



Sarichioi Wind Farm, Romania

Non-Technical Summary

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1 INTRODUCTION

This Non-Technical Summary (NTS) provides a summary of the project description, the benefits of the project, the mitigation of potentially significant adverse environmental and social impacts which have informed the development of an Environmental and Social Action Plan (ESAP) and public consultation activities. Contact information for this project is provided below.

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The wind farm at Sarichioi comprises 11 wind turbines (turbine model VESTAS V90 3.0MW), providing a total power of 33MW. Each wind turbine consists of a hollow steel tower with a generator nacelle which houses and protects the main components of the rotor blades, gear box, transformer and control systems. The turbines each have a total height of 150 m (comprising 105 m tower and 45 m rotor blade above the tower height). Each foundation has a turbine with an area of 324 sqm to a depth of 3 m.

The total area of land allocated for the wind farm amounts to 200 ha. The footprint of the infrastructure works covers an area of approximately 1.35 ha, including access road, the footprint of turbines and the transformer station. The land which was temporarily disturbed during the construction works has been restored. The proposed layout of the wind farm at Sarichioi is shown on Figure 1.

The transformer station is connected to the electricity grid via the nearest ENEL Dobrogea transformer station (110/20kV).

The Project has already obtained Construction Authorisations and environmental permits (in line with Romanian legal requirements). The construction phase is now complete and the wind farm is operational.

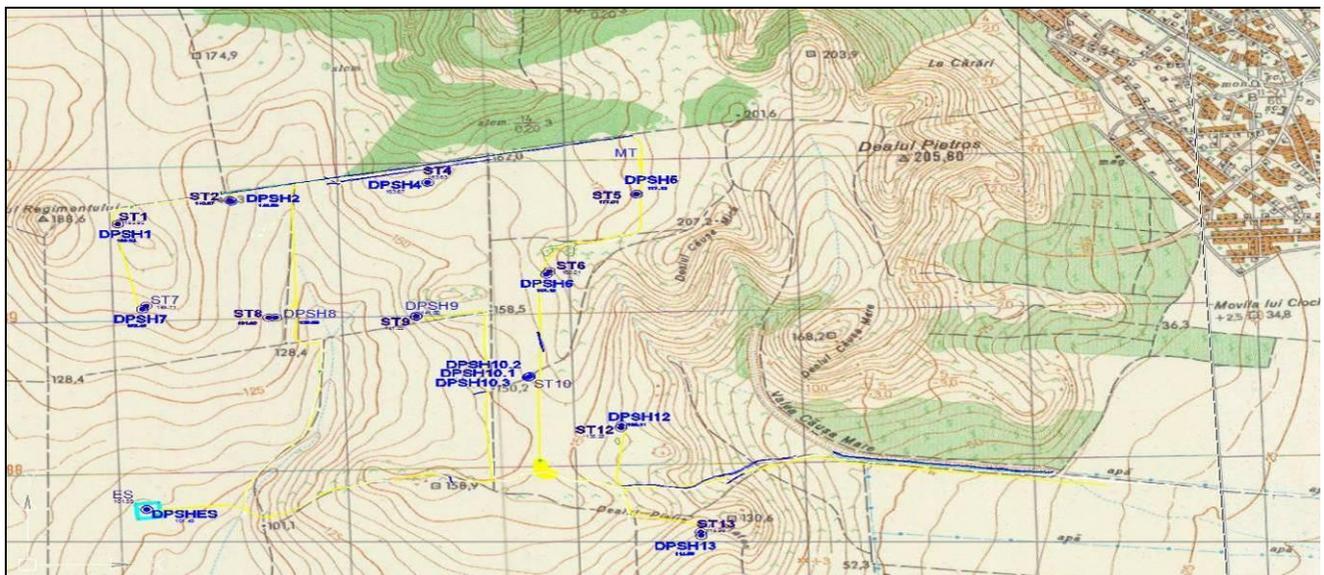


Figure 1 – Layout of Sarichioi Wind Farm

2 SETTING AND LOCATION OF WIND FARM

The Sarichioi wind farm is located approximately 7 km north of the Sarichioi commune, and is approximately 4 km west of the town of Sabangia. The nearest village to the Site is Agighiol, which is located approximately 900 m to the north-east (see Figure 2). The current population of Sarichioi is 3,722 and covers an area of 295.95 ha. The site is accessed via DJ222, which links Sarichioi in the south with Tulcea in the north. The land is privately owned and is classed as arable land.

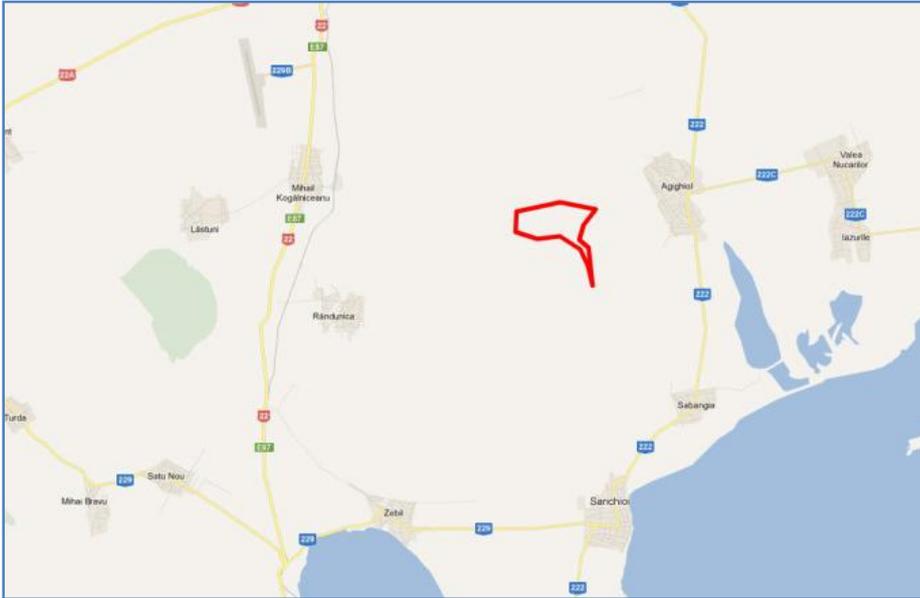


Figure 2 – Location of the Sarichioi Wind Farm

The site consists of undulating agricultural land (including arable and pasture) and is set within a rural area. There are very few trees on either the site or in the surrounding landscape and one number of single-storey building on the site (a substation) as well as the turbines. There are no major wetlands, significant watercourses or other notable natural features within the site, although a number of large water bodies are located in the wider landscape, approximately 5 km to the east and further to the south.

The Site covers an area of approximately 200 hectares and the wind turbines cover an area of approximately 1.35 ha

There are five protected areas within approximately 10 km of the Sarichioi wind farm (See Figure 3 below), two relating specifically to birds, designated under the Birds Directive, and the other three designated under the terms of the Habitats Directive. The designated sites are as follows:

- Delta Dunării și Complexul Razim – Sinoie (Site Code ROSPA0031) - located approximately 5 km east of the wind farm;
- Delta Dunării (Site Code ROSCI0065) - located approximately 5 km east of the wind farm;
- Dealurile Agighiolului (Site Code ROSCI0060) - located adjacent to the north, west and east of the wind farm, one of the turbines (turbine 6) is located within the Dealurile Agighiolului SCI;
- Deniz Tepe (Site Code ROSPA0032) – located approximately 10 km west of the wind farm but contains approximately 600 m of overhead transmission line associated with the wind farm; and
- Deniz Tepe (Site Code ROSCI0067) – located approximately 9 km west of the wind farm but near the overhead transmission line associated with the wind farm.

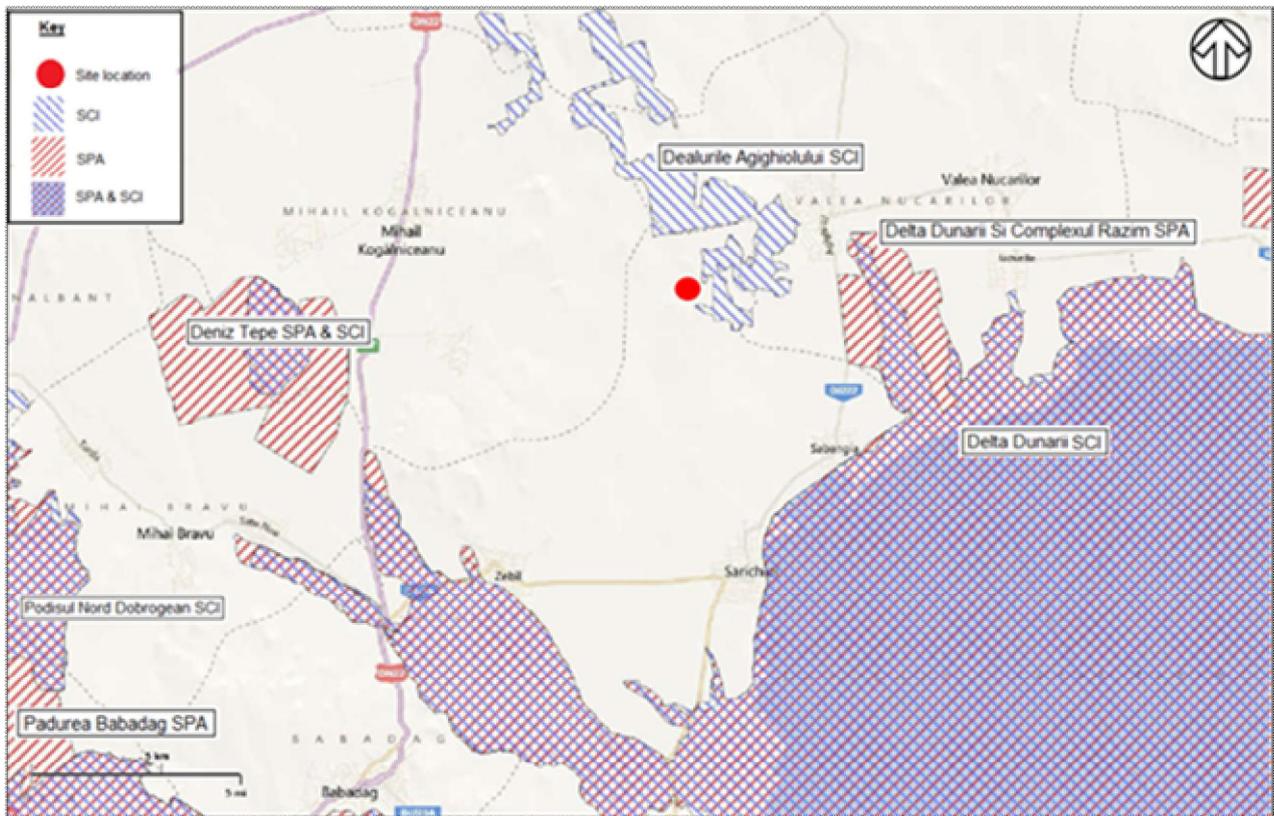


Figure 3 – Location of Natura 2000 Sites in relation to the Sarichioi wind farm

The Danube Delta Special Protected Area (SPA) and Site of Community Importance (SCI) is protected for its importance to birds, and supports between 470,000 – 950,000 migratory waterfowl annually. The area is a major bird flyway during spring and autumn migration periods for such species such as osprey, little tern, pygmy cormorant, ferruginous duck, white-tailed eagle and glossy ibis. The area also includes species such as otter, steppe polecat and European mink. The area is covered by Article 4 of Directive 79/409/EEC and is listed in Annex II of Directive 92/43/EEC. The main characteristics of the area include: bogs, marshes, water fringed vegetation, fens and mud flats.

The Sarichioi wind farm is located outside areas of international ecological importance but is partly on the boundary of the Dealurile Agighiolului Site of Community Importance (SCI) and the Deniz Tepe SPA. One of the turbines is within the boundary of this SCI, which is protected for its important habitats, however it is located on arable land so the integrity of the SCI is considered not to be affected by the wind farm. Approximately 600 m of overhead transmission line and three pylons are located on agricultural land within the Deniz Tepe SPA. As a result of consultation with the Environmental Protection Agency (EPA), the Societatea Ornitologica Romania (SOR) and EcoPontica special provisions relating to monitoring of bird species and mitigation measures have been implemented to deter birds from the wind farm, and in particular the transmission lines within the Deniz Tepe SPA.

In addition a geological reserve is located at Agighiol, 0.7 km north of the Site. The reserve covers an area of 9.7 ha and is within the Dealurile Agighiolului SCI and is protected due to the presence of fossils of fauna from the middle Triassic age. No impact on this protected geological site is anticipated as a result of the wind farm.

3 DESCRIPTION OF THE WIND FARM

3.1 DESCRIPTION OF EQUIPMENT AND INFRASTRUCTURE

EDP Renewables are using and installing wind turbine model V90 supplied by Vestas of Denmark for the production of clean electricity by converting wind energy. These wind turbines have a capacity of 3.0MW and the maximum height of the turbine including rotor blade is 150 m. The type of turbine installed is shown in Figure 4 below:

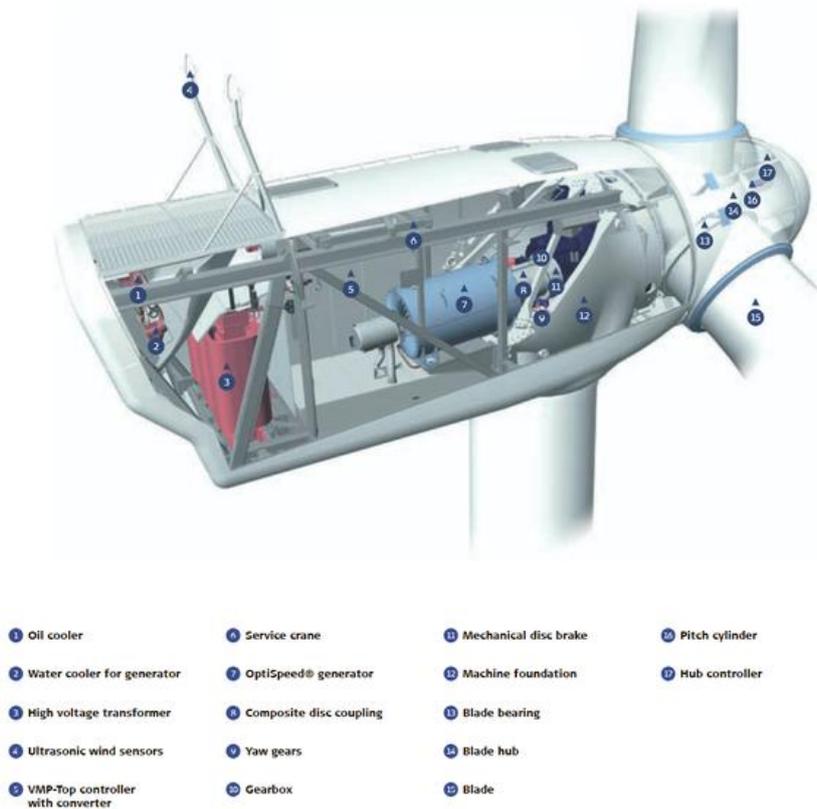


Figure 4 – Vestas V90 Turbine



Figure 5: Control building at Wind Farm site.

The other infrastructure associated with the wind turbines includes a transmission substation, overhead cables, underground cables, switchboards and a control building (Figure 5).

There are underground cables connecting the turbines to the transmission station and overhead cables which follow a line south-west from the substation and connect the site with the national grid.

Access roads have also been constructed as part of the wind farm and these are also open for use by local residents, including those who lease the land within the site for agricultural purposes.

4 ENVIRONMENTAL, HEALTH, SAFETY AND SOCIAL REVIEW OF PROJECT

4.1 SCOPE OF WORK

The Environmental and Social Due Diligence (ESDD) audit was carried out during May and June 2012 and comprised analysis of the Environmental, Health and Safety and Social (EHSS) impacts and benefits of the project. Where necessary, mitigation measures have been proposed and used to develop an Environmental and Social Action Plan (ESAP).

A visit was made by the project audit team to view the site and the surrounding area. Where possible, the project audit team also met with stakeholders and further stakeholder activities were undertaken during the course of the project to inform the development of a Stakeholder Engagement Plan (SEP).

4.2 SITE OBSERVATIONS

The 11 3MW wind turbines associated with the Sarichioi Wind Farm have been constructed and are currently operational. Figure 6 shows a view from the control building looking north-east across the Wind Farm site

The only building on the site is the operational sub-station located in the south-west area of the site. The transformer station is connected to the electricity grid via the nearest ENEL Dobrogea transformer station (110/20kV), see Figure 7 below.



Figure 6 – General view of Sarichioi site

The site is bordered to the north-east by a further wind farm site, which lies between the EDP site and the nearest residential properties in the village of Agighiol.

The site comprises mainly grassland and arable land with some areas of woodland/scrub towards the northern boundary. The wind farm was located on an area of relatively high ground compared to the surrounding flat open plain landscape.

Land between the turbines is leased for agricultural use by local residents on a 1-3 year basis. Access to the turbines and the agricultural plots is via a network of internal site roads which connect to the DJ222, located to the east of the site.



Figure 7 – View of transmission line

4.3 EIA REVIEW AND GAP ANALYSIS

The EIA for the project was reviewed against Romanian legislation, EU Directives and EBRD guidelines to consider potential impacts associated with the proposed development and identified data gaps. Where necessary, additional information was obtained through a site visit, stakeholder consultations and desk based research to enable potential impacts to be considered in further detail. Additional monitoring was recommended to enable the development of appropriate mitigation measures, if deemed necessary.

5 PLANNING AND ENVIRONMENTAL IMPACTS

Overall this project should have positive socio-economic impacts from the generation of clean wind power energy. The key benefit of this project is the use of reliable renewable wind power technology which will achieve significant greenhouse gas emissions (GHG) savings as opposed to the use of conventional power generation plant using fossil fuels, as well providing jobs to the local community and generating revenue for the local budget.

From a review of the available information and following stakeholder consultations no agricultural use and no persons or businesses have been or will be displaced as a result of the proposed wind farm scheme.

The key findings in terms of impacts and mitigation are summarised below:

5.1 ECOLOGY

Two key potential impacts upon biodiversity as a result from the wind farm development have been identified, and these relate to potential impacts to resident and migratory bird species and potential impacts to resident and migratory bat species.

It is considered that the habitat within the wind farm site is generally of limited ecological importance due to the type of species present or other factors. The site is located on an open and windy hillside predominantly covered in arable crops (see Figure 8). The construction of the wind turbines is likely to have led to very small amounts of habitat loss, and given the large amount of similar habitat both within the site and in the local area this impact will have been negligible. Although the wind farm is within the boundary of the Dealurile Agighiolului SCI it is located on arable land, therefore the integrity of the SCI is considered not to be affected in any way by the wind farm. The wind farm was originally proposed to have 20 turbines. This was reduced to 11 due to difficulties in acquiring the necessary land and following consultation with the Tulcea Environmental Protection Agency (EPA) to avoid potential adverse ecological effects due to the turbines being close to or within the Dealurile Agighiolului SCI.

Figure 8 – General view of site



Approximately 600 m of overhead transmission line and three pylons are located on agricultural land within the Deniz Tepe SPA. EDPR undertook detailed consultations with the custodians of the SPA and SOR and came to an agreement on the mitigation measures required to avoid adverse impacts on this protected area and help to deter birds. Measures which have been implemented include monitoring of bird species and installation of bird deflectors, and artificial nests for saker falcon.

EDPR have appointed an Independent Ornithological Expert (IOE) on a full time basis to carry out the bird monitoring at the Sarichioi site and in the immediate area and is responsible for instigating appropriate mitigation measures as required. At certain times of the year during spring and autumn migration periods in particular the rotor speed of the turbines may be reduced and/or they could be temporarily turned off during bird and bat migration periods, should it be required. A formal turbine shut-down system managed by the IOE has been developed. A decision to shut down a turbine or turbines will be made by the IOE based on field observations. This system provides an early warning system for approaching flocks of birds and allows turbines to be switched off in the event of adverse weather conditions (which could result in a risk of bird collision with the turbines).

The surveys are being undertaken in accordance with an Ecological Monitoring Plan which has been discussed with the regulatory authorities, including the SOR, EcoPontica and Tulcea EPA. Monitoring reports will be submitted to the SOR, EcoPontica and Tulcea EPA on an annual basis. As required by the Environmental Authorisation the monitoring will be undertaken for a period of 5 years following commencement of operation of the wind farm. The monitoring period will be reviewed based on the results.

Bat species were not identified as a potential ecological receptor during the consultation and no known bat migration routes were identified over the site. The site has been found to be unsuitable for bats due to a number of factors, such as being located on an open and windy hillside, the absence of trees or hedgerows within the wind farm and limited vegetation features. There was found to be suitable habitat for foraging and roosting bats in the form of woodland and scrub habitat, however, this is outside the boundary of the wind farm.

The birds recorded at the site were observed demonstrating a variety of behavioural activities, including smaller birds which were feeding and breeding, and some larger birds that appeared to be using the area as a migration route. There is potential for local impacts due to mortality caused by collision for migrating birds, and large flocking wintering birds; and disturbance/avoidance during operation. A Monitoring Plan has been established in agreement with EcoPontica, the Romanian Ornithological Society (SOC) and the Environmental Protection Agency. The significance of this issue should be minimised by the presence on site of an Independent Ornithological Expert (IOE), who will be responsible for monitoring bird movements in the area of the wind farm and applying appropriate mitigation measures as required, including reducing the speed of the turbines or, potentially, for the turbines to be temporarily turned off during bird migration periods (which often coincide with bat migration periods), should it be required. The IOE will be present during the spring and autumn migration periods and during the winter. In addition, the marking of overhead powerlines with bird deflectors to increase visibility will also reduce the potential for bird strikes.

The Monitoring Plan will help to inform the actual impacts of the wind farm on birds and bats and will be used to manage the operation of the wind turbines at certain times of the year. Furthermore, a Collision Risk Assessment will be completed within two years of the Sarichioi wind farm becoming operational, which will be used to further define site specific mitigation measures.

5.2 LANDSCAPE AND VISUAL

The site consists of undulating agricultural land (including arable and pasture) and is set within a rural character. There are a significant number of wind turbines located in the surrounding landscape, widely spaced, and which create a distinctive visual feature. The nearest wind farm lies adjacent to the north-east of the site, between it and the nearest residential properties, which are located in Agighiol village. Figure 9 presents a view from the village towards the Sarichioi wind farm. The majority of the turbines visible are related to the adjacent wind farm.

There are no trees on the site, and very little tree cover within the area, therefore due to the nature of wind turbines there is little mitigation possible to reduce the visual impacts of the turbines. The introduction of wind turbines would therefore have an impact on the existing landscape character of the site and surrounding visual amenity. This impact would last for the operational period of the wind farm and be reversed on decommissioning, although during operation any impacts would be more significant to receptors within approximately 2-4 km of the site. With distance from the site, the effect of the Sarichioi wind farm on visual amenity would be reduced, particularly given the number of wind turbines associated with other wind farms in the local area.

Figure 9 – View towards Sarichioi site from Agighiol village



5.3 NOISE & VIBRATION

Given the limited noise associated with operation of the wind farm and the distance to the nearest residential areas, noise and vibration impacts are considered unlikely to be a significant concern.

5.4 WASTE MANAGEMENT

Waste materials generated as part of the project are likely to be minimal. Any wastes generated by routine maintenance activities are removed from site by the contractor and disposed of in an appropriate manner in accordance with applicable legislation. It has been recommended a waste management strategy is developed to ensure the disposal of any hazardous substances in accordance with Romanian Legislation.

5.5 CUMULATIVE EFFECTS

An assessment has been undertaken of the potential cumulative ecological, landscape and visual effects from the Sarichioi wind farm together with other wind farms in the area. The nearest other operational wind farm is at Agighiol adjacent to the north of the Sarichioi wind farm.

The spacing of the turbines at the Sarichioi site, the open topography and the limited amount of semi-natural habitats on the site suggests that the site would be unlikely to contribute towards a significant cumulative disturbance or barrier effect on birds. The mitigation and monitoring measures implemented will assist in confirming that there are no significant cumulative effects on birds. No cumulative impacts on bats are anticipated, however as a precautionary measure monitoring for bat carcasses will be undertaken as part of the bird monitoring.

The local topography limits views towards the site and it is unlikely that the Sarichioi wind turbines would be distinguishable in the view from the adjacent wind turbines. The number of wind turbines in the vicinity means that they are part of the character of the wider landscape.

5.6 DECOMMISSIONING

A decommissioning plan will be prepared to ensure potential impacts associated with the removal of the turbines and associated infrastructure at the end of their operational life are adequately considered.

5.7 OTHER ENVIRONMENTAL DISCIPLINES

Based on the available information no significant environmental impacts or cumulative effects are considered likely on the following environmental topics and as such no mitigation measures have been proposed in relation to these:

- ground conditions and water resources;
- air quality;
- cultural heritage;
- electromagnetic interference;
- access; and
- shadow flicker.

6 GREENHOUSE GAS ASSESSMENT

An estimate of greenhouse gas savings potential for this project has been calculated using EBRD's Greenhouse Gas Assessment Methodology where renewable energy power generation projects are assumed to displace the emissions associated with the national average grid electricity generation.

Based on 11 3MW wind turbines in constant use with a possible annual generation of 87,000KWh, the Sarichioi wind farm will provide CO₂ emissions savings in the order of 44.51 kt CO₂-e/yr.

The above total does not take into account emissions associated with the construction phase and other life cycle impacts, and that wind turbines will not be in constant operation throughout a year.

7 ENVIRONMENTAL AND SOCIAL ACTION PLAN

An Environmental and Social Action Plan (ESAP) has been developed to set out specific environmental and social actions required to minimise impacts associated with the wind farm. It is a 'live' document and will be updated on a regular basis.

The key considerations relevant to the wind farm include the following:

- Prepare and submit reports on status of ESAP implementation and environmental, health, safety and social performance, including resolution of grievances associated with the project;
- Develop and implement an Environmental Management System (EMS);
- Continue to implement the Ecological Monitoring Plan to assess the impacts to birds and bats that may be occurring during the operational phase of the wind farm, including use of a full time appointed Independent Ornithological Expert (IOE) to carry out the ecological monitoring at the Sarichioi site and in the immediate area and instigate appropriate mitigation measures as required. These measures include management of the formal turbine shut-down system which provides an early warning system for approaching flocks of birds and allows turbines to be switched off in the event of adverse weather conditions. A decision to shut down a turbine or turbines will be made by the IOE based on field observations;
- Develop comprehensive a waste management plan;
- Undertake a health and safety risk assessment of all staff job functions and activities and implement a health and safety action plan covering control measures and work instructions as required; and
- Develop and implement a decommissioning plan that includes a plan for minimising impacts during decommissioning.

8 STAKEHOLDER ENGAGEMENT PLAN (SEP)

A SEP has been developed with the objective of identifying key stakeholders and ensuring that, where relevant, they are informed in a timely manner of the potential impacts of the project. The plan also identifies a formal grievance mechanism to be used by stakeholders for dealing with complaints, concerns, queries and comments. It will be reviewed and updated on a regular basis. If activities change or new activities relating to stakeholder engagement commence, the SEP will be brought up to date. The SEP will also be reviewed periodically during project implementation and updated as necessary. The SEP includes the following:

- Public consultations and information disclosure requirements;
- Identification of stakeholders and other affected parties;

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- Overview of previous engagement activities;
 - Stakeholder engagement programme including methods of engagement and resources; and
 - A grievance mechanism.

Stakeholders could be individuals and organisations that may be directly or indirectly affected by the project either in a positive or negative way, who wish to express their views. The definition applied to identify the key stakeholders is:

'any stakeholders with significant influence on or significantly impacted by, the work and where these interests and influence must be recognised if the work is to be successful'.