



Non-Technical Summary

Udanin Wind Farm 50 MW, Poland

Company: Quadran Polska

7 October 2019

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Acronyms and Abbreviations

| Name | Description |
|--------|--|
| EBRD | European Bank for Reconstruction and Development |
| EIA | Environmental Impact Assessment |
| E&S | Environmental & Social |
| ESDD | Environmental and Social Due Diligence |
| GHG | Greenhouse Gas |
| NTS | Non-Technical Summary |
| PR | Performance Requirements |
| 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 *50 MW Udanin Wind Farm* project (hereinafter referred to as “*the Project*”) and on the measures considered to keep these potential impacts at acceptable levels, so that no harmful effects are induced and all applicable norms and regulations are met.

The Project was developed by the company Eolfi Polska Sp. z o.o. and its SPV Farma Wiatrowa 5. The ownership of the windfarm changed in February 2016, when Quadran Polska (the Project Owner) acquired the Project to proceed with its further development. The Project is located in the area of Damianowo, Rozana, Piekary, Udanin, Konary and Lusina villages, Udanin Commune, sredzki County, Dolnoslaskie Voivodeship, western Poland.

An Environmental Impact Assessment (EIA) prepared by a local consultant was completed for the Project in June 2010. The local EIA process was favorably approved through an Environmental Decision issued on June 21st, 2011 by the Head of Udanin commune and became final on June 27th, 2011. The Environmental Decision was granted for a total capacity of up to 75 MW. On October 8th, 2015 the Environmental Decision has been extended, stating that the Project will be conducted in stages and that conditions determined in Environmental Decision issued on June 21st, 2011 are relevant and no need for a revised Decision. Furthermore, additional biodiversity surveys were conducted during pre-construction and, according to the obligations set out by the Environmental Decision, will be conducted until the fifth year of the wind farms’ operation. The monitoring campaigns aim to confirm the results of the completed assessments and define any additional mitigation measures, if necessary.

The abovementioned EIA identified the environmental and social impacts expected to occur as a result of the Project implementation, and their significance was evaluated. Where significant adverse changes were identified, the measures that could be taken to avoid, reduce or compensate for those changes during the construction and operation of the wind farm were defined and implemented.

The Project Owner is seeking to enter a financial agreement with international lender institutions such as the European Bank for Reconstruction and Development (EBRD), with 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 bird 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).

The above documents will be translated into Polish and together with the local EIA (2010) 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 Udanin wind farm was selected based on a number of criteria, such as:

- 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 (20 km to the south-west of the site);
- 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, complying with the health protection buffers, area of low-value landscape etc.).

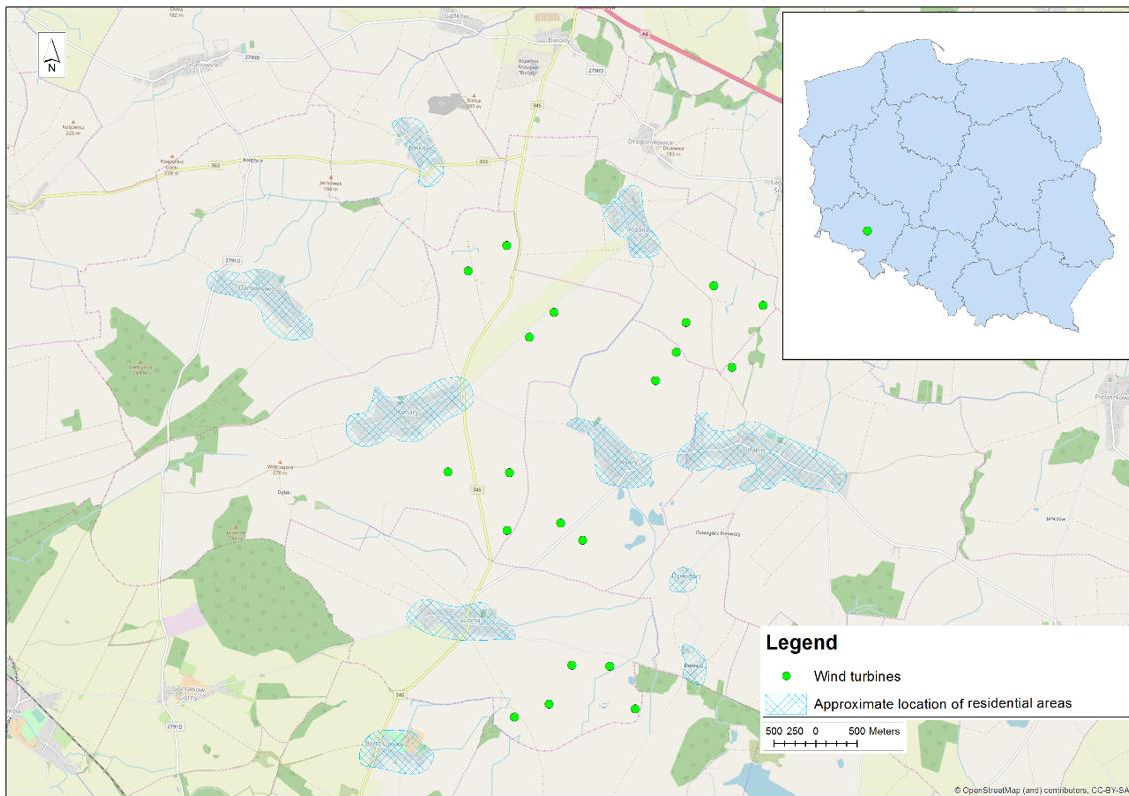
2.2 Project Description

The Project is to be located on flat arable land, in the area of Damianowo, Rozana, Piekary, Udanin, Konary and Lusina villages, Udanin Commune, sredzki County, Dolnoslaskie Voivodeship, western Poland. The nearest house is located at approximately 680 m north of WTG No.14.

The Project location and layout maps are illustrated in Figure 2-21 and Figure 2-2.

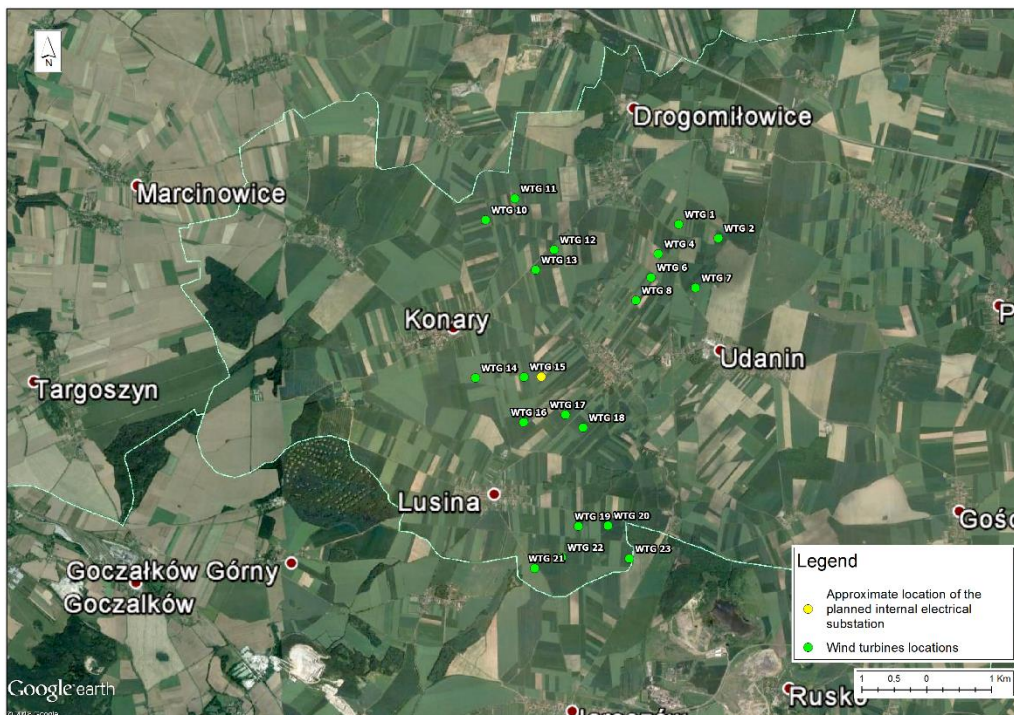
The Project is located outside of any nature protection areas. The nearest protected areas are Landscape Protection Area Gora Krzyzowa, located approximately 5 km south-west of the Project site, and Zbiornik Mietkowski (PLB020004) Natura 2000, protected under the Birds Directive 2009/147/EC, located approximately 12 km south-east of the Project site.

Figure 2-1 Project Location Map with affected residential areas



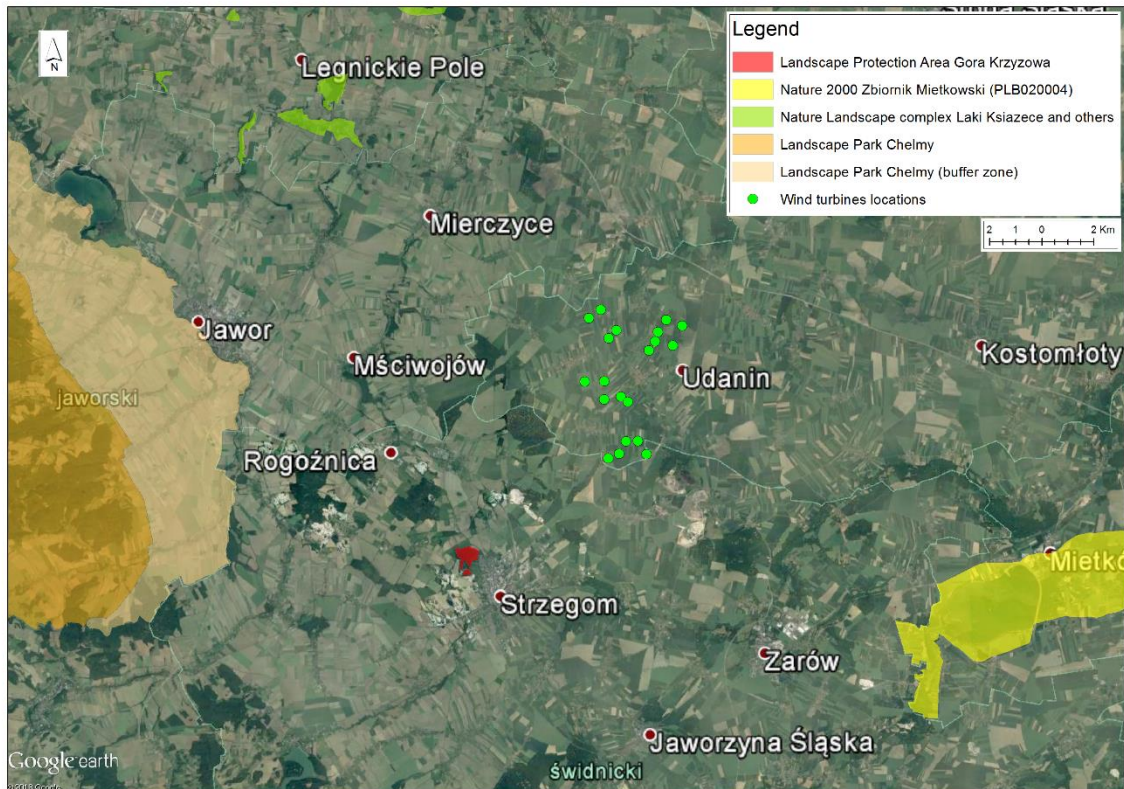
Source: Google maps, edited by ERM.

Figure 2-2 Project layout map



Source: Google Earth, edited by ERM

Figure 2-3 The nearest protected areas



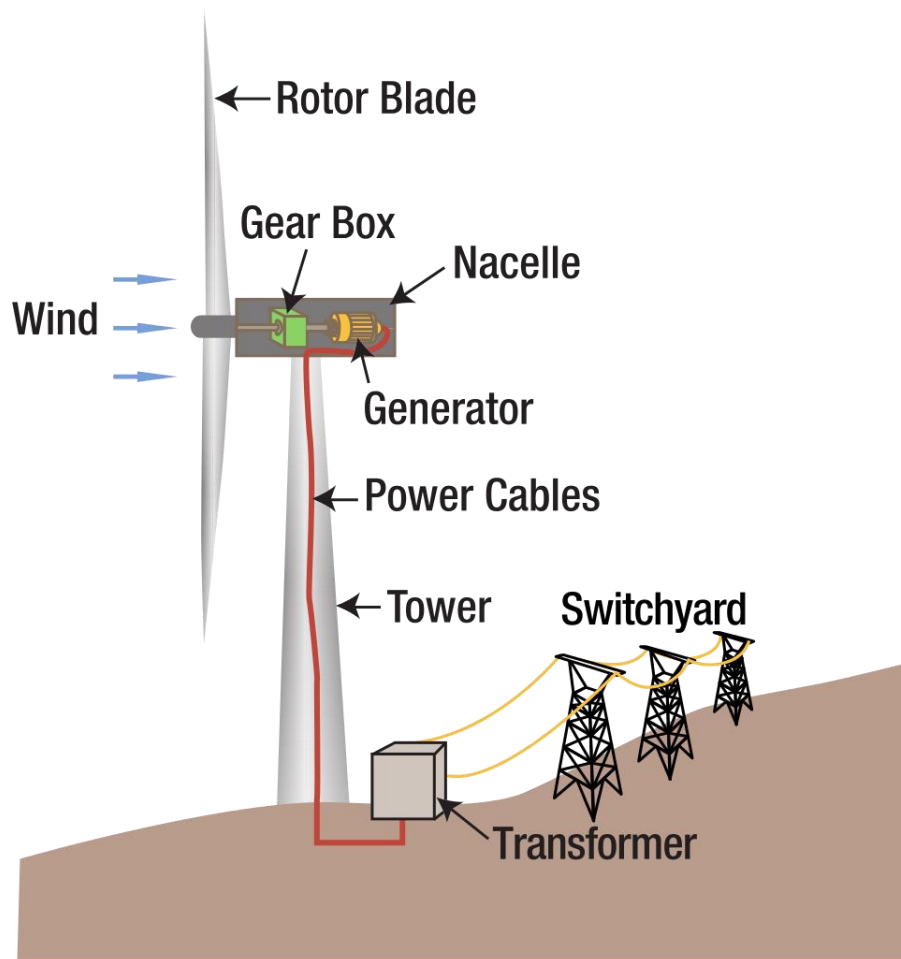
Source: Geoserwis and Google Earth, edited by ERM.

The main Project components will include:

- 17 GE120 wind turbine generators (WTG) with a 120-m rotor diameter and a hub height of 110 m, and 3 WTGs GE100 with a 103-m rotor diameter and a hub height of 98.3 m; each WTG will have a capacity of 2.5 MW, i.e. a total Project capacity of 50 MW;
- one 110/30 kV electrical substation will be located within the Project's area, in the village of Konary, in the vicinity of WTG No.15;
- a 30 kV underground power line connecting all 20 WTGs to the 110/30 kV Project electrical substation; the routes of these power lines were established along the internal access roads;
- approximately 28 km of underground power lines, which connect the Project electrical substation with the electrical substation located in Swiebodzice (south-west of the Project). The external electrical substation belongs to TAURON Dystrybucja S.A.
- internal access roads from the 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 the auxiliary infrastructure. The Environmental Decision for the Project was issued on June 21st, 2011 by the Head of Udanin commune and became final on June 27th, 2011. Moreover, designs and building permits for all WTGs, as well as for the electrical substation and power lines, have already been issued and are currently valid.

In January 2013, the Company signed a grid connection agreement with Tauron Dystrybucja Company. The contract has been amended six times and became final on February 25th, 2019. The Project should be connected to the grid by October 31st, 2020.

Project construction is currently planned to start in October 2019. For the first six 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 six months. It is currently foreseen that one turbine will be erected in two days.

Land acquisition

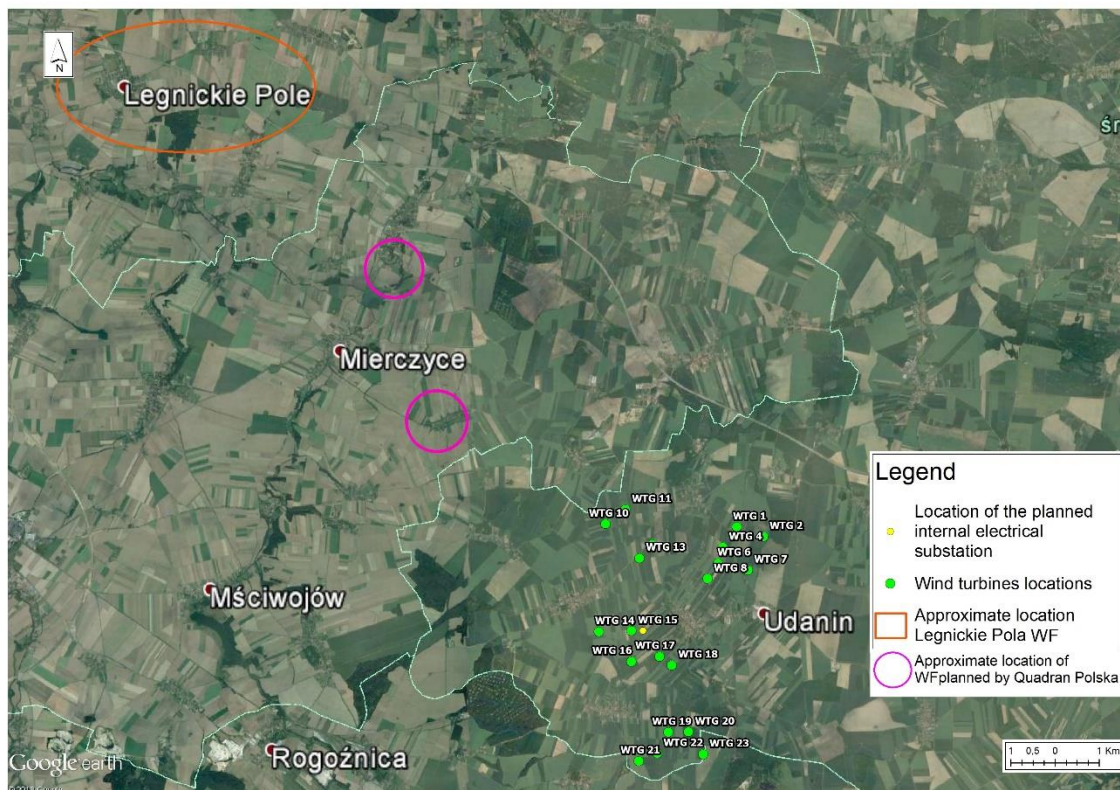
The cession and superficies agreements for the land required for the Project were concluded by former developer and amended by the Project Owner with land owners on a voluntary basis. No owners were forced to give up their land and no physical resettlement was required for the development of the Project.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

2.3 Other Wind Farm Projects in the Area

Based on the publicly available information and on the data provided by the representatives of the local authorities, there is only one existing wind farm in the neighboring commune of Legnickie Pole. It is located approximately 15-20 km north-west of the planned Udanin WF. Legnickie Pole WF counts 22 WTGs with a total capacity of 44 MW. However, Quadran is planning a new wind farm investment close to Udanin WF (6 km to the north), which will consist of seven turbines GE 120.

The approximate locations of these two wind farms in relation to the Project site are illustrated below.

Figure 2-5 Approximate location of the existing and planned windfarms within a 20-km buffer area around Udanin WF



Source: Google Earth, edited by ERM.

2.4 Project Environmental Performance

The expected annual energy production of the Project will amount to approximately 122,487 MWh. As a positive effect, the wind farm's operation will result in a significant reduction of greenhouse gas (GHG) emissions, by replacing CO₂-emitting power generation facilities. Therefore, the environmental benefit of the Project will be the reduction of GHG emissions by 78,146.7 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 reducing GHG emissions, the future operations of the Project will also result in significant avoidance of post-combustion emissions. As an example, the equivalent production of electricity by the largest Polish hard-coal power plant would result with the following emissions (estimations based on emission factors for 2011):

-
- Particulate matter (PM): approximately 10.8 tons/year;
 - Sulphur dioxide (SO₂): approximately 322.1 tons/year;
 - Nitrogen oxides (NO_x): approximately 209.39 tons/year.

3. SUMMARY OF IMPACTS AND MITIGATION MEASURES

3.1 Soil and Groundwater

Potential impacts on soil and groundwater during the Project construction could be associated with removal and handling of topsoil, soil compaction and potential spills of fuel, lubricants and paint. Impacts on soil and groundwater generated by future operations of Udanin 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 of the 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, lubricants and paints will be stored in secured designated fuel and chemical storage areas in line with national requirements and international norms/ good practices on handling harmful materials;
- procedures will be developed for responding to emergencies/spills of hazardous materials, and procedures for the storage and handling of 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 as far as possible (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:

- Cicha Woda river (left tributary of Odra river) – approximately 800 m south-west of the Project site;
- complex of small aquifers (Mlyn, Pod Stodola, Kapielowy, Lubin, Zalany, Trojkat, Gorki and Basenowy) – between 0.3-1.5 km south-west of the Project site;

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.

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 waters are expected.

3.3 Air Quality

During the Project construction, air emissions sources 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 using well-maintained construction equipment and employing 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 operational 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 165 m a.s.l. and 192 m a.s.l. No legally protected areas are located within or in the immediate vicinity of the Project. Terrestrial animals identified in this area mainly belong to common species and are not subject to protection.

3.4.2 Legally Protected Sites

The protected areas identified on a range of 20 km around the Project site are the following::

- Landscape Protection Area Gora Krzyzowa, located approximately 5 km south-west of the Project site;
- Natura 2000 Zbiornik Mietkowski (PLB020004), protected under the Birds Directive 2009/147/EC, located at approximately 12 km south-east of the Project site;
- Nature Landscape complex Laki Ksiazce, located approximately 14 km north-west of the Project site;
- Landscape Park Chelmy (buffer zone), located approximately 15 km west of the Project site.

3.4.3 Birds

To determine the Project site's importance to birds, a number of surveys were conducted. The first ornithological screening was conducted at the end of 2008, which allowed for terrain recognition, identification of ecological corridors and helped to define the scope of pre-construction bird monitoring.

The pre-construction bird monitoring campaign was conducted between January and December 2009, the scope and approach of which were in line with the PSEW Guidelines 2008¹. During the pre-construction bird monitoring conducted in 2009, 22,298 individuals belonging to 96 species were identified the Project area. In Poland, according to the Nature Conservation Act dated 2018, most of the passerines are under strict protection², while others are under partial³ protection. The majority of birds were observed in autumn. The most frequently observed species were common starlings, geese, seagulls, northern lapwings, yellowhammers and fieldfares.

The area of the planned Udanin WF is located in a sector of relatively intense autumn seagull migration, as well as increased geese movements, having an average ornithological value. As seagulls are not birds with high collision rates, the bird monitoring report assessed the collision risk as

¹ PSEW (2008). Wytyczne w zakresie oceny oddziaływanie elektrowni wiatrowych na ptaki. Szczecin.

² strict protection – total and permanent interdiction of direct human intervention in the state of ecosystems, wild fauna and flora and in the course of natural processes in protected areas;

³ partial protection – protection of species of plants, animals and fungi allowing harvesting, i.e. the possibility to reduce the size of a given population;

low. If post-construction monitoring reveals significant seagull mortality, i.e. more than 30 individuals per year, and/or increased geese mortality, i.e. more than 50 individuals per year, the operations of Udanin WF will have to be adjusted.

Based on the obligations imposed by the Environmental Decision, all construction works must be conducted outside the bird-breeding season (i.e. between November 15th and March 31st). Moreover, post-construction bird monitoring will be conducted over five years once the WF becomes operational, i.e. in the first, second and fifth years of operation. The post-construction monitoring methodology will be in line with Polish and international guidelines.

Monitoring results must be submitted to the Regional Directorate of Environmental Protection in Wrocław by January 31st of the year following the monitoring campaign. Considering the above, if adequate mitigation measures are implemented, no significant impacts on birds are expected.

3.4.4 Bats

The pre-construction bat monitoring campaign and analysis of the potential impact generated by the Project were conducted in line with Polish Guidelines (valid at that time) for pre-construction bat monitoring⁴, which are based on the methodology developed by EUROBATS⁵. The preliminary monitoring in 2009 was conducted between spring and autumn. The same methodology was used during all monitoring periods.

The following bat species were identified:

- Greater mouse-eared bat (*Myotis myotis*), listed in Annex II of the Habitats Directive 92/43/EEC⁶;
- Daubenton's bat (*Myotis daubentonii*);
- Serotine bat (*Eptesicus serotinus*);
- Nathusius's pipistrelle (*Pipistrellus nathusii*);
- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Common noctule (*Nyctalus noctula*);
- Brown long-eared bat (*Plecotus auritus*);
- Grey long-eared bat (*Plecotus austriacus*).
- Western barbastelle (*Barbastella barbastellus*), listed in Annex II of the Habitats Directive 92/43/EEC

Considering the results of the bat monitoring conducted in 2009, in order to minimize the impacts on bats, the following requirements were imposed by the Environmental Decision:

- WTGs should be placed at least 200 m from the nearest forested area, watercourses and aquifers;
- New trees should not be planted on the land plots leased for Project purposes or in their vicinity (i.e. up to 200 m);
- Once Udanin WF becomes operational, in order to minimize mortality of the common noctule (*Nyctalus noctula*), WTGs No 1-9 and WTGs No 11, 12, 18 must be switched off periodically (i.e. between July 1st and September 30th, up to 6 hours after sunset, when wind speed is lower than 8 m/s).

⁴ Tymczasowe wytyczne dotyczące ocen oddziaływania elektrowni wiatrowych na nietoperze (na rok 2009) (Kepel i in. 2009)

⁵ Porozumienie o Ochronie Populacji Europejskich Nietoperzy EUROBATS (Rodrigues i in. 2008)

⁶ Dyrektywa Siedliskowa – Załącznik II Gatunki zwierząt

Moreover, based on the obligations imposed by the Environmental Decision, post-construction bat monitoring will be conducted over five years once the WF becomes operational (i.e. in the first, second and fifth years of operation). The post-construction monitoring methodology will be in line with Polish and international guidelines. Monitoring results must be submitted to the Regional Directorate of Environmental Protection in Wroclaw by January 31st of the year following the monitoring campaign.

As requested by the Regional Directorate of Environmental Protection in Wroclaw, in 2013, bat detector recordings were conducted in forested areas in the vicinity of the planned WTG No 3 and WTG No 9, between September and October. However, neither WTG No 3 nor WTG No 9 are part anymore of the total 20 WTGs Project's components.

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 permanently covered by the Project will be only 0.03 km², corresponding to the project footprint (land effectively taken up by WTGs, access roads, accompanying infrastructure).

As mentioned in the EIA report, the Project will be located on agricultural lands, where mechanized agriculture and the use of chemicals contributed to a decrease in the diversity of plant species. Therefore, the report concluded that local flora, which might be impacted by the construction activities, is mainly of low conservation value.

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

3.4.5.2 Amphibians and Reptiles

According to the EIA report, the presence of the following amphibian and reptile species was noted:

- Common toad (*Bufo bufo*);
- Common frog (*Rana temporaria*);
- Edible frog (*Rana esculenta*);
- Moor frog (*Rana arvalis*);
- Sand lizard (*Lacerta agilis*);
- Slowworm (*Anguis fragilis*);
- Grass snake (*Natrix natrix*).

As indicated in the EIA report, no protected species listed in the Polish Red Book of Animals or in the Annex II of Habitats Directive 92/43/EEC have been identified. However, four species (*Rana temporaria*, *Rana esculenta*, *Rana arvalis*, *Lacerta agilis*) are listed in Annex IV of Habitats Directive. In Poland all reptiles (in total 18 species) and all amphibians (in total 9 species) are under legal protection. However, pre-construction monitoring concludes that the Udanin WF area does not provide a particularly suitable habitat for amphibians and reptiles.

Based on the EIA report, the Project operation is not likely to pose a threat to animals moving at ground level. However, the Project Owner will voluntarily develop and implement an additional monitoring survey on herpetofauna in line with Poland and international guidelines. Considering the

above, if adequate mitigation measures are implemented, no significant impacts on amphibians and reptiles are expected.

3.4.5.3 Mammals

Surveys on mammals were conducted simultaneously with the pre-construction bird and bat monitoring. The following mammals, other than bats, were identified:

- European mole (*Talpa europaea*);
- Hedgehog (*Erinaceus sp.*);
- European hare (*Lepus europaeus*);
- Red fox (*Vulpes vulpes*);
- European roe deer (*Capreolus capreolus*).

Based on EIA report, the operation of Udanin WF is unlikely to negatively affect mammals, thus no significant impacts on them are expected.

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 of the WF area, in particular to people from Damianowo, Rozana, Piekary, Udanin, Konary and Lusina villages.

Udanin WF will result in a continuous change (for the duration of the project lifetime) in landscape characteristics affecting a large area. However, the sensitivity of the landscape is not deemed high, as it would be the case for a protected landscape and/ or a landscape widely acknowledged for its quality and value, or for a landscape with a distinctive character.

A landscape and visual impact assessment was performed as part of the EIA Report. A modeling process was carried out involving the transfer of photographs of GE 2.5 XL turbines, Vestas V90 1.8/2.0 turbines (hub height 105 m) and Fulrlander (hub height 141 m) into photographs of places selected for the planned Project. It processed WTG sizes and proportions, WTG locations against each other, as well as the existing landscape elements.

It was concluded that the Project would not generate a significant impact and would not deteriorate the landscape.

However, 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 distortion of the surface;
- the tower, nacelle and rotor will be painted in a uniform color, in order to reduce visual impacts.

3.6 Cultural Heritage

According to the information presented in the EIA report, within the Udanin WF area there are no monuments listed in the Monuments Register.

The following monuments listed in the Monuments Register are located in the vicinity of the planned Udanin WF:

- Church, palace and park complex in the vicinity of Drogomilowice village;
- Church and cemetery in the vicinity of Goscislaw village;
- Church, two cemeteries and park in the vicinity of Konary village;
- Church, cemetery and wall in the vicinity of Lusina village;
- Church, cemetery and park in the vicinity of Piekary village;
- Cemetery and chapel in the vicinity of Rozana village.

Based on the information provided in the EIA report, the above-mentioned monuments will not be impacted by the planned Udanin WF, neither during the construction nor the operation phases. A potential impact might be generated during the construction phase on archaeological sites located in the vicinity (sites No. 7/31/81-22 AZP, 8/19/81/22 AZP, 9/20/81-22 AZP, 8/14/81-22 AZP, 9/7/81-23 AZP, 1/8/81-23 AZP). The Environmental Decision and the Building Permits imposed an obligation to notify the Archaeological Monument Department in Wroclaw about the commencement of construction works and a document issued by the Voivodeship Monuments Conservatory in Wroclaw in May 2019 requires the developer to conduct an archaeological survey before start of construction works and ensure archaeological supervision during these works.

During the construction phase, the Project Owner will develop and implement a Chance Find Procedure which will describe the process of managing situations when Project construction activities lead to the identification of cultural heritage unknown until then.

Taking into account the above, potential Project impacts on cultural heritage are not expected to be significant.

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 50-75 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 0.009 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;
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- 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.

The current Project Owner will develop and implement a SEP (see section 4), which will also feature 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 completion of construction activities, local farmers will be granted access to the Project area 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 estimates that approximately 50 vehicles per turbine will be needed to deliver concrete for the foundations purposes. The potential impacts of increased heavy and oversized transportation may include:

- Increased noise, vibrations and particulate matter;
- Increased traffic on the local roads;
- damages to road's surface and possibly also 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 trucks 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.

If the abovementioned mitigation measures will be implemented, the transportation impacts should be minimized.

3.8.2 Environmental Noise

For the EIA report, former developer Farma Wiatrowa 5 Sp. z o.o. completed noise level analyses to determine whether the Project met mandatory noise levels, defined as 55 dB for daytime and 45 dB for night-time in residential areas. The noise analysis did not reveal exceedances of permissible levels.

The nearest noise receptors are residential areas in Damianowo, Rozana, Piekary, Udanin, Konary and Lusina villages, with the closest house located approximately 680 m north of WTG No. 14 in Konary village.

The Environmental Decision requires to conduct post construction noise measurements within three months once the wind farm becomes operational. The noise measurements should be conducted following the methods and requirements defined in the decision. The results should be submitted to the Regional Directorate of Environmental Protection in Wroclaw within six months once the wind farm becomes operational. If the results show exceedances, mitigation measures, such as fitting silencing mode for designated WTGs with silencers, will have to be implemented.

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, cast a shadow on the neighboring area when the sun is visible.

As a part of the EIA procedure, an analysis of the shadow flicker effect was conducted. The range of the shadow flicker effect was analyzed taking into account the actual astronomical data for the nearest residential areas. The WindPro software was used for modelling purposes. A shadow coverage model was prepared for the Project's area and adjacent areas.

It should also be 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 Energy⁷, the minimum distance between the Project turbines and the nearest residential areas should be 345 m (for GE120-type WTGs) and 301.95 m (for GE100-type WTGs). The closest residential area to any of the Project turbines is 680 m.

Consequently, it is expected that no shadow flicker effect is likely to occur as a result of the Project.

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 Udanin WF area is +8.5°C with an average monthly temperature in January of -2.1°C. Wind turbine icing is rather unlikely under such climatic conditions.

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

To minimize ice throw risks, the following mitigation measures will be adopted:

- all WTGs will be equipped with ice detecting systems to control ice formation on the rotor blades. In case of icing detection, wind turbines are shut down automatically;
- warning signs will be placed at the entrance to the individual WTGs location;
- the wind farm 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; such information will be delivered through continuous engagement with local communities, as the Project SEP will outline;
- 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 aforementioned mitigation 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 in relation to the Project.

The nearest airport is located approximately 45 km east 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.

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

For wind power projects, EMF generation is associated with overhead transmission lines (which are not included in the Udanin Project) and the substation.

The following measures will be adopted to protect employees and local communities:

- all works on construction, maintenance and repairs of the Project electrical substation will be carried out in compliance with the safety regulations related to these activities;
- the Project electrical substation will be fenced and equipped with adequate warning signs;
- entrance to the Project electrical substation will be prohibited, except for employees holding adequate permits;
- the substation will be regularly inspected for compliance with the relevant safety requirements, constant monitoring will be implemented, and monthly, quarterly and annual inspections will be conducted.

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 commencement and during construction phase of the Udanin WF.

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

Measures to allow safe access to grazing/farming areas will be identified and implemented upon consulting 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 public roads) and an Emergency Response Plan.

Having 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 **Error! Reference source not found.***

According to the EIA, while the presence of cumulative impacts is considered unlikely given the distance between the project sites, 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 area is located approximately 70 km from the nearest border with the neighboring country – the Czech Republic. Considering the WF's local nature and scale, it does not fall under the provisions of procedures on transboundary environmental impact assessments. 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 land use. 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 are 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 are 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 the 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 in the following documents that will be used during 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, a community grievance mechanism and a 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 relationships between the Project and local communities. Regular stakeholder engagement will also enable the Project Owner to gain a better understanding of the ways in which communities prefer to 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.
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