HİLAL-2 WIND POWER PLANT PROJECT

Environmental Management Plan

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ENVIRONMENTAL MANAGEMENT PLAN

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ABBREVIATIONS

BP	Bank Procedures
CO_2	Carbon Dioxide
EA	Environmental Assessment
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GD NCNP	General Directorate for Nature Conservation and National Parks
GP	Good Practices
MoEU	Ministry of Environment and Urbanization
OP	Operational Policies
PCB	Polychlorinated Biphenyl
PDR	Project Description Report
SANKO	SANKO Rüzgar Enerjisi Sanayi ve Ticaret A.Ş. Hilal-2 RES Şubesi
TKB	Development Bank of Turkey
WB	World Bank
WPP	Wind Power Plant

1 INTRODUCTION

1.1 Objective of the EMP Report

2U1K Mühendislik ve Danışmanlık A.Ş. has been assigned by SANKO Rüzgar Enerjisi Sanayi ve Ticaret A.Ş. Hilal-2 RES Şubesi (hereafter referred to as "SANKO") to prepare an Environmental Management Plan (EMP) for its Wind Power Plant (WPP) in Karaman. The EMP Report aims to provide an assessment of the current situation of the WPP in terms of environmental, ecological, social and health & safety concerns.

The Report is based on site studies performed on April 14-15, 2016, which comprise of visual site observations, meetings with mukhtars, bat surveys and ornithological assessments. Site studies are supported with literature survey and review of project documents.

The Report presents an assessment of the current situation in environmental, social and ecological terms. An Ecosystem Assessment Report is attached as Annex, focusing on birds and bats at and around the Project Site. While the Ecosystem Assessment Report provides a comprehensive flora and ornithology assessment, the Bat Assessment Study Report appended to the Ecosystem Assessment Report provides a detailed discussion on possible bat populations. Please see Annex for assessment of the Project Site flora, birds and bats.

1.2 Project Description

SANKO is currently operating the WPP named "Hilal-2" (hereafter referred to as the "Project" or "Hilal-2 WPP"). For the purpose of this assessment, the land occupied by the Project is referred to as the 'Site' or "Project Area" in this report.

The Project is comprised of three wind turbines with unit capacity of 3300 kW installed for the operation of the 9.9 MWm (7 MWe) wind power plant. The turbine towers are placed approximately 250 m apart. Turbine equipment is supplied from Vestas, based on an optimization of safety factors, simple durable design for low maintenance and long life operation, high efficiency, and also for fine visual appearance.

As a result of the Project, an estimated electricity net generation of approximately 24,500 GWh per year will be accomplished, which will attain a total emission reduction of 13,900 tons of CO_2e/year.

The key parameters about the technical design of the selected model V112 turbines are listed below in Table 1.

Table 1. Technical Specifications of Turbines

Project Characteristics	Quantity
Rated Power (kW)	3300
Rotor Diameter (m)	112
Hub Height (m)	84
Number of Blades	3
Cut-out wind speed (m/s)	25

The license for energy generation has been issued by Energy Market Regulatory Authority (EMRA) on 28 March, 2012. Operational lifetime of the project is 49 years.

The Project has triggered building a 15 km overhead power transmission line. The line extends towards Kepezkaya Transfer Station located in Bucakkışla Quarter of Karaman, to the west of the Site. The overhead line is 34.5 kV medium voltage line that follows the road sides. According to the EIA Regulation, medium voltage transmission lines are not subject to EIA requirements.

1.2.1 Construction Stage

Construction stage of the Project started on September 15, 2014 and operation of the WPP started as of October 23, 2015. No residual impacts from construction stage were observed on the Site and its environs.

During the construction stage, SANKO applied for the Gold Standard certification in 2015 as a verification of sustainable development impacts of the Project. Gold Standard ensures that energy efficiency and renewable energy projects actually reduce carbon dioxide (CO_2) emissions, and provide benefits to the local population. The Project Company compiled its Gold Standard Passport that is inclusive of project information and views of stakeholders. As one of the steps of Gold Standard process, SANKO organized a meeting on May 05, 2015 and a “stakeholder feedback round” between March 14 and August 14, 2015. Annex-2 of the EMP Report provides a copy of the Gold Standard Passport. Its Section E on Stakeholder Consultation Process gives detailed information of the stakeholder consultation process.

During the public participation meeting on May 5, 2015, a non-technical project summary was provided to the participants. Project presentation was made by the project manager. Including information about project developers, technology and operation of the power plant, estimated emission reduction amount of the plant, the importance of revenue from emission reduction and the project characteristics which makes this project different from other power plant projects in Turkey. Before passing to blind sustainable development exercise, questions and comments were taken from participants about further clarifications about the project activities(Please see Annex-2).

1.2.2 Operation Stage

The WPP is currently in operation as of October 23, 2015. Possible risks and impacts in the operation stage are related mainly with birds and bats, and also risks of contaminating soil and groundwater just as in any development project. It is also important to safeguard the communities living nearby from possible negative impacts of the power plant.

1.3 Project Location

The project site is located about 40 km to center of the Karaman Province and 60 km to center of Mut District, Mersin.

The closest settlement to the project site is Cerit and Elmadağı Villages which are located to the south and north of the wind farm, respectively. The distance between the village and the closest wind turbine is approximately 2 km. The license area neighbors the Mut WPP of Borusan EnBW with an installed capacity of 52,8 MWm/50 MWe generated by means of 16 turbines.

Figure 1. Project Area

1.4 Project Proponents

The Project proponents are as follows:

- Hilal-2 WPP
- Development Bank of Turkey, TKB
- World Bank

Hilal-2 WPP is the operation company under SANKO which is a subsidiary of Sanko Holding, which started in 1997 with a group of companies for its energy production investments. Sanko Energy is the owner of Çatalca Wind Power Plant of 60 MW in Istanbul, and six hydropower projects with various capacities. SANKO has applied TKB for a loan agreement for financing of the Project. Once a loan agreement is signed, TKB will be allocating the financing from the World Bank renewable energy credit line. Thereby World Bank operational policies will be required for compliance.

2 LEGAL FRAME

2.1 National EHS Legislation

This section provides a layout of key national environmental legislation related with the Project.

One of the principal legislation related to the Project is the Environment Law of August 1983 (amended with the Law dated April 26, 2006; No: 5491). Several by-laws and decrees are enforced under the Environment Law.

2.1.1 Environmental Impact Assessment (EIA) Legislation

Given the installed capacity below 10 MW, the Project falls outside the scope of Turkish EIA By-law.

2.1.2 Nature Conservation

Hunting Law (No: 4915) and associated regulations ban any activities that destroy areas of nesting, breeding, wintering and migration in such a way that cannot be used again. The law also bans activities that may impact on biological cycles of wildlife during their breeding, migration and wintering periods. Competent Authority is the General Directorate of Nature Conservation and National Parks (GD NCNP) under the Ministry of Forestry and Water Affairs.

Besides the EIA By-law, other regulations related to environmental, health and safety and social issues mainly include the following:

Table 2. Project Related EHS Legislation

Legislation	Official Newsletter Issue	Official Newsletter Date	Implications for the Project Stages
Regulation on Waste Management	02.04.2015	29314	Waste disposal at operation stage, including hazardous waste.
Water Pollution Control Regulation	31.12.2004 30.03.2010	25687 27537	Wastewater discharge from site staff at construction stage and operation staff at operation stage
Waste Oil Control Regulation	30.07.2008 30.03.2010	26952 27537	Waste oils generated at construction and operation stages
Regulation on Assessment and Management of Air Quality	06.06.2008	26898	Dust emissions at construction stage
Regulation on Assessment and Management of Environmental Noise	07.03.2008	26809	Noise emissions at construction and operation stages
Regulation on Soil Pollution Control and Point Source Polluted Areas	08.06.2010	27605	Risks of soil contamination at construction and operation stages
Regulation on the Control of Excavation Soil, Construction and Debris Wastes	18.03.2004	25406	Transportation and disposal of excavation waste and construction debris at construction stage

Legislation	Official Newsletter Issue	Official Newsletter Date	Implications for the Project Stages
Regulation on Occupational Health and Safety	09.12.2003	25311	Health and safety measures to be taken at construction and operation stages
Law on Conservation of Cultural and Natural Assets No. 2863 (as amended with the Law numbered 5226) and relevant regulations	23.07.1983 27.07.2014	18113 25535	Measures to be taken during chance finds at construction stage
Hunting Law No. 4915	11.07.2003	25165	Monitoring requirements regarding birds and bats and terrestrial wildlife
Labor Law No. 4857 and relevant regulations	10.06.2003	25134	Workers' rights at construction and operation stages

2.2 World Bank Standards

The potential lender for the Project is Development Bank of Turkey (TKB), who will be allocating financial loan from the renewable energy credit line of the World Bank. In this respect, the Project must be in compliance with World Bank (WB) Safeguard Policies, guides, performance standards and best practices documents alongside the National EHS Legislation.

World Bank governs projects and activities by the Safeguard Policies in order to assure that they are conducted in an environmentally, financially and socially sound manner. Safeguard Policies include Environmental Assessments and other policies that define environmental and social adverse effects of the projects as well as their reduction and prevention. These policies are enlarged upon in "The World Bank Operations Manual", which also provides guidance on compilation with the Operational Policies (OPs), Bank Procedures and Good Practices. OPs are defined as statements of policy objectives and operational principles including the roles and obligations of both the Borrower and the Bank, while BPS are compulsory procedures to be followed by both the Borrower and the Bank and GP are non-compulsory advisory material. The main objectives and tasks of the Project-related WB Safeguard Policies are explained below:

OP/BP 4.01 Environmental Assessment

- To ensure the proposed projects' environmental and social sustainability and soundness
- To inform decision-makers about the environmental and social risks
- To increase transparency by providing stakeholder engagement in the decision-making process

OP/BP 4.04 Natural Habitats

- To conserve natural habitats and their biodiversity
- To avoid significant conversion/degradation of critical natural habitats
- To ensure the sustainability of services and products provided to human society by natural habitats

The Project does not trigger the WB's policies on cultural heritage protection and involuntary settlement.

3 CURRENT SITUATION

3.1 Post-construction Status

Based on the Site visit performed by 2U1K on 14-15 April 2016, no residual impacts from the construction stage were observed visually on and around the Site.

The Site is located on a land formerly designated as “degraded forest area” by the Ministry of Forestry and Water Affairs. Land-use for the Project has been approved by the Ministry. Sanko has paid significance on minimizing the need for tree cutting in site selection for the turbines and the Site building. It has been stated by the Site representatives that 71 trees were cut by the Chief Forestry Department for site clearance. Trees cut were identified to have poor ecological significance by the Forestry Department.

3.2 Environmental and Health and Safety Issues

The Site personnel is comprised of a Site manager, a technical assistant and two guards that work on two shifts.

Water for sanitary use is supplied by tankers. Drinking water is by means of bottled water.

Given the low number of staff, amounts of waste and wastewater from site personnel is very low. Wastewater is collected in a plastic cesspit emptied on regular basis by the vacuum truck of Mut Municipality. Waste is not left on site; personnel takes their waste to the city center for disposal on daily basis.

No complaints were raised during interviews with *mukhtars* and community members in the nearest settlements of Elmadağı and Cerit about noise or flicker effect from the wind turbines. Communities stated that no disturbance occurred during the construction stage as well.

SANKO is in the process of finalizing its Emergency Response Plan. The plan will comprise of measures against risks of fire, earthquake, natural disasters such as landslide and heavy storm, electricity shortages, etc. One major risk identified at the Project Site is associated with the ice and snow throw during winter. As a mitigation, the Site building is protected by means of tempered glass windows and iron bars.

The Site building is comprised of an office, a meeting room, a kitchen, a generator room, storage room for the Supplier (Vestas) equipment used for maintenance and the transformer room. No storage of chemicals is allowed at the Site. Maintenance oil is brought in by suppliers. Likewise, empty containers of oil used in maintenance is handled and disposed by suppliers and maintenance contractors. Hence no use oils or hazardous wastes are stored on-site.

All health and safety labelling are in place at the Site. Personal protective equipment such as helmets, gloves and long boots are used in the transformer room.

The Site Manager and his technical assistant make daily inspections for general site control and blade integrity for possible corrosions, oil stains and cracks for timely detection of problems.

The Site is currently in operation. No residual impacts from construction activities have been observed during the Site observations.

3.3 Regional Ecology

3.3.1 Terrestrial Ecology

In general ecological terms, the Site is located in the intersection of Irano-Turanian and Mediterranean Phyto-geographical zones. During the field surveys a total of four vegetation types have been identified: forest, rocky shrub, frigana and steppe. These vegetation types generally develop in soils rich in lime. Steppe and forest vegetation communities in the Sertavul-Karaman region is a mountain passage which connects Central Taurus to Central Anatolia. Sub-alpine mountain step vegetation is found in Sertavul pass, at elevations of 1600-1650 m. Vegetation around the Project site is dominated by *Juniperus excelsa* on rocky and lime soils (Photo 1).

Photo 1. Juniper Trees around the Project Site

The next dominant forest vegetation which is represented by *Pinus nigra* subs. *pallasiana* and *Juniperus drupacea* at altitudes ranging between 1350 to 1550 m, around Elmadağı, Ağaçyurdu, Değirmenbaşı, Kozlubucak villages (See Photo 2).

Photo 2. Mixed Forest Cover

The passage areas where the forest vegetation is disturbed include shrubs, textured grassy steppe vegetation which is sparsely distributed along with short *Juniperus oxycedrus* subsp. *oxycedrus* bushes. Lastly, *Thymus spyleus, Astragalus sp.* dominated herbaceous step vegetation extends in Central Anatolia plateu plains in Karaman region (Vural, 1981).

The site surroundings are habitat to native plant and animal species. It is not possible to rank these areas as Critical Natural Habitat as there are no legally protected areas officially proposed for protection, or unprotected but of known high conservation values.

The area is used for grazing of sheep and goat providing a pasture land. In addition, there are old agricultural lands, gardens-vineyards and olive yards which have some importance for local people are around the project site. Local people often make forestry and bee keeping as alternative incomes (See Photo 3).

Photo 3. Gardens and Vineyards in the Villages

Springs and wet and dry riverbeds form the ecologically important and sensitive areas in the project area. For this reason protection of these habitats during the operation activities is important. The turbines and the other structures are distant from Çokum Spring, Sarıali Spring and the Sayharman Riverbed.

The altitude of the Project site is 1650 m. *Juniperus excelsa* (Greek juniper) are observed around the Site.

3.3.2 Birds

The songbirds listed in the IBA inventory (Black-eared Wheatear, Olive-tree Warbler, Subalpine Warbler, Sardinian Warbler, Rueppels's Warbler, Krueper's Nuthatch, Masked Shrike, Cinereous Bunting and Cretzschmar's Bunting) occur on both slopes of the area and are very common at the area.

During the field surveys, big flocks of migration were not observed, but some raptors migration such as Black Kite, Egyptian Vulture, Honey Buzzard in small numbers. However, literature survey and the interviews with local people indicate that migration of these species takes place in the region.

The Project site is located on the main migration route of whitestork, blackstork, sparrowhawk, lesser spotted eagle, greater spotted eagle, black kite, and buzzard species, the secondary route of Egyptian vulture. Moreover, the Site surroundings are the possible breeding site of White-tailed eagle (*Haliaeetus albicilla*), Merlin (*Falco columbarius*), Saker falcon (*Falco cherrug*), Nothern harrier (*Circus cyaneus*). Buzzard, long legged buzzard, kestrel, Golden eagle, Goshawk and sparrow hawk are observed in the area throughout the year. Further details are available in the Annex.

3.3.3 Bats

Given the high wind speeds at the Site, it is anticipated that it is unlikely for bats to fly around the Site. No carcasses were seen during the site visit. Caves in the region of the Project Site were observed to have no signs of bats dwelling.

Further details on birds and bats are given in the Bat Assessment Report in the attachment of the Ecosystem Assessment Report Appendix-1.

3.4 Nearby Communities

2U1K visited the mukhtars of the two villages to get information regarding social and economic state of the two nearest settlements to the Project Site, which are Cerit Village and Elmadağı Village (See Photo 4 and Photo 5 below).

According to interviews with mukhtars and villagers, communities were not disturbed by the Project. When asked about flickering effect and visual aspects, they did not mention any complaints.

Photo 4. Meeting with Mukhtar of Cerit Village

Photo 5. Meeting with Mukhtar of Elmadağı Village

Two turbines are located within the borders of Cerit Village that lies to north of the Project Site, whereas the third turbine is in Elmadağı that about to the south. Both villages are within the border of Karaman Province.

Cerit Village has a population of 319, with 40 dwellings within the village and 40 dwellings in the two quarters in the close vicinity. There are no schools in Cerit Village, students go to school in Elmadağı Village. The security guard at the Hilal-2 WPP is employed from Cerit Village. 22 people work at biscuit factories in Karaman. Majority of villagers plant wheat, barley and beans. The number of livestock is around 2000 goats and sheep and about 150 cattle. Five families in the village are poor and live on state aids.

Elmadağı Village has a population of 520, with 110 dwellings. A primary school is present with 60 students. 30 people work in the biscuit factories in Karaman. Villagers grow wheat and peas mainly. Livestock breeding is comprised of about 4000 sheep and goats, and about 50 cattle. Five families in the village are poor and live on state aids.

A community health center is open in each village once in every 2-weeks when a doctor visits for regular health checks. Wastewater in both villages is collected in cesspits. Wastes are either burned or wild dumped in the environs.

4 CONCLUSIVE REMARKS

The Project is a comparatively small scale wind farm comprised of 3 turbines with a total power generation capacity of 9,9 MW capacity. The Project is currently at operation stage.

No residual impacts have been observed from the construction stage in environmental and ecological terms. Temporary impacts on flora and fauna have faded and the flora and terrestrial fauna are observed to have adapted to the post-construction status.

Despite that the land occupied by the Project and the surrounding lands are designated as forest lands, it is actually dominated by steppe vegetation with sparsely grown junipers and black pine trees mainly. Majority of the endemic plant species observed on the Site have wide distribution in Turkey except few species specific to the Site. In case of project extension (new turbines, roads, buildings, etc.) is planned for the future, Sanko should consider the endemic flora species and re-assess possible impacts and mitigation measures accordingly.

Given the high rates of adaptability of the terrestrial ecosystem, the Ecosystem Assessment Report focuses largely on birds and bats for possible impacts of the wind power plant.

The impact zone of the Site can be said to be comparatively broad with respect to terrestrial elements. Bird migration routes include key biodiversity areas such as Ermenek Valley at 27 km, Gökdere key biodiversity area at 1 km, Göksu valley at about 34 km, Göksu Delta at about 90 km and Sertavul pass at about 2 km. distance to the Site. Although the Project does not have direct impacts on these areas, their presence calls for well-planned ornithological monitoring.

As with all wind power plants, the Project Company commits conducting an ornithological monitoring as defined in the Ecosystem Assessment Report, and to stop the turbines in case of risks associated with bird migrations.

The project's effect may increase in the context of cumulative impacts especially when combined with Mut WF (Borusan Co.) which is the closest Wind Power Project to the Hilal-2 WPP. That's why two companies must work in cooperation for monitoring the cumulative impacts.

In terms of bats, a detailed site observation with sound detectors has been performed and has shown to conclude that there are no significant bat colonies in the impact zone of the Site.

In social terms, communities in the nearby villages are not disturbed by the Project. Still, Sanko will maintain a grievance mechanism and continuous public relations with local people in order to ensure that the Project does not cause any discomfort or nuisance. Sanko will also contribute to the well-being of the communities with its corporate social responsibility, as well.

Environmental and social mitigations and monitoring requirements are presented in Table 3 and Table 4.

Table 3. Environmental Management Plan

Environmental & Social Issue	Management Action	Responsibility
Ice and snow throw from blades	• Physical and visual warnings will be placed for site personnel and visitors • Use of PPE will be ensured • Emergency Response Plan will include measures against ice and snow throw	Hilal-2 WPP Contractors for maintenance
Community health and safety	• Emergency contact information and emergency measures will be displayed on public boards.	Hilal-2 WPP
Soil and groundwater	• Long-term on-site storage of chemicals, fuel and oil and waste oil will be avoided • Spill kits will be made available at all times against accidental spills at times of maintenance • Contaminated materials such as empty oil containers and adsorbent fabrics will be disposed by maintenance contractors and suppliers. • Turbines will be maintained and inspected regularly for possible leakages • Transformer will be ensured to be located on concrete paved floor and equipped with spill control (tray, sump, etc.) • Non-PCB oils will be used at the transformer unit. • Emergency Response Plan will include oil spill control. • Waste batteries and accumulators will be separated from domestic wastes and will be delivered to the collection points immediately without temporary storage on-site. • Hazardous solid wastes such as fluorescent lamps and printer inks generated during operation will be collected separately and disposed separately without temporary storage.	Hilal-2 WPP Contractors for maintenance
Traffic Management	• Drivers will be ensured to have road safety training certificates. • Limit vehicle speed on unpaved roads to 30 km/h. • Safety and traffic signs will be clearly placed on the access roads and the Site. • No intrusion allowed outside the site boundaries and access roads so as not to cause any damage on vegetation and wildlife.	Hilal-2 WPP
Information Disclosure and Stakeholder Engagement	• An external formal grievance mechanism for the public will be developed which includes written procedures describing the process on how to handle a complaint, designated personnel for this purpose and related forms. • The availability of the grievance system will be disclosed to stakeholders including the public. This will include disclosing contact details for the company and how to go about making a complaint.	Hilal-2 WPP

Table 4. Environmental Monitoring Plan

Environmental & Social Issue	Parameters to be Monitored	Location of Monitoring	Means of Monitoring	Frequency of Monitoring	Responsibility
Ice and snow throw from blades	• Ice and snow on turbine blades	• Turbines	Visual observations	Daily at winter times	Hilal-2 WPP
Community health and safety	• Emergency contact information and emergency measures displayed on public boards?	• Villages	Visual observations	Continuously	Hilal-2 WPP
Soil and groundwater	• Spillage or stain of chemicals, oils, fuels, etc. on the Site • Spill kits in place • Contaminated materials stored and disposed safely by maintenance contractors and suppliers • Leakages and stains of oil on blades • Transformer oil is PCB-free • Emergency Response Plan includes spill control measures • Hazardous solid wastes are not stored on the site.	• The Site building and surroundings • Turbines • Transformer	Visual observations	Daily and at times of maintenance	Hilal-2 WPP
Traffic Management	• Drivers have road safety training certificates • Vehicle speed on unpaved roads below 30 km/h • Safety and traffic signs clearly placed on the access roads and the Site	At all places	Visual observations	Continuously At new hire of drivers	Hilal-2 WPP
Information Disclosure and Stakeholder Engagement	• Formal grievance mechanism in place • Grievance mechanism disclosed to local people • Grievance records and responses are kept	Project site and villages at close proximity	Visual observations	Continuously	Hilal-2 WPP

Environmental & Social Issue	Parameters to be Monitored	Location of Monitoring	Means of Monitoring	Frequency of Monitoring	Responsibility
Flora and Fauna	• No hunting at and around project site by the site personnel. • Monitoring of birds • Monitoring of bats	Project site and environs	Visual observations Sound detectors Carcass counts	Particularly during spring and autumn at times of migration (birds)	Hilal-2 WPP