

ROTOR

ELEKTRİK ÜRETİM



Zorlu Plaza, 34310 Avcılar – İSTANBUL / TÜRKİYE

Tel: + 90 (212) 456-2300 Fax: +90 (212) 422-0099

www.zorlu.com.tr



NON-TECHNICAL SUMMARY OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE BAHCE WINDFARM PROJECT (135 MW)



Dokay Engineering and Consultancy Ltd.

Ovecler 4. Cadde No: 140/A 06460 Dikmen / Ankara -Turkey

Tel: +90 (312) 475-7131 • Fax: +90 (312) 475-7130

www.dokay.info.tr

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Bu rapor, ISO 9001:2000 Kalite Yönetim Sistemi ve ISO 14001 Çevre Yönetim Sistemi'ne uygunluğu 30160 ve 30161 numaralı sertifikalar ile Bureau Veritas tarafından belgelenmiş olan DOKAY Mühendislik ve Danışmanlık Ltd. Şti. tarafından hazırlanmıştır.
This report is prepared by DOKAY Engineering and Consultancy Ltd. Co. whose ISO 9001:2000 Quality Management System and ISO 14001 Environmental Management System are certificated by Bureau Veritas (Certificate No: 30160, 30161).

INTRODUCTION AND BACKGROUND

ROTOR Elektrik Uretim Ltd. (ROTOR), a wind farm developer and a subsidiary of Zorlu Energy Group, is planning to construct and operate a 135 MW wind farm (Project) in Bahce District of Osmaniye Province to the south of Turkey. The location of the Project in Turkey is given in Figure 1.

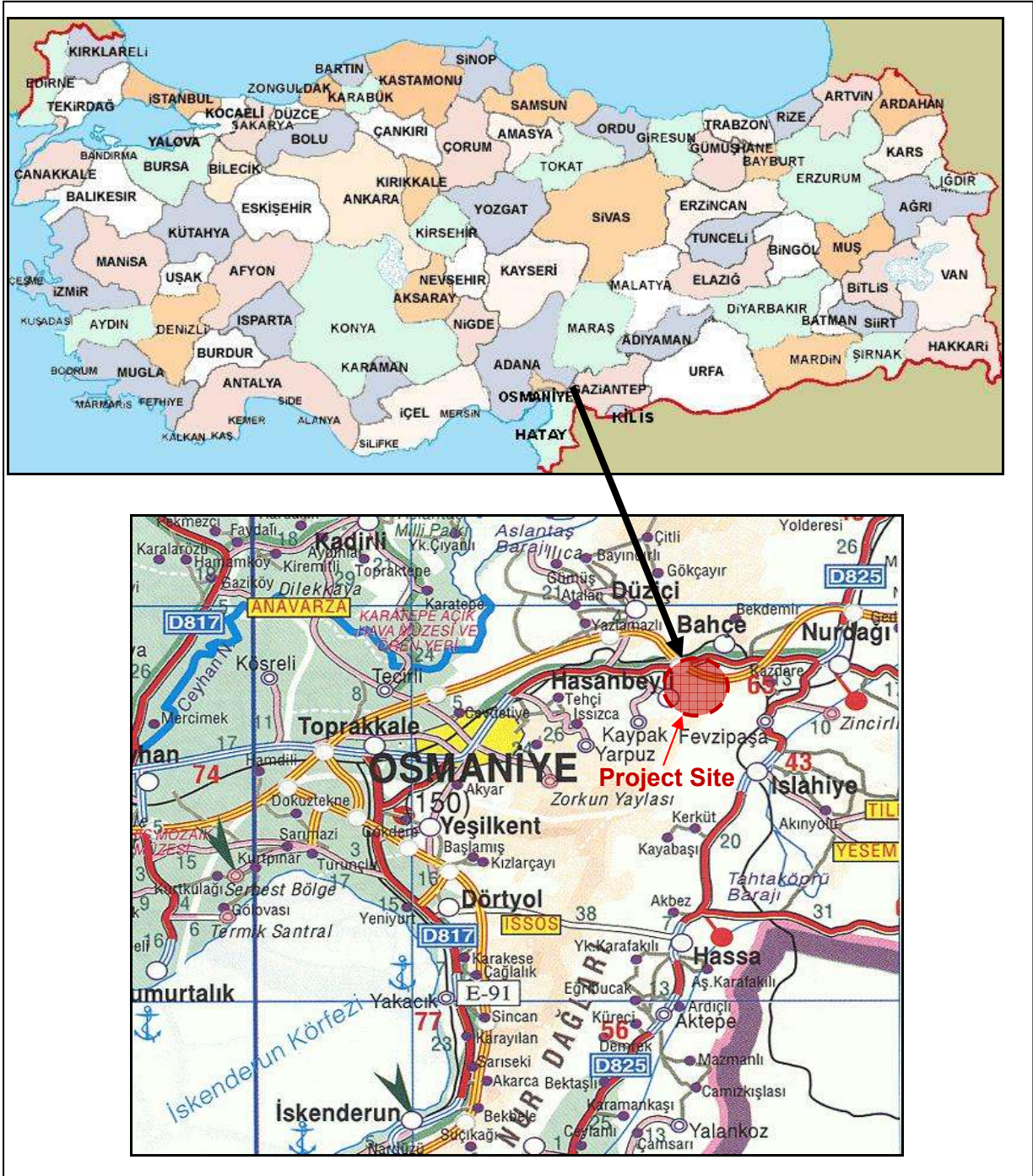


Figure 1 Location Map of the Osmaniye Bahce Wind Farm Project.

ROTOR is planning to obtain a loan for the Project from international lenders (including the International Finance Corporation, IFC, which is taking the lead for the environmental side of the financial/loan evaluation for the Project). In this regard, ROTOR has decided to prepare an Environmental and Social Impact Assessment (ESIA) report to meet the requirements of such lenders as the IFC. The ESIA has also been performed to ensure adherence to the EU Environmental Acquis, notably the EIA European Directive 85/337/EEC, as amended by Directives 97/11/EC and 2003/35/EC and the Habitats Directive 92/43/EEC as well as Natura 2000 Sites.

The ESIA process includes the following key elements:

- Consulting with stakeholders and introducing the ESIA.
- Listening to recommendations and concerns of local people near the Project Site.
- Determining legal requirements concerning the Project.
- Conducting environmental and social surveys in the Project Site and its vicinity.
- Developing a rehabilitation plan which describes the environmental impacts that may arise as a result of the Project activities and proposes pertinent mitigating measures.
- Developing a monitoring program to measure actual impacts of the Project.
- Preparing a rehabilitation plan

ROTOR aims to

- Develop a commercially viable wind park.
- Contribute to Turkey's total installed capacity for wind energy.
- Contribute to local and national economy.

The Osmaniye Bahce Wind Farm Project will significantly increase Turkey's wind generation capacity and will be the country's largest wind farm built up to date. It will contribute to addressing the Turkish power deficit and increase the country's power generation with an annual contribution of 512 GWh from clean renewable sources while supporting the rapidly growing national economy.

Once the Project gets into its operational phase, it will:

- Increase Turkey's electricity output from wind energy;
- Displace carbon emissions, reducing pollution and contribute to the effort to reduce global warming;
- By size and nature of the transaction, influence Turkey's ability to attract foreign investment in the renewable energy sector and position Turkey as an alternative emerging market destination for wind power investments; and
- Contribute to the development of merchant power operations and private sector investment in Turkey's energy sector.

THE PROPOSED PROJECT

The location of the Project is shown in Figure 2. The Project includes the construction and operation of:

- A number of 58 turbines to be purchased from GE, each with a power capacity of 2.5 MW, providing a total installed capacity of 135 MW;
- A 7-km long transmission line of 154 kV to Bahce Substation to connect to the national grid; and
- An approach road to the site.

Construction phase of the Project started in July 2008. Partial commissioning of the power plant will be in January 2009 with six turbines being put into operation per month. Commissioning of the power plant will be completed in August 2009. Project life time is 20 years.

The Project Site has been selected as a result of wind measurements carried out for a period of four years in the area when ROTOR was not owned by Zorlu Energy Group. In other words, the Project Site was selected by the original developers of the Project based on measuring masts erected at various locations within the site. The results of wind measurements confirmed that the area possesses good wind; and hence, the site has been selected. Connection to the national transmission line grid was also favorable, since there was a substation nearby with available connection capacity. Regarding the transmission lines, TEIAS¹ determines the final route for the connection, based on the preliminary routing design made by another consultant of the ROTOR, to the substation. TEIAS Routing Department considers the environmental sensitive areas, if any, on the route.

LEGAL FRAMEWORK

There are pieces of national legislation and IFC's Performance Standards (PS's) and Guidelines that the Project must comply with.

National Legislation

The main pieces of national legislation which affects the Project and hence the ESIA works in various different ways can be listed as:

- Law on Utilization of Renewable Energy Sources;

This Law encompasses the procedures and principles for the conservation of renewable energy resource areas, certification of the energy generated from these sources and the utilization of these sources.

¹ Turkish Electricity Transmission Authority.

In compliance with this law, the Project has been issued a “Generation License” by the Energy Market Regulatory Authority.

- Law on Forestry;

The Law states that the forest lands of the State, excluding those within tourism areas and centers, can be used by real persons and legal entities for installations which are for public benefit after obtaining the necessary permits from the MoEF and appropriate amounts of payments are made. The period of such a permit cannot exceed 49 years. All kinds of buildings and facilities other than the ones built by the State become the property of the State at the end of the permission period without any reservation.

- Law on Environment;

The Law on Environment is currently being revised and the new Law will come into effect in near future. However, it is highly likely that the EIA Regulation will continue its significance in terms of project acceptability in general.

The Osmaniye Bahce Wind Farm Project is within the context of Annex-II. Hence, a PIF was prepared. This PIF was approved by the Osmaniye PDoEF. With this approval, the EIA process of the Project was completed. According to Article 17 of the EIA Regulation (both the most recent version as well as the one before), the construction of the Project should commence within five years after the receipt of the “EIA Not Required” certificate. Otherwise, the EIA process should be restarted.

IFC PS's and Guidelines

IFC applies Performance Standards (PS's) to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in its member countries eligible for financing. The Performance Standards may also be applied by other financial institutions electing to apply them to projects in emerging markets. In general, an investment funded by IFC has to meet the following PS's throughout the construction and operation phases of the project:

- PS1: Social and Environmental Assessment and Management System;
- PS2: Labor and Working Conditions;
- PS3: Pollution Prevention and Abatement;
- PS4: Community Health, Safety and Security;
- PS5: Land Acquisition and Involuntary Resettlement;
- PS6: Biodiversity Conservation and Sustainable Natural Resource Management;
- PS7: Indigenous Peoples; and
- PS8: Cultural Heritage.

A due diligence study was carried out in order to determine which of the above PS's are of significance for the Project. In this context, the potential environmental and social impacts of the Osmaniye Bahce Wind Farm Project should be managed in a manner consistent with the following PS's of the IFC:

- PS1: Social and Environmental Assessment and Management Systems;
- PS2: Labor and Working Conditions;
- PS3: Pollution Prevention and Abatement; and
- PS4: Community, Health Safety and Security.

The IFC documents of April 30, 2007 titled as "Environmental, Health, and Safety Guidelines for Wind Energy" and "Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution" have been utilized as the main technical reference during the preparation of the present ESIA Report.

ENVIRONMENTAL AND SOCIAL IMPACTS AND REQUIRED MITIGATION

The impacts of the Project on the environment and on local people are described in Chapter 4 of the ESIA Report. Mitigation measures for negative impacts of the Project are described in Chapter 5 of the report, and monitoring in Chapter 6. The impacts and the pertinent important mitigating measures are summarized below.

Climate

Current Conditions and Potential Impacts: The Mediterranean climate prevails in the region where the Project Site is located. Therefore, in general, summers are hot and dry, and winters are warm and rainy. On the other hand, this climate pattern can change at locales where the elevation is higher compared to the District Centre of Bahce (665 m). Thus, at the elevation of the Project Site (i.e., ranging from 1,000 m to 1,700 m), relatively severe weather conditions (snow and ice formation) may prevail in winter.

Minimum and maximum daily average temperatures are about 3°C and 18°C. Average annual precipitation is about 850 mm.

Measures to reduce impacts: The project will have no effect on temperature, precipitation, or wind. One beneficial effect will be that wind-generated electricity at Bahce will reduce the need to burn coal, and this will reduce carbon emissions by average 288,262 tonnes (CO₂) per year, or a total of over 2,017,833 tonnes over 7 years.

Air Quality

Current conditions and potential impacts: Industrial activity is not considerably dense in Bahce. There are only minor repair and maintenance workshops and some small scale industrial establishment manufacturing variety of goods. Therefore, all the industrial establishments in the region have the Class B emission license which indicates that there is

no major source of air pollution due to industrial activities. Considering the fact that there is no large-scale heavy industry in the region, the ambient air quality is not expected to be poor in the region. There may be only temporary fugitive dust due to vehicles on soil roads.

Measures to reduce impacts: Roads on which vehicles travel will be water-sprayed for dust control. It is not needed to carry out an air quality monitoring survey at the Project Site since the Project will not cause any air emission during its operational phase.

Landscape and Geology

Current conditions and potential impacts: Wind turbines of the Project will be located on a hilly area with an elevation ranging from 1,046 m to 1,707 m (see Figure 2 for topographical map and locations of turbines). A plateau is situated at the north of the hill where settlements are located. There are meadow lands and communities of oak trees on the hills (see Figure 3). On the other hand, as there is no special habitat which needs to be protected in the area, there are no natural parks and natural monuments within or nearby the Project Site. Furthermore, there are no landscape elements of particular importance to be stated in the vicinity of the Project Site. No major impacts are expected in this context.

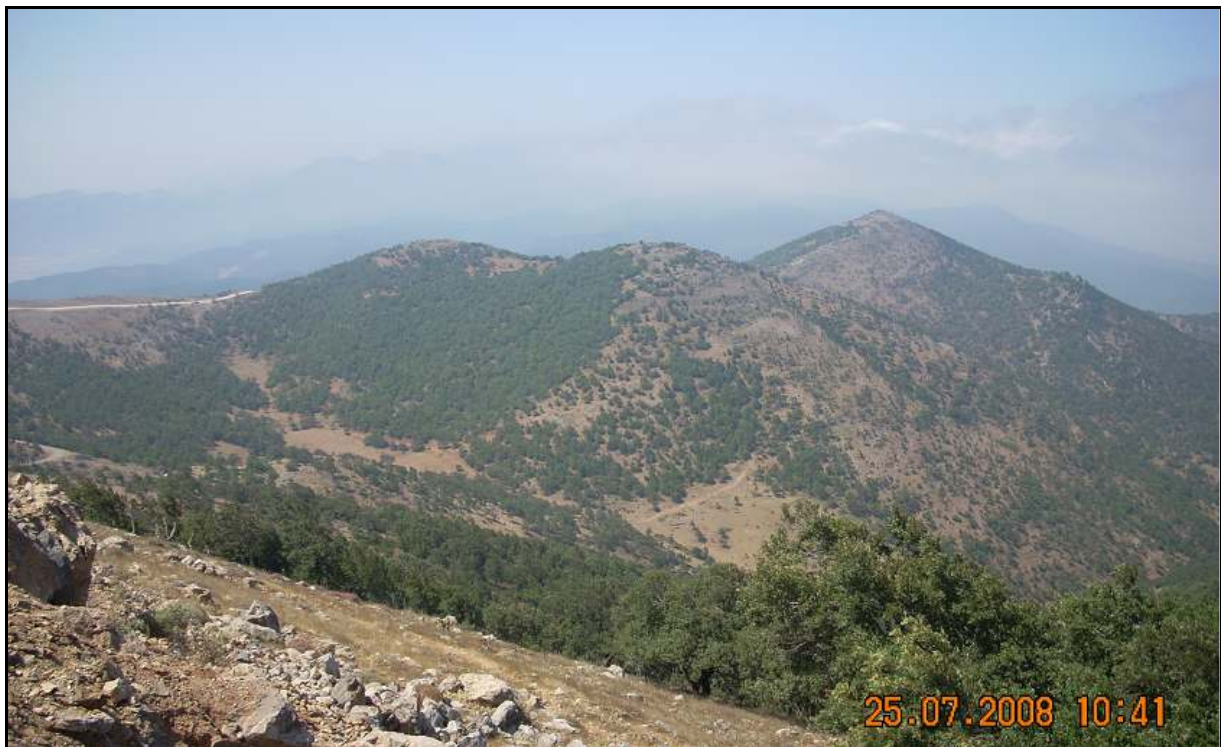


Figure 2 Landscape of the Project Area (View from the area of T40 and T41)

Visual Impacts

Depending on the location and local public perception, a wind farm may have a visual impact. Simulated 3-D views of the Project Site from Bahce District and Gokmustafali Village are shown in Figures 4 and Figure 5, respectively. Views of the Project Site from Hasanbeyli and Fezipasa Districts are also available in Appendix-C of the ESIA report.

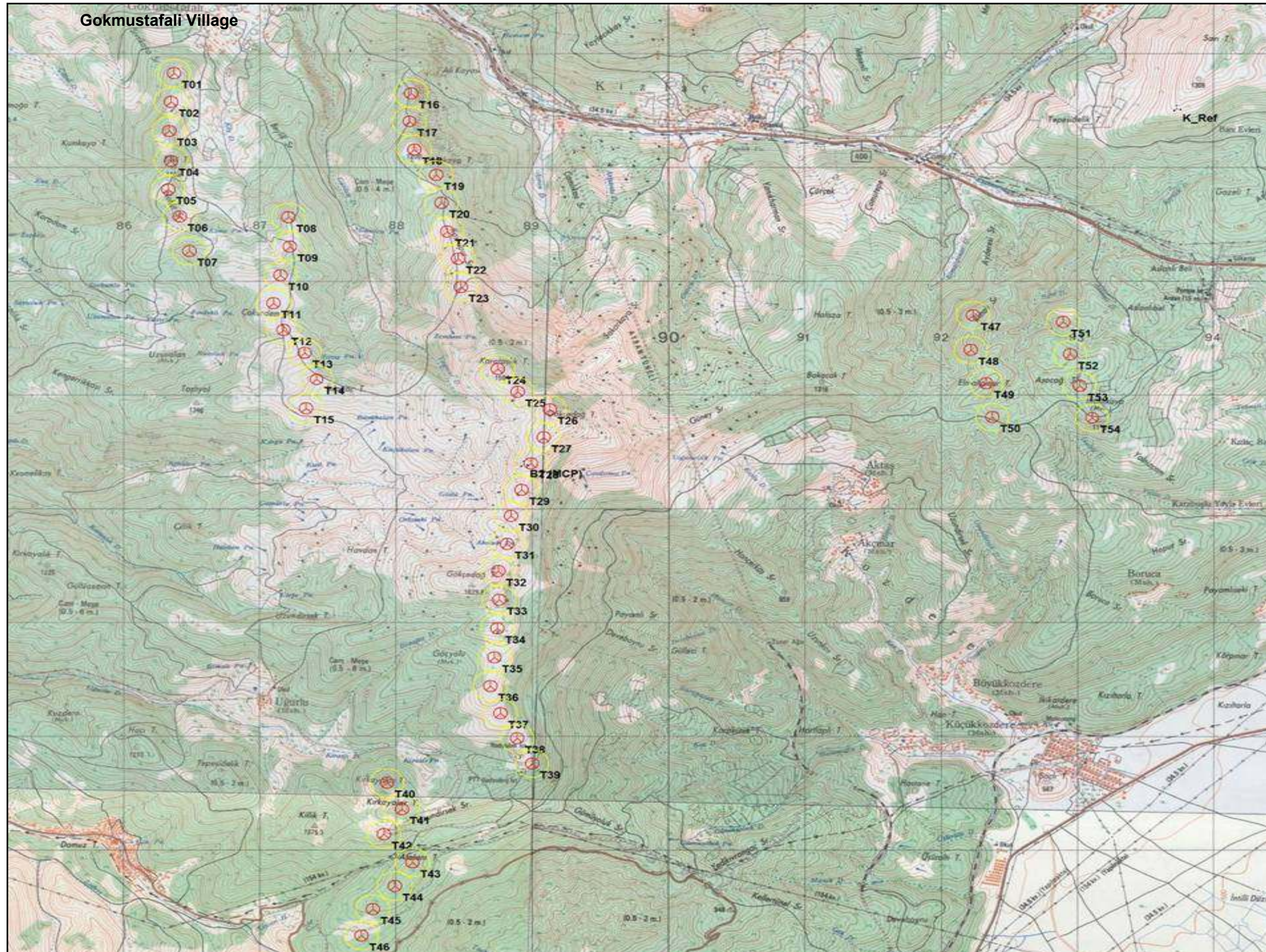


Figure 3 Distribution of Wind Turbine Locales over the Topographical Map (produced from 1:25.000 scaled map and each square is 1x1 km²)

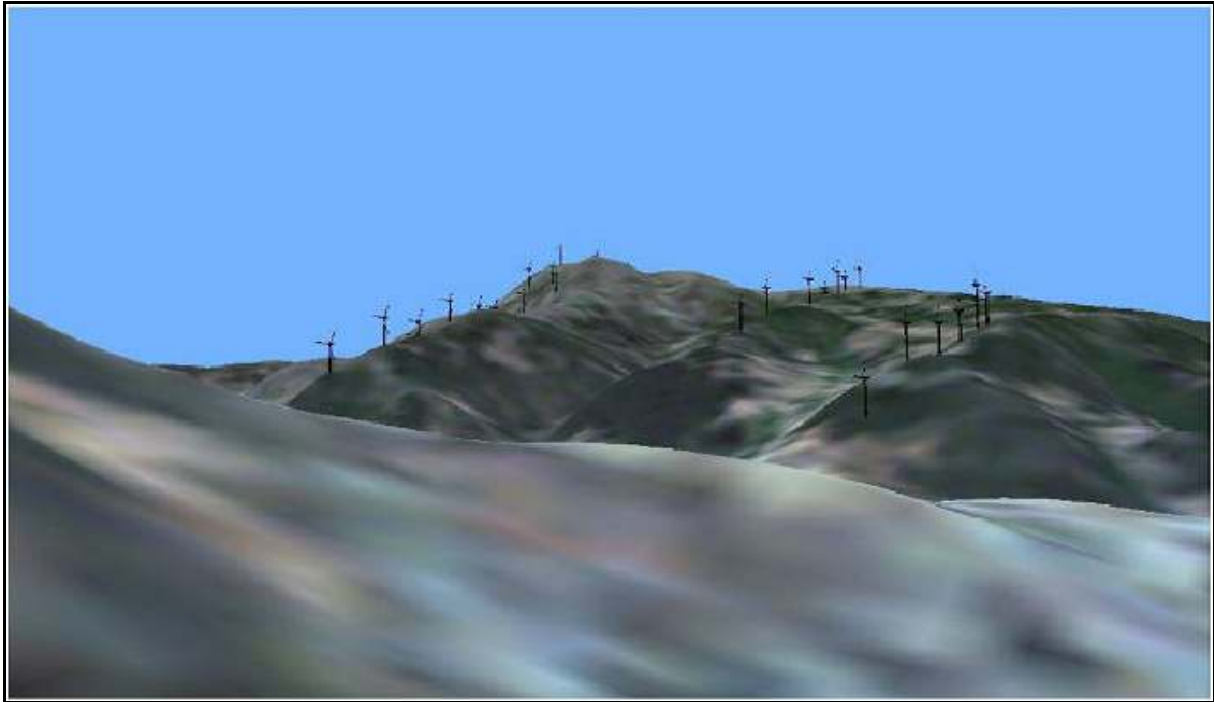


Figure 4 View of the Project Site from Bahce District

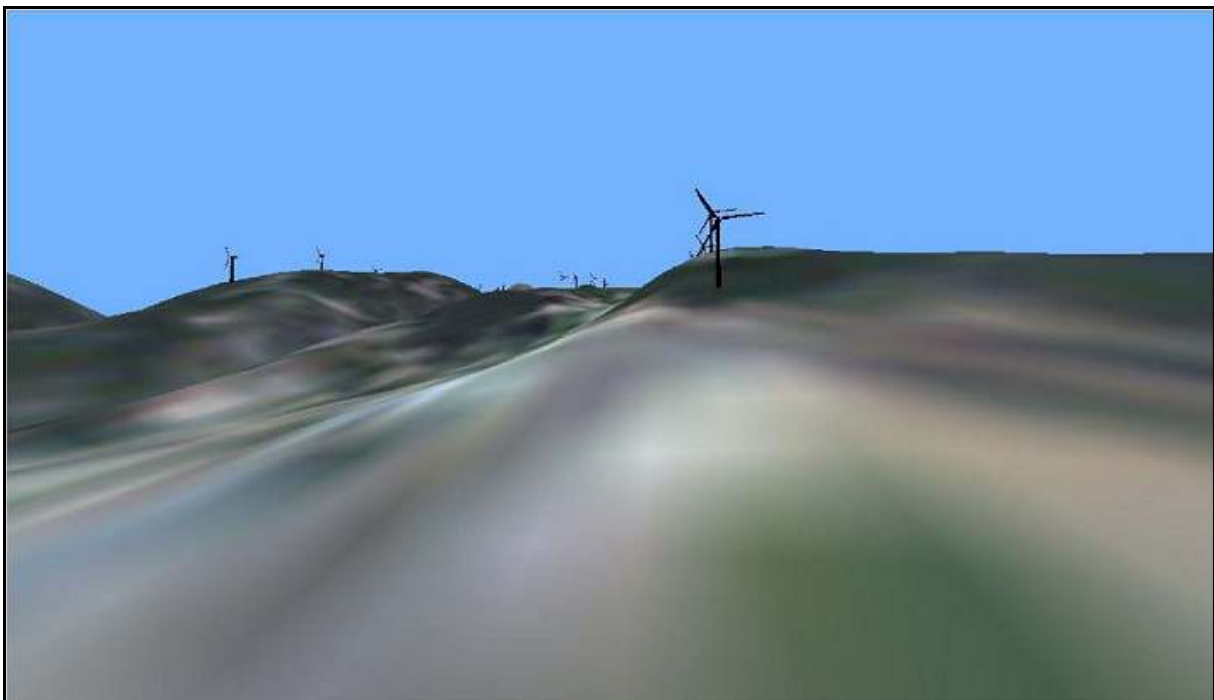


Figure 5 View of the Project Site from Gokmustafali Village

Measures to reduce impacts: According to the outcomes of DOKAY's questionnaire (see Appendix-C in the ESIA Report) there were no such perception or hesitation on local people about the visual disturbance of wind towers and turbines and even there were positive reactions such as suggestion of platforms to watch the towers.

Surface Water and Groundwater

Current conditions and potential impacts: There is no running surface water at the location of the Project Site. There are some seasonal creeks which might have running water only in the wet seasons. The construction of the Project shall not hinder the flow of any of these waterways.

Measures to reduce impacts: Drainage systems are being built alongside the access roads so that any water flow after the rainy seasons could safely run to their natural beds, without destroying the roads. Moreover, within the construction phase, storage of excavation soil in steep slopes will be avoided in order to prevent it from mixing with surface water bodies to result in turbidity or similar undesired outcomes.

The foundations of the turbines shall have a depth of around 3 m, not deep enough to destroy any groundwater (GW) resource. Drilling at the turbine locations was carried out to a depth of around 30 m, in order to be sure that there are no water reservoirs under the turbine foundations. No aquifer has been observed up to 30 m. This means that at the hilltops where the turbines are located, the Project will not be a concern in terms of alteration of GW flow pattern and also, GW will not pose any impact on the stability of turbine foundations.

Soil

Current conditions and potential impacts: Regarding the surface of the Project site, it should be noted that due to the severe erosion in the area based on steep slopes there exist no high quality soil available for agricultural activities. The area is used for afforestation in order to prevent soil erosion as much as possible. The Project Site is of Class VII in terms of soil capability for agricultural activities (“I” being the top quality soil for agricultural activities and “VIII” being the poorest-quality soil) and there is no agricultural area in the Project site.

Measures to reduce impacts: Vegetative top soil will be stripped prior to excavation works and will be stored in the construction site away from the other excavations to be used in landscaping.

Animals and Birds

Current conditions and potential impacts: There exist 80 taxons including different reptiles, birds and mammal species in the region covering not only the Project Site and its vicinity but also boundaries of Bahce and Hasanbeyli districts. All fauna taxons are widespread and do not inhabit the Project Site. In particular, it should be noted that the area does not have any importance as an IBA (Important Bird Areas) and a habitat of migratory and local birds as supported by the findings of literature survey. Thus, it is not expected to have any impacts on fauna species due to on-going and future activities of the Project during its construction and operational phases. There may be only ponds due to poor storm water management that may attract birds for feeding and nesting near the wind farm.

Measures to reduce impacts: Appropriate stormwater management will be implemented to avoid creating attractions such as ponds which can attract birds for feeding or nesting near the wind farm. Furthermore, Rotor will do carry out ornithological surveys in spring and fall seasons with experts internationally accepted and shall monitor whether the Project has influence on the migratory and local birds.

Noise and Vibration

Current conditions and potential impacts: Since the Project Site is located in a rural area, the background noise level is low. In fact, this statement is supported by the results of spot noise measurements which were conducted in day time by DOKAY in the vicinity of the Project Site and in particular at the nearest house of Gokmustafali Village to the site as a sensitive receptor. The background equivalent noise level (L_{eq}) has been measured within the range of 45-55 dBA. It can be also noted that one of the major source to have noise levels of 55 dBA at the Village is the traffic noise coming from the Adana-Gaziantep highway passing at less than 1 km to the south of the Village.

There might be only temporary disturbance to local people due to utilization of heavy machinery in the construction phase in close distance to the Gokmustafali Village. Noise and vibration may be more problematic when carrying out construction activities in the nighttime with permission of the local authorities. Noise level calculation for the construction phase yields a sound level lower than 55 dBA which satisfies the limit values given in both the Turkish legislation and Guidelines of IFC, and hence no adverse impact is expected to occur on local people due to noise generated by construction activities. As for operational phase, there will be generation of noise in gear boxes of turbines.

Measures to reduce impacts: Construction works should be carried out only during the day time period (07:00-19:00) and local people will be informed prior to such activities that may cause a temporary disturbance. Regular maintenance of heavy machinery will be made. Moreover, gearbox of each turbine will be insulated to control operational noise.

Protected Areas

The Project Site does not possess any special habitat for wildlife and is away from protected areas.

People

The settlements that might be most affected from the Project Site are Gokmustafali Village² (see Figure 6) and Savranlı Village of Bahce District of Osmaniye Province.

² Less than 1 km

Gokmustafalı Village (population of 462) is more populated than Savranlı Village (population of 270). There are almost 117 households in Gokmustafalı Village and the household number increases up to 100 in Savranlı Village during summer months. The villages tend to be more populated during the summer months since they serve as a mountain pasture for those village residents living in nearby districts or provinces. Average household size is reported as four by both villages.



Figure 6 General View of Gokmustafalı Village

Educational and healthcare services are obtained from the Bahce District and the average educational attainment in the village is high school graduation. Moreover, since young population live outside for education and working the mean age is around 40 in both villages.

In both villages, retired population comprises the majority of the community. The major source of income is retirement pensions since these people are not currently engaged in any other works. Agriculture and animal husbandry are practiced in both villages mainly for self needs rather than generating an income.

Both villages supply water from springs and have electricity networks whereas there is no sewage systems in the villages and septic tanks are being used. Moreover, water shortage is reported to be a major problem in villages.

Local people are mostly unfamiliar with the “renewable energy” concept and wind turbines. However, they have been well informed about minor environmental impacts of the Project to them, and they have a positive attitude towards the Project.

Due to the fact that all the land used for the wind farm and its associated transmission lines are located on state-owned lands (mainly owned by the Forestry Administration), neither land acquisition (except any pylon location - i.e., two according to the current planning - that may be on private lands to be expropriated by TEIAS) nor resettlement (i.e., direct or indirect economic displacement) will occur. Therefore, PS5 was excluded for this specific Project.

Cumulative Impacts

Two additional wind farms (with 50 MW and 60 MW installed capacities) will be erected at an area that is 5 km to the north of the site of the Project with an installed power capacity of 135 MW. These additional wind farms will be realized following the completion of the 135 MW wind farm. Therefore, there will not be overlapping of construction activities and hence, cumulative impacts are not expected during the construction phases.

On the other hand, operational phases will overlap and the expected cumulative operational impact might be in terms of visual aspects since the distance is too long to have overlapping of noise distribution from each farm assuming that the noise will be less than limit values at a distance of 300 m. In short, due to the remarkable distances between the additional two wind farms and the one with installed power capacity of 135 MW, it is not expected to have overlapping noise levels reaching sensitive receptors in the area.

there should be separate ESIA works to be conducted for these two additional wind farms of 50 MW and 60 MW in order to find out site specific baseline and project specific impacts on the baseline conditions as well as corresponding mitigation measures.

Preparers

This NTS of the ESIA for Osmaniye Bahce Wind Farm Project was prepared by DOKAY Engineering and Consultancy Ltd, based in Ankara, Turkey, in consultation with IFC and Rotor.