



Non-Technical Summary

Parzeczew Wind Farm 8.8 MW, Poland

Company: Quadran Polska

7 October 2019

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
Document title	Non-Technical Summary
Document subtitle	Parzeczew Wind Farm 8.8 MW
Date	7 October 2019
Client Name	EBRD Quadran Polska

CONTENTS

Contents

1.	INTRODUCTION	5
2.	SUMMARY OF THE PROJECT	6
2.1	Site selection criteria.....	6
2.2	Project Description.....	6
2.3	Other Wind Farm Projects in the Area	9
2.4	Project Environmental Performance	10
3.	SUMMARY OF IMPACTS AND MITIGATION MEASURES	10
3.1	Soil and Groundwater	10
3.2	Surface Water.....	10
3.3	Air Quality	11
3.4	Biodiversity and Nature Conservation.....	11
3.4.1	Site Context	11
3.4.2	Protected and Recognized Sites.....	11
3.4.3	Birds.....	12
3.4.4	Bats.....	12
3.4.5	Other Biodiversity Receptors	13
3.5	Landscape and Visual Impacts	14
3.6	Cultural Heritage.....	15
3.7	Socioeconomic Impact.....	15
3.8	Community Health, Safety and Security	16
3.8.1	Transportation Issues	16
3.8.2	Environmental Noise.....	16
3.8.3	Shadow Flicker	17
3.8.4	Ice and Blade Throw	17
3.8.5	Electromagnetic Interference	18
3.8.6	Public Access and Health and Safety	18
3.9	Cumulative Impacts	18
3.10	Transboundary Impacts	19
3.11	Impacts During Decommissioning	19
4.	ENVIRONMENTAL AND SOCIAL MANAGEMENT.....	19

List of Figures

Figure 2-1	Project Location Map relative to local residential areas	6
Figure 2-2	Project layout map	7
Figure 2-3	The nearest protected areas.....	7
Figure 2-4	Diagram of a wind turbine	8
Figure 2-5	Approximate location of the existing windfarms within a 10-km buffer around Parzeczew WF	9

Acronyms and Abbreviations

EIA	Environmental Impact Assessment
E&S	Environmental & Social
ESDD	Environmental and Social due Diligence
GHG	Greenhouse Gas
NTS	Non-Technical Summary
SPV	Special Purpose Vehicle
WF	Wind Farm
WT/WTG	Wind Turbine/ Wind Turbine Generators

1. INTRODUCTION

This Non-Technical Summary (NTS) provides an overview on the environmental and social impacts associated with the construction, operation and decommissioning of the *8.8 MW Parzeczew Wind Farm* project (hereinafter referred to as “*the Project*”) and the measures considered to keep these at acceptable levels so that no harmful effects are induced and all applicable norms and regulations are met.

The Project was proposed by the company Park Wiatrowy Juwi 2 Sp. z o.o. The ownership of the windfarm changed in July 2015, when Quadran Polska acquired the Project to proceed with its development. Currently, the Project is being developed by a special purpose vehicle (SPV) Quadran Wind Park 2 Sp. z o. o.. The Project is located in the area of Golaszyny, Ignacew Folwarczny, Ignacew Parzeczewski, Ignacew Rozlazly, Stary Chrzastow, Sniatow and Budzynek villages, Parzeczew Commune, zgierski County, lodzkie Voivodeship, in central Poland.

An Environmental Impact Assessment (EIA) was completed for the Project by a local consultant in September 2014. The local EIA process was favorably approved through an Environmental Decision issued on June 3rd, 2015 by the Mayor of Parzeczew Commune. The Environmental Decision was granted for 4 WTGs of a capacity up to 2.35 MW each. Furthermore, pre-construction additional biodiversity surveys were performed as a part of EIA procedure.

The above-mentioned EIA identified the environmental and social impacts anticipated to occur as a result of the Project implementation, and evaluated their significance. Where significant adverse changes were identified, measures to avoid, reduce or compensate for those changes were defined, which should be implemented during the construction phase, as well as during the operation of the Project.

The Project Owner is seeking to enter a financial agreement with international lender institutions such as the European Bank for Reconstruction and Development (EBRD), having strict environmental and social requirements (Performance Requirements - PRs) for project financing. In order to assess how the Project meets these standards, ERM was commissioned to undertake a gap analysis of the environmental and social documents prepared for the Project (local EIA and follow-up surveys) against the EBRD PRs. As part of this process, and to bridge the gaps identified to lender requirements, ERM also developed additional documents such as:

- this NTS;
- a Corporate Stakeholder Engagement Framework (see Section **Erreur ! Source du renvoi introuvable.**).

The above documents will be translated into Polish and together with the local EIA (2014) will form the disclosure package for the Project and will be made publicly available. Furthermore, the Corporate Stakeholder Engagement Framework will be used by the Project Owner to develop a Stakeholder Engagement Plan for the Project.

The disclosure package will be publicly available in hard copy at Quadran’s office at the following address: 2c Wagonowa Street, 53-609 Wroclaw. Additionally, the electronic form of these documents will be available for consultation on the:

- Project Owner website: www.quadran-international.com; and
- the EBRD website (www.ebrd.com).

There is a mechanism in place to receive and address grievances, questions, comments and suggestions from stakeholders. Such grievances regarding the Project can be submitted through the following channels:

- by regular mail to: Quadran Polska, 2c Wagonowa Street, 53-609 Wroclaw, Poland;
- by e-mail to: biuro@quadran-international.com;

- by contacting the Project's Communication Officer: Mirosław Polec, Head of Development, email: m.polec@quadran-international.com, phone: +48 512 086 694.

2. SUMMARY OF THE PROJECT

2.1 Site selection criteria

The location of the Parzeczew wind farm was selected based on a number of criteria. These included:

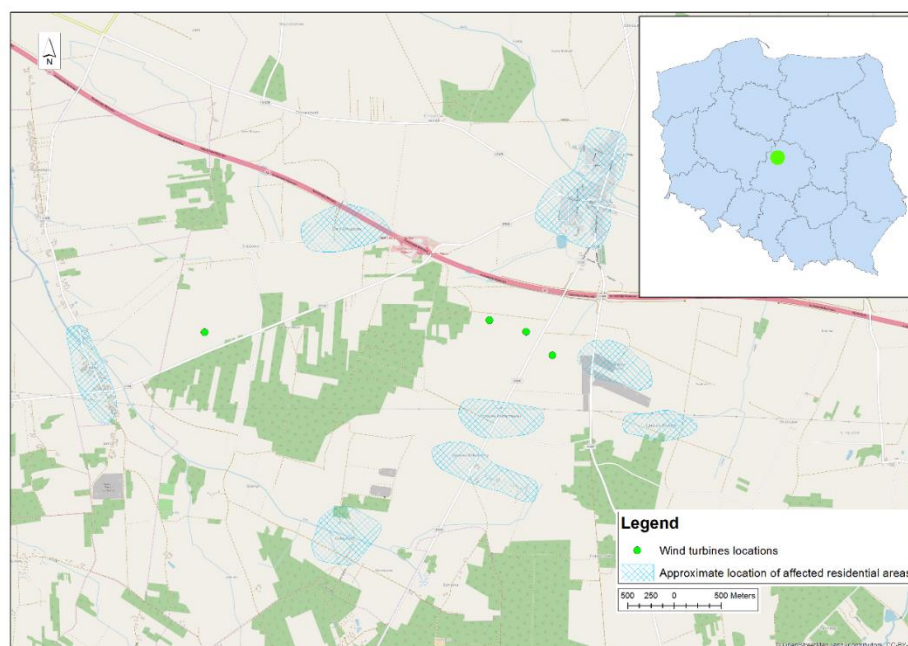
- the site is located outside any protected and residential areas;
- wind measurements indicated that the site has good wind resources;
- relative proximity to a main energy distribution grid connection located in Ozorków, i.e. approximately 11 km in a straight line north-east of Parzeczew WF);
- the site has good access via existing public roads;
- suitable geotechnical ground conditions;
- land availability;
- limited environmental, health and social predicted impacts (e.g. on noise and shadow flickering, respecting the health protection buffers, low-value landscape etc)

2.2 Project Description

The Project will be located on flat arable land, in the area of Golaszyny, Ignacew Folwarczny, Ignacew Parzeczewski, Ignacew Rozlazły, Stary Chrzastów, Sniatów and Budzynek villages, Parzeczew Commune, zgierski County, łódzkie Voivodeship, in central Poland. The nearest house is located at approximately 630 m east of WTG No.6.

The Project is located outside any natural protected areas. The nearest protected area is Natura 2000 Słone Łaki w Pelczyskach (PLH100029), protected under the EU Habitats Directive, located at approximately 5.3 km north-east of the Project site.

Figure 2-1 Project Location Map relative to local residential areas



Source: Google maps, edited by ERM.

Figure 2-2 Project layout map



Source: Google Earth, edited by ERM.

Figure 2-3 The nearest protected areas



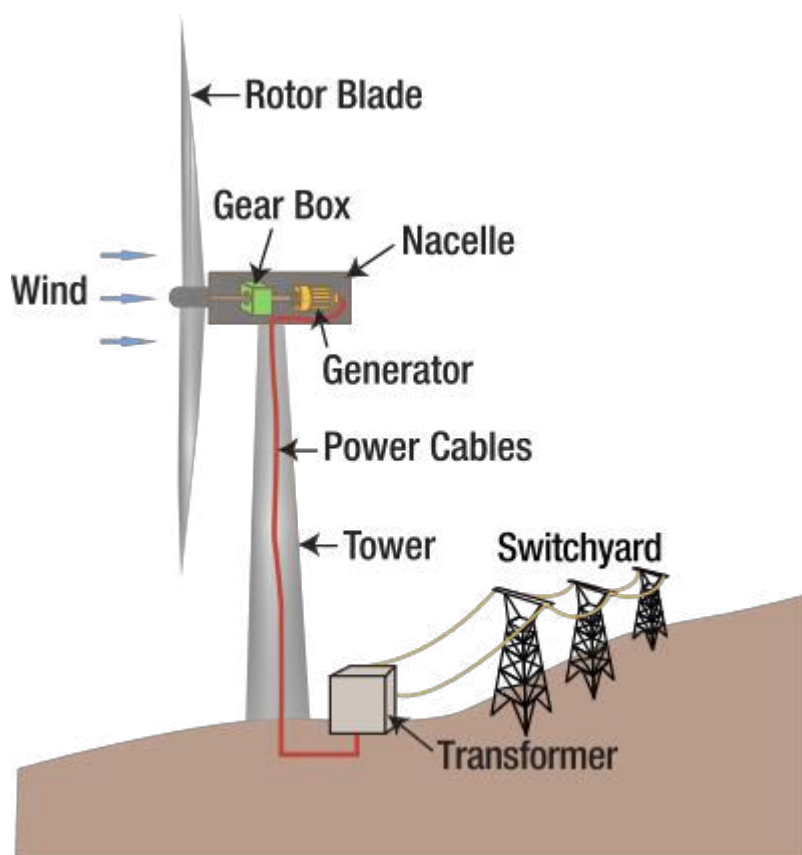
Source: Geoserwis, Google Earth, edited by ERM.

The main Project components will include:

- 4 Vestas100 wind turbine generators (WTG), with a 100-m rotor diameter and a hub height of 125 m; each WTG will have a capacity of 2.2 MW, which results in a total Project capacity of 8.8 MW; all WTGs will be located in Parzeczew commune;
- approximately 19 km of underground power lines, which will connect all WTGs directly to the 15/30/110 kV external electrical substation located in Ozorkow (11 km north-east of the Project). The external electrical substation belongs to PGE Dystrybucja.
- internal access roads from local asphalt roads to the individual turbine locations.

The diagram of a wind turbine is illustrated below.

Figure 2-4 Diagram of a wind turbine



Source: https://en.wikipedia.org/wiki/File:Wind_turbine_diagram.svg.

Project Schedule

The Project is covered by the Local Zoning Plan, which allows the construction of all WTGs along with auxiliary infrastructure. The Environmental Decision for the Project was issued on June 3rd, 2015 by the Head of Parzeczew Commune. Moreover, designs and building permits for all WTGs have already been issued and are currently valid.

In April 2016, the Company signed a grid connection agreement with PGE Dystrybucja Company. The Project should be connected to the grid by October 31st, 2020. Connection points are located approximately 12-19 km from the planned Parzeczew WF. WTG No 1 and WTG No 5 will be

connected together (with one cable line) and WTG No 4 and WTG No 6 will be also connected together (with one cable line) directly to the medium voltage external electrical substation “RPZ Ozorków”. Project construction is currently planned to start in January 2020. For the first two months, Project activities will consist in clearance of the land and construction of the roads and foundations. Turbine components will start to be transported to the site after these two months. It is currently foreseen that one turbine will be erected in two days. The latest date to start energy production at Parzeczew WF is May 5th, 2021.

Land acquisition

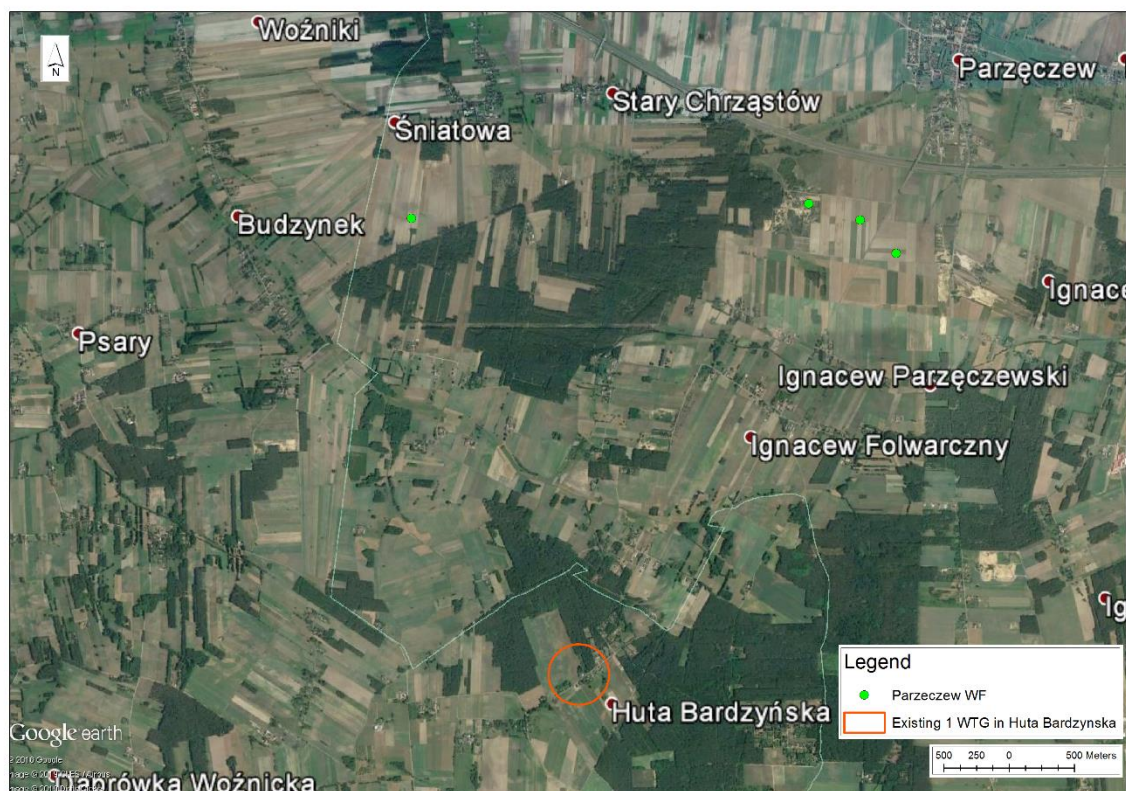
The cession and superficies agreements for the land required for the Project were concluded by former developer and amended by current Project Owner with willing land owners/users. No owners were forced to give up their land and no physical resettlement was required for the development of the Project. At the end of the construction period, the land areas not occupied by turbines and other infrastructure (e.g, roads) will be restored to agricultural use.

2.3 Other Wind Farm Projects in the Area

Based on public information and on the data provided by the representatives of local authorities, one operational WTG located in the area of Huta Bardzyska village, i.e. 4 km south-west and 5.7 south of the Project site.

The approximate location of this wind farm in relation to the Project site is illustrated below.

Figure 2-5 Approximate location of the existing windfarms within a 10-km buffer around Parzeczew WF



Source: Google Earth, edited by ERM.

2.4 Project Environmental Performance

The expected annual energy production from the Project will amount approximately 25,608 MWh. As a positive effect, the wind farm operation resulted in a significant reduction of greenhouse gas (GHG) emissions (CO₂), by replacing CO₂ emitting power generation facilities. Therefore, the environmental benefit of the Project will be the reduction of GHG emissions in an amount of 16,337.9 tons/year (calculated based on an emission factor, representative for conventional energy projects, of 0.638 t CO₂/MWh, for Poland in 2012).

Apart from saving on GHG emissions, the future operations of the Project will also result in significant 'avoidance' of post-combustion emissions. For instance, the equivalent production of electricity by the largest Polish hard-coal power plant would result in the following emissions (estimations based on emission factors for 2011):

- Particulate matter (PM): approximately 2.3 tons/year;
- Sulphur dioxide (SO₂): approximately 67.4 tons/year;
- Nitrogen oxides (NO_x): approximately 43.9 tons/year.

3. SUMMARY OF IMPACTS AND MITIGATION MEASURES

3.1 Soil and Groundwater

Potential impacts on soil and groundwater during Project construction could be associated with removal and handling of topsoil, soil compaction, potential spills of fuel, lubricants and paint. Impacts on soil and groundwater generated by future operations of Parzeczew WF could potentially result from leakage of lubricants from the wind turbine nacelle and the transformer substation. However, this is unlikely due to the liquid retention systems integrated into the structure of the wind turbine nacelle and electrical substation.

An Environmental Pollution Prevention and Control Plan will be developed for the Project and will include measures that will be implemented on site to avoid potential contamination, for example

- all fuels and lubricants will be stored in secured designated fuel and chemical storage area in line with national requirements and international norms/ good practices of handling harmful materials (such as providing secondary containment);
- procedures will be developed for responding to emergencies/spills of hazardous materials, and procedures for storage and handling fuel, construction materials and waste;
- refueling of vehicles, equipment and maintenance will be restricted to specially designated platforms with strict control of spills; and
- construction machinery and vehicles will be parked overnight on paved surfaces with storm water control (drainage system equipped with hydrocarbon separator).

Similarly, during the construction, the Project Owner will develop and implement a Waste Management Plan to cover all waste streams generated by the Project activities and will make sure that the waste is temporarily stored and managed in line with national requirements and international best practice.

With the above mitigation measures in place, impacts on soil and ground waters are not expected to be significant.

3.2 Surface Water

The nearest surface water bodies are:

- Gnida river located approximately 1.5 km south of the Project site;
- unnamed watercourse located approximately 2.3 km east of the Project site;

-
- Bzura river located approximately 4.4 km east of the Project site.

The potential impact on surface waters during construction could result from the improper handling of hazardous materials such as oils, paints, herbicides and other toxic substances.

However, earthworks will be avoided during heavy rains, where practicable, to reduce the risk of runoff of sediment, oils or chemicals into the natural drainage system.

Considering the distance from the Project site to the nearest surface water bodies and the fact that there will not be any direct discharge of wastewater generated by Project activities into groundwater or surface water bodies, it is anticipated that the Project will not impact surface water quality.

During construction, potable water and wastewater facilities will be provided at the site by the general contractor, as part of the construction site organization.

No significant impacts on surface water quality are expected during the Project operation.

3.3 Air Quality

During the Project construction, air emissions will consist of dust generated from construction activities (e.g. land clearance and excavation, traffic on local roads) and combustion related emissions from vehicles and construction equipment. These impacts will be mitigated by employing good construction practices, including the use of well-maintained construction equipment and the implementation of dust abatement measures. Such measures will be included in the Environmental Pollution Prevention and Control Plan to be developed and implemented for the Project.

No significant air quality impacts are associated with the Project's operation phase. Operational traffic emission impacts will be associated with a limited number of vehicles accessing the site for maintenance or security purposes.

3.4 Biodiversity and Nature Conservation

3.4.1 Site Context

The Project area elevation varies between 135 m above sea level (a.s.l.) and 150 m a.s.l. No legally protected areas are located within or in the immediate vicinity of the Project.

3.4.2 Legally Protected Sites

The nearest protected areas to the site are the following:

- Natura 2000 Site of Community Importance Slone Laki w Pelczyskach (PLH100029), protected under the EU Habitats Directive, located approximately 5.3 km north-east of the Project site;
- Natura 2000 Site of Community Importance Dabrowa Grotnicka (PLH100001), protected under the EU Habitats Directive, located approximately 7.5 km east of the Project site;
- Nature reserve Dabrowa Grotnicka (PLH100001), located approximately 7.5 km east of the Project site;
- Natura 2000 Site of Community Importance Grady nad Linda (PLH100022), located approximately 8 km to the south east of the Project site;
- Nature reserve Grady nad Linda (PLH100022), located approximately 8 km to the south east of the Project site.

3.4.3 Birds

In order to determine the Project site's importance to birds, 36 surveys were conducted between November 2011 and November 2012 (out of 40 as recommended by Polish Guidelines¹) in the Project site area and surrounding. The results revealed the following:

- 45 species of breeding birds were identified, of which 3 species are listed in Annex I of the Birds Directive, 43 species are under species protection, 14 Species of European Conservation Concern (SPEC²) and 2 are under hunting protection;
- 26 species of non-breeding birds, of which 3 species are listed in Annex I of the Birds Directive, 24 species are under species protection, 9 species of European Conservation Concern and 2 are under hunting protection;
- 23 species were identified during spring migrations, of which 3 species are listed in Annex I of the Birds Directive, 19 species are under species protection, 7 species of European Conservation Concern and 4 are under hunting protection;
- 63 species were identified during autumn migrations, of which 5 species are listed in Annex I of the Birds Directive, 60 species are under species protection, 21 species of European Conservation Concern and 3 are under hunting protection;
- 27 species were identified during the winter season, of which 1 species is listed in Annex I of the Birds Directive, 25 species are under species protection, 6 species of European Conservation Concern and 2 are under hunting protection;

There are no European, national or local migration corridors in the planned Project area or in its vicinity. In order to ensure the protection of bird species, the Environmental Decision set, among others, the following requirements:

- construction works related to removal of humus layer must be conducted outside the birds breeding season;
- lighting at the Project site should have a limited number of flashes per minute, so that it does not attract or confuse birds;
- to apply adequate colors and patterns on external ends of blades, which will increase their visibility for birds;
- post-construction bird monitoring must be conducted three times over five years after the WF becomes operational;
- monitoring results must be submitted to the Regional Directorate of Environmental Protection in Lodz within two months after one year monitoring is completed.

Considering the above, if adequate mitigation measures are implemented, no significant impacts on birds are expected.

3.4.4 Bats

In order to determine the Project site's importance to bats 27 bat surveys were conducted between November 2011 and November 2012 (out of 30 as recommended by Polish Guidelines for bat monitoring³).

¹ Wytyczne dotyczące ocen oddziaływania elektrowni wiatrowych na ptaki. Projekt. (Chylarecki i in. 2011, Generalna Dyrekcja Ochrony Środowiska, Warszawa).

² List of species with unfavourable conservation status in Europe, compiled by UK-based NGO BirdLife International considering their global conservation status on the IUCN Red List, European population status, and the proportion of global population or range in Europe

³ Wytyczne dotyczące oceny oddziaływania elektrowni wiatrowych na nietoperze" (Kepel i in. 2011)

In Poland, all 25 bat species are protected. According to EIA, the area of the planned Project and its surroundings are used by bats only to a small extent. The most common species identified belong to the genera *Pipistrellus* and *Eptesicus*, considered the most common casualties of wind energy facilities. However, according to pre-construction bat monitoring results, suitable habitats for bats are located relatively far from the Project site.

In order to ensure bat protection, the Environmental Decision sets, among others, the following requirements:

- Post-construction bat monitoring must be conducted three times (for one year each) over five years after the WF becomes operational;
- Monitoring results must be submitted to the Regional Directorate of Environmental Protection in Lodz within two months after one year monitoring is completed.

Considering the above, if adequate mitigation measures are implemented, no significant impacts on bats are expected.

3.4.5 Other Biodiversity Receptors

3.4.5.1 Habitats and Flora

The total area occupied by the four WTGs, access roads and accompanying infrastructure will be only 0.01 km². A survey of habitats and flora was conducted during the growing season in 2012, within the Project site, planned access roads and neighboring areas.

The following flora species under partial⁴ protection were identified:

- Alder buckthorn (*Frangula alnus*);
- Dwarf everlast (*Helichrysum arenarium*).

In the vicinity of the Project site, common corn-cockle (*Agrostemma githago*) was observed. The species is listed in the Polish Red List of Pteridophytes and Flowering Plants and considered endangered in Poland. No flora species protected under Annex II of the Habitats Directive were identified.

EIA report concludes that the Project will not affect the above-mentioned species. Based on the requirements imposed by the Environmental Decision, the vegetation located in the direct vicinity of the future construction area should be secured against destruction or damage.

According to the EIA, no significant impacts on habitats and flora are expected. However, the Project Owner will voluntarily develop and implement an additional vegetation survey in line with international guidelines. Considering the above, if adequate mitigation measures are implemented, no significant impacts on vegetation are expected.

3.4.5.2 Amphibians and Reptiles

Based on the 2012 field results, the following amphibian and reptile species were recorded:

- common toad (*Bufo bufo*);
- European green toad (*Bufo viridis*);
- edible frog (*Rana esculenta*);
- common frog (*Rana temporaria*);
- moor frog (*Rana arvalis*);

⁴ partial protection – protection of species of plants, animals and fungi allowing harvesting, i.e. the possibility to reduce the size of a given population;

- sand lizard (*Lacerta agilis*).

Five species (i.e. *Bufo viridis*, *Rana temporaria*, *Rana esculenta*, *Rana arvalis* and *Lacerta agilis*) are listed in Annex IV of Habitats Directive. In Poland all reptiles (in total 18 species) and amphibians (in total 9 species) are under legal protection.

Based on the results of the field surveys, the planned Project will not affect the above-mentioned species. However, the Project Owner will voluntarily develop and implement an additional survey on herpetofauna in line with international guidelines. Considering the above, if adequate mitigation measures are implemented, no significant impacts on herpetofauna are expected.

3.4.5.3 Mammals

The following protected mammals, other than bats, were identified:

- Common shrew (*Sorex araneus*);
- European mole (*Talpa europaea*), under partial protection (nationally);
- European hedgehog (*Erinaceus europaeus*);
- Eurasian beaver (*Castor fiber*), under partial protection (nationally) and listed in Annex II of the EU Habitats Directive;
- European badger (*Meles meles*).

Mammal species recorded are common for the area. Considering the small scale of the planned Project, the EIA concluded the project would not generate a significant impact on mammals.

3.5 Landscape and Visual Impacts

The WTGs would dominate the flat landscape and would be visible or partially visible within a radius of about 20 km around the WF area, in particular to people from Golaszyny, Ignacew Folwarczny, Ignacew Parzeczewski, Ignacew Rozlazly, Stary Chrzastow, Sniatow and Budzynek villages.

The sensitivity of the landscape is not deemed high, as it would be the case for a protected landscape, a landscape widely acknowledged for its quality and value, or one with a distinctive character.

The EIA report concludes that Parzeczew WF will not generate a significant impact and will not deteriorate the landscape.

Additionally, in order to mitigate any potential landscape and visual impacts, the following measures will be implemented:

- WTGs will be placed in an orderly layout to avoid visual disturbances;
- smooth cylindrical towers will be used, as this type of tower has a simpler configuration less complex surface characteristics and a lower reflection/shadow casting potential;
- non-reflective paints and coatings will be used in order to reduce glare;
- the Project will involve only underground power cables at the site in order to minimize the distortion of the surface;
- the tower, nacelle and rotor will be painted in a uniform color, to reduce visual impacts.

3.6 Cultural Heritage

According to the information presented in the EIA report, within the Parzeczew WF site there are no monuments listed in the Monuments Register or archaeological sites.

The nearest monuments listed in the Monuments Register located in Parzeczew commune are the following:

- Church at the cemetery (No. A/525 dated 08.08.1967), located 1.5 km north of the Project site;
- Church Wniebowzięcia NMP (No. 510-V-38 dated 13.01.1950), located 1.5 km north of the Project site;
- Saint Jacob Church (No. A/494 dated 04.08.1967), located 6.5 km north-west of the Project site.

Considering the distance between the Project site and the nearest known cultural heritage sites, potential impacts are considered unlikely.

A chance find procedure will be developed and implemented during the construction phase to define how potential discoveries need to be managed.

3.7 Socioeconomic Impact

During the construction phase, the following types of socioeconomic impacts are likely to arise as a result of the Project implementation:

- direct employment opportunities with the Project; the exact number of required construction workforce is still to be defined at this stage but the Project could involve approximately 10-15 workers; the Project owner will seek to employ locally available workforce for the Project construction;
- direct economic impacts as a results of Project purchase of goods and services such as construction materials for civil works, construction equipment and machinery, catering, transportation; the Project owner will seek to maximize local procurement of goods and services for the Project;
- induced economic effects of spending by construction workers;
- permanent loss of approximately 0.01 km² of arable land;
- increase of the commune income through payment of taxes by the Project owner;
- increase of the household income of land owners leasing their land for each WTG. The land for the Project was secured based on land lease agreements signed with the land owners by the Project owner
- improvement of the local communication routes;
- potential impacts on community cohesion arising from the influx of construction workers;
- potential increased pressure on local infrastructure and utilities as a result of transporting goods and services, constructing new roads and rehabilitating existing ones, wiring the wind farm.

Additionally, as imposed by the Environmental Decision, in order to minimize potential loses of crops, the construction works should be planned in a way to ensure that onerous works are conducted after harvesting and before planting new crops.

The current Project Owner will develop and implement a SEP (see section 4) which will also include a formal grievance management procedure for the Project. This mechanism will be disseminated to the affected communities so that people understand how to proceed in case they have questions or complaints in relation to the Project.

Following the completion of construction activities, local farmers will be granted access and will continue using the agricultural land around the turbines mainly for farming and occasional cattle grazing activities.

During the operational stage, there will also be direct employment opportunities with the Project as well and indirect opportunities as the Project will subcontract maintenance and security services.

3.8 Community Health, Safety and Security

3.8.1 Transportation Issues

The EIA report prepared for the Project presents approximate calculations on the number of trucks needed for the development of the Project. The construction of one WTG foundation is expected to involve 60 trucks.

The expected impacts of increased heavy and oversized transportation may include:

- increased noise, vibrations and particulate matter;
- increased traffic on local roads;
- damages to road surface and possibly also to building structures;
- temporary roads access.

The road survey has been completed by the wind turbines provider. During the construction phase, the Project Owner will develop and implement a Traffic Management Plan and Community Health and Safety Plan which will describe truck routes and planned schedule when heavy and oversized transportation can be expected. The Plan will also define health and safety rules, which should be followed prior commencement of the construction works.

Taking into account the relatively small number of WTGs, which will be delivered and that the abovementioned mitigation measures will be implemented, the transportation impacts should be limited.

3.8.2 Environmental Noise

For the EIA report, former developer Park Wiatrowy Juwi 2 Sp. z o.o. completed noise level analyses to determine whether the Project would meet mandatory noise levels defined as 55 dB for daytime and 45 dB for night-time in residential areas. Based on the results, it was concluded that all WTGs (1, 4, 5 and 6) can operate both during daytime and nighttime with the maximum acoustic power of 105 dB. The noise analysis did not reveal exceedances of the permissible levels.

The nearest house is located approximately 630 m east of WTG No.6.

While construction activities may result in noise impacts due to equipment operation and vehicle traffic, the activities will take place only during the daytime and the construction noise generation will only be temporary. However, all the works will be executed in such a way that the permissible noise level at the nearest residential areas will not be exceeded.

The Environmental Decision imposes, among others, the following requirements related to the post-construction noise monitoring:

- post-construction monitoring must be conducted within 9 months after the wind farm becomes operational;
- the methodology of post-construction noise measurements must be compliant with requirements defined in paragraph VII of the Environmental Decision;
- the results must be immediately submitted to the Regional Directorate of Environmental Protection in Lodz (within one month after the measurements are completed);

-
- if any exceedances of permissible noise levels are identified, the turbines must be switched off immediately (within one month after the exceedances are identified) and the Regional Directorate of Environmental Protection in Lodz, as well as Voivodeship Inspectorate of Environmental Protection in Lodz, must be notified;
 - after two years after the abovementioned noise monitoring measurements are completed, another noise monitoring must be conducted and the results must be submitted to the Regional Directorate of Environmental Protection in Lodz.

Additionally, the following measures to reduce the negative impact of noise and associated residual effects are proposed:

- construction works will be limited to daytime only (between 6.00 am and 10.00 pm), except for activities related to pouring the foundations which must be conducted 24 h/day;
- appropriate noise reduction equipment will be installed on all construction equipment; construction equipment will be subject to appropriate maintenance;
- all fixed construction equipment (compressors, generators etc.) will be placed as far as possible from the nearest residential areas;
- residents of the nearest settlements will be notified in advance of noisy works during construction.

3.8.3 Shadow Flicker

Any moving object that comes between a viewer and a light source can cause a flicker effect. Wind turbines, like other tall structures, will cast a shadow on the neighboring area when the sun is visible.

A detailed assessment of shadow flicker effect was conducted as a part of the EIA report and the results indicated a lack of significant impacts from shadow flicker.

It should be also stressed that there are no regulations in Poland that set limit values for this effect in terms of duration and frequency.

According to the recommendations of the World Bank Environmental, Health and Safety Guidelines For Wind Energy⁵, the minimum distance between the turbines and the nearest residential areas should be 337.5 m. The closest residential area to any of the turbines is 630 m or more. Given the above, no shadow flicker effect is likely to occur.

3.8.4 Ice and Blade Throw

Wind farms operating in cold climates may suffer from icing in certain weather conditions and ice accretion can result in 'throwing' of ice from the wind turbines, which may affect public safety. The average annual temperature in the Parzeczew WF area is +7.9°C with an average monthly temperature in January of -4.8°C. Icing of wind turbines is rather unlikely under such climatic conditions.

The Project area is located in an agricultural area, with regular farmer car traffic, farmers working the land, as well as grazing livestock during spring and summer.

To minimize the risk, the following mitigation measures should be adopted:

- all WTGs will be equipped with special ice detecting systems to control ice formation on the rotor blades. In case of icing detection, wind turbines will be shut down automatically;
- warning signs will be placed at the entrances to the WTGs complexes, additional warning signs will be placed at the entrance to every single WTG location;

⁵ ENVIRONMENTAL, HEALTH AND SAFETY GUIDELINES FOR WIND ENERGY, AUGUST 7, 2015. WORLD BANK GROUP, IFC, MIGA.

-
- the wind farm operational personnel and local farmers will be informed about the conditions that could lead to WTG icing, about the risk of ice falling from the wind turbine rotor, as well as the existing risk area;
 - if a change in WTG operation is detected, which may be associated with the start of rotor blade icing, the turbine will be shut down.

With the proposed mitigation measures in place, no significant impacts from ice throw are expected.

3.8.5 Electromagnetic Interference

Wind turbines could potentially cause electromagnetic interference with aviation radar and telecommunication systems (e.g. microwave, television, and radio). As part of the construction permitting procedure, the relevant authorities were consulted and no concerns were raised with regards to the Project at that stage.

There is a military airport located approximately 7.5 km north of the Project site. The nearest international airport in Lodz is located approximately 35 km south of the Project site; therefore, there are no risks associated with aviation radar interferences.

Electromagnetic fields (EMF) are produced by any wiring or equipment carrying electric current. The potential effects of EMF on human health vary depending on the frequency and intensity of the fields. For wind power projects, EMF generation is associated with overhead transmission lines and the substation (which will not be present at the Parzeczew WF).

No significant impacts from electromagnetic interference are expected to arise in association with the Project.

3.8.6 Public Access and Health and Safety

Appropriate public communication to allow timely notice of affected residents before major construction operations or traffic movements on public roads will be implemented before the commencement and during the construction phase of the Parzeczew WF.

Currently, the area of planned Parzeczew WF is used for arable farming and occasional grazing.

Measures to allow safe access to grazing/farming areas will be identified and implemented in communication with local authorities and residents. The mitigation measures will comprise clear procedures to be implemented by contractors, including a Construction and Traffic Management Plan (on the construction site and on public roads) and an Emergency Response Plan.

With the above mitigation measures in place, impacts on public health and safety are not expected to be significant.

3.9 Cumulative Impacts

Projects can generate impacts in isolation or cumulatively with other projects, either existing or planned to be developed in the area. Additional projects identified in the Project area are presented in Section 2.3. According to the EIA, while the presence of cumulative impacts is considered unlikely given the distance between the projects, any future wind farm investment will require a robust cumulative impact assessment.

The Project Owner is committed to exchange information on the environmental monitoring results (with focus on bird and bat mortality). In case of any increase in the number of carcasses identified in the Project site, the Project Owner will liaise with the developers of the other windfarms in the area to identify and agree proper mitigation measures. Such actions will be carried out upon consultation of relevant stakeholders (e.g. bird protection associations and NGOs, experts, community members, lenders, authorities etc.).

3.10 Transboundary Impacts

The Project is located approximately 355 km from the nearest border with the neighboring country – Belarus. Considering the local nature and scale of the WF, it does not fall under the provisions of procedures on transboundary environmental impact assessment. Potential transboundary impacts generated by the WF are not expected.

3.11 Impacts During Decommissioning

Impacts caused by decommissioning activities are, in principle, comparable with construction impacts.

The projected operational lifetime of a typical wind farm is 25 years. After this period, there are two options: repowering the site and replacing existing wind turbines or decommissioning the site, removing the wind turbines and other major structures and restoring the site. At this stage, the Project Owner has not decided which of the two options will be selected for the Project. However, the Project Owner will comply with the relevant mandatory requirements and best practices in force at the time of Project decommissioning.

Prior to decommissioning, a method statement, detailing how the site would be restored is usually prepared and approved by the relevant authorities.

At present, wind turbines are removed by crane and reused elsewhere, if possible. In the case of foundation works, upper sections are removed and the voids backfilled with appropriate materials to support the land use at that time. Underground cables and deep concrete foundations are usually left in place, as removal is likely to cause more disruption than leaving them in-situ. However, if techniques allowing removal of underground cables with limited disruption and impacts will be available at the time of decommissioning, they will be considered. Areas affected by decommissioning activities will be restored to the use defined for the respective land plots at that moment in time. As with the turbines, the electrical control building and internal equipment is removed and reused or recycled, where possible.

4. ENVIRONMENTAL AND SOCIAL MANAGEMENT

The EIA Report performed for the Project identified the potential environmental and social impacts associated with the Project and also defined mitigation measures to be implemented in order to maintain these impacts within acceptable limits. The gap analysis of the EIA Report against EBRD PRs also indicated a number of actions that still are necessary for the Project to meet said standards. These measures were defined within the following documents that will be used during the Project implementation:

- the Environmental and Social Action Plan (ESAP) which represents a roadmap for implementation of key environmental and social actions required for the Project;
- the Corporate Stakeholder Engagement Framework (SEF) which defines the overall engagement strategy and will be further used by the Project Owner to develop a Project specific Stakeholder Engagement Plan (SEP). The SEP will define the relevant Project stakeholders, planned engagement activities, resources from the Project Owner to deal with stakeholder engagement, community grievance mechanism and management process along with monitoring and evaluation. The Project SEP will aim to lay the foundation for an effective, bilateral communication between the Project and its stakeholders and to build reliable relations between the Project and affected communities. Regular stakeholder engagement will also enable the Project Owner to gain a better understanding of the ways in which communities prefer for receive information about the Project. The Project SEP will be made available to the public on the Project Owner's website, and as hard copy to local authorities and communities. It will be periodically updated as needed, to reflect engagement undertaken, stakeholder feedback and potential changes in the Project.