

Silesia wind farm I

Non-Technical Summary



Document details

Document title	Non-Technical Summary
The basis of this document	Decision of the Environmental Impact Assessment Report 2012-03-02 No. GK.III 6220.36.20.2012.MD
Document subtitle	Silesia wind farm I
Client Name	Altiplano Sp. z o.o.

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1. Short description of the project

Altiplano Sp. z o.o. plans to install a wind farm consisting of 16 wind turbines (WTGs) in the communes of Grodków, Opolskie Voivodeship. The power plants will be located between the villages of Kucharzowice, Bąków, Młodoszowice and Jaworów. The total capacity of the planned wind farm will not exceed 64 MW. Maximum power of each turbine up to 4 MW, maximum total height of the power plant: 200 m, maximum height of the tower: 140 m, maximum rotor diameter: 120 m, maximum sound power of the individual turbines – 106 dB(A), except for the EW 01 and EW 14 turbine, whose maximum sound power is 101.0 dB(A) and the EW 12 turbine, whose maximum sound power is 104.0 dB(A). The total area of land on which the power plants will be set up is approximately 390 ha. The average size of the plot of land allocated for a single power plant is only about 0.3 – 0.4 ha.

2. Legal basis and background

Environmental Impact Assessment (EIA) is governed by a legal framework designed to ensure that environmental considerations are integrated into project planning and decision-making processes. The primary legislative instrument is *the Act of 3 October 2008 on the Provision of Information on the*

Environment and Environmental Protection, Public Participation in Environmental Protection and Environmental Impact Assessments. This act outlines the procedures for conducting EIAs, ensuring public participation, and providing access to environmental information. Additionally, the Regulation of the Council of Ministers of 9 November 2010 *on projects likely to have a major environmental impact* specifies the types of projects requiring an EIA, categorizing them based on their potential environmental impact.

An EIA report was completed for wind farm project under the name “*Bąków wind farm with auxiliary infrastructure in the commune of Grodków, Opolskie Voivodeship*”, planned to be implemented in the area of the villages of Młodoszowice and Bąków, in the commune of Grodków, district of Brześć, Opolskie voivodeship. In 2011, after the assessment of the environmental impact of the project, Regional Director for Environmental Protection in Opole – decision of 30 December 2011, ref. no. WOOŚ.4242.166.2011.IOC, agreeing the conditions for the implementation of the project.

3. Site location and description

The planned economic activity will be carried out on 7 land plots: 12.5591 ha (cad. No. 7730/0007:28), 9.04 ha (cad. No. 7730/0007:85) in Nemeiliai village, 1.02 ha (cad. No. 7730/0006:39), 3.00 ha (cad. No. 7730/0006:127), 2.78 ha (cad. No. 7730/0006:126) in Kamščiai village, 6.53 ha (cad. No. 7730/0006:27) in Žilučiai village, 2.87 ha (cad. No. 7730/0005:101) in Griežpelkiai II village, Lauksargiai eldership, Tauragė district, Tauragė county. The purpose of the planned land plots is agricultural. The infrastructure of the area meets the needs of the planned economic activity.

The wind farm is planned in the area of the villages of Młodoszowice and Bąków, in the commune of Grodków, district of Brześć, Opolskie voivodeship. internal connection infrastructure, in the form of power 30 kV cable lines and telecommunication lines (optical fibres), connecting individual power plants into cable circuits, which will be then connected to an external substation (not being part of the Bąków 2B farm).

The location of the power plants, the substation and the course of the medium voltage (MV) line is shown on the topographical map attached to this summary (*Appendix No. 1*).

4. Description of the planned activity

The total area of land on which the power plants will be set up is approximately 390 ha. The wind turbines and auxiliary infrastructure will actually occupy only a small part of this area. The average size of the plot of land allocated for a single power plant is only about 0.3 – 0.4 ha.

The tower of each power plant will be a steel or concrete tubular (conical) structure, consisting of several or a dozen segments (depending on the model). The diameter of the base of the tower will be approximately 4 – 6 m, while the diameter of the top will be approximately 3 – 4 m. At the top of each tower there will be a rotating nacelle that positions itself with a rotor depending on the wind direction. The propellers are three blades made of glass fibre reinforced plastic.

The parameters of the wind turbines will be as follows:

- total height – 200 m (comprising maximum tower height – 140 m and maximum rotor radius – 60 m);
- maximum rotor diameter – 120 m;
- zone below the rotor – not less than 60 m.
- maximum sound power of the turbines – limited in accordance with the recommendations of the acoustic analysis attached to the environmental impact report for the project.

The power plants will be founded on footings or piled foundations. In order to ensure that the electrical and technical connections are located above the expected level of any flood water, the foundations may be placed on artificially excavated ground elevations of up to 3 m above sea level.

There are plans to construct medium-voltage underground (cable) power lines connecting individual wind turbines with an internal substation and underground telecommunication lines are planned.

The construction of a substation is also planned. Its function will be to:

1. receive the generated power from the wind farm at medium voltage level,
2. transform the power, via MV/HV transformers, to high voltage level,
3. feed the power into the existing power grid of the commercial power distribution network, through an external connection (the place of connection has not yet been determined).

In addition, the investor planning to build roads to allow access to the power plant through the fields and to reconstruct the existing roads to allow the transport of the finished components from which the power stations will be assembled. The width of the roadway will be 4 m and the width of the shoulders will be 2 x 0.5 m. The road surface will be made of aggregate.

For the duration of construction work, the access roads to the power stations will end with paved assembly yards. Once construction is complete, only small manoeuvring yards will be left at the power plant to be used by power plant maintenance crews.

In the immediate vicinity of the assembly yards, storage yards and construction facilities will be located. They will be temporarily paved. Building materials for the construction of the power plant foundations, structure components and construction machinery and equipment will be stored there. There will be also welfare units, tool containers and portable toilets.

In accordance with the report's recommendations, a part of the power plant will be operated with a sound power limitation so that the applicable noise standards are not exceeded, as shown in the table below:

Turbine designation	Turbine load	Turbine height	Turbine sound power
EW_01	95%	140m	101.0dB(A)
EW_02	95%	140m	106.0dB(A)
EW_03	95%	140m	106.0dB(A)
EW_04	95%	140m	106.0dB(A)
EW_05	95%	140m	106.0dB(A)
EW_06	95%	140m	106.0dB(A)
EW_07	95%	140m	106.0dB(A)
EW_08	95%	140m	106.0dB(A)
EW_09	95%	140m	106.0dB(A)
EW_10	95%	140m	106.0dB(A)
EW_11	95%	140m	106.0dB(A)
EW_12	95%	140m	104.0dB(A)
EW_13	95%	140m	106.0dB(A)
EW_14	95%	140m	101.0dB(A)
EW_15	95%	140m	106.0dB(A)
EW_16	95%	140m	106.0dB(A)
Transformer/switching station	—	—	79dB(A)

In addition, the EW8 and EW13 power plants will be temporarily shut down to protect bats.

Wind power plants will convert the kinetic energy of the wind into electrical energy as a result of the production process. The turbine of the wind plant will generate electricity with a voltage of approximately 400 – 700 V, which will be then increased by the power plant transformer. The generated electricity will be transmitted via underground MV cable lines to the internal MV/110kV transformer station (transformer/switching station). Here, the transmitted energy will be transformed to a voltage level of 110 kV and sent via 110 kV power lines to the substation owned by the grid operator.

Wind turbines are closed and unmanned unit, so there is no need to install sanitary facilities or build staff facilities at the farm.

The operation of the power plants will be supervised remotely, via fibre optic cables to be routed from each plant.

5. Summary of the impacts and mitigation measures

5.1 Physical pollution (noise and shading)

A specialist analysis has been carried out for the purposes of the report concerning the impact of the proposed wind farm in terms of electromagnetic field and radiation. The analysis shows that:

- **No electromagnetic field impacts** are identified during the construction and installation of the apparatus, equipment and systems.
- **The operation of the wind farm** will cause emission of electromagnetic fields and radiation. However, its impact will be negligible and will not exceed the applicable standards.

For the purposes of the **cumulative impact analysis**, the Regional Environmental Protection Directorate in Opole and the commune offices were requested to provide information on other investments, in particular on the existing and planned wind farms in the commune of Grodków and the neighbouring communes.

The responses received indicate that:

- the following wind farms are planned to be built in the commune of Grodków:



- near the villages of Jaszów and Bogdanów: a wind farm consisting of 23 turbines,
- near the villages of Wierzbnik, Kolnica, Przylesie Dolne and Wojsław: WF Wierzbnik, consisting of approx. 21 turbines,
- near Grodków and Tarnów Grodkowski: a single turbine,
- near the villages of Bąków, Młodoszowice, Kolnica, Wojsław, Lubcz, Gnojna, Polana, Żarów, Grodków and Nowa Wieś Mała: the following wind farms: Bąków (16 turbines), Bąków 2A (3 turbines), Bąków 2B (17 turbines), Bąków 2C (13 turbines), Bąków 2D (5 turbines) and Bąków 2E (12 turbines),
- in the commune of Wiązów, a wind farm consisting of 6 turbines is planned to be built near the town of Jutrzyn,
- in the commune of Niemodlin, one wind turbine is planned to be built in the Gracze section,
- in the commune of Kamiennik, a Lipniki wind farm, consisting of 15 turbines, is planned to be built near the villages of Lipniki, Chociebórz and Goworowice,
- in the commune of Skarbimierz, a wind farm is planned to be built near the villages of Skarbimierz Osiedle, Pępice, Łukowice Brzeskie and Małujowice; a part of the farm will be located in the commune of Olszanka commune, and the total number of turbines for both communes is approx. 30,
- in the commune of Nysa, two wind farms with 3-4 turbines each are planned to be built near the town of Hajduki Nyskie,
- in the commune of Oława, there are plans to build a wind farm consisting of 3 turbines within the Gaj Oławski section and two single turbines: one near the town of Gaj Oławski and the other near the town of Bolechów.

In the communes of: Przeworno, Skoroszyce, Łambinowice, Otmuchów, Pakosławice, Lewin Brzeski, no wind farms exist or are planned.

All of the above-mentioned projects have at least initiated procedures on the decision on environmental conditions.

The Bąków, Bąków 2A-E, Wierzbnik and Wiązów wind farms **may involve cumulative impacts related to the construction stage**, including the construction of high voltage lines. Unfortunately, **it is not possible** to indicate the implementation schedules for these farms, as they are a trade secret of the investors.

In the scenario where these farms are built simultaneously, the cumulative impacts will multiply. However, this is highly unlikely. It

should also be borne in mind that the construction of wind farms involves a specific sequence of works. First of all, access roads to the wind farm sites must be built. Only after these have been completed can the foundations be laid. The next stage involves the assembly of the power plant from prefabricated components. The laying of the cable network can take place at any time, but this is much less onerous work. As can be seen, the work in the construction of a wind farm is spread over several stages, each of which can only be carried out after the previous one has been completed.

As for the **operation stage**, significant cumulative impacts are possible for wind farms in 3 areas:

- noise, as examined in the acoustic analysis attached to the report,
- impact on the landscape, as examined in the landscape analysis appended to the report,
- impact on the natural elements of the environment, as examined in the nature studies attached to the report.

As can be seen from the aforementioned analyses, the impact of the final project variant, also on a cumulative basis, will not exceed the applicable standards, provided that the minimising and mitigating measures specified in the report are applied.

Mitigation measures

At the planning stage:

- performing a specialist analysis of the acoustic impact of the investment,
- performing a specialist analysis of field and electromagnetic radiation,
- locating the investment within an adequate distance from human settlements, guaranteeing that the applicable emission standards, in particular noise and electromagnetic fields, are not exceeded.

The **construction phase** will involve negligible, spatially and temporally variable emissions of noise, air pollutants and vibration within the project area. These emissions are not expected to be a significant nuisance to the population living in nearby areas, as confirmed by the acoustic impact analysis of the project.

The phase will also involve human health hazards associated with the construction and earthworks (including repairs to access road sections) and the movement and manoeuvring of vehicles at the construction sites.

Eliminating these hazards requires the proper organisation of work, the marking of work areas and compliance with health and safety rules.

The **operation of the wind farm** with auxiliary infrastructure will not have a significant negative impact on living conditions and human health. Painting the tower wings with matt paints will prevent a stroboscopic effect that could be troublesome for observers, and the distance kept from buildings will minimise the effect of shadow flicker. Noise impacts and field and electromagnetic radiation emissions will not exceed the applicable standards, as confirmed by the acoustic analysis and field and electromagnetic radiation analysis carried out for the purposes of the report.

For the purposes of the report, the acoustic impact of the proposed farm has been subject to specialist analysis. The analysis shows that:

- **Construction work** will involve noise from means of transport (trucks) and construction machinery (excavator, concrete mixer, crane, hoist, other). Due to the short-term and local nature of these emissions, no special environmental protection measures are envisaged.
- **The operation of the wind farm** will result in noise emissions to the environment. However, noise emissions will not exceed applicable standards.

5.2 Biodiversity

For the purposes of the report, a number of analyses have been conducted to thoroughly investigate the impact of the wind farm on plants and animals: a nature inventory, an analysis of the impact of the investment on Natura 2000 areas and annual monitoring of birds and bats. The reports on these studies are chapters or appendices to the report.

The analysis of the above studies shows that:

- The construction and decommissioning, if any, phase of the wind farm will not have a significant impact on the flora and fauna in the area of the investment.
- **The operation of the wind farm** will not have a negative impact on flora and fauna, including birds and bats. The results of the environmental studies indicate that it is possible to implement the wind farm project, with the application of measures to prevent and limit negative impacts. The studies

suggest that the wind farm will not have a significant negative impact on habitats.

Mitigation measures

At the planning stage:

- performing a habitat inventory of the investment area and pre-investment monitoring of birds and bats,
- abandoning the construction of some of the power plants and making the necessary relocations of the remaining turbines, as recommended in the environmental studies,
- locating the power plants in an appropriate way so as to minimise their potential impact on nature, in particular on birds and bats (allowing their free flight),
- locating the investment within a significant distance from protected areas and not encroaching on areas of high natural value.

At the stage of construction and decommissioning:

- painting the structure with matt, light-coloured paints, in order to eliminate light reflections, increase visibility and the probability of seeing the working turbine by flying birds during the day and at night and as a deterrent for birds of prey,
- using methods to limit the possibility of animals entering excavations created during construction work and to allow animals to escape from the excavations.

During operational stage:

- conducting post-investment monitoring of birds and bats: a three-year monitoring of birds and bats to be carried out after the farm has been constructed;
- switching off turbines EW08 and EW13 during periods of bat activity (from March to November the turbines should be switched off from sunset to sunrise, but switching off will not be necessary at wind speeds > 6 m/s and during rain and drizzle when bats are not active).

5.3 Protected areas and areas of high ecological value

The Natura 2000 network in Poland had not yet been established at the time of the EIA, which significantly hindered the analysis of the impact of the project on habitats and species protected under Natura 2000.

Before the wind farm is put into operation, as-built measurements of the environmental noise level in the nearest protected areas should be carried out under extremely unfavourable conditions, i.e. at the maximum sound power of the turbines specified in this decision, which has been declared by the Investor as the limit for the power of the turbines that have the greatest impact on the environmental noise level being exceeded in the nearest protected areas.

During the construction stage, the project is not expected to have a significant negative impact on the natural elements of the environment, including the integrity, coherence and subject of protection of Natura 2000 areas.

Mitigation measures

At the stage of construction and decommissioning:

- the need to obtain the relevant permits (in accordance

with the Nature Conservation Act) if there is a possibility of destruction of a habitat or protected species during construction works.

5.4 Soil pollution and erosion

The following direct transformation of soil will occur during the construction work – a slight displacement of soil layers during the earthworks and partial changes of permeability and water capacity in the vicinity of the constructed facilities, caused by the mechanical pressure of technical equipment on the soil.

Excavations for the foundations will also involve the need to remove or level approximately 1,000 m³ of soil for a single wind turbine.

At the construction stage, a part of the project area will be permanently excluded from its current use (the area under the



power plants, substation or permanent access roads), and a part will be temporarily excluded (temporary storage yards or construction facilities).

During construction, large quantities of waste are expected to be generated, primarily soil and soil from excavations.

Mitigation measures

At the stage of construction and decommissioning:

- properly supervising and organising construction works, which should prevent pollution of the environment by oil-derived substances from construction machinery and equipment,
- securing the humus layer of soil during construction works, and using it after the completion of construction works at the investment site,
- restoring any loss of vegetation caused during construction and assembly work.

5.5 Air pollution

The planned economic activity will not have a negative impact on the air and climate. Minimal impact on the ambient air might occur during the construction of wind turbines and the installation of infrastructure due to emissions from internal combustion engine vehicles to be used, however, the construction work is expected to be short-term, and the amount of emissions will be insignificant and will not affect the current air quality.

The only significant environmental impact of the wind farm will be a significant positive impact on the atmospheric air and climate. This is due to the production of energy from a renewable source that is wind and the possibility to avoid pollution associated with the production of the same amount of energy in a conventional power plant, e.g. a coal-fired one.

Mitigation measures

During construction work, there will be disorganised emissions of exhaust fumes and dust from means of transport (trucks) and construction machinery (excavator, concrete mixer, crane, hoist, other). Due to the short-term and local character of these emissions, no special environmental protection solutions are envisaged.

The operation of the wind farm will not cause atmospheric air pollution. Quite the contrary, the production of energy from a renewable source such as wind will make it possible to avoid gaseous and particulate emissions that would have been produced by a conventional (e.g. coal-fired) power plant of similar capacity. This positive impact will continue for the lifetime of the power plant (20-30 years).

5.6 Landscape and visual

The construction phase of the Silesia I wind farm will involve only a temporary reduction in the aesthetic value of the area as a result of the works and organisation of the works facilities.

The impact of the operating wind farms on the surrounding landscape, cultural landscape and historical monuments can be described as follows:

- The construction and operation of the wind farm is not expected to significantly affect the monuments located within the commune of Grodków.
- The power plants will constitute a new element in the landscape and cultural landscape of the commune. Its assessment may vary depending on the observer, as there are no legally sanctioned criteria for assessing the impact on the landscape.
- The location of the Silesia I wind farm complies with the local spatial development plan for the commune of Grodków.
- Due to the nature of the terrain, the visibility of the power plant is expected to totally disappear at a distance of several to a dozen kilometres, depending on the observation point.

Visibility will be affected by the forest cover of the area, dispersion of the turbines and weather conditions.

Mitigation measures

At the stage of construction and decommissioning:

- painting the structure with matt, light-coloured paints, in order to eliminate light reflections, increase visibility and the probability of seeing the working turbine by flying birds during in the day and at night and as a deterrent for birds of prey.

At the operation stage:

- not placing commercial advertisements on the tower structures in order to preserve the landscape value.

5.7 Hydrology and Hydrogeology

The following impacts on surface water and groundwater may occur during the **construction stage**:

- short-term lowering of the groundwater level as a result of drainage associated with the dewatering of the excavations for the power plant and substation foundations and for the cable trenches,
- water pollution by oil-derived substances leaking from construction machinery and equipment and means of transport.

At the operation stage, the investment will not affect surface water and groundwater. Such an impact could arise in an emergency situation: when there occurs a transformer oil spill from the substation or the power plant tower is toppled over, but this is unlikely.

Mitigation measures

During the construction stage the above impacts should be excluded or minimised by:

- immediately covering the foundations with concrete,
- by immediately backfilling the cable trenches after the cables have been laid,
- properly supervising the operation of construction machinery and equipment and keeping them in good working order,
- laying assembly yards around the power plant for the duration of construction work.

5.8 Waste

Construction waste may be generated during the planned construction of wind turbines. A waste listed in EIA (with the exception of soil) will be temporarily collected in appropriate containers/boxes to minimise the risk of contamination penetrating into the soil and water environment.

No waste is expected to be generated during the laying of the power and optical fibre network, with the exception of small quantities of cables which will be handed over to a specialised company for recovery and/or disposal. Soil from the cable laying excavations will be used entirely for backfilling. During the construction works, a small amount of municipal waste will be also

generated in the area of the construction temporary facilities.

At the operation stage of the wind power plant, waste will be generated in the form of transmission and hydraulic oils related to the maintenance of the technical equipment. A single wind turbine usually contains about 360 l of gear oil and about 300 l of hydraulic oil. The transmission oil is changed depending on the results of controls (the frequency of change depends on the intensity of wind turbine operation). The hydraulic oil is changed on average once every 5 years (depending on the intensity of power plant operation).

Mitigation measures

It is planned to handle construction waste as follows:

- Construction waste will be collected in containers and then removed by specialised companies and sent for recovery or disposal.
- Metal waste and hazardous waste will be collected in separate containers.
- The humus layer of soil will be properly protected. Its protection will involve removing the top layer of soil and heaping it at the construction site (as agreed with the administrative authorities), and then, after the completion of the works – levelling it at the project site, with the exception of permanently occupied areas.
- Earth from the excavations for the power plant foundations and for the sections of the underground cable line will be collected at the construction site and will be used for backfilling the excavations, levelled at the project site or removed.

Small amounts of waste are expected to be generated **during the operation of the wind farm**. These will be collected on an ongoing basis by a maintenance company (manufacturer's service), which will take full responsibility for them under a contract. As a result, no waste containers will be set up. The service company will have the relevant permits for the collection and transport of waste, including hazardous waste. The waste will be then sent for recovery or disposal.

At the stage of **construction and decommissioning**:

- handling waste generated at the stage of construction, operation and decommissioning, in accordance with the provisions of the Waste Act, in particular collecting particular types of waste in containers adapted for this purpose, transferring waste for transport, recovery or neutralisation only to specialised companies, holding the relevant permits.

5.9 Fire and extreme events

A major accident is understood as an event, in particular an emission, a fire or an explosion, resulting from an industrial process, storage or transport, involving one or more hazardous substances, leading to an immediate hazard to human life or health or to the environment, or to a delayed occurrence of such a hazard. **The construction and operation of the wind farms does not involve a major failure hazard.**

5.10 Cultural heritage and protected areas

Several wind farms are planned to be constructed in the commune of Grodków. Thus, their visual impact will be cumulative. The

power plants will be, to a greater or lesser extent, visible from most of the villages in the commune. Thus, they will affect its landscape, a vital element of which are buildings listed in the register of immovable monuments.

The conservation areas defined in the local spatial development plan for the town and commune of Grodków are also protected by law, but the power plants will not be located in these areas or otherwise affect them.

In addition, there are numerous archaeological sites in the territory of the commune, supervised by the Provincial Monument Conservator. It cannot be ruled out that power cables will be laid in their vicinity.

The location of the Silesia I wind farm, as well as the nature of its operation, associated with the occurrence of only local emissions (mainly noise) exclude the possibility of its transboundary environmental impact.

5.11 Traffic and transport

As a result of the need to provide good quality roads for transporting the power plant components, some sections of public roads will be reconstructed and repaired during the **construction phase** to be subsequently used by local residents. These works will be carried out at the investor's expense.

The **operation** of the project will have a positive impact on material assets. This is because it will cause a significant increase in the commune's income from taxes.

6. Glossary

EIA	Environmental Impact Assessment.
Local spatial development plan	Legally binding document adopted by a municipal council that dictates land use and development within a specific area.
Natura 2000	A coherent network of special areas of conservation of habitats which is composed of sites hosting the natural habitat types of community interest and habitats of the species of community interest, and which enables the natural habitat types and the species' habitats to be maintained and, where appropriate, restored to a favourable conservation status in their natural range. The Natura 2000 network includes special areas of conservation of birds.
Protected area	A land and/or water area which has clearly defined boundaries, an acknowledged scientific, ecological, cultural and other value and for which a special protection and use regime/procedure has been established by legal acts.
Reserve	A protected area established for the preservation of the natural and/or cultural sites valuable from a scientific or cultural point of view, the territorial complexes and objects/properties of natural and cultural heritage located therein, the landscape, biological diversity, and gene pool. Preservation of the properties located in these areas shall be ensured without terminating economic activities therein.
Restoration site	A protected area intended for the protection, restoration, enhancement and limited use of natural resources, formerly impoverished by human activities.
Sanctuary	A protected area set up in order to preserve and conduct research of the natural or cultural territorial complexes of particular scientific value, ensure the unaffected course of natural processes or maintenance of authenticity of cultural properties, and promote protection of the territorial complexes of natural and cultural heritage. The principal designation of land use shall be established as conservational in these areas, with termination of economic activities therein.
State (national and regional) park	A large, protected area which is complex from the natural, cultural and recreational points of view and is particularly valuable, and whose protection and management is related to the designation of the area's functional and landscape management zones.
WTG	Wind turbine generator.

7. Contacts



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Appendix No. 1

