site and Dilek Peninsula Natural Park is 22 km away from the Project site.

According to a dedicated assessment done by a biologist on the site there are 52 flora species belonging to 27 families, none of which are endemic or under protection.

Table 2-1: Environmental characteristic

ENVIRONMENTAL ASPECTS	PRESENCE/DISTRIBUTION	COMMENTS
Land use/characteristic	The project area consists of forestry lands	Forest permit to be received
	The project area is a first degree area	-
Waters surface	Bafa Lake (26 km away), Dilek Peninsula (22 km away)	-
Protected area	<ul style="list-style-type: none"> Bafa Lake Dilek Peninsula Natural Park 	Letter of opinion from directorate of nature conservation and national parks to be received
Flora and Fauna	52 flora species which belong to 27 families, 7 bird species that 5 of them are protected under Bern	Bird monitoring during operation

	Convention	
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2.2 Social condition of the project area

According to the year 2007 census the total population of the Aydın province and Söke district were approximately 231,884 and 62,000 people, respectively.

The district lies between the Aegean coast and the edge of the fertile alluvial plain of the Büyük Menderes River. Lake Bafa is to the south of the district. The plain contains much rich agricultural land, one of Turkey's largest cotton growing areas and also important for wheat and flour. Other income comes from handicrafts, forestry and fishing. Söke is Turkey's only exporter of culinary snails.

The project area is hilly and in the vicinity of Yenidoğan township in Söke district close to Milas-Söke highway. The area in which the wind turbines will be constructed is not suitable in terms of agricultural activities.

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

3. Social and Environmental Impact

3.1 Land Use

All of the lands belong to the Ministry of Forestry and Forest permit is awaited to be obtained. There is no settlement on the project area.

3.2 Water

There should be household water waste both during construction and operation phase. This is generally employees' daily waste. Based on the assumption that the daily domestic water requirement is 150 litres per capita, considering 10 employees during the construction phase and 2 employees during the operation phase, the domestic water requirement are respectively estimated to be 1.5 m³/day and 0.3 m³/day. Domestic wastewater 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 Yenidoğan. As a consequence, WPP project will not affect the water component.

3.3 Waste

The solid waste that is expected to be generated at Söke WPP are excavation waste (from preparation of tower foundations) and domestic solid waste (paper, plastics, glass etc.). Daily domestic solid waste production is 1 kg per capita, for a total of 10 kg/day and 2 kg/day taking into account respectively 10 project workers during construction phase and 2 project workers during operation phase. The recyclable waste will be displaced in separate waste containers.

The excavation waste (app. 7,500 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 that cannot be re-used will be stored in containers on site and sent to an area where Municipality confirms to be dumped.

As maintenance for construction machinery and equipment will be carried out at the technical services, waste oil will be collected in specific storages temporary and will be sent to licensed disposal areas in compliance with the "Regulation on Control of Waste Oil".

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

3.4 Birds and other species

The project is in the wide area of secondary bird migration route and moreover 26 km far away there is the Bafa Lake that it's a very important birds' habitat. A baseline ornithology study was carried out and 7 bird species has been identified that 5 of them are protected under Bern Convention.

The sponsor should implement a monitoring campaign at least for the first two years to ensure the no interference with the birds migration.

3.5 Emissions: Noise and Particulate

Noise emissions are expected during operation due to turbines working. A detailed study in the project information report shows that it is acceptable level for the nearest settlements. The plant location is within the forest areas and there is no residential area very close to the power plant location. The closest dwelling unit is 650 m; the nearest house is 450 m distance to the closest turbine. According to the PIR the level of noise will be 37 dBA at 450 m distance to the nearest turbine in construction phase which is below the acceptable limit.

Noise emissions will be generated during construction due to equipment/machinery operation. A study in shows that noise emissions are acceptable levels (42.9 dBA) and the sponsor is obliged to work according to related regulations and all precautions will be taken by the sponsor before and during construction.

Dust 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 a sensitive aspect. Considering the nearest neighbourhood at 450 m of the Söke plant and the presence of one planned WPP and one in operation WPP around the project site of Söke WPP based on internet research, the PC suggested a photomontage study to assess the impact on landscape. This photomontage study will be shared with the locals during stakeholder meetings.

3.7 Seismic

The Project area is located in a tectonically active region, the basement design will be made by considering the value for effective ground acceleration coefficient (A0) as 0.40 as required by “Turkish Earthquake Regulation” and “Regulation about the Buildings that will be constructed on Earthquake Areas”.

Table 3-1: Impact Quantification

COMPONENT	IMPACT	QUANTIFICATION
Land use	Different use of the land	To be identified
Water	Utilization and Discharge	1.5 m ³ /day during construction phase 0.3 m ³ /day during operation phase
Waste	Production of solid waste	10 kg/day during construction 2 kg/day during operation
	Excavation waste	7,500 m ³ (vast amount of excavation waste is reused)
Birds and other fauna and flora species	Interference with migration routes/interference with protected species-	The project is located in the wide area of secondary migration route; a monitoring campaign will be done at least for the first two years to verify the real interference of the WPP with the birds' migration routes.
Emissions	Noise	Construction phase < 70dBA (law limit) Operational phase: No disturbance for the nearest receptors. Monitoring campaign is suggested for the first two years of operation.
	Particulate	< 1.5 kg/h (law limit) monitoring campaign

		suggested during construction phase
Landscape	<u>Changing in the aspect of the area</u>	The photosimulation including other WPPs around and also power line is needed to be done
Seismic	<u>Possible damage to the project due to earthquake</u>	A0 is taken 0.40 during basement design

MidSEFF Office

Asmadalı Sokak, No. 27

Kosuyolu

34718 Kadikoy, Istanbul

TURKEY

www.midseff.com