AECOM Environment

Prepared for:
Kavram Enerji
Ankara, Turkey

Prepared by:
AECOM
Turkey
Report No: TR-R780-01-00
October 2014

Non-Technical Summary (NTS) for Environmental and Social Impact Assessment Report of Uluborlu Wind Farm, Isparta, Turkey



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List of Abbreviations

EIA	Environmental Impact Assessment
EMRA	Energy Market Regulatory Authority
ESAP	Environmental and Social Action Plan
ETL	Energy Transmission Line
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
Kavram Enerji	Kavram Enerji Yatırım Elektrik Üretim A.Ş.
KBA	Key Biodiversity Area
MWe	Megawatt electricity
NTS	Non-Technical Summary
PDoEU	Provincial Directorate of Environment and Urbanization
PDR	Project Description Report
RAMEN	Regulation on Assessment and Management of Environmental Noise
TEIAS	Turkish Electricity Transmission Company
WFP	Wind Farm Project

1.0 Project Description

1.1 Proposed Project

Kavram Enerji Yatırım Elektrik Üretim A.Ş. (Kavram Enerji) plans to develop and operate a wind farm in Uluborlu District of Isparta Province in Turkey. The closest settlements to the Project site are İnhisar Village in east of the northern section and İleydağı Village situated between the northern section and southern section of the Project site. The wind farm will have an total installed capacity of 60 MWe with 36 turbines. GE 1.7 – 103 type wind turbines will be used for the Project. The Project is planned to generate about 216 GWh of electrical energy annually. The generated energy will be connected to the existing Keçiborlu-Çayseka Energy Transmission Line (ETL) through an overhead ETL (approximately 6 km in length) that will be constructed in the scope of the Project.

1.2 Environmental Impact Review Status

Uluborlu Wind Farm (WF) Project's Environmental Impact Assessment (EIA) process was started in 2009 therefore the Project was subject to the former EIA Regulation that is published in Official Gazette No. 26939 dated July 17, 2008. According to the former EIA Regulation, the wind farm projects with a capacity of 10 MW and more are included in Annex II. Since WF Project's capacity is more than 10 MW, a Project Description Report (PDR) was prepared and submitted to Isparta PDoEU for development consent. Isparta PDoEU evaluated and reviewed the PDR and "Environmental Impact Assessment is Not Required" decision was issued for the proposed Project on September 9, 2009. Afterwards, the number of turbines has been increased from 20 to 36. The wind farm projects having more than 20 turbines are included in Annex I of the EIA Regulation that is published in Official Gazette No. 28784 dated October 3, 2013. This means, it is required to prepare an EIA report for Uluborlu WF Project. The EIA process of Uluborlu WF has started and is currently ongoing.

Since the route and the location of pylons of the ETL between the switchyard and 154kV Çayseka-Keçiborlu ETL, are not finalized yet, the ETL could not be evaluated in the ESIA report. In accordance with the Turkish EIA Regulation, if the length of the line is between 5 km and 15 km with a voltage of 154 kV or higher, a Project Description Report (PDR) should be submitted to Provincial Directorate of Environment and Urbanization (PDoEU) and this will be sufficient for development consent of the transmission line. Since the voltage of the ETL of Uluborlu WF is 154 kV with an approximate length of 6 km, a PDR should be prepared and submitted to PDoEU. Kavram Enerji is currently waiting for Turkish Electricity Transmission Company's approval of ETL route. Afterwards, a PDR will be prepared and submitted to PDoEU for ETL.

2.0 Legal Framework

2.1 Generation License

All energy producers need to secure a Generation License from Energy Market Regulatory Authority (EMRA) prior to developing new power projects. Hence, Kavram Enerji, the project company, has applied to the EMRA for generation license. This application was approved and a “49-year electric power generation license” for the proposed project (License No. EÜ/3034-1171792, dated January 19, 2011) has been secured from the EMRA by Kavram Enerji. Since the project has been revised afterwards, license amendment application has been made to EMRA on May 14, 2014.

2.2 Local Environmental Regulatory Framework

The Turkish Environmental Law provides the legislative framework for the regulation of industries and their potential impact on the environment. Industrial projects are subject to varying levels of review that begin while projects are in the development and pre-operation phases. Additional regulations apply to facilities once they are in operation.

The Environmental Law authorized the promulgation of a number of regulations. Those that pertain to development and operation of the proposed power project are the following:

- *Industrial Air Pollution Control Regulation*
- *Packaging Waste Control Regulation*
- *Environmental Permit and Licenses Regulation*
- *Regulation Related to Workplace Opening and Operation Permits*
- *Environmental Impact Assessment Regulation*
- *Regulation on Assessment and Management of Environmental Noise*
- *Water Pollution Control Regulation;*
- *Regulation on General Principles of Waste Management*
- *Waste Oil Control Regulation*
- *Regulation on Protection of Wetlands*
- *Regulation on Soil Pollution Control and Contaminated Sites by Point Source*
- *Hazardous Wastes Control Regulation*
- *Vegetable Waste Oil Control Regulation*
- *Medical Waste Control Regulation,*
- *Waste Batteries and Accumulators Control Regulation*
- *Excavation, Construction and Demolition Waste Control Regulation,*
- *Solid Waste Control Regulation*

- *Air Pollution Control Regulation For Heating Sources*
- *Air Quality Assessment and Management Regulation*
- *Exhaust Gases Emission Control and Gasoline and Diesel Oil Quality Regulation*
- *Regulation on the Septic Tanks to be installed where a Sewer System is not Available*
- *Regulation on Inventory and Control of Chemicals*
- *Communiqué on Recovery of Some Non-Hazardous Wastes*
- *Waste Tires Control Regulation*

In addition to the Environmental Law and its associated regulations, there are several other laws that directly or indirectly include environmental review, and thus, are applicable to the Project. The Project will comply with the 6331 numbered Law on Occupational Health and Safety, Official Gazette No.28339, dated June 30, 2012 and its regulations stated below:

- *Health and Safety Regulation for Construction Works*

Other regulations that the Project will comply with can be listed as follows:

- *5346 numbered Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy;*
- *2863 numbered Law on Protection of Cultural and Natural Heritage*
- *6831 numbered Forestry Law;*
- *Regulation on Buildings located on the Disaster Areas*
- *Regulation on the Buildings to be Constructed in Earthquake Zones*
- *167 numbered Groundwater Law.*

2.3 Environmental Impact Assessment Process

The scope of the Turkish EIA regulation includes the following:

- Determination of the type of projects required to prepare an environmental impact assessment report or a project description report and the issues to be covered in these applications or reports;
- The technical, administrative and legal aspects related to the environmental impact assessment process;
- The work related to the establishment of the Scope Definition, Review and Evaluation Committee; and
- Monitoring and auditing of the projects subject to this regulation, prior to the commissioning phase, during the operational phase and the decommissioning phase.

According to Article 6 of the EIA regulation, projects should either submit an Environmental Impact Assessment (EIA) Report or Project Description Report (PDR) based on the classification of the projects listed in Annex I and Annex II of the EIA regulation. Annex I and Annex II define the type and projects that are subject to preparing and submitting an EIA Report and PDR, respectively.

2.4 International Conventions Adopted by Turkey

Turkey signed many international conventions and agreements to protect its environment and biodiversity. Potential related international conventions with the Project are the following:

- Convention on Biological Diversity, approved by 4177 numbered Law dated August 29, 1996 and published in the Official gazette No. 22860 and dated December 27, 1996, Ratified 1997;
- Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES), published in the Official Gazette No.22672 and dated June 20, 1996, Ratified 1996;
- Convention on The Conservation Of European Wildlife And Natural Habitats (Bern), published in the Official Gazette No. 18318 and dated February 20, 1984, Ratified 1984;
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar), published in the Official Gazette No. 21937 and dated May 17, 1994, Ratified 1994;
- International Convention For the Protection of Birds, published in the Official Gazette No. 12480 and dated December 17, 1966, Ratified 1967; and
- Convention Concerning the Protection of the World Cultural and Natural Heritage published in the Official Gazette No. 17959 and dated February 14, 1983.

The Project should comply with the relevant provisions of conventions mentioned above.

2.5 Equator Principles

The Project is assessed in accordance with the Equator Principles. The “Equator Principles” is a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing. The Principles apply to all new project financings globally with total project capital costs of US$10 million or more, and across all industry sectors.

The Equator Principles (2013) that are adopted by the Equator Principles Financial Institutions (EPFIs) are listed below:

- Principle 1: Review and Categorization
- Principle 2: Environmental and Social Assessment
- Principle 3: Applicable Environmental and Social Standards
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan
- Principle 5: Stakeholder Engagement
- Principle 6: Grievance Mechanism
- Principle 7: Independent Review
- Principle 8: Covenants

- Principle 9: Independent Monitoring and Reporting
- Principle 10: Reporting and Transparency

The Equator Principles are based on the IFCs Environmental and Social Safeguard Policies. Thus, the IFC/World Bank environmental, health and safety guidelines are described in the following section.

2.6 IFC/World Bank Group Environmental, Health, and Safety Guidelines

The Project is assessed in accordance with the IFC guidelines, performance standards and their related guidance notes, and manuals related to environmental, social, health and safety issues. The documents that guided the ESIA study are listed in the following sections.

Guidelines:

- IFC/WB Environmental, Health, and Safety General Guidelines (2007),
- IFC/WB Environmental, Health, and Safety Guidelines for Wind Energy (2007); and
- IFC/WB Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007).

Performance Standards:

- IFC Performance Standards on Environmental and Social Sustainability (2012),
  - Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 2 - Labor and Working Conditions
  - Performance Standard 3 – Resource Efficiency and Pollution Prevention
  - Performance Standard 4 - Community Health, Safety and Security
  - Performance Standard 5 - Land Acquisition and Involuntary Resettlement
  - Performance Standard 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources
  - Performance Standard 7 - Indigenous Peoples
  - Performance Standard 8 - Cultural Heritage
- IFC Guidance Notes: Performance Standards on Environmental and Social Sustainability (2012).

IFC's Performance Standards and related guidance notes were followed in the ESIA. The overall content of the ESIA is formulated in accordance with the Guidance Note on Performance Standard 1. Guidance notes for Performance Standard 2 to 8 were addressed when applicable. Performance Standard 7 is not applicable to the Project.

2.7 EBRD Performance Requirements

The PRs that are applicable to the proposed Project are listed below:

PR 1: Environmental and Social Appraisal and Management,
PR 2: Labour and Working Conditions,
PR 3: Pollution Prevention and Abatement,
PR 4: Community Health, Safety and Security,
PR 5: Land Acquisition, Involuntary Resettlement and Economic Displacement,
PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources,
PR 8: Cultural Heritage,
PR 10: Information Disclosure and Stakeholder Engagement.

The remaining Performance Requirements which are “PR 7: Indigenous People” and “PR 9: Financial Intermediaries” are not relevant to the proposed Project.

3.0 Proposed Project

3.1 Project Objective

Turkey has an increasing energy demand. This rate of demand growth has been higher than the growth rates seen in other major Turkish industries and outstrips growth in the Turkish economy overall. The purpose of this Project is to utilize wind energy potential and to compensate energy requirement through a sustainable, environmentally and cost effective way by using wind energy.

3.2 Project Location

Uluborlu WF is located to the western border of Isparta Province in the Mediterranean Region of Turkey. The Project site can be considered as two sections; the northern section is located next to the province boder between Afyon and Isparta Provinces in Uluborlu District whereas the southern section is situated on the border between Gönen District and Uluborlu District. The northern section of the project site is located approximately 4.6 km northwest of Uluborlu District Center. The distance between the southern section of the project site and Uluborlu District Center is about 7 km. The Project site is approximately 29 km to the Isparta City Center. Project location map and general layout of the project is given in Figure 3-1and Figure 3-2 below.

3.3 Shipment and Transportation

It is planned to transport wind turbine components and equipments from İzmir Port to Uluborlu WF Project site. İzmir port is located in the western Turkey, in the center of İzmir Province. The operator of this port is General Directorate of Turkish State Railways (TCDD). The port is the agriculture and industry port of Aegean Region of Turkey and has a vital importance for the exportation of Turkey. Also, the port has connections to both rail and highway networks.

3.4 Project Work Force

For the construction phase of the Project, approximately 45 personnel are expected to work. However, not all workers will be on-site at any one time. Local contractors will be encouraged to tender for the civil and electrical works. Electricians, riggers, crane operators and heavy equipment operators will also be required.

After construction phase, about 10 personnel will work during the operation phase of the wind farm.



Figure 3-1 Project Location Map

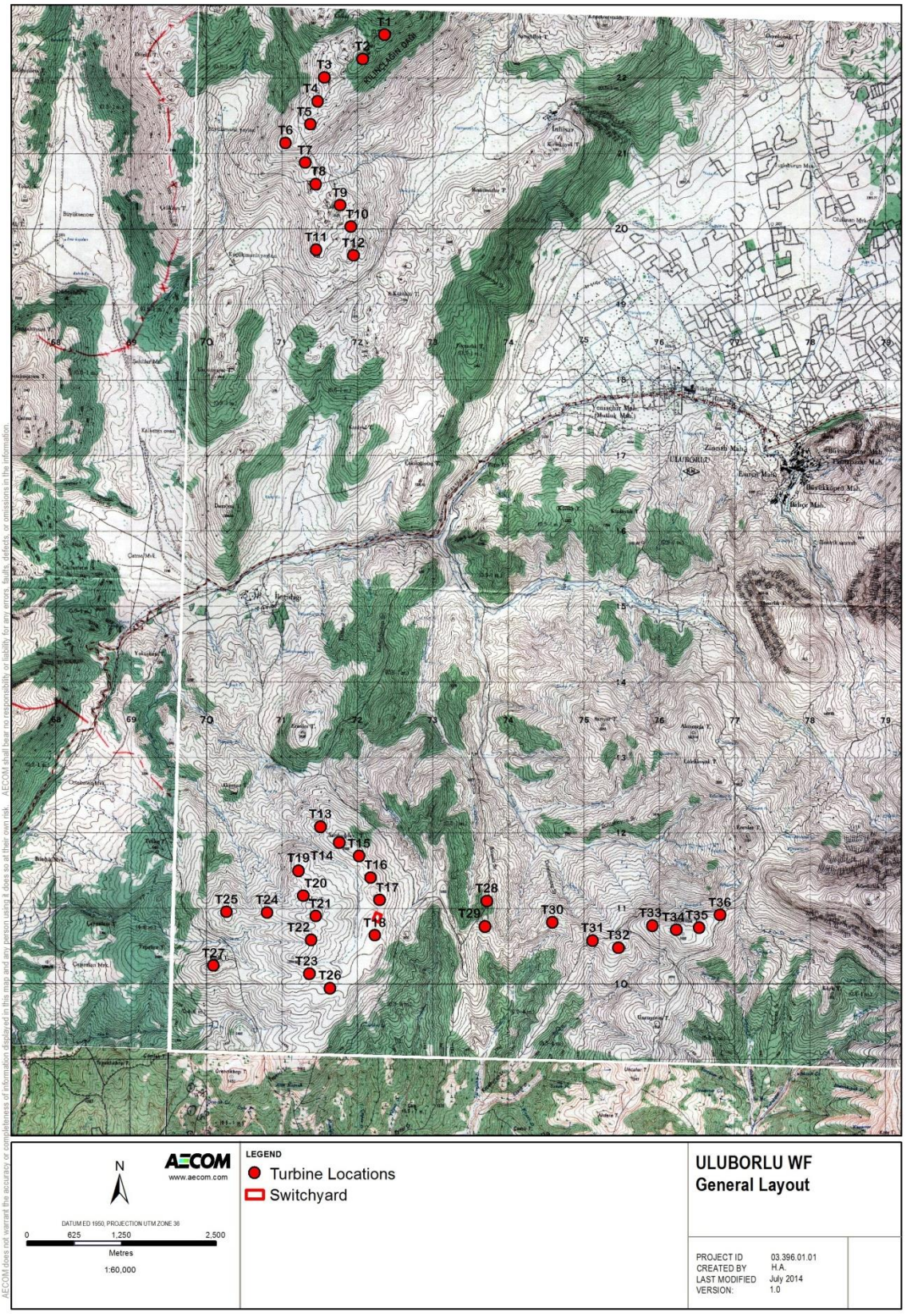


Figure 3-2 General Layout Map

4.0 Existing Environment

4.1 Climate

The Project site is located within Uluborlu District of Isparta Province and under continental climate. According to long-term meteorological data recorded by the Isparta Meteorological Station, the annual average temperature is 12.2 ºC. The maximum precipitation occurs during December.

Wind frequencies were obtained from the wind mast data supplied by the Project owner. The wind data on the Project site recorded at Mast#54 and Mast#55 between June 2003 and July 2013 were evaluated. According to the data recorded at Mast#54, the first prevailing wind direction is eastnorth-east and the second is south-southeast. At Mast #55 which is situated in the southern section of the Project site, the first prevailing wind direction is north-northeast while the second is south-southeast. Regarding the wind speed frequencies, both wind masts recorded the similar values; wind was blown at 6 m/s at nearly 12% for the measurement period at each wind mast.

4.2 Air Quality

Although air quality is not expected to be an important issue in wind farm projects, brief background information about air quality of Isparta Province is provided in this section.

General statistical information on the SO_2 and PM_{10} parameters for Isparta Province is taken from Ministry of Environment and Urbanization's website. Average SO_2 and PM_{10} concentrations are 72 µg/m³ and 26 µg/m³, respectively.

4.3 Land Use

The Project area is located on state-owned areas classified as forest areas and privately-owned areas classified as agricultural land, pasture land. Permits will be taken before the construction phase for the forest areas to be used within the Project in accordance with the Article No. 17/3 (amended by Law No. 5192) of Turkish Forestry Law No. 6831.

The privately-owned areas that will be used within the Project site will be expropriated in accordance with Turkish Expropriation Law No. 2942.

The Project area is in a rural land. Therefore, there will be no physical displacement within the Project.

4.4 Background Noise Levels

In order to determine existing ambient noise levels (background noise) around the Project site, background noise monitoring studies were undertaken at the dwelling situated in the southwest İnhisar Village which is the closest settlement to the Project site.

The NSR, selected as nearest permanent used dwelling, is identified during the noise impact assessment study and the noise impact assessment studies are carried out in these NSRs (Figure 4-1).

NSR is situated on the southwest edge of İnhisar Village in the east of the northern section of the Project site. It is a permanently used house. There is a dirt access road passing from the northwest of the house. The closest turbine is Turbine 1 (T1) in northwest with a distance of 2,456 m. The location of the receptor is given in Figure 4-1below.

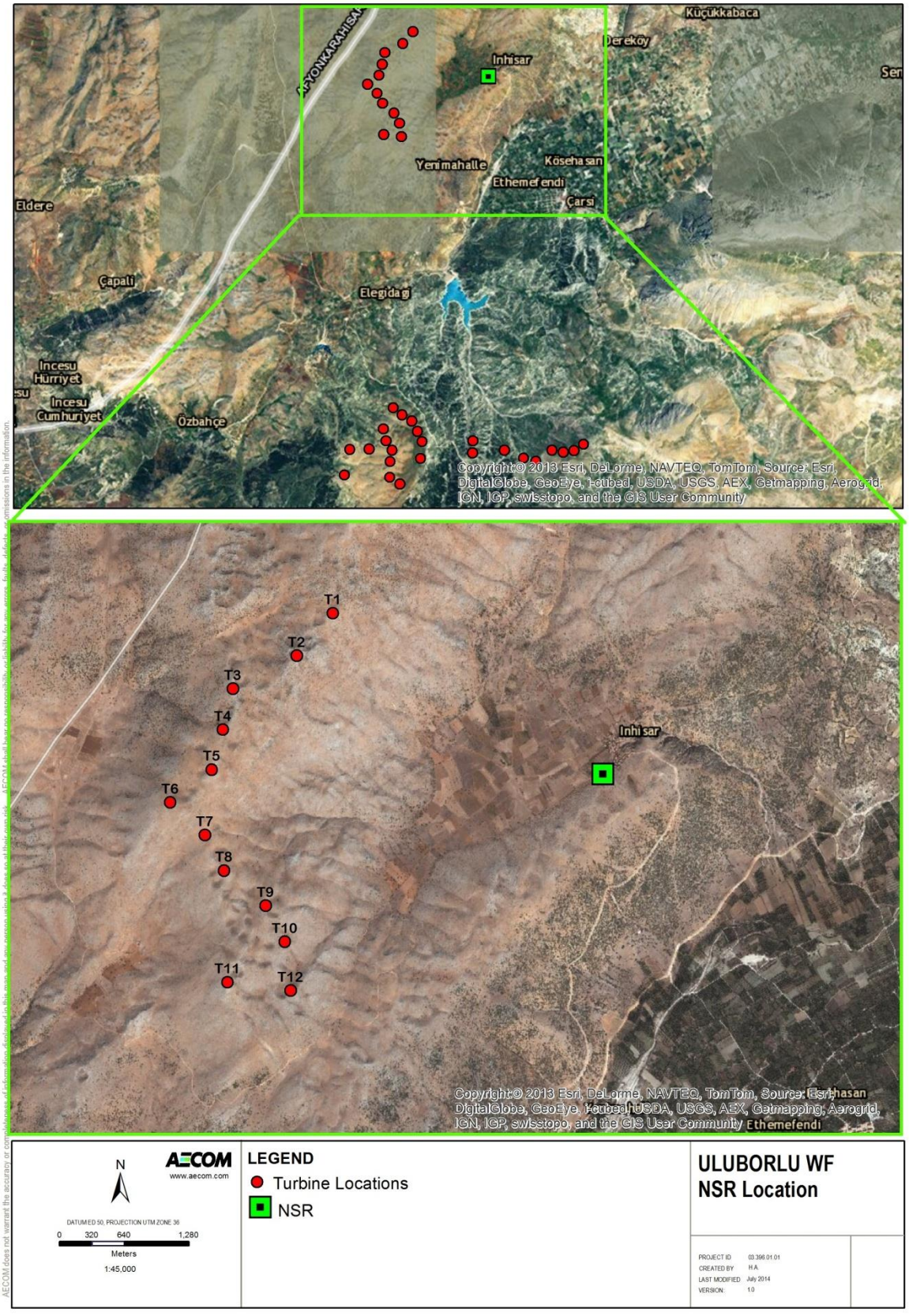


Figure 4-1 Location of Noise Sensitive Receptor

Background noise level monitoring studies were undertaken for two days between July 2, 2014 and July 3, 2014 at NSR. The results of the background noise level measurements are compared with respect to both IFC/World Bank Group Environmental, Health and Safety Guidelines – Wind Energy (April 30, 2007) and Turkish Regulation on Assessment and Management of Environmental Noise (RAMEN). The measured background noise levels are below the IFC/WB noise guideline and Turkish RAMEN noise limits.

4.5 Geology, Seismicity and Hydrogeology

Regional Geology

The region is defined as Taurids. The section that is above the Toros band to the north of Antalya Gulf is named as Isparta Bend. Ispart Bend is bordered by Denizli, Fethiye, Alanya, Antalya, Akseki, Ahirli, Seydişehir, Beyşehir, Akşehir, Çay, Afyon, Sandıklı and Çivril. The rock units in Isparta Bend are formed in different environments varying from platform to marine whereas some of them are autochthonous and some are allochthonous.

Local Geology

Around the project area, generally sedimentary rocks are observed (Bakanoğlu, 1998). Exposed units are –older to younger- Eocene aged Isparta Formation, Oligocene aged İncesu Formation and Quaternary aged alluviums. As allochthonous unit, Jurassic- Cretaceous aged Kapıdağ Limestone overlies İncesu Conglomerate and Isparta Formation with reverse faulting.

According to the studies conducted by Bakanoğlu, units belonging to Kapıdağ Limestone are observed in common to the north of the project area. Besides, above the rock units, alluvium layer was observed at a mean thickness of 12.5 m. These units are generally comprised of silty, gravelly clay.

In middle regions of the project area, units belonging to İncesu Formations were detected in common. These units are generally comprised of clayey, sandy conglomeratic gravel layers.

To the south of the project area, greenish grey/beige sandstone – claystone units with thin layers belonging to Isparta Formation were detected in common.

Seismicity

Isparta City and the project area are located in 1st Degree Seismic Zone according to the earthquake zones determined by the General Directorate of Disaster Affairs (GDDA). The project site can be considered tectonically very active. There are a significant number of faults in this area, which are considered to be tectonically active.

Hydrogeology

The northern part of the project site is located in Scattered Mid-Mediterranean Basin (Müteferrik Orta Akdeniz Suları) and the southern part of the project site is located in Closed Basin of Burdur (Kapalı Bursa Havzası).

Surface Water

The main rivers of Scattered Mid-Mediterranean Basin are Manavgat River, Köprüçay River, Aksu River and Alara River. The main lakes of the basin are Eğirdir Lake, Kestelovası Lake and Kovada Lake.

The main river of Closed Basin of Burdur is Bozçay River. The main lakes of the basin are Burdur Lake, Acıgöl Lake, Solda Lake, Yarisli Lake, Akgöl Lake and Karataş Lake.

Spring Water

According to the hydrogeological and geophysical studies conducted in Isparta province (Isparta Environmental Report, 2013), 91 hm^3/year safe groundwater reserves were detected. Groundwater investigations were conducted in 4,500 km^2 large area of Isparta, which is 8,933 km^2 in total.

The major plains of Isparta are Hoyran Plain, Yalvaç Plain, Gelendost Plain, Isparta Atabey Plain, Keçiborlu Plain, Şarkikaraağaç Plain, Uluborlu-Senirkent Plain and Isparta Plain. Authorities declared that a yearly reserve of 91.0 hm^3 exists in total. The allocated reserve of the total reserve is 62.8 hm^3/year and the utilized reserve is 31.4 hm^3/year. The closest plain to the project site, Uluborlu-Senirkent Plain, has a yearly reserve of 6.2 hm^3/year.

4.6 Flora and Fauna

Flora

In order to determine the plant species which occur in the Uluborlu Wind Farm Project site and in the vicinity, literature surveys were carried out by AECOM.

As a result of this study, no threatened or endangered flora species were determined in the Project area in accordance with the Red Data Book, Bern Convention and CITES. Also, there is no Important Plant Area on the Project site. Flora and vegetation structure of the area, the conservation status of the plant species in this area, the environmental risks and appropriate mitigation measures were included in the detailed assessment report of consultants.

As a result of the literature survey in and around the Project area, 173 species belonging to 41 families were identified. The phytogeographical regions are composed of 44 Mediterranean, 33 Iranian-Turanian, 6 Eastern Mediterranean, and 4 European-Siberian elements. 35 of the species have multi-zone category or their phytogeographical region is unknown.

Since the Project area is in Mediterranean phytogeographical region, most of the species are Mediterranean elements.

There are fifteen endemic species observed in the field survey period. Three of these endemics are listed as LC (Least Concern) in the IUCN Red List.

Fauna

In order to determine the terrestrial fauna species within the Project site and its vicinity, the field surveys were conducted by a team from Nature Research Society, coordinated by Associated Prof. Can Bilgin and Associated Prof. Zafer Ayas. Moreover, the results are supported by detailed literature survey.

Amphibians and Reptiles

As a result of the additional studies conducted by AECOM, no endemic or endangered amphibian and reptile species were found in the Project area in accordance with the IUCN Red List of Threatened Species and Bern Convention.

Birds

In order to identify the bird species within the Project site and its vicinity, their habitats, the reasons of their existence in this area and conservation status, detailed field surveys were undertaken and literature studies were performed. An ornithological survey was conducted for 3 days within the scope of the Project in August and September – 2011 by Associate Professor Zafer Ayaş for autumn migration. Then, a second field survey was conducted for 15 days between 18th March and 12nd May 2014 by a team from Nature Research Society, coordinated by Associated Professor Can Bilgin. The Project area was observed in terms of local and migratory bird species. Moreover, the flight directions of each soaring birds are drawn and behaviours of bird were recorded.

The species forming the avian fauna of the Project site and the conservation status of the bird species were evaluated according to the updated lists of the Bern Convention Annexes, the European Red List (ERL) prepared by the IUCN (International Union for the Conservation of Nature) and the national RED DATA BOOK categories, “Turkish Birds Red List” (Kiziroglu, 2008).

There are 98 bird species, local and/or on passage, identified in the area. Not only observed-recorded species are included in the list, but also the previous years’ birdwatching records, questionnaires with the local people and literature searches were included.

Mammals

The mammalian species consists of common and broadly distributed species. Predator and large herbivore species are weak in the region. In the scope of the fauna survey; mammals such as bats, predator’s characteristics of their habitats have been investigated. The species are determined

considering geographical region and habitat information except for bat species. The mammalian species are identified according to literature surveys and field observations written in the Environmental Impact Assessment Report written by Selin İnşaat Turizm Müşavirlik Sanayi ve Ticaret Ltd. Şti.

During the field surveys, observations for the existence of bat species and the appropriate habitats for them have been conducted. It is assessed that there are no caves or cavities which the bats can roost as colonies on the project site habitats. In addition to that, literature surveys and questionnaries about the bat species in the vicinity have been conducted. As a result of these studies, small sized bats are said to be observed especially within and around the settlements by the local community. Due to appropriate habitats and literature informations (Demirsoy, 2002), Common pipistrelle (*Pipistrellus pipistrellus*) and Noctule (*Nyctalus noctula*) are assessed that likely to occur in the villages close to the project site and in the orchards close to these villages. The aforesaid bat species have diurnal and nocturnal activities, flying from 0,5 meters to 10 meters high. There are no caves or large dark cavities that the species can reside as colonies in the project sites.

Therefore, it is assessed that the species might reside in the galleries of abandoned constructions of the settlements. Because there are no appropriate feeding and sheltering areas for the species in the project sites and they have no important categories (such as CR, EN, VU) according to the IUCN Red List, they are assessed as there will be no negative impacts towards them both during the construction and the operating periods. (2011, Zafer Ayaş)

4.7 Naturally Protected Areas

In accordance with the national environmental legislation, there are no national parks, nature reserves, natural monuments, wildlife protection areas and wildlife development areas within the project site.

The study area is under the control of Isparta Provincial Directory Forestry and Nature conservation and National parks in terms of nature and species protection. There is no legally protected area in the Project site. Naturally protected sites around the Project area is given in Figure 4-2.

Karakuyu Wetland & Lake Karakuyu Wildlife Development Area

The Lake of Karakuyu has two official protection statuses that almost overlap their borders. Karakuyu is also defined as key biodiversity area by Doğa Derneği. The Lake Karakuyu is located approximately 5 km west of Dinar district. The lake has freshwater ecosystem, dominantly covered by marhshes with *Typha domingensis, Nymphaea alba, Phragmites australis* and surrounded by agricultural fields. Karakuyu wetland is important breeding area for waterfowl such as *Ardeola ralloides, Aythya nyroca, Grus grus, Ixobrychus minutus, Oxyura leucocephala.* In addition, *Circus aeruginosus* is also breeding in the area.

The Project site is situated almost 10 km away from the Lake Karakuyu.

Barla Mountain Key Biodiverstiy Area

Barla Mountain, which is a range of mountains having rich plant diversity, is located west of Lake Eğirdir. Grecian Juniper (Juniper excels), Cedrus (*Cedrus libani*), Black Pine (*Pinus nigra pallasiana*) form main habitat with *Quercus coccifera* and also maquies, mountain steppes and highland pastures in Barla Mountain KBA. The area has endemic plant species such as *Centaurea mykalea Clypeola ciliate, Cyclamen mirabile, Erysimum pallidum, Festuca punctoria, Verbascum sorgerae a*nd also butterfly species *Anthocharis damone, Thymelicus action.* The eastern part of the Project site coincides with the western part of the Barla Mountain KBA.

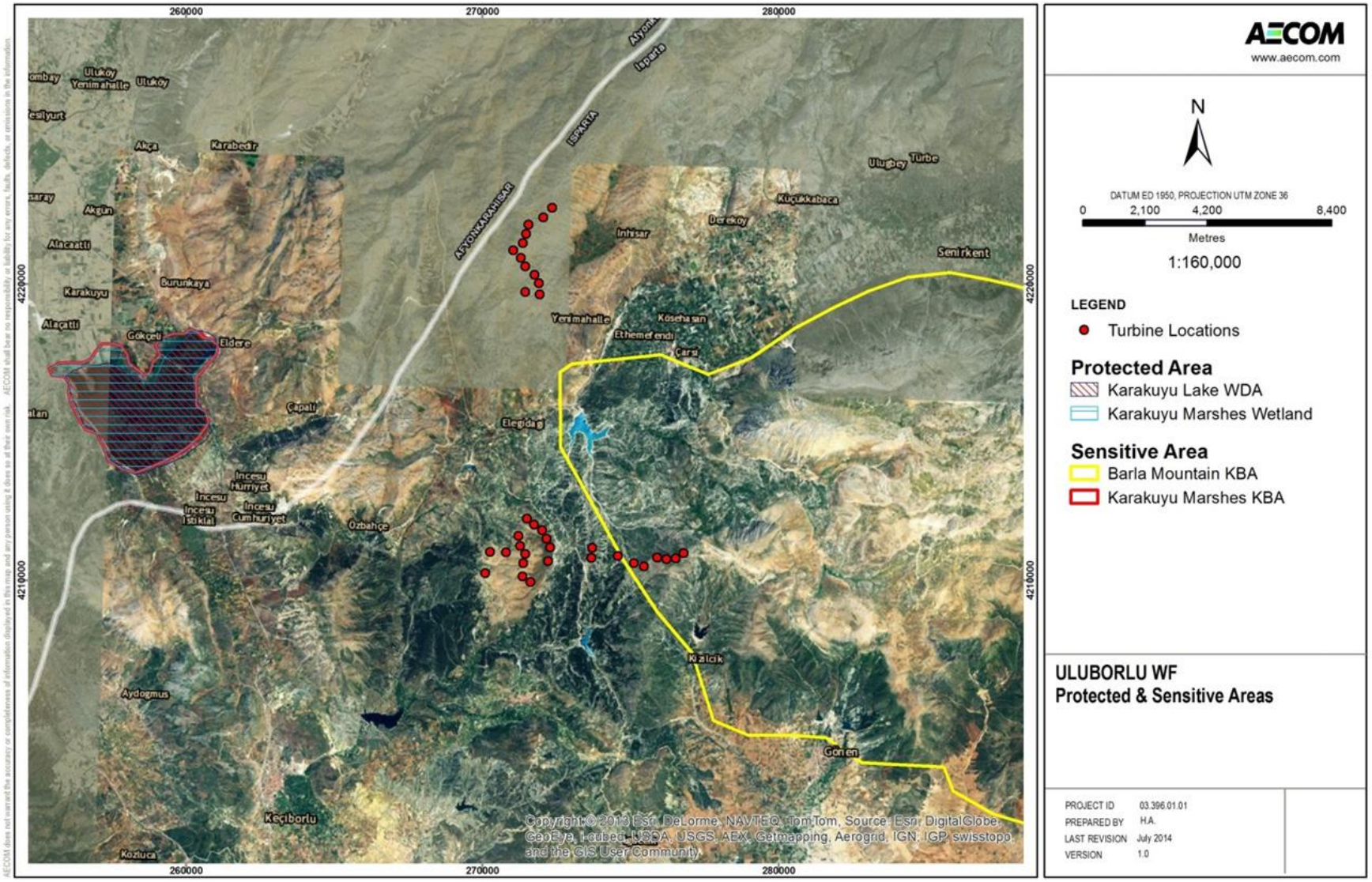


Figure 4-2 Naturally Protected Sites around the Project Area

5.0 Impacts and Mitigation

5.1 Noise

The noise levels generated by construction works would have the potential to impact on noise sensitive receptors. The shortest distance between a noise sensitive receptor and a turbine is determined as 2456 m between NSR and Turbine 1 (T1). As a result of calculations, the noise level generated from construction activities at the NSR is calculated as 47.5 dBA. Therefore, the noise levels at the NSR during the construction periods will be in compliance with the Turkish RAMEN construction period noise limit of 70 dBA. In addition to the regulatory compliance demonstrated above, construction noise is temporary and transient in nature and can be controlled through good site working practices, limiting construction hours and adopting noise control measures where necessary. Thus, noise impact associated with the construction activities is not expected to be a significant issue for the proposed Project.

The potential noise impact of the wind turbines on sensitive receptors is determined by noise modeling. This noise assessment study has demonstrated that the operational noise of the proposed wind farm Project will not exceed the Turkish RAMEN daytime, evening time and nighttime and IFC/WB Guideline daytime and nighttime noise limits. During the operation of the wind turbines, the likelihood and magnitude of the potential noise impact will be unlikely and negligible, respectively. Thus, the significance of potential noise impact is expected to be negligible.

Noise levels during decommissioning are expected to be similar to the noise levels during construction. Thus, noise impacts associated with the decommissioning activities are expected to be minor for the proposed Project.

The Environmental and Social Action Plan (ESAP) for Uluborlu WF lists a number of mitigation measures for noise control during construction and operation. Considering the mitigation measures no adverse impacts are anticipated during the construction and operation activities of the proposed project.

5.2 Air Emissions

Dust will be generated during civil works during the construction phase. Various construction vehicles and machines will also result in mobile source emissions such as SO_2, NO_x, CO and PM. The Environmental and Social Action Plan (ESAP) for Uluborlu WF lists a number of mitigation measures for dust and mobile emissions control. Considering the mitigation measures and the short duration of the activity, no adverse and permanent impacts on air quality are anticipated during the construction activities of the proposed Project. Besides, no air emissions will be generated during operation.

During decommissioning phase, potential impacts of air emissions are likely to be similar in scale to those associated with construction and an adverse impact is not expected.

5.3 Water Supply and Wastewater

Water will be mainly used for the construction works and domestic usage. The total water demand for the construction of wind turbines, switchyard and energy transmission lines is estimated to be 16.75 m^3 per day, whereas the operation period water demand is estimated to be as 1.5 m^3 per day.

During construction and operation periods, a leak-proof septic basin will be used for the collection of domestic wastewater since there is no municipal sewer system in the vicinity of the Project site. Wastewater collected in the septic tank will be disposed of in accordance with Water Pollution Control Regulation. Hence, no adverse impact is anticipated due to wastewater generated in the scope of the Uluborlu WF Project.

During decommissioning phase, potential impacts of water supply and wastewater are likely to be similar in scale to those associated with construction and an adverse impact is not expected.

5.4 Hazardous Waste

During the construction phase, no explosive or toxic materials will be used for the preparation of the site. Limited amounts of hazardous material will be used during the construction and operation phase of the proposed Project. Waste oils, waste battery and accumulators will be generated during construction and operation.

Any hazardous waste will be collected in leak-proof containers and removed to a licensed disposal facility by licensed transporters. The hazardous wastes will be handled, stored, transported and disposed of according to the Turkish Hazardous Wastes Control Regulation, Waste Oils Control Regulation and Waste Batteries and Accumulators Control Regulation, and the IFC/WB guidelines. Thus, an adverse impact on the local environment is not expected.

5.5 Non-Hazardous Waste

Domestic waste will be produced during the construction and operation phases. Domestic solid waste will be transported to the disposal area of local Municipality. Recyclable waste such as paper, plastics, metal, etc. will also be produced during the construction and operation phases. These wastes will be collected separately and will be sent to the licensed recycling facilities.

Excavated soil will be re-used for the filling of the turbine foundation, location of energy transmission line pylons and site leveling purposes. Hence, no excavated soil will be transported and stored outside the Project site.

Small amounts of hazardous wastes will be generated during the proposed construction activity. Liquid hazardous wastes will be collected in leak-proof and safe containers stored in an area with a concrete surface and a proper secondary containment to prevent potential spills and leakages reaching to the soil and groundwater. Hazardous wastes will be sent to the licensed recover/disposal facilities by licensed transporters.

Non-hazardous wastes are not expected to affect the environment adversely during the construction, operation and decommissioning period.

5.6 Soil and Groundwater

All chemical storage containers, including diesel fuel, and hazardous liquid waste drums/containers will be placed so as to minimize the risk of soil and groundwater contamination and water pollution. Such chemicals and fuel will be stored in concrete areas with proper secondary containments and drip trays during construction. When necessary, spill kits, absorbent pads or materials, and absorbent sands will be provided near the chemical storage areas at all times.

As a summary, it is anticipated that the significance of impacts on the soil and ground water during construction, operation and decommissioning will be minor. The residual impact after taken all necessary measures can be defined as negligible.

5.7 Impacts on Flora and Fauna

Flora

There will be a potential impact on the existing vegetation during site preparation and excavation activities. There will be no impact on the flora during the operation phase.

In order to construct the project units and roads, the vegetation will be removed. The majority of the habitat destruction occurs during the road constructions in wind farm projects. However, vegetation loss will be limited and moreover, topsoil will be removed and stored on site for future landscaping purposes.

In the first phase of the Project, the vegetation will be stripped for the construction in the Project site. Thus, the natural vegetation will be destroyed by the cuttings, removal of the vegetation and excavation processes. The construction activities will cause most of the fauna species that depend on this flora and vegetation structure to lose their habitat.

There are fifteen endemic species determined by literature survey. Three of these endemics are listed as LC (Least Concern) in the IUCN Red List.

The habitat loss must be evaluated according both to ‘vegetations’ and ‘species’ which are dependent to this habitat and that’s why their population may be negatively affected. Black Pine which is an important species in Barla Mountain KBA, might be affected due to road construction. There will be a biomass loss to be incurred by the plant species in the regions where stripping works will be performed; but the works will not affect their populations. Therefore, it is concluded that the proposed wind farm project will not disturb the general vegetation structure particularly.

In the first phase of the Project activities, the vegetation in the site will be stripped. During this phase, a risk will arise for the fauna elements, which use these flora formations. The main mitigation measure is to make these animals leave the Project site or remove them by means of appropriate equipments. It is not always easy to remove fauna elements which have been living in their habitats for a long time. Some fauna elements may return to their habitats after they are removed. Because of these possibilities, it is required to take all necessary mitigation measures depending on the type of activity to be carried out. For this reason, before the stripped material is removed from the area visual controls will be carried out for the possibility that vertebrates such as tortoises, hedgehogs, lizards and snakes may enter these stripped

materials. If any fauna element is found these fauna elements will be removed from these areas, by putting into a cloth bag and transferring to a nearby habitat. When it is not certain that all the animals leave the site and if necessary, high volume noise will be used to make these animals disturb and leave the area.

Fauna

Construction

The road construction in wind farm projects constitutes the majority of the destruction. Therefore, the existing roads should be used in the Project area for the construction activities and no construction will be conducted additional side roads as much as possible. The species using these areas for various purposes will not be able to use these areas again. The time period of the removal of vegetation could be carefully arranged so that the species inhabiting these areas will be protected. These species will migrate to other similar habitats for nesting and nourishment in their breeding periods.

Most of the amphibians are depended to aquatic environment, thus in order these animals to survive and form sustainable populations the creeks and lakes should not be destroyed.

The amphibian and reptile species will most probably leave their habitats due to the disturbance resulting from the construction activities. Yet, there will be some reptilian species which will return to their habitats in time. Therefore, unscheduled stripping may result in damage on the protected species. In order to prevent this, the start of the construction activities should be arranged carefully.

Spur headed tortoise (*Testudo gracea*) is known to exist in the Project area. According to the Bern Convention, Common Tortoise (*Testudo graeca*) is included in the list of strictly protected fauna species. Although *Testudo graeca* has “Vulnerable” status according to ERL/IUCN, this species is in the list of species that are not protected by Turkey since it is abundant in Turkey.

The most vulnerable fauna elements to wind farm projects and energy transmission lines are the birds. Another vertebrate group that could be affected from wind farm projects are *bats*. The bats can be affected from the air currents that result from the turbines.

Bats, which are flying mammals, are directly threatened species from wind farm projects and that’s why they have priority. With birds, they are the most vulnerable group against the directly adverse effects of wind farm projects. Bat populations’ adverse effect depends on the presence of large colonies near the turbines. Caves are natural housing for a lot of bats. There isn’t any cave (especially recorded bat caves) in and around the Project site. Because of this reason, bats population size are not big and important, also the death risks by collision with the turbines are not discussed. But, bat survey with using the bat detectors will be useful in suitable seasons. Moreover, the identified bats have low population density and species’ diversity in the area and do not conglomerate big groups, fly at higher attitudes because of the continuous and harsh wind; moreover, especially the night times when the wind speed is lower, bats rarely go out. Considering all these factors, no negative impact of the Project is expected in terms of bats.

The turbines will be located distant from feeding and sheltering habitat of the majority of active mammalian species. Only Red fox, Wild Boar and Golden Jackal from widespread medium and big

sized mammalian species for the country, are identified for the Project area. There is no expectation about those species permanently abandons from the Project area during the construction and operational phases. Current species seem to accord with this situation by little changing on their daily activities and local place options. Especially in the construction period, these animals which use the Project area and surroundings may leave their habitat. However, there are alternative habitats for such species around the Project area. As the structures do not occupy large areas, the Project will not affect a large amount of wildlife negatively.

The areas of proposed wind turbines are far away from the sheltering and feeding grounds of active mammalian species. The most widespread mammalian species are mice and mole rat. Since these species are based on ground; they are not expected to be affected.

To test the accuracy of these predictions, there are some possibilities about comparative faunistic monitoring programme between pre-construction and post-operation phases on selected indicator species.

Operation

In order not to have an adverse impact on the fauna elements, there are some other mitigation measures. One of these mitigation measures is the selection of the turbines. Recently, the turbines are designed and produced to be more silent and have blades with smooth lines. By this way, the risk of collision with the birds significantly decreases. Another mitigation measure is to paint the blades in appropriate colors. The blades may be painted with noticeable colors when needed.

Uluborlu Wind Farm, with 36 planned turbines is not expected to form an appreciable risk in terms of the location and number of turbines on wildlife, native and migratory bird species, provided that the recommendations mentioned above are implemented. Moreover, additional detailed migratory bird monitoring surveys are recommended.

Birds

Valid the mitigation measures should be taken for the habitat losses and the birds and bats should be prevented to collide with the turbines.

The most important mitigation measure is the site selection. Also, the quantity of turbines is important when the turbines are planned to be constructed on a limited size areas. It is important that the turbines not to prevent the migration of birds and not being constructed on the high altitudes along important migration routes. In addition they should be carefully sited and painted against collisions.

There isn’t any clustering or bottlenecks area for the birds around the Project area. Birds can fly at different altitudes in different points of the region with the impact of geographical structure. Main flying route is north-south direction. This direction is the main migration route for the region and birds can fly safely in this direction because of there isn’t any barriers. There are two main migration routes in Western Anatolia. One of them is exceeding Mediterranean Sea with a facade and actively flying birds use it. The other one is following the Mediterranean Coasts in Turkey and passing through Hatay Province. There is no certainty about the main migration route of birds in the Project area, but mainly their migration shape is north-south direction.

206 individual birds from 7 species which are gliding migrate and can be potentially affected by the turbines, were observed during the site visits (15 days). The observed birds came across to region generally from north direction and flied to south direction.

The Project area is not an important breeding point and it is not located on a main migration route.

When the survey results were evaluated, it can be stated that the area is not on the primer important migration route. Crashing risks are very low due to low number of individual birds which are passing through the area. Because of the geographical conditions (the project area is not on bottleneck, there aren't any valleys or steep slopes around the area etc.), the ratio which is possible moving away from the turbines after the construction phase is finished, will be high. On the other hand, this situation which bird collision to turbines in case of the absence of maneuvers chance, not because of they can't see the turbines, is well known.

Modern wind turbines are known to present a risk of collision mortality to diurnal and nocturnal migrant birds. The greatest losses seem to occur at wind farms situated at narrow migration routes or near wetlands, which attract congregations of waterfowl and other large birds.

Relatively high collision rates have been recorded at several large, poorly sited wind farms in areas where large concentrations of birds are present, especially on migration routes and where large raptors or other large soaring species are present (Kirby, 2010). Research suggests that collision mortality only becomes a significant detrimental factor if wind farms are inappropriately located.

In addition to turbines, overhead electricity lines and associated infrastructure can pose a significant collision risk for many larger migrant birds (e.g. swans, geese, raptors), especially if sited across flight-paths or close to congregation sites such as wetlands. Furthermore, electrocution on poorly designed medium-voltage lines is a significant cause of mortality in large perching species such as raptors (Birdlife International, 2007).

The wind energy is considered as clean energy sources. However, in order to this statement to be valid the mitigation measures should be taken for the habitat losses and the birds and bats should be prevented to collide with the turbines.

The most important mitigation measure is the site selection. Also, the quantity of turbines is important when the turbines are planned to be constructed on a limited size areas. It is important that the turbines not to prevent the migration of birds and not being constructed on the high altitudes along important migration routes. In addition they should be carefully sited and painted against collisions. When Uluborlu WF project is evaluated considering this, the number of the turbines and the design of the wind farm are not expected to prevent passes and do not harm the breeding areas of birds and bats. The site and project specific impacts will be observed through suggested two year monitoring period.

When observation data was evaluated, it can be stated that Project area is on a secondary migration route where is passing from Western Anatolia. While Western Anatolian Migration Route is not as intense as İstanbul-Hatay Route, it can be still used by some birds. Especially, bird presence, which are flying to Africa through Mediterranaen Sea, was proved by satellite transmitters. But also it is not possible to say that all birds that are directed to southwest are crossing Mediterranean Sea. They can also go through Hatay Province by following Aegean and Mediterranean Sea.

Although there aren't high individual numbers for bird passing through the region, their frequencies must be taken into account. Bird species which are migrating and trying to gain altitude spent their times on the hills where turbines will be situated. Especially native and migrating Eurasian sparrowhawks were making low flights on the region. There is no high risk for Western Marsh-harrier cause of they are flying on high altitudes. The more accurate information is needed about native raptors' behaviors and their frequency of field using in breeding season in the region.

In terms of displacement, there are no vital habitats for breeding birds in the area, because of the forest assets outside of the turbine sites. Also, using of fire lanes as turbine settlements, will decrease the habitat loss and fragmentation.

Due to the fact that low turbine numbers, hummocky topography, alternative corridors for birds and more than 4 kilometers distance from the other nearby windfarms, creation of a barrier effect is not expected.

All migrated species may not be recorded in the site visit because of the study couldn't done (there weren't any site visits between August and September) in the absence of sufficient time for the wholly migration period. When the current observation data and information gap for the other birds who are migrating another periods are considered, next studies must be include all migration periods and each site visit get to focus exhaustively for each species.

As a result, there is no negatively remarkable expectation for birds resulting from the Project. However, a monitoring study will be useful in order to identify the threats that may occur in the future or unforeseen in this report.

5.8 Visual Impact

During the construction phase, there will be temporary and reversible effects on the landscape of the site due to ground disturbance. Any debris or other wastes produced during such activities will be collected and disposed in an orderly manner to prevent any lasting impacts to the area. During the construction, the contractor will make sure that the camp will be well maintained and cleaned regularly. The camp site will not create any adverse visual impact.

Visual or aesthetic resources refer to those natural and cultural features of an environmental setting that are of visual interest to people. The Project site is not located in a protected area or a tourist/resort area; it is located on a hilly topography and not considered as an aesthetically significant place. Thus, a visual impact is not considered as significant. However, the visual impact associated with the proposed wind farm will be permanent for those residing at the closest settlements

In order to demonstrate the visual impact, views of the Project site from five different locations have been prepared. Three dimensional models were used in order to represent wind turbines, towers and blades and these models were located on photographs of the Project site.

Visual impact is a subjective issue, a significant number of people in Turkey associate wind farms with clean energy and view the towers as symbols of modern and civilized living. There is no known public opposition on wind farms in terms of potential visual effects. . Moreover, there is an operating wind power plant located in neighbor districts in Isparta. Therefore, residents of the settlements around the Project site

are familiar with wind farms and after the conversations with local people, it was understood that they do not have any objection or negative attitude about the visual impact of wind towers Thus, it is expected that public and NGOs will view this development favorably and visual impacts will not considered as significant.

During the decommissioning phase, visual impacts will be temporarily similar to the construction phase. It is expected to preserve the natural image of the location.

As a summary, it is anticipated that the significance of impacts on the soil and ground water during construction, operation and decommissioning will be negligible to minor.

5.9 Shadow Flicker and Blade Glint

Wind turbines, like all other tall structures will cast a shadow on the neighboring area when the sun is visible. The major difference between a tall structure and a wind turbine regarding their shadow casting potential is the rotating blades of the wind turbine. As the rotor blades rotate, shadows pass over the same point causing an effect termed as shadow flicker. Shadow flicker occurs when the sun passes behind the wind turbine and thus casts a shadow. This phenomenon is regarded as an environmental impact and can create a disturbance/nuisance if the wind farm is not situated and/or planned accordingly.

A modeling study was performed in order to estimate the shadow casting areas by WindPRO software and to create a shadow model for each of the wind turbines. The modeling results demonstrate that no shadow flickering will be observed at the shadow receptors for both worst case and realistic case scenarios since the distance between the shadow receptor and turbines are greater than 2 km. There is no limit stated in both Turkish legislations and IFC/World Bank guidelines regarding to shadow flickering. The modeling results show that no shadow flickering will be observed at the shadow receptors and it can be stated that the proposed wind power plant will not cause shadow flickering impact on the closest settlements. In addition, blade glint is not expected to be an important issue since the blades will be made of and painted non reflective materials.

5.10 Cumulative Impacts

Cumulative impacts mainly regarding noise, shadow, visual and birds were identified and assessed in this report. The existing and planned wind farms and existing ETLs that are situated in the vicinity of Uluborlu WF are taken into consideration. All facilities that are anticipated to interact with Uluborlu WF are listed in Table 5-1 below.

Table 5-1 Planned and Existing Facilities in the vicinity of Uluborlu WF

Facility name	Capacity	Distance (km)	In operation/Under construction/Planned
Energy Transmission Lines			
Çay SEKA (Afyon II) Çölovası - Keçiborlu ETL	154 kV	2.5	Under Construction
Wind Farms			
Dinar WF	50 turbines 115 MWe	13.2	Operation
İncesu WF	4 turbines 10 MWe	5.9	Planned

During the operation phase, the ETLs have impacts mainly associated with landscape and birds. In addition to the impact on landscape and birds, the wind farms may also have noise impact on the nearest settlements. Although there are some other issues such as traffic (*due to access to the turbine locations*) and air quality (*fugitive emissions of SF_6, Sulfur hexafluoride used in switchgear and circuit breakers*), it is anticipated that these issues do not have significant impacts and do not interact resulting in cumulative impacts. Therefore only noise, landscape and birds are assessed in terms of cumulative impacts.

Table 5-2 Cumulative Impacts due to the Presence of Other Facilities in the Vicinity

Facility	Noise	Shadow	Landscape (Visual)	Birds
154 kV Çay SEKA (Afyon II) Çölovası - Keçiborlu ETL	-	-	X	X
Uluborlu WF	X	X	X	X
Dinar WF	X	X	X	X
İncesu WF	X	X	X	X
Cumulative Impact	**-**	**-**	**X**	**X**

As seen in Table 5-2, although each wind farm has individual noise impact, a cumulative noise impact is not anticipated due to the distances between the wind farms. Therefore, only cumulative impacts on visual and birds are anticipated. These impacts and associated mitigation measures are presented below.

5.10.1 Noise

The operation of ETLs does not cause noise however, operating wind turbines generate noise varying with wind speed. The sources of sounds emitted from wind turbines consist of mechanical sounds and aerodynamic sounds. The interaction of noise from one wind farm with the noise of another wind farm depends on the distance between them. The distances between the turbines of the wind farms located in the vicinity of Uluborlu WF and Uluborlu WF are as far as possible for the noises of turbines do not to

accumulate. The assessment of cumulative noise impact concludes that the operation of wind farms will have no cumulative noise impact on the settlements. Therefore, no mitigation measures are proposed.

5.10.2 Shadow

The cumulative shadow impact assessment was carried out by performing a modelling study to determine if cumulative shadow flickering occurs at the settlements around. The same model inputs, used in the modeling study just for Uluborlu WF, were inserted into the cumulative shadow modeling study. The additional inputs were the turbines of both Dinar WF and İncesu WF. The modeling results demonstrate that due to the distances between the turbines of each wind farm project and the settlements around, there will be no cumulative shadow impact caused by the operation of turbines in each wind farm.

The assessment of cumulative shadow impact concludes that the operation of wind farms will have no cumulative shadow impact on the settlements around, therefore no mitigation measures are proposed.

5.10.3 Landscape (Visual)

The cumulative visual impact assessment of Uluborlu WF turbines and the turbines of other wind farms located in the vicinity of Uluborlu WF is carried out according to the visibility of the Uluborlu WF turbines together with the visibility of the turbines of other wind farms in the same view shed from the settlements and roads which are the major principle visual receptors. In order to determine the areas that will be able to observe Karova WF turbines and other wind farm turbines, ZTV diagrams for each wind farm were generated.

Regarding the significance of the cumulative visual impact on the settlements, it is unlikely that an impact will occur. The magnitude on the views will be low, since the wind farms will not be visible in the same view shed and scene although they constitute apparent features. In addition, there are other factors that reduce the magnitude. The turbines will be seen against the skyline, where their vertical form will not create contrast strongly with the baseline characteristics of the view. Thus, the significance of the effect on these views will be negligible.

Regarding the significance of the cumulative visual impact on these settlements, its unlikely that an impact will occur. The magnitude on the views will be low, since the wind farms will not be visible in the same view shed and scene although they constitute apparent features. In addition, there are other factors that reduce the magnitude. The turbines will be seen against the skyline, where their vertical form will not create contrast strongly with the baseline characteristics of the view. Thus, the significance of the effect on these views will be negligible.

As in the case of wind farms, the visibility of the energy transmission lines mainly depends on the height of the transmission towers and cables. The higher the transmission lines, the greater the distance of visibility. In addition to height, topography, land use, vegetation and local nature along the route of an ETL are the other factors affecting its visibility from the viewpoints.

Regarding the significance of the cumulative visual impact of Uluborlu WF and 154 kV Çay SEKA (Afyon II) Çölovası - Keçiborlu ETL, its likely that an impact will occur. The magnitude on the view will be low, since the turbines and the ETL will not be in the same viewshed and the limited portion of scene will be affected. Thus, the significance of the effect on this view will be negligible-minor.

Regarding the cumulative visual impacts and necessary mitigation measures, visual impacts of moderate and above are considered as significant, as this is the level at which changes would be clearly perceived. Since the cumulative visual impacts at the viewpoints in this study are classified below moderate, no mitigation measures are proposed.

5.10.4 Birds

A cumulative impact assessment on birds requires taking the other projects into consideration. Although there is no biodiversity study for other wind farm projects, it is possible to predict cumulative impact of Uluborlu WF Project on birds. The geographical properties of the region results that the migration directions of soaring birds and turbine distribution in Uluborlu WF do not affect the bird movement. It can be stated that the cumulative impact on local bird movements will be none or negligible due to the distance between Uluborlu WF and other two wind farm projects situated in west. Therefore, it can be stated that the cumulative impact on birds caused by Uluborlu WF and other wind farms will be negligible.

6.0 Socio-Economic Impacts

This Social Impact Assessment (SIA) aims to build on the existing EIA studies to analyze Project impact. SIA involves the processes of analyzing the intended and unintended socioeconomic and community impacts, both positive and negative, of the Project and will help:

- Understand the potential impacts and manage any change that may occur;
- Predict potential impacts and identify mitigation strategies to minimize adverse impacts.

Broadly speaking, changes may effect: Employment, income, production, way of life, culture, community, social environment, health and well-being, personal and property rights, and fears and aspirations. There may be differential social impacts and the Project may affect different groups differently. Some people may tend to benefit, whereas some may not.

The aim of this study is to define the project affected people and the households, portray the socio-economic features of the project affected households and the project neighborhood; within a social impact assessment framework. Both qualitative and quantitative, a variety of primary methods are used to collect relevant data in this social impact assessment study, which are;

- Statistical data obtained from official resources such as Turkish Statistical Institute and YerelNET,
- Surveys (household questionnaire);
- In-depth interviews with the headmen of the affected villages.

15 people are interviewed in the scope of the study. Household questionnaires are conducted with the male households as a rule, and its natural result, all interviewed people are male with 100% percent.

İnhisar Village

İnhisar is a forest village located 67 km far from Isparta province and 7 km away from Uluborlu district. The settlement type is a collective settlement. According to mukhtar number of households are 34. Population composed of 176 people living in the village. The population of men and woman are ½ in ratio.

It is stated that the population in winter is decreasing because people are moving to Uluborlu district, so the number of people changes half and half as in between seasons. Population has been decreased in last 5 years because of restricted mainstays. There are not any immigrants. Young and working aged people are migrating to cities. Visitors and people, who come summer time, are locals of the region.

A school is present but it is going to be demolished due to mobile education. In the village; cementary, fountain, mosque, personal barns, land belonging to the village legal entity, a family doctor (who comes in every 15 days), healthcare organization, village pasture and a children playground are present.

The village cannot compensate its intaken product, which is the most important problem of the last 5 years. There exist 17 households that need financial support, 2 disabled and 20 widow people. 17 households are taking salary from socail aid. The village is included in one of the plans of the Ministry of Environment and Urbanization which is basically providing assistance to people who build their own houses, called “EYY Model”.

The village was found around 100 years ago. It is found by 3 brothers, who came to there from Bilecik İnhisar town.

There are residues and rumors of 2 churches. Also, there is a forest development area 500 away from the village. However, it is not in use because the place is surrounded by wire fences.

Except very old people all people lilving in village have ability to read and write. The nearest pre, primary, secondary and high schools are in Uluborlu district. Süleyman Demirel University is in Çünür district.

All school aged children are going to school. Financial problem is the only problem for education. The village is close to schools.

Most of the houses are stone houses and they are in bad condition. Roads inside the village are made from keystone or parquet. There are drinkable water, eletricity and phone network available but internet network is not present. Wastewater is removed by cesspit ways. Solid wastes are taken by municipality but there are not enough barrels for that business. Besides, irrigation is not done in the village.

Main source of incomes is dry agriculture and stockbreeding. Barley, wheat, rose, sour cherry are produced. Barley and wheat is produced only for subsistence farming. Brokers are coming from Uluborlu District for sour cherry and for roses, brokers are coming from Isparta Province. There are no migrating or immigrant employees in the village.

Overall income per household is in between 100-200 Turkish Liras. Every person in a household is working. In the last 5 years there is nothing changed in the village in positively or negatively. To make source of income better irrigation system must be supplied, stockbreeding must be improved and budget must be supplied in these business.

Major problems in the village are irrigation network, telecommunication, communication, unemployment, insufficient sheltring conditions, waste and garbage. Uluborlu road is narrow and an available 3000 decare area can be used to make the road wider that is available in the area. The last field cadastre was done in year 1974.

There is a healthcare organisation in Uluborlu District 7 km away from the village, which is the nearest. Every 15 days a family doctor comes and care people in a coffeehouse. The major health problem in the village is aging.

People are informed by the constructed measurement masts. Locals do not have much information about wind turbines, so they said that they will see effects after construction period is done. AECOM is informed by the company that turbines will cause visual pollution, natural distortion and sound pollution in the area. Locals are even a little afraid from turbines because they may affect their stockbreeeding negatively. People expect the same meeeting to be done in İnhisar village. Widening of the road is requested to use the present road but they do not want a new road to be opened.

İleğidağı Village

Meeting held on in İleğidağı village, 60 km far from Isparta Province, 5 km away from Uluborlu District. It is a forest village and collective settlement.

Geographically nearest city center to İnhisar village is Isparta, which is 60 km away; and Uluborlu, which is 5 km far the nearest district to the village. The village is located in a forest and physical structure of it is collective settlement. There are 110 household and the population number is 400 that half of it are men. People living in the village younger than 5 years old are 25, in between ages 6-15 are 25-30, in between ages 16- 25 are approximately 50 people, in between ages 26 to 45 are 80-90, ages between 46 – 60 are 150–200 and over 60 there are 80 -90 people according to the age population distribution. The population of the village increases in summer because people, who have houses are coming in summer time. Also, there are people coming from Antalya and İzmir.

In the last 5 years there is decrease in the population due to the unemployment and there are not any immigrant in the village. Mostly young people migrate to cities like Isparta, Denizli and Antalya when they find a job. Present public services are school (mobile eduation is used), grocery store, health agency, village council, mosque, coffeehouse, sport and social facility, post office, bank office, cemetery, barn, fountain, playground for childern, village pasture, land belonging to the village legal entity. In the last five years the village can not afford the intaken products and there are not any development plan for the future. The number of poor, disabled, widow people are respectively 15, 1, 8. The village was found 150 – 200 years ago. People living there came from Eğirdir, which belongs to Yörük originally. Previously people were living in İleği with a landlord but now they are living near İleği mountain.

Near the region there are ruins and protected area called Büyükyayla and Köyiçi. Köyiçi was burned in 1820 and it is completely destroyed. There is an underground pipeline carrying water from Köyiçi to village. Besides, there is an irrigation area used for watering in protected areas. The literacy rate is almost 100%. All primary, secondary, high schools and an academy for 2 year education are located in Uluborlu District. All school-age children are going schools. Young people and childeren going to school are have financial problems and problems with mobile education.

Houses in the village are all stone houses. Roads are parquets and keystones. In the village a water supply network, electric network, telephone line, internet connectivity, network coverage are available. A sewerage system is also present. Garbages are taken by special provincial administration. Watering is done in the village. Rose and cherry are the agricultural products. 80% of cherry is exported and 20% is imported. Cherry is sold to brokers and rose is sold to fabricators. The rose belongs to Kılıç village in Isparta, which is a special type in ejecting oil rose.

The agricultural production and stockfarming are mainstay for the village. However, stockfarming composes only 10% of the mainstay.The village pays for seasonal workers in between 15 June to 15 July. The average income per household is not more than 500 Turkish Liras. Both men and women are working in households. In the last 5 years economic problems increase in the village. The 90% of people are deptor and 60% are distrained. People can not pay back the product intaken,so all are deptors to banks. To make the economical activity better a new work area can be created, product support is needed. The products are expensive but the goods are cheap, which causes a trouble in agriculture. Problems that the settlement face are insufficient irrigation network, conditions of houses (60% are in bad condition), low income, inadequate health services, not having an opportunity for economic development, insufficient and insecure health requirements, insufficient electric supply, insufficient wastewater network (clean-up system is close to the village, so there is a bad smell and blockages happening in the system) and unemployment. Forest and rural cadastre is done in the village. The nearest healthcare organization is in Uluborlu District. Common health problems that people face in the village are diabetes, heart disorder, breathing passage disorders and high blood pressure (tension). The agricultural development cooperative is active in the village and it commercializes only rose. People were informed by the company about the project one year before the measurement mast constructed. In the village no one had an experinece in construction business. They expect to work in the construction of wind turbines and they say that they do not presume to see any effects of the turbines in the future.

During the construction of water network they couldn’t pay the money to the contrutor, so they want 100 bilion Turkish Liras to pay the loan. They are distrained because of it. They demand complimentary scholarship for the university education of students living in the village. They want their people to have a job in the project. The region also do not have any cherry purchase area even they grow cherry, so they demand it. Keystones roads are not present in every road, which is demanded and they have restrictions in accessing their land. Also,a support for the water network is demanded because it is insufficient for cherry.

The vast majority of the villagers haven’t heard about the Project before. Secondly; they may have seen the masts or the project workers in the field which are their information sources.

Majority of the villagers are inclined with live stocking. When primary livelihood is agriculture, villagers also feed animals for their needs as a secondary livelihood.

Accordingly, villagers are questioned about the presentation, their level of information about the Project and their desired way of gathering information.

A vast majority of the villagers feel informed enough about the Project.

When questioned about their desired way of information; the villagers are willing to gather more information from the Project authorities.

A vast majority of the people or a member of their households own land. Village local economy/household income depends on income from agriculture and civil service pension, with a much smaller percent.

The majority of the household head are graduates of primary school. The level of literacy is not high in the village. The family type is generally nuclear family in the village, which can also explain the migration phenomena. Related with the means of the household head ages; the population seems to be aging.

Nearly all of the interviewed villagers have been living in the village since their born. Majority of the respondents own their houses. Building material of the vast majority is brick. Stone is also a common construction material.

The vast majority of the insurance owning consists of Farmers Social Insurance Institution. However, all household members do not have their own insurance; this is the current situation for the household head. An important ratio of villagers is insured by Social Security for Artisans and the Self-employed and yet another important ratio does not have any social insurance.

The common/chronic diseases in the villages are; chronic respiratory diseases, KOAH and diabetes. The average household income per month is 1517 Turkish Liras, which is under the Turkey average hunger limit.

When asked “How do you perceive your household according to your income?” not related with the real amount of income, the vast majority of the respondents perceive themselves earning poor level income.

Household Equipment

White goods ownership is one of the basic socio-economic indicators. However, except crucial ones, the villagers do not own any extra or luxury goods.

There is a common sewage system working in the village properly. The villagers who are interviewed use fuel wood with a 75% percent. Fuel wood together with coal usage is also common.

There is a regular system in dumping of wastes in which the Municipality is in charge of.

Villagers are asked to define the most important problems they strive to encounter. Insufficient infrastructure seems to be the first crucial problem being encountered in all surveyed villages. As the others; poor roads as an infrastructure problem and unemployment are counted as the other problems.

There are no villagers met throughout the field study who opposes the Project. A vast majority of the villagers support the project.

Benefits of the project

When villagers are asked to mention the most important benefits of the Project, they accept the positive impact of the project on an international level and the employment opportunities.

Harms of the project

The villagers claim that they are informed much about the project. However, they are still afraid of any harm on their livelihood.

Stakeholder Engagement and Grievance Mechanism

Informative activities concerning the public involvement meeting are held. E-mail and faxes are sent before the meeting in order to inform people. Related questions are as follows:

- **No side effects of the Project, right?**
- We expect only noise as a side effect.
- **Is it going to be any employment opportunities?**
- We will strive to hire local people at a maximum level. The project will need security guards and technicians owning relevant certifications. Adding to that, we will strive for local procurement.

Other notes: Project summary and meeting evaluation forms are distributed.

A public grievance mechanism will be established for the Project. Any comments or concerns can be brought to the attention of Fina Enerji orally or in writing (by post or e-mail) or by filling in a grievance form.

Social risks are very context specific and could include factors such as:

- Economic changes such as inflationary trends.
- Political changes which may make it difficult to implement particular mitigation measures.
- Unforeseen events such as natural disasters.
- Lack of skilled people to implement mitigation measures.

After the social impact assessment study, it can be stated that basic needs and wills of the villagers are revealed:

- First of all; this study shows that the villagers are in the need of continuous information and public disclosure throughout the life cycle of the Project.
- Second, the villagers deprive of employment opportunities especially for the youngster.
- Any effect on migration is not expected due to the duration of construction works.
- Villages lack of a sufficient drainage system and efficient roads.
- Finally, they want support in social and recreational facility opportunities and cheaper electricity. Some of these demands are not directly related with the project owner, however,

all of the demands are tried to be reflected. Providing the rest is based upon the resources and the availability of the firm.

General recommendations are provided below.

Both in the construction and operation phases; some recommendations can be stated as follows:

General recommendations;

- Screening the potential socio-economic impacts within the wind energy value chain
- Assessing impacts on tourism, if any; and maximizing the tourism potential of the development of the wind farm.
- Improving the quality of studies by asking specialists to undertake socio-economic studies, complementary to the EIA lead consultancy.

Entrenched perceptions:

- Raising awareness and communicating with factual information.
- Avoiding, minimizing and managing noise impacts.
- Using appealing ways to disseminate a broad positive communication on wind energy.

Proximity to housing:

- Mapping of most suited sites to avoid landscape saturation.
- Raising awareness and communicating with factual information.
- Assessing the visual impacts of the wind farm.
- Integrating wind turbines in the landscape.
- Careful siting and pre-construction assessment with respect to human activities especially residential development to minimize impacts.
- Avoiding, minimizing and managing noise impacts.
- Developing clear, transparent spatial planning to improve social acceptance.

Benefit schemes:

- Creating and maintaining up-to-date and complete websites, social media networks and newsletters about the project and its environmental and economic impacts and benefits to the locality.
- Communicating positively on local initiatives: from cooperatives, local authorities, associations.
- Supporting and helping local community participation in wind energy projects to increase citizen ownership and secure equitable profit sharing.
- Facilitating the implementation of conditions enabling an equitable distribution of benefits.
- Using the profits from wind energy as leverage for developing other RE projects.

Involvement of local community:

- Securing a positive dialogue between the project promoter, the consenting authorities and the communities.
- Fostering early communication between project developer, local communities and economic actors.

- Creating and maintaining up-to-date and complete websites, social media networks and newsletters about the project and its environmental and economic impacts and benefits to the locality.
- Raising awareness and communicating with factual information.
- Providing detailed information on local benefits.
- Organizing events around wind energy.
- Communicating positively on local initiatives: from cooperatives, local authorities, associations.
- Supporting and helping local community participation in wind energy projects to increase citizen ownership and secure equitable profit sharing.
- Developing clear, transparent and strict rules as a frame for the consenting process, to improve social acceptance.
- Facilitating the implementation of conditions enabling an equitable distribution of benefits.
- Using the profits from wind energy as leverage for developing other RE projects.
- Finding the right balance securing both community involvement and efficient wind farm development.

Sustainable development:

- Maximizing the tourism potential of the development of the wind farm.
- Considering compatibility with other human activities.
- Fostering early communication between project developer, local communities and economic actors.
- Creating and maintaining up-to-date and complete websites, social media networks and newsletters about the project and its environmental and economic impacts and benefits to the locality.
- Providing detailed information on local benefits.
- Avoiding, minimizing and managing noise impacts.
- Include socio-economic criterions while granting the permits.
- Considering socio-economic impact assessments in EIAs.
- Monitoring and evaluating socio-economic impacts to track and understand changes to local communities.

For better engagement and corporate communications:

- Organizing events around wind energy.
- Assessing the visual impacts of the wind farm.
- Avoiding, minimizing and managing noise impacts.
- Communicating positively on local initiatives: from cooperatives, local authorities, associations.
- Supporting and helping local community participation in wind energy projects to increase citizen ownership and secure equitable profit sharing.
- Developing clear, transparent and strict rules as a frame for the consenting process, to improve social acceptance.
- Developing clear, transparent spatial planning to improve social acceptance.
- Facilitating the implementation of conditions enabling an equitable distribution of benefits.

7.0 Occupational and Community Health and Safety

The main community health and safety issues related with this project were determined as lightning, aviation safety and public access to the project site.

The wind turbine will be equipped with lightning protection systems which have the task of diverting the lightning currents arising from lightning strikes and the energy associated with the lightning into the ground in a controlled manner. The turbine will be equipped with receptors, e.g. on the blades, that receive the lightning current and divert it through predefined paths within the turbine to the ground.

In case request of a local authority, anti-collision lighting and marking systems will be used on the blades in order to provide aviation safety.

In order to prevent entrance of un-authorized access to the Project site, farm area will be fenced. In addition, there will be two security personnel during the operation period.

8.0 Analysis of Alternatives

There are various technical alternatives of producing electricity from different energy resources. However, in order to combat with the global warming problem, sustainable and renewable energy resources must be used as much as possible. Uluborlu WF aims at utilizing wind energy, which is a renewable energy, potential of Turkey via wind turbine technology to generate electricity. Hence, the wind farm will not only provide benefit to Turkey by producing electricity but also to global atmosphere by reducing CO_2 emissions.

General Directorate of Renewable Energy (former General Directorate of Electrical Power Resources Survey and Development Administration) evaluated the natural wind energy potential for most parts of Turkey using monthly wind speed and direction data from the State Meteorological Service. As a result of these studies, Turkish Wind Energy Potential Atlas had been prepared in order to evaluate the wind energy potential (REPA, 2007). The location of the Project in Isparta Province is in moderate wind energy potential regions in Turkey according to Turkish Wind Energy Potential Atlas. The Project site is selected in this region in order to utilize this wind energy potential in this region.