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REPORT ON THE IMPACT ON THE ENVIRONMENT

of the project named construction of a set of 16 wind plants of the same type with a capacity of not less than 2 MW each, including access roads, manoeuvring areas and power infrastructure, within Karzcinó on plots with registration numbers 13, 49, 50, 57, 58, 59, 61, 62, 63, 148/1, 150, 151, 153, 154, 155, 156, 164/1, 166/1, 28, 145, 146, 147/2 and 147/4 in the Słupsk commune

Investor: "EWG Słupsk" Sp. z o.o.
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On the basis on:

- the Act of 27 April 2001 on Environmental Protection Law (Journal of Laws No. 62, item 627, as amended),
- the Act of 27 July 2001 on the introduction of the Environmental Protection Law, the Act on Waste and on the Amendment of Certain Acts (Journal of Laws No. 100, item 1085),
- the Act of April 16, 2004 on Nature Conservation (Journal of Laws No. 92, item 880),
- the Act of 27 April 2001 on Waste (Journal of Laws No. 62, item 628),
- Regulation of the Minister of the Environment of September 27, 2001 regarding the waste catalogue (Journal of Laws No. 112, item 1206),
- Regulation of the Minister of the Environment of June 14, 2007 regarding permissible noise levels in the environment (Journal of Laws No. 120, item 826),
- Regulation of the Minister of Environmental Protection, Natural Resources and Forestry of 11 August 1998 on detailed principles of protection against radiation harmful to people and the environment, acceptable levels of radiation that may occur in the environment, and requirements applicable to radiation control measurements (Journal of Laws No. 107, item 679),

with taking into account:

- Provisions of the Mayor of the Słupsk Commune regarding the imposition of the obligation to prepare a report on the impact on the environment, and its scope, for the project entitled construction of a set of 16 wind plants of the same type with a capacity of not less than 2 MW each, including access roads, manoeuvring areas and power infrastructure, within Karzćino on plots with registration numbers 13, 49, 50, 57, 58, 59, 61, 62, 63, 148/1, 150, 151, 153, 154, 155, 156, 164/1, 166/1, 28, 145, 146, 147/2 and 147/4 - letter of 6 August 2007 with ref. number OŚ/DŚ - 7625/23/4/07,
- Field inspection and maps and information provided by the investor

was prepared a report on the environmental impact of the project named:

construction of a set of 16 wind plants of the same type with a capacity of not less than 2 MW each, including access roads, manoeuvring areas and power infrastructure, within Karzćino on plots with registration numbers 13, 49, 50, 57, 58, 59, 61, 62, 63, 148/1, 150, 151, 153, 154, 155, 156, 164/1, 166 / 1, 28, 145, 146, 147/2 and 147/4 in the municipality

1. The purpose and scope of the study

The purpose of the study is to analyse the potential impact on the environment of the intended project in the scope determined by the decision of the Mayor of the Słupsk Commune, letter of 6 August 2007, ref. no. OŚ/DŚ - 7625/23/4/07, concerning the obligation to prepare a report on environmental impact for project named construction of a set of 16 wind plants of the same type with a capacity of not less than 2 MW each, including access roads, manoeuvring areas and power infrastructure, within Karzćino on plots with registration numbers 13, 49, 50, 57, 58, 59, 61, 62, 63, 148/1, 150, 151, 153, 154, 155, 156, 164/1, 166/1, 28, 145, 146, 147/2 and 147/4.

The report was prepared with details and accuracy appropriate to the data available, resulting from the adopted design assumptions, as well as the technical parameters of the devices.

2. Description of the planned project

Wind plants belong to pro-ecological undertakings consisting in the production of energy from renewable sources. In 2006, the share of renewable energy - from water, wind, biomass, thermal water and solar radiation - in the amount of electricity sold to end users in our country amounted to 3.5%. Poland's membership in the European Union obliges us to take steps to increase this share to around 7.5% in 2010 and 12% by 2020. Therefore, renewable energy sources are becoming more and more important. They are also extremely important in the face of increasing air and water pollution, acid rain and global warming. Poland has quite large energy resources from these sources, although the possibilities of their use in various regions of the country are diverse. Wind is one of the energy sources, and wind plants are gaining more and more followers. In Europe, especially in the last few years, the most dynamically developing wind energy is developing in Germany and Spain.

Below is a chronological overview of wind plants that were built in Europe (northern part of the continent):

- 1989 Esbjerg (Denmark) - power 2 MW - single tower with a height of 57 m, blade diameter 60 m, weight of the turbine rotor approx. 67 tons; similarly in Malmo (Sweden) - a single tower with a height of 80 m, with a 3 MW aggregate, blade diameter 78 m,
- 1989 Richborough (England) - power 1 MW - single tower 45 m high, blade diameter 55 m,
- 1991 Vindeby (Denmark) - power 4.9 MW - offshore wind plant consisting of 11 units of 450 kW, located on platforms at a depth of 2 - 5 m,
- 1991 Swarzewo near Puck (Poland) - power approx. 100 kW - single tower with a 21 m diameter impeller, after 1998 additional 2 TACKE TW-600 towers for 600 kW each are operated,
- 1994 Vellinge (Denmark) - capacity approx. 3.5 MW - wind farm consisting of 34 units of 90 kW and 2 units of 200 kW each,
- 1994 Medemblik (the Netherlands), 4 offshore mills of 0.5 MW, 2 MW in total,
- 1995 Tunø Knob (Denmark) - 10 offshore mills 0.5 MW each, 5 MW in total,
- 1995 RejsbyHede (Denmark) - a farm of 40 power plants with a capacity of 600 kW each, a total of 24 MW,
- 1996 Dronten (the Netherlands) - 28 offshore mills of 0.6 MW each, 16.8 MW in total,
- 1997 Clark Wind Farm (Ireland) a farm of 25 turbines of 600 kW each, 15 MW in total,
- 1998 Sustrum (Germany) - 32 power plants of 1.5 MW, 48 MW in total,
- 1998 BockstigenValar (Sweden) - 5 offshore mills 0.5 MW each, 2.5 MW in total,
- 1998 Sylthom (Denmark) 35 power plants of 750 kW, a total of 26 MW,
- 1998 MynyddGorddu (Wales) 12 power plants of 500 kW and 7 power plants of 600 kW, 10 MW in total,

Photo 1. One of the first wind farms in Poland, Cisowo I near Darłowo - construction year 1999



- 1999 Cisowo I (near Darłowo, Poland) - 5 power plants of 132 kW, total 0.660 MW,
- 2000 Blyth (Great Britain) - 2 offshore mills of 2 MW each, 4 MW in total,
- 2001 Middelgrunden near Copenhagen (Denmark) - 20 offshore mills at 2 MW each and a total capacity of 40 MW (type: BONUS 2.0 MW)
- 2001 YttreStengrund (Sweden) - 5 offshore mills at 2 MW each, 10 MW in total,
- 2001 Barzowice (Poland) - 6 power plants, about 833 kW each, a total of 5.0 MW,
- 2001 Utgrunden Kalmar (Sweden) - 7 offshore turbines x 1.425 MW, 10 MW in total,
- 2002 Cisowo II (near Darłowo) - 9 power plants for 2.0 MW each, 18 MW in total.

Photo 2. Wind farm Cisowo II near Darłowo - construction year 2002



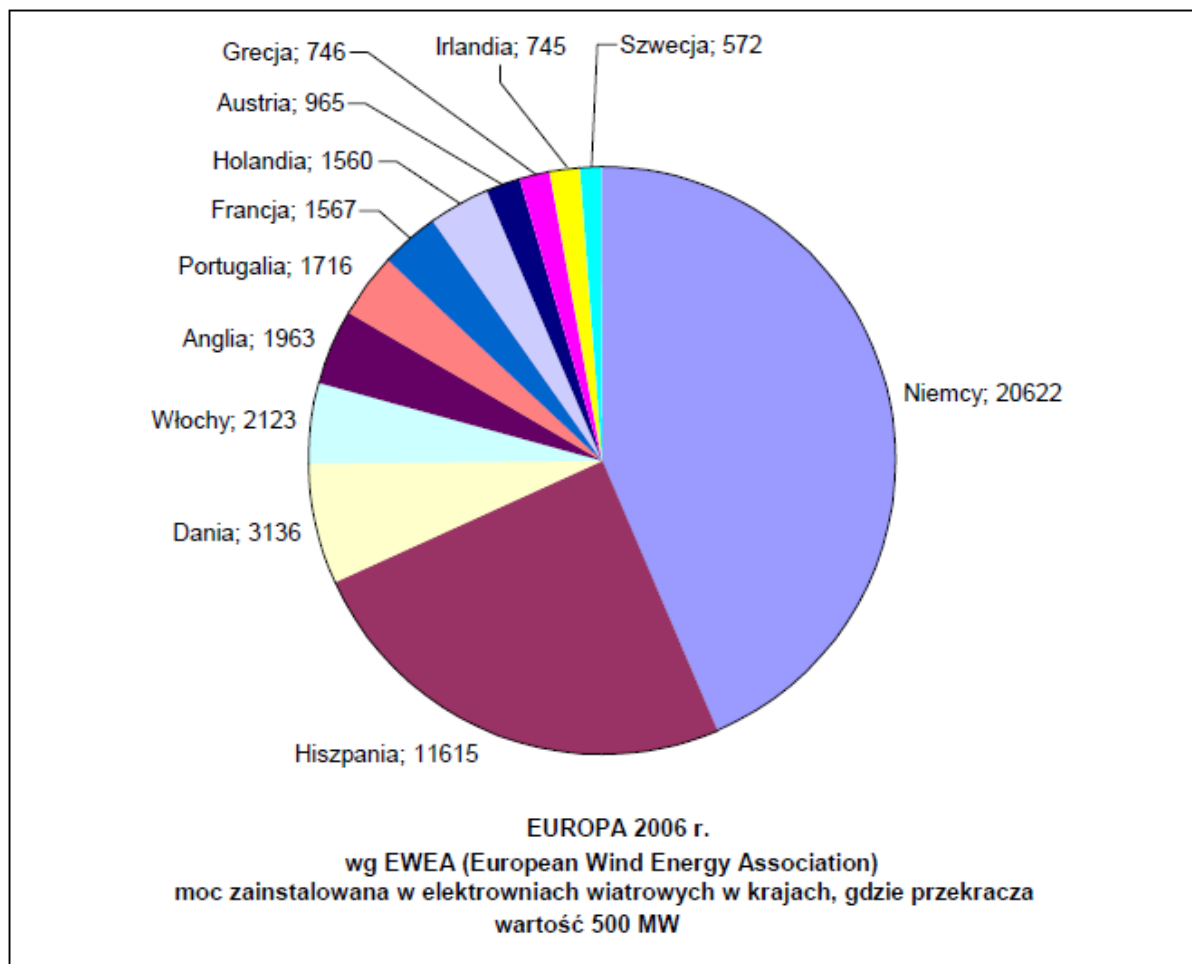
In total, in 2002 in Poland the installed capacity in wind farms was 22 MW. In January 2003,

the largest wind farm in the country, consisting of 15 power plants with a capacity of 2 MW each, which practically doubled the national potential, to a total capacity of approx. 50 MW was opened in Zagórz, Wolin commune. In the next stage, after starting the farm in Tymienie, near Kołobrzeg, opened in June 2006, consisting of 25 VESTAS V80 power plants with a capacity of 2.0 MW each, the total national capacity of wind farms reached the level of 150 MW. At the end of 2007, including Kisielice (40 MW), Kamieńsk and Jagniątkowo (30 MW each), this level increased to around 250 MW. In Europe, after 2006, the largest producers of wind energy (over 2,000 MW) are: Germany - 20,622 MW, Spain - 11,615 MW, Denmark - 3,136 MW and Italy - 2,123 MW.

Table 1. Leading countries in Europe in terms of the power output of wind power equipment (over 1000 MW), as of 1999 - 2006

State	power as of 1999	power as of 2002	power as of 2004	power as of 2005	power as of 2006
Germany	4 450 MW	8 700 MW	16 630 MW	18 428 MW	20 622 MW
Spain	1 539 MW	2 500 MW	8 260 MW	10 027 MW	11 615 MW
Denmark	1 761 MW	2 900 MW	3 117 MW	3 122 MW	3 136 MW
Italy	-	-	1 120 MW	1 717 MW	2 123 MW
Great Britain	-	-	-	1 353 MW	1 963 MW
Portugal		-	-	1 022 MW	1 716 MW
The Netherlands	-	-	1 078 MW	1 219 MW	1 560 MW

Fig. 1. Graphical representation of the power [MW] of wind farms installed in Europe (at the end of 2006)



Greece; 746	Grecja; 746
Austria; 965	Austria; 965
Netherlands; 1560	Holandia; 1560
France; 1567	Francja; 1567
Portugal; 1716	Portugalia; 1716
England; 1963	Anglia; 1963
Italy; 2123	Włochy; 2123
Denmark; 3136	Dania; 3136
Ireland; 745	Irlandia; 745
Sweden; 572	Szwecja; 572
Germany; 20622	Niemcy; 20622
Spain; 11615	Hiszpania; 11615
EUROPE - 2007 according to EWEA (European Wind Energy Association) installed capacity in wind farms in countries where it exceeds 500 MW [MW]	EUROPA 2006 r. wg EWEA (European Wind Energy Association) moc zainstalowana w elektrowniach wiatrowych w krajach, gdzie przekracza wartość 500 MW

MW	
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2.1. Characteristics of the entire project and conditions of land use in the construction and operation phase

The intention of the investor, i.e. "EWG Słupsk" Sp. z o.o. in Legnica, is a construction of 16 NORDEX wind turbines of the same type in the Karzcinno village, each with a capacity of not less than 2 MW and a tower height of 120 m ($\pm 5\%$) and a rotor diameter of up to 100 m ($\pm 5\%$). 30 kV underground cable lines will be routed from each of the power stations to the newly built GPZ 30/110 kV power station, hence the 110 kV overhead line to the transformer station GPZ 400/110 kV Słupsk - Wierzbicino. The construction of the overhead line and the GPZ station will constitute a separate project.

Karzcinno is located in the municipality of Słupsk, north-east of Słupsk, at a distance of about 10 km from its centre, north of the road no. 213 from Słupsk to Wicko in the direction of Łeba. The area for the planned wind farm set is located north-west of the buildings of the village of Karzcinno and from the road Karzcinno - Smółdzino.

Fig. 2. A fragment of the road map - a red circle indicates the place of the planned wind farm set in the area of the village of Karzcinno



The area of the Słupsk commune, in the part of the planned project, was shaped by a glacier and has a slightly wavy surface. It is located in the catchment of the river Słupia. The area covered by the planned power plant set is relatively flat, its ordinates reach values of approx. 30 m above sea level. (Owcz Góra is 31.8 m above sea level). In the northern direction, beyond the investment area, there is the Karzcinno Las with a hill (moraine hill) with a height of 53.6 m above sea level. In a straight line the distance to the sea is approx. 9 km.

The set of designed wind farms within Karzcinno will be located on nine plots, located in areas that are free of buildings and mainly used for agricultural purposes. Plots designated for

development form a relatively compact complex. They are characterized by different surfaces and irregular shapes. The area of plots designated directly for the foundation of 1 – 16 wind farms amounts to a total of about 270 ha.

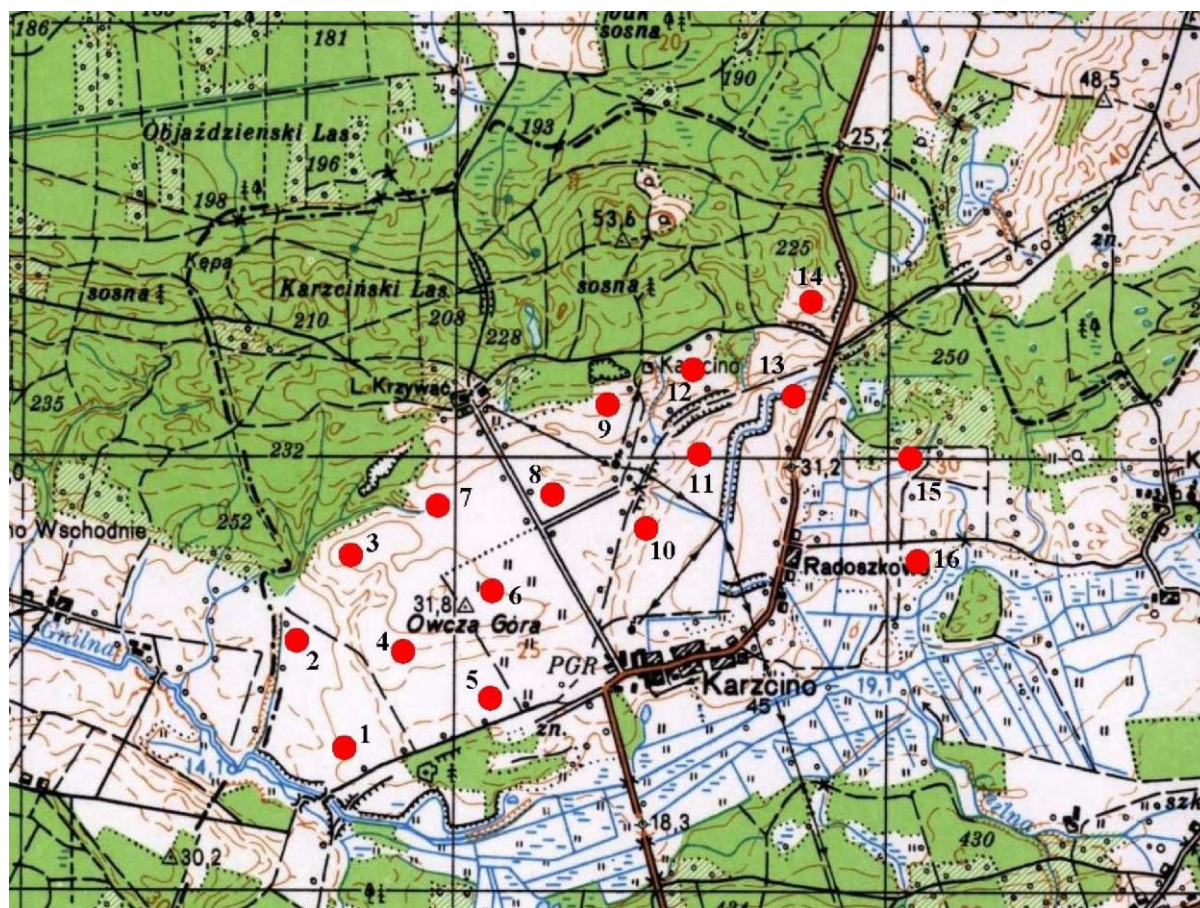
The purpose of individual plots is as follows:

- | | |
|---|-----------------------------|
| - plot no. 147/2, area approx. 105 ha | - power plants no. 1 - 5, |
| - plot no. 147/4 with an area approx. 54 ha | - power plants no. 6 - 7, |
| - plot no. 148/1 with an area 25.84 ha | - power plants no. 8 - 9, |
| - plot no. 164/1 with an area 43.46 ha | - power plants no. 10 - 11, |
| - plot no. 154 with an area 9.92 ha | - power plant no. 12, |
| - plot no. 166/1 with an area 24.69 ha | - power plant no. 13, |
| - plot no. 156 with an area 7.5 ha | - power plant no. 14, |
| - plot no. 13 with an area 0.35 ha | - power plant no. 15, |
| - plot no. 28 with an area 1.45 ha | - power plant no. 16. |

The other plots included in the application for the environmental decision of the plots, such as 49, 50, 57, 58, 59, 61, 62, 63, 145, 146, 150, 151, 153 and 155, are not designated for the power plants, but are leased by investor.

The distances between the planned terminal wind turbines plants are: in the EC system, about 2.8 km, and in the NS system about 1.7 km, maintaining the distance between them in the range of 400 - 600 m. The arrangement of the power plant is shown in Figure 3.

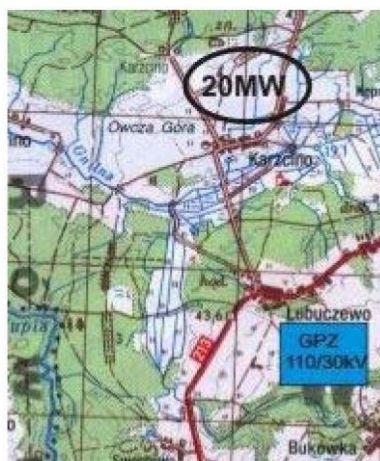
Fig. 3. Location of wind farms on the background of the topographic map of the Karzczino village



The power plants will be mounted on foundations made of reinforced concrete. The foundation of each power plant will occupy an area measuring 25 m x 25 m and an area of

approx. 625 m². The access road and manoeuvring area will be indispensable for each power plant at the stage of the wind farm operation, thanks to which it will be possible to reach the service team's equipment together with the equipment for the purpose of renovation or maintenance. The investor plans to make each of the roads in the immediate vicinity of existing local roads. The required road width is 5 m (min 4.5 m), the angle of the road is below 6%. The surface must be paved, while the power plant manufacturer recommends an access road made of crushed stone (maximum granularity 60 mm, layer thickness 0.4 m) laid on a sand foundation (a layer about 0.3 m thick), separated by a layer of unwoven fabric (silting prevention), optionally for making the top layer instead of gravel, it is allowed to use brick or concrete debris (maximum grain size 60 mm, surface area 30 mm, layer thickness 0.5 m) free of impurities such as glass, ceramics, steel or wood. An appropriate road profile is also required, with a 2-3% drop, allowing outflow of rainwater. At the implementation stage of the project, road vehicles will move along the access roads, which - taking into account the dimensions of the individual components supplied - maximum length reaches 52 m, height 5 m, maximum pressure on the vehicle axle about 16 t, maximum single vehicle weight about 165 t, pressure of a track crane about 25 t/m². It can be estimated that the area of each manoeuvring area will be about 630 m².

Fig. 4. The concept of locating the GPZ 110/30 kV substation, south of the village of Lubuczewo, for the needs of the discussed power plants set in the area of Karzcin



The towers of individual power plants will have a height of up to 120 m ($\pm 5\%$). At the top of each of them will be a nacelle with power generating and control devices. The hub of the wind turbine blades will also be located here. The diameter of the circle, which is made with shovels, for the approved type of NORDEX power plant, has been set at the level of 100 m ($\pm 5\%$). The accompanying installation will include devices matching electrical energy generated in individual generators to the MV receiving line and underground wires supplying energy to the intermediate power station GPZ, matching energy with MV voltage to the HV level (typically 110 kV), hence the HV overhead line to the area of the village of Wierzbicino, to the power station 110/400 kV. The total power generated on the site of the proposed wind power plant (2.5 MW each) will amount to 40 MW. In the area of the farm, electrical cables with a fiber optic line will be routed in detail at the stage of the construction project by underground routes, the total length of which can be estimated at approx. 9.7 km. During the implementation phase, work will be carried out on excavations for power cables and fiber optics and for foundations. Temporary roads and manoeuvring areas will be constructed for vehicles supplying power plants components (tower elements, shovels, nacelles, accessories) and devices for their installation (cranes), as well as for the supply of mechanical equipment (excavators, bulldozers, etc.). Access roads will run from municipal

roads to individual plots for the power plants. The area of the plots where the power plants will be located is approx. 270 ha, while directly occupied by the power plant's foundations will amount to 1 ha (25 m x 25 m x 16), and, as can be estimated, access roads will occupy approx. 1.7 ha (approx. 3 km x 5 m) and manoeuvring areas 1 ha (630 m² x 16).

The investor predicts that the materials necessary to make access roads and manoeuvring areas (including gravel and rock crushed stone) and to make foundations for the power plant (including reinforcement steel and concrete) will be delivered to the construction site in batches as needed, with possibly closest to wholesalers or labels.

During the operation phase of the project, the area around the power plant will be used in accordance with the original purpose, i.e. as an agricultural area. The investor does not plan to enclose areas around individual towers of wind farms.

2.2. The main characteristics of production processes

The technology of generating electricity using wind farms and putting this energy into the network is based on following transformations and phenomena:

- aerodynamic - the transformation of energy carried by the wind into rotational motion of the rotor (blades, power plant propellers)
- electromagnetic - conversion of mechanical energy (rotation of the rotor) to electrical energy (power generator),
- power engineering - conversion and electrical adaptation (voltage, frequency and phase) to the receiving network (e.g. transformer station GPZ) and energy transmission by a line supplying the network,
- electronic - use of electronic circuits to control the work of the team, measurements, control and registration (including remote data transfer).

Depending on the type of power plant, there is also used mechanical transformation - it is based on adjusting the rotor speed to the generator's rotations (gearbox increasing the speed - the so-called transmission).

The accompanying systems that may accompany the wind power plant's power generation set are:

- a system that sets the rotor on the wind direction,
- lightning protection system (lightning arrester) requiring grounding,
- generator cooling system (optionally with the use of a coolant),
- gear cooling system, with gear oil (in power plants of this type),
- brake (optionally hydraulically assisted, with brake fluid).

The basic structural elements that make up the wind power plant are as follows:

- underground foundation (optionally: piles, slab, slab with piles) with plinth, protruding above the ground, for fixing the tower,
- a tower (tubular multi-section, steel or concrete),
- nacelle-head (inside, generator, transducers, control motors, etc.),
- hub with rotor blades.

The power of wind power plants can be divided according to the following ranges:

- from 1.0 to 10 kW includes small installations cooperating with batteries,
- from 100 to 200 kW and from 600 to 3000 kW applies to the most common sources of electricity introduced into the power grid, also cooperating with small hydro or diesel power plants,
- from 3 to 5 MW - highly technically advanced - large wind farms included in the grid or as independent energy sources, used most often in places with very favourable wind conditions (e.g. sea farms) and where there is a large local demand for electricity.

The nominal power of a particular blade with a specified diameter is determined at a certain

wind speed, usually 9 - 12 m/s. The plant is also characterized by the scope of work. The upper and lower wind speed limit at which the power plant works is determined. The lower limit is a speed of approx. 3 - 5 m/s, above which the generator is switched on and the upper limit of approx. 20 - 25 m/s at which the plant is immobilized.

Table No. 2. Selected parameters of the power plant with similar capacities from the 1.2 MW - 2.5 MW range

Item	power plant type	maxim power [MW]	power of a small generator [kW]	tower height [m]	blade diameter [m]
1	NORDTANK (DK)	1,5	750	50/60/68	64
2	NORDEXN80 (D)	2,5	-	60/80/100	80
3	AUTOFLUG A 1200 (D)	1,2	250	60	61
4	ENERCON E-70 (D)	2,0	-	80/98/112	70
5	TACKETW 1,5 (D)	1,5	-	67	65
6	VESTASV80 (DK)	2,0	-	80/100	80

Photo 3. The profiles of typical wind farms with the power range of 1.2 - 2.5 MW



Manufacturers of wind power plants provide detailed technical data for each type separately, including shown in Table 2. Profiles of the power plants included in table are shown in Photo 3.

The success of a project depends primarily on the strength of the wind at the location of the device (this factor occurs in the third power). The relationship between the size of energy, and wind speed is as follows:

$$P = 1/2 C_p \lambda \rho A V^3$$

where: P - obtained power,

C_p - energy conversion factor (different for individual types of devices),

ρ - air density,

A - surface covered by a rotor,

V - wind speed

In the technical solutions used so far, there are distinguished following wind turbines:

- constant rotor speed and one generator nominal power,
- constant rotor speed and switched capacities (with double winding of the generator),

- with smoothly variable rotor speed (within certain speed limits, the energy produced varies infinitely in proportion to the wind force).

Wind power plants usually work in the automation system and are controlled electronically (possible is their remote control). Such a regime of work does not require constant operation of the plant, but only periodic inspections and maintenance.

The investor's intention is to build a NORDEX N90 power plant set, each with a capacity of 2.5 MW.

The basic technical parameters of this type of power plant, according to the manufacturer's data (NORDEX, "Technical Description", 2006.09.20), are as follows:

- rated power: 2,500 kW, achieved at wind speeds of approx. 13 m/s,
- diameter of the rotor arms range: 90 m,
- series of towers with heights: 60/80/100 m,
- the principle of the power plant operation: mechanical transmission, power generation at variable rotor speed,
- rotor: three-armed with adjustable blade turning, setting the wind direction in an active way,
- area covered by the reach of the arms: 6 362 m²,
- the material from which the blades are made: epoxy resin,
- total shoulder length 43.8 m,
- rotor speed range, rotational speed: 9.6 - 16.9 rpm,
- blade turning adjustment: 0.5°/s in the electronic control system,
- working conditions: wind speed 3.0 - 25.0 m/s,
- remote monitoring, Nordex Control 2 system.



Photo 4. NORDEX Power plant

The principle of generating energy and its transmission

The NORDEX N90 power plants belong to the type of wind turbines generating electricity at variable rotor speeds. Power regulation is carried out by changing the angle of the rotor arms. Each of the blades of the power plant propeller is individually screwed in such a way that optimum working conditions are maintained, taking into account the current wind pressure. In the nacelle's rotor axis there is a shaft that carries rotational energy to the boost gear with 9.6-16.9 rpm to the range of 740 - 1 310 rpm.

In a generator operating on the principle of an asynchronous alternating current generator, within the limits of the above mentioned rotation speed range, a three-phase voltage of 660 V and 50 Hz is generated. This energy, through the transformer of the power plant, in the form of a free-standing container station with dimensions of 3,1 m x 2,4 m x 2,7 m, increasing the voltage up to 30 kV and through a network of underground cables, is supplied to the GPZ station, from where, after increasing the voltage to 110 kV, is fed into the power grid. The guidance system, when analysing wind speed and direction data on an ongoing basis, sets the power plant rotor, by rotating the nacelle, to the direction of the wind and sets the blade turning angle depending on the wind power.

Automatic control (Nordex Control 2) consists in collecting and analyzing data from, among others temperature sensors, energy status of electrical devices, etc. Data on registered

parameters are stored in the computers' memory, placed in individual power stations, to which remote access is possible, from virtually anywhere, thanks to the integration of computers into the Internet.

The system is configured in such a way that it enables not only the adjustment of a single power plant to work in the electrical network receiving the generated energy, but also can control the operation of several wind farms. The response to the information received from the network may be, for example, turning off the given power plant. Such situations may occur in the event of a short circuit at the receiving end. In a controlled manner, the given power plant is connected to the network again. Other disconnection situations from the power plant network include atmospheric conditions, such as exceeding the wind speed above the threshold value allowed for a given power plant. Control parameters are programmed in the control system that disconnect the power plant depending on, among others duration of exceeding the set wind speed limit threshold, with short-circuits as well as electric discharges, breaks on transmission lines or other failures.

2.3. Expected types and quantities of pollution resulting from the operation of the planned project

The operation of wind farms will not be a source of pollutant emissions to the air. Also in the normal operation phase, power plants will not be a source of pollutant emissions introduced into surface and underground waters and into the ground. Generated waste will include used transmission oils, hydraulic fluids and coolant. Waste will also be consumed elements such as brake linings, bearings, etc. The operation of the engine room will be accompanied by noise emission, the coverage of which will include the nearest areas adjacent to the power plant.

3. Description of environmental elements of the environment, covered by the expected environmental impact of the planned project

The surface of the earth, vegetation, natural and landscape values

The Act of 27 July 2001 on the introduction of the Act - Environmental Protection Law, the Act on Waste and the amendment of certain acts introduced the concept of landscape values into the Act on Nature Conservation. This means the ecological, aesthetic and cultural values of the area and related natural elements, shaped by the forces of nature or as a result of human activity.

The area designated for the planned wind plants is located north of the buildings of the village of Karzcinio. The total area of plots where the power plants set will be located is approx. 270 ha. The area is currently used agriculturally. According to the registration maps of the area of Karzcinio, RIVa and RIVb class soils predominate within the boundaries of the project (medium quality soil), and there are also RV (weak soils) and N (wasteland) soils. It is planned that the area of approx. 3.7 ha will be occupied for direct functions related to the foundation of the power plants, as well as for access roads and manoeuvring areas, which constitutes approximately 1.4% of the total area of plots covered by this investment. The area in question is free of buildings and used for agriculture (one-year crops prevail). There are small shrubs and bushes along the field roads and at the sides.

Photo 5. The place of the planned location of wind farms - view from Karżcino village



The area covered by the project is located in the valley of the Gnilna River (12 km long), the right tributary of Słupia. The investment area borders with Gnilna from the south. The River Słupia flows to the west of the planned wind farm complex, while on the eastern side the Łupawa River is fed by the Brodniczka River, situated on the extension of the Gnilna valley. Between the Gnilna and Brodniczka there is a bifurcation zone - the watercourses in this zone supply the second river once depending on the hydrological conditions. The flowing water network complements the system of drainage ditches, located mainly to the south of Karżcin, i.e. on the section between Karżcin and Lubuczew. The Gnilna river valley creates a landscape with broad perspectives in the latitudinal system. On the northern side, the landscape closes with a forest complex and a string of head moraines following it, whereas from the south there is clearly visible edge of the moraine plateau, from which there is a view of the whole valley and village buildings. In "Studium uwarunkowań i kierunków zagospodarowania przestrzennego gminy Słupsk - strategia rozwoju, polityka przestrzenna" (Annex to the Resolution of the Słupsk Commune Council of December 30, 2004), this area is marked as a location offer for wind farms.

The area in the region of the project has no higher natural values. The plant and animal world is represented by widely occurring species. The occurrence of specimens subject to species protection in this area is not documented. The area in question is not covered by any form of protection, such as a national park, nature reserve, landscape park, protected landscape area, Nature 2000 site, documentation sites, nature and landscape complexes, and plants, animals and fungi species protection.

The lists of nature monuments in the Słupsk commune include:

- individual specimens of pedunculate oaks, with trunk circumferences 610 cm, 440 cm and 370 cm and registration numbers respectively 259, 260 and 261, located in Karżcin in the meadows of the former state farms,
- beech, single beech and a group of three trees, with tree trunks of 420 cm and 255 cm, 110 cm and 100 cm, registry numbers 262 and 263 respectively, located in the forest near the road Karżcino - Gąbino (branch 203 of Wrzeście Forest District),
- pedunculate oak with trunk circumference of 440 cm and registry number 264, located by the road Karżcino - Gąbino (branch of the Radwanki Forestry 225),
- green brigade with a trunk circumference of 440 cm, registry no. 517, located in Karżcin in

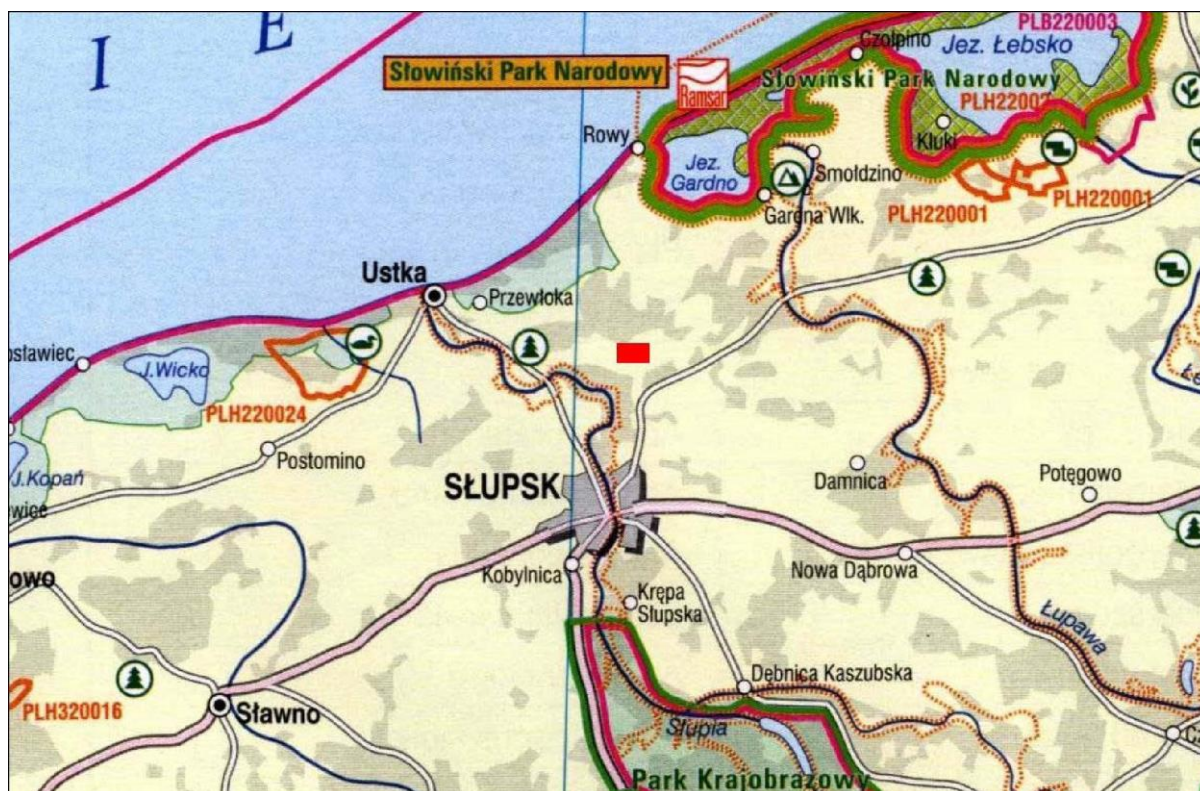
a court park,

- red oak, circumference 368 cm, registry number 518, located in the park of the court above,
- pedunculate oak, circumference of 400 cm, registry no. 519, located in the park of the court above,
- a group of three beech trees, circumference of 291 cm, 259 cm and 256 cm, located in a court yard as above,
- a group of four common oaks, a circumference of 507 cm, 493 cm, 485 cm and 375 cm, located in a court yard as above.

Nature 2000 areas

The closest area of the planned investment in regard to Natura 2000 site is the area of protection of habitats PLH220036 Dolina Łupawy. It is located approximately 6 km to the east of the borders covered by the project. A fragment of the map with areas from the Nature 2000 network is shown in Fig. 4. According to the Standard Data Form (M. Miller - Park Krajobrazowy Dolina Słupi; B. Utracka-Minko; Stowarzyszenie Proekologiczne Słupia, Słupsk; Z. Osadowski - Stowarzyszenie Zielone Pomorze; Instytut Ochrony Przyrody PAN Kraków), the area of this region is 5508.63 ha. It includes the valleys of the Łupawa and Bukovina rivers from the outflow from the Jasiień Lake. Its natural boundaries include deep river beds, spring beds and small streams (tributaries), vast swollen foothills on the slopes of the valley, oak and hornbeam forests in many ravines and beech forests as well as waterlogged meadows, transitional bogs and high and dystrophic lakes in out-flow areas. Taking into account habitat classes, the extent of habitat coverage is as follows: 38% - forests, 18% - meadows and pastures, 17% - mixed forests, 12% - broadleaf forests, 7% - arable land, 4% - agricultural areas with a large share of elements natural and water reservoirs.

Fig. 5. Map of protected areas NATURE 2000 - the area of location of wind farms in the area of the village of Karzczino is marked with a red rectangle



The following habitat types listed in Annex I occur here: lowland and mountain fresh meadows used extensively (code 6510) - 23% coverage, willow, poplar, alder and ash marsh (91E0) - about 12%, transition mires and quaking bogs (7140) - about 7%, acidic beech forest (9110) - about 6%, sub-Atlantic forest (9160) and hard water lakes - and meototrophic water reservoirs with underwater Characea meadows (3140) - about 5% each, mountain and lowland alkaline peat bogs the type of hammer, sedges and moss (7230) and lowland and submontane rivers with Rununculionfluitantis (3260) - about 3%, oxbow lakes and natural eutrophic water reservoirs with communities of Nympheion, Potamion (3150), flooded muddy river banks (3270), moribund molinia meadows (6410), mountain herb and riverside herbaceous (6430), peat substrate depressions with vegetation of Rhynchosporion (7150), limestone sources with Crateneurion commutati (7220) - less than 1%. 22 species of birds listed in Annex I of the Council Directive 79/409 / EEC are observed within the area of the area, including the black stork Ciconia nigra, the white stork Ciconia ciconia and the honey buzzard Pernis ptilorhynchus. Regular migrating birds not listed in Annex I of the Council Directive have been recognized as 5 species, such as Teas, Anascaucoma, Teas, Anasquimula, Bucephala clangula, Merganser, Mergus merganser and Tringa ochropus. MAMMALS listed on Annex II of Directive 92/43/EEC is Castor fiber European beaver and otter Lutra Lutra, amphibians - Triturus cristatus great crested newt, and fish - Lampetra planeri brook lamprey, river lamprey Lampetra fluviatilis, Atlantic salmon Salmo salar, bullhead and goat Cobitis taenia and Cottus gobio.

Areas such as hydro-engineering works, cessation of use (grazing or mowing) of meadows and soligenous peatlands, intensification of forest management, cutting out of trees, especially on steep slopes of the valley, ravines and springs, as well as localization within the area and in its vicinity were considered to be threats to the investments area causing pollution of waters.

Other areas located in the vicinity of the Natura 2000 network and visible in Fig. 5 are located in the north-east and east directions at a distance of approx. 10 km Ostoja Słowińska PLH220023 and PLB220003 (cover Słowiński National Park) and PLB990002 Coastal waters of the Baltic Sea, south-west at a distance of about 16 km PLB220002 Dolina Słupia and westbound at a distance of about 19 km PLH220024 Przymorskie Błota. The location of the above-mentioned areas in relation to the planned project suggests that the impact on these investments can be considered negligible.

Atmospheric air

Air quality assessment is carried out for zones, i.e. the city area and agglomeration with population of over 250,000 and the area of the powiat not included in the agglomeration. On the scale of the Pomorskie Voivodeship, the zone is the Słupsk powiat marked - according to the Nomenclature of Territorial Units for Statistical Purposes - with the code 4.22.28.12. The area in question is within the boundaries of this zone. In terms of health protection, as well as in terms of plant protection, the zone was classified by the State Environmental Protection Inspection ("Ocena roczna jakości powietrza w województwie pomorskim za rok 2006", Provincial Inspectorate for Environmental Protection in Gdańsk, Gdańsk 2007) as Class A. Class A means that the concentration level does not exceed the limit values and there is no need to take the required action. The classification for health protection includes such indicators as sulphur dioxide SO₂, nitrogen dioxide NO₂, particulate matter PM₁₀, lead Pb, benzene C₆H₆, carbon monoxide CO and ozone O₃, whereas in the field of plant protection sulphur dioxide SO₂, nitrogen oxides NO_x and ozone O₃. Therefore, the air quality in the zone area was considered good.

Acoustic climate

Significant - in terms of noise - sources of impact on the environment are road communication routes and they determine the quality of the acoustic climate in this part of the Słupsk commune. The range of influence of communication noise depends, among others, on traffic and vehicle speed. The State Environmental Protection Inspection conducts research and assessment of acoustic climate in terms of road traffic noise. SEPI opinion concerns the national road no. 6 from Szczecin to Gdańsk. Noise levels in the environment along this road, according to data for 2004-2005, fluctuated in the daytime (6:00 – 22:00) in the limits of 61.4 - 61.7 dB, and at night (22:00 – 6:00) 56.9 - 58,8 dB, with a traffic volume of 8,000 - 12,000 vehicles per day. The discussed area is about 10 km away from this road. In the vicinity of the area covered by the venture runs the poviato road from Lubuchewo to Smolczyno. It is characterized by significantly lower traffic volume than on national road no. 6, hence it was not the subject of SEPI research. It can be estimated that the road noise around it does not exceed the permissible values in the residential and farm buildings, i.e. 60 dB daytime level and 50 dB at night, with ranges ranging from a few to a dozen or so meters from the road's edge. The implementation of the project will change those conditions, as there will be industrial sources of noise in the form of wind farms.

Electromagnetic radiation

Electromagnetic radiation is a natural phenomenon in nature and is associated with sources commonly found in the environment, while as a result of human activity and technological progress, artificial electromagnetic fields are created. They are part, among others of information transmission systems, including radio and television, medical devices, household appliances, etc. and power lines. Under environmental law, emission of electromagnetic fields is environmental pollution of the same importance as waste generation or emission of gases and dust to the air. In the immediate vicinity, there are no transmitting objects or relay stations, whose electromagnetic interaction should be taken into account in connection with the analyzed project. However, an overhead power line with a rated voltage of 15 kV passes through the area of the planned project, the risk of which does not occur.

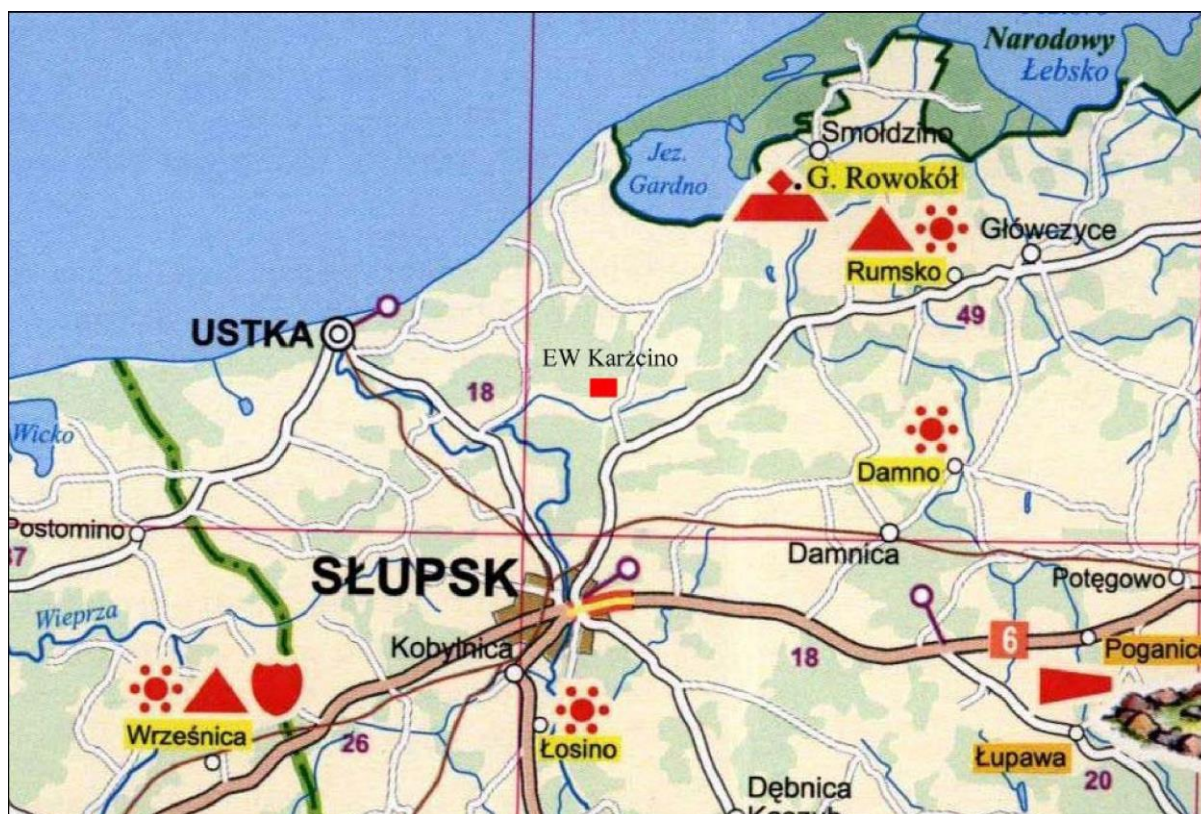
For the wind farms in question, the energy collection would be carried out by a medium voltage (about 30 kV) network, made with underground cables. The investor predicts that the transformer station GPZ 110/30 kV and the 110 kV overhead line will be required to receive energy, which will be the subject of a separate project.

4. Description of protected monuments in the vicinity or in the immediate range of the impact of the planned project under the provisions on the protection of monuments and the care of monuments

No information was received to include monuments protected under the provisions on the protection of monuments and the care of monuments in the immediate scope of the planned project.

The location of the most valuable archaeological monuments in the area of the country in the area of Słupsk and the space designated for the discussed project are shown in Fig. 6.

Fig. 6. The most valuable archaeological monuments in the whole country in the area of Słupsk and the place of EW Karzczino investment (red rectangle)



The above figure does not include, among the main in the Słupsk powiat, settlements near the village of Machowino (late medieval and modern), the village of Lękwica (Lusatian Pomeranian culture and VII - IX century and Lusatian culture and early medieval period) and the village of Wiklino (Lusatian and Pomeranian culture and the late medieval period as well as the late Roman period of Roman influence), located outside the area of the planned investment. The national register of monuments includes - located in the neighboring town of Karzczino - a warehouse from 1863 and a stable (no. A-826). They are beyond the reach of the projected wind farm set.

5. Description of the analysed variants of the planned project, including the variant consisting in the project inaction and the most favourable for the environment, along with the justification of their choice

The land development project includes one variant of the project, concerning the construction of 16 wind power plants in the areas located to the north of the village of Karzczino, by the road from Lubuczew to Smołdzino. The power plants will be located in an area of approx. 2.8 km in length and 1.7 km in width, maintaining mutual distances between devices of the order of 400 - 600 m. The foundation of each of the mentioned power plants provides for the occupancy of a square in the shape of a square side 25 m and area 625 m². The concept of detailed location of devices is shown in Fig. 4. A 5 m wide road (min. 4.5 m) will be allocated to each power plant to provide access for the service team and a manoeuvre area with an area of approx. 630 m². The investor assumes driving roads from the nearest paved roads. Variant solutions concern technical parameters of devices: tower height up to 120 m ± 5%, rotor diameter up to 100 m ± 5%.

Failure to take the planned project, i.e., discontinuation of the investment consisting in the

construction of wind farms, will result in an increase in the emission of harmful pollutants from other conventional energy sources, primarily from coal-fired power plants.

From one small wind farm with a nominal power of about 660 kW, such as "Cisowo I" near Darłowo, annual energy production is estimated at approx. 1200 MWh, which balances the energy demand for approx. 400 households. Saving for the environment in this case is, among others 432,000 kg of unburnt coal or 480,000 litres of crude oil. Combustion of fuels on the above scale is accompanied by emissions of atmospheric pollutants such as carbon dioxide in the amount of 1 336 000 kg and sulphur dioxide in the amount of 8 520 kg. For a given carbon dioxide emission, this corresponds to the unloading of the area of 185 ha of forests. The wind farm complex planned to be built in the Karzćino area with a total capacity of 40 MW is to produce - according to the investor's expectations - about 80,000 MWh of energy per year, which will result in a correspondingly higher, approximately 65-fold environmental benefit.

Demand for electricity (industry, households, exports) should be satisfied taking into account the lowest possible environmental damage, i.e. in accordance with environmental protection regulations aimed at sustainable development. Unconventional, renewable energy sources meet this challenge.

Another aspect includes the economic benefits that the implementation of the discussed project can bring for the local community. Lease of land and taxes will be a source of income, which should have an impact on the improvement of the situation in the commune. During the construction period there will be the possibility of occupational activation of residents in the sphere of, for example, the provision of services, this may have a continuation during the operation of the wind farm. Failure to undertake the undertaking will favour the consolidation of the state of apathy in the rural areas covered by relatively high unemployment.

6. Determination of the expected environmental impact of the analysed variants, also in the event of an extraordinary threat to the environment

In the area of the potential impact of the investment, i.e. in the vicinity of the discussed wind power plant set, located north of the buildings of Karzćino, there are:

- from the north - forest areas,
- from the east - agricultural and forest areas,
- from the south - agricultural and forest areas and buildings of the village of Karzćino and behind them the road from Lubuczew to Smółdzino,
- from the west - agricultural and forest areas.

Protected areas in accordance with environmental protection regulations and potentially exposed to the burdensome impact of the planned investment are the areas of the nearest residential and farm buildings of the above-mentioned village.

The factors, considered in this report, which may worsen the state of the environment in connection with the intended undertaking, are:

- noise emission,
- electromagnetic field,
- disturbing the landscape,
- waste production,
- emergency situations.

Their impact will affect people, animals, plants, land surface, landscape, and in the event of a major accident, also the water and soil environment. Other elements of the environment, such as surface water, air, climate, material goods and monuments, taking into account the interactions between these elements, are not threatened due to the location of the project and the type of intended activity.

The locations of the discussed investment, as well as the scale of the project and the estimated emission levels, do not indicate the possibility of cross-border impact on the environment.

7. Analysis and assessment of possible threats and damages to protected monuments under the provisions on the protection of monuments and the care of monuments, in particular archaeological monuments, within the area where the project is to be implemented

Due to the fact that no information was received that within the area where the project is to be implemented, there were monuments protected under the provisions on the protection of monuments and the care of monuments, and in particular archaeological monuments, the analysis and assessment of possible threats and damages was omitted in this regard. However, if during carrying out earthworks or construction works an object capable of presenting archaeological value was encountered, all works that could contribute to the damage or destruction of the monument should be stopped, along with the place of discovery, as well as immediately informed about the finding of the proper monument restorer or at least the community head.

8. Justification of the variant chosen by the applicant, with an indication of its impact on the environment, in particular on people, animals, plants, land surface, water, air, climate, material assets, monuments, landscape, and the interaction between these elements

The offshore, from Szczecin and Świnoujście to the Tri-City, and the north-eastern edge of Poland in the Suwałki region are characterized by an extremely favourable distribution of wind speed and energy in the country. The investor planning the project in the municipality of Słupsk was primarily guided by favourable wind conditions in the discussed area, deciding on the profitability of the investment. The investor is planning to erect a set of 16 wind farms NORDEX type N90 with a capacity of 2.5 MW each. The location of the power plant was determined in the land development plan, taking into account the terrain and the anticipated acoustic impacts of the power plant on the housing under construction, mainly housing and farm, as well as the required mutual distances between the devices.

The impact of the investment on the existing acoustic climate will occur both during its construction and operation. At the construction stage, the source of noise will be primarily highly specialized mechanical equipment (road machines, excavators, bulldozers, cranes and other equipment) necessary for the installation of the power plant and, to a lesser extent, vehicles supplying the construction site with building materials (reinforcement, cement, structural elements, etc.). Vehicle exhaust systems will be the source of pollutants entering the air. The level of emissions in this area will depend, among others, from the time that equipment has been in operation. At the end of construction, potential nuisances will cease. During the operation of the wind farm there will be no sources of air pollution, and the individual power plants will be a source of noise.

The impact on the earth surface will occur mainly during the construction phase during earthworks. Each construction of power plant, as well as cabling, will be accompanied by

excavations. The use of construction equipment for these works will require the preparation of temporary access roads and manoeuvring areas. With the completion of the work, the impact will cease. The implementation of the wind farm will to some extent disturb the existing water relations in the water and ground environment, but at the stage of exploitation of the project, a new state of equilibrium will be established. A comparable range of impact will also apply to the landscape. Impact on people and fauna will occur at the park's operation stage, while the range of impact has been taken into account when drawing up the site development concept, through the appropriate location of the wind park away from, among others places of residence. A description of potentially significant environmental impacts of the planned project is discussed in the next chapter.

9. Description of potentially significant environmental impacts of the planned project, including direct, indirect, secondary, cumulative, short-, medium- and long-term, permanent and temporary environmental impacts resulting from the existence of the project, use of environmental resources and emissions, and a description of forecasting methods applied by the applicant

9.1. Noise emission

Noise is regulated by the Regulation of the Minister of the Environment of June 14, 2007 on permissible noise levels in the environment. It specifies different permitted noise levels for sites depending on their purpose, noise levels taking into account the type of site or activity being the source of noise, as well as the periods (reference periods) to which the noise levels apply. Among the objects and activities that are the source of noise, the following have been distinguished:

1. in one group:
 - roads or railways,
 - other objects and activities that are a source of noise,
2. in the second group:
 - take-offs, landings and flights of aircraft,
 - power lines,

Noise from the wind park area is included in the group of other facilities and activities being the source of noise.

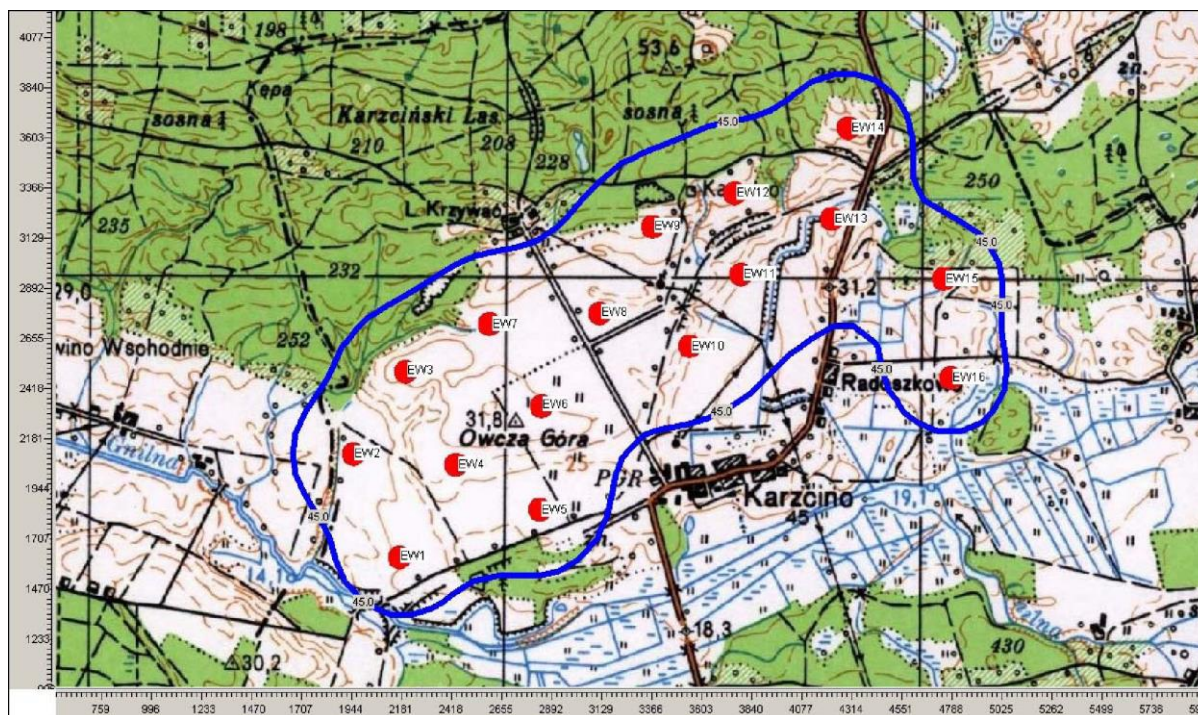
The regulation contains indicators applicable to setting and controlling the conditions of using the environment (LAeq D and LAeq N) and conducting long-term policy in the field of protection against noise (LDWN and LN). According to the above the protection provision is subject to areas of multi-family housing and collective housing, farm buildings and residential and service areas, where the acceptable noise levels are in the daytime LAeq D = 55 dB and at night LAeq N = 45 dB, where LAeq D corresponds to a reference range of the least-favourable 8 for the next day's successive days, LAeq N is a reference interval equal to 1 least-favourable hour of the night.

To estimate the degree of nuisance of wind farms in the environment, a forecast of sound propagation was made. For the calculations there was used the computer program LEQ Professional developed by Biuro Studiów i Projektów Ekologicznych oraz Technik Informatycznych Soft-P in Piotrków Trybunalski with the approval of the Institute of Environmental Protection (BH/158/95). In the relation between the noise emitted from the power plant and imitated in the adjacent area, the following elements were included in the sound propagation, taking into account the nature of the source, reduction of noise along with distance, shielding by acoustic obstacles, attenuation through green areas, sound absorption by air. As a result of the calculations, the levels of noise from the power plant and the range

of its impact on the environment were determined.

The acoustic plan regarding the noise penetration into the environment from the planned wind power plants set, type NORDEXN90 2.5 MW, is shown in Fig. 7.

Fig. 7. Acoustic map depicting the range of noise impact from 16 wind farms in the area of the village of Karzcin - blue line illustrates the value of 45 dB



The limit value for the night (more stringent from the point of view of environmental protection) is illustrated by 45 dB insulation - the red line in the figure above. The range of isoline is about 300 m counting from each extreme within the power plants set and does not include areas subject to the protection of farm and residential buildings.

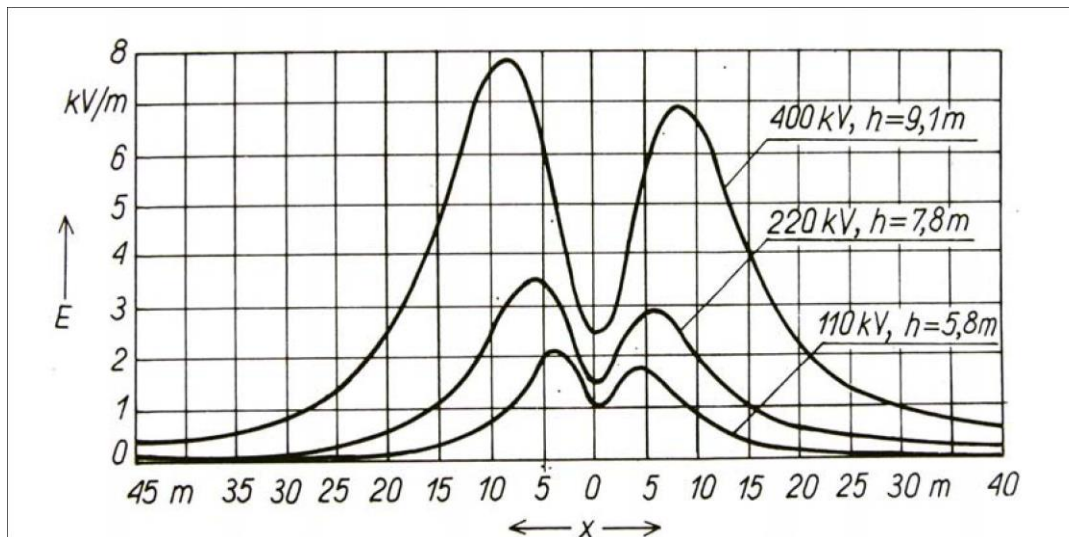
9.2. Electromagnetic radiation

Permissible level of electromagnetic non-ionizing radiation allowed in the environment is specified in the Ordinance of the Minister of Environmental Protection, Natural Resources and Forestry of 11 August 1998 on detailed principles of protection against radiation harmful to people and the environment, acceptable levels of radiation that may occur in the environment, and requirements for performing radiation control measurement. Pursuant to this regulation, the permissible electromagnetic radiation values for 50 Hz fields produced by stations and power lines are determined by the values of such physical quantities as:

- electrical component of the 10 kV/m field,
- magnetic field component 80 A/m.

Currently, the area designated for the project is intersected by the 15 kV overhead power line. Lines with a voltage lower than 110 kV (15 - 30 kV) produce fields of negligibly low intensity and hence they are not taken into account in the regulations on environmental protection.

Fig. 8. Distribution of field intensity under power lines at various distances "x" from the axis



kV/m	kV/m
400 kV, h=9,1m	400 kV, h=9,1m
220 kV, h=7,8m	220 kV, h=7,8m
110 kV, h=5,8m	110 kV, h=5,8m

Through the area of the investment will run the underground energy line SN (about 30 kV), from which the values of electromagnetic fields are not analyzed, as they are many times lower than the permissible values.

Electricity from the wind farm near Karzćino will be discharged to the intermediate power station GPZ 30/110 kV, hence the 110 kV overhead power line to the 110/400 kV power station in the village of Wierzbicino, where the power lines and GPZ will be a separate undertaking.

9.3. Disruption of the landscape

The foundation of sixteen wind power plants will change the aesthetic values of the agricultural landscape. The impressions related to this will have a subjective character. Negative feelings will have supporters of an unhampered natural landscape. In this case, it should be assumed that wind farms will be the dominant element of the landscape due to the height of the masts (up to 120 m \pm 5%). The total area of plots earmarked directly for the power plant is approx. 270 ha. It follows from this that on average 1 wind farm will fall on about 17 ha. The distances between the extremes of newly designed power plants will reach respectively: in the EC system, approx. 2.8 km, and in the NS system, approx. 1.7 km, while maintaining mutual distances between them in the range of 400 - 600 m. Positive feelings can include with the observation of harmonious movements of propellers (a fascination comparable with that concerning fire or water), slender building figures, or the availability in the poor rural region of the most modern techniques for obtaining energy from renewable sources. It is important for visual reasons to determine for all power plants the same direction of rotation of the rotors and to set the same rules for painting them. The NORDEX N90 power plants have one direction of rotation (clockwise).

9.4. Waste generation

NORDEX N90 2.5 MW wind turbines have been designed with a mechanical gear, hence

transmission oil will be used to lubricate the rotation mechanisms. The oil will also be used in the shaft lubrication system, as well as in the cylinders used to rotate the gondola and adjust the blade angle. When replacing such oils, waste from group 13 of the waste catalogue classified as hazardous will be generated. In the hydraulic system of one power plant, oil will be used in an amount of approx. 160 dm³, in a transmission system of approx. 80 dm³. If the NN/MV transformers installed in the power plants nacelle are selected in the "dry" version or filled with oil in a non-replaceable system, then no waste from used transformer oil, which also belongs to hazardous waste, will be generated.

The types of waste planned for production at the operational stage and the corresponding codes are presented in Table 3. The symbol * indicates hazardous waste.

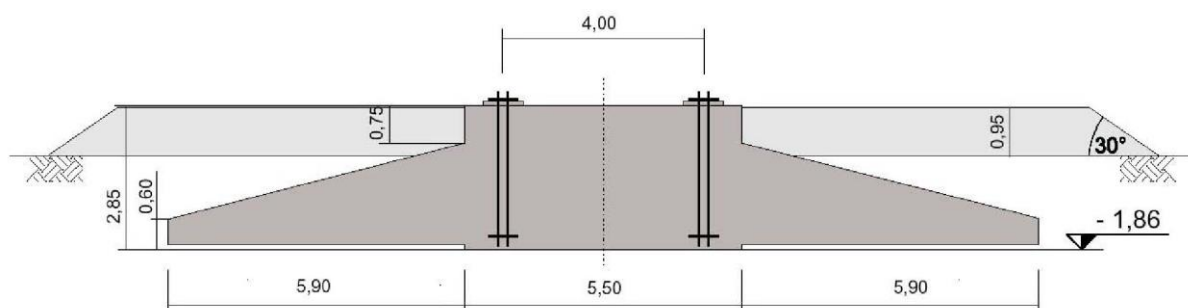
Table No. 3. The types of hazardous waste expected to be produced

Item	type of waste	waste code
1	hydraulic oil	13 01 13*
2	gear oil	13 02 08*

Guided by operational information about existing wind farms, it is to be expected that for the designed power plant team, the average amount of hazardous waste generated during the period of equipment usage should not exceed approx. 0.8 Mg/year. In accordance with the Act on waste, a producer of waste generated as a result of providing services in the field of, maintenance and repair of equipment is the entity that provides the service, unless the contract for the provision of services provides otherwise.

At the stage of investment implementation, waste of building materials and elements may occur at once, including those marked with code 17 01 01 and 17 01 82, such as waste concrete, reinforcement and other not mentioned waste. It can be estimated that their number will not exceed 1.6 Mg (after 0.1 Mg for the power plant).

Fig. 9. Cross-section of a typical circular foundation with a diameter of 17 m for a wind turbine with a tower about 100 m high



The earthworks will be accompanied by waste in the form of soil from excavations marked with code 17 05 04. The quantities of soil from excavations can be estimated as follows:

- for the foundations of the power plant - approx. 8000 m³,
- for cables - approx. 4900 m³,
- for access roads and manoeuvring areas - approx. 18900 m³.

The investor declares the use of the land as needed and within the limits of the project (e.g. for the construction of access roads) or export to a place agreed with the local authorities.

The Waste Act excludes from the waste category the earth masses removed or moved in connection with the implementation of the investment, if the local spatial development plan, the decision on building conditions or the building permit determine the conditions and

manner of their development. Therefore, it should be used in the first place, if possible, to transfer the earth masses within the boundaries of the area. If, on the other hand, there was no possibility of developing earth masses on the site, then they should be exported to other places agreed with the local authorities. Considering the protection of utility values of the soil, the top layer (humus) should be collected for use for agricultural crops or in another agreed place as above.

9.5. Emergency situations

During the normal operation of newly designed plants based on NORDEX N90 2.5 MW devices, there is little probability of an emergency situation related to environmental protection. Potential hazard is the possibility of lube oil leakage from transmission systems and hydraulic fluid used in mechanical systems placed in the engine nacelles (according to factory data, about 160 litres of hydraulic fluid and about 80 litres of transmission oil and a few kg of lubricants are used in one plant) shaft mounting system and bearings for rotating elements). The penetration of oil and petroleum substances from the nacelle to the ground is unlikely, due to the tight structure of the base and the nacelle housing. To some extent, however, there will be a risk of contamination of the water and soil environment in places surrounding the foundations of individual towers. Potentially possible are also emergency situations regarding the operation of electrical and electronic systems, which may, for example, lead to short circuits and a fire (Photo 6). In such situations, there would also be indirect environmental effects that cannot be estimated at this stage.

*Photo 6. July 2003, Great Britain, fire at the wind farm located at the NISSAN factory
(source: BBC Internet)*



Prevention of such situations consists in periodic inspections and maintenance of equipment and subassemblies in a proper technical condition.

9.6. Project liquidation

Currently, the investor is starting construction of wind farms and is not planning to liquidate them yet. Eventual liquidation of the project may occur, for example, for economic reasons. At the stage of decommissioning, the most important issue will be the restoration of the utility value. If this intention were to be created in the future, then the following rules should be followed:

- set the destination of the land,
- dismantle the equipment and accompanying installations, and segregate the generated waste taking into account the types, as well as in terms of their reuse,
- ensure proper disposal or disposal of waste,

- protect all openings of underground installations against penetration of dirt from the ground surface.

According to the device manufacturer's data, NORDEX, the total weight of a single tubular tower (six segments) is estimated at approx. 306 Mg. The foundation is embedded, among others, elements such as load distribution plate (2 pcs) with a weight of approx. 3.1 Mg, anchor plate (2 pieces) - approx. 1.7 Mg, bolts (160 pieces) - approx. 6.0 Mg and washers, nuts and small elements - approx. 0.4 Mg. As it results, the wind turbine team's liquidation may be accompanied by the production of waste with a weight of approx. 5075 Mg. In accordance with the Act on waste, a producer of waste generated as a result of providing services in the field of, demolition of facilities is the entity that provides the service, unless the contract for the provision of services provides otherwise.

In accordance with the Environmental Protection Law, the intended use of land is determined on the basis of its actual development and use, possibly based on the local spatial development plan.

10. Description of the activities envisaged to prevent, reduce or offset harmful environmental impacts

To minimize negative results impact for the environment there should be protection of the topsoil (humus) due to its collection before the start of earthworks at the foundations, excavations as well as temporary and final roads, and the use of its utility values elsewhere. In accordance with the Act on waste, a producer of waste generated as a result of providing services in the field of, demolition and repair of facilities, and maintenance and repair of equipment is the entity that provides the service, unless the contract for the provision of services provides otherwise limiting the amount of waste generated will consist in entrusting activities in the maintenance of equipment (including repairs, etc.) to a specialist company that will ensure proper waste handling, including their reuse or disposal.

This wind power plant set will be located approximately 6 km from the special habitat protection area from the Natura 2000 network designated PLH220036 Dolina Łupawy. There are 22 species of birds listed in Annex I of the Council Directive 79/409/EEC and 5 species of migratory birds not listed in the Annex. At a distance of approximately 10 km to the north-east and the east, 16 km to the south-west and approx. 19 km to the west there are such areas as PLH220023 and PLB220003 Ostoja Słowińska and PLB990002 Przybrzeżne Wody Bałtyku, PLB220002 Dolina Słupi and PLH220024 Przymorskie Błota.

Wind turbines create a potential risk of birds colliding with turbines. The investor declares to take the following solutions to mitigate this risk and constitute deterrents:

- painting the tips of the propellers (on the length of 1/3 of the blade) with orange or red paint,
- tower lighting with white rotating light.

Regardless of this, monitoring of the impact of wind farms on the occurrence of avifauna is planned.

Due to the scale and type of activity and related emission volumes, there are no reasons to introduce compensation for the environmental negative impacts of the project on the environment.

11. Indication whether it is necessary to establish a limited use area for the planned project (if it is necessary to define the boundaries of such area, restrictions on the use of land, technical requirements for construction works and ways of using them)

For the discussed project, which is the construction of a wind power plant set, there is no need to establish a limited use area. Environmental protection law, in art. 135 list the objects

around which an area of limited use can be established. Among the listed are, among others power lines and substations. However, the discussed project does not include their construction - the course of power lines and the detailed location of the GPZ station will constitute a separate undertaking.

The 30 kV MV power lines planned for implementation under this project will run underground, at a depth of approx. 1 m, underground. The electromagnetic fields produced by them do not reach the limit values, to constitute the basis for introducing restrictions on the use of land in the mode of environmental protection regulations.

The investment area is located near the town of Karzćino. The total area of plots designated directly for wind farms is approx. 270 ha, of which 1.4% of the area will be occupied for foundations, access roads and manoeuvring areas. There are no restrictions or contraindications to leave the remaining area (except for power plants and access roads) in agricultural use, as it has been the case until now.

Extremely important - in the aspect of acoustic protection of areas of farm and residential buildings - there should be a restriction including the prohibition development within the limits set by the range of impact of wind farms ($L_{Aeq\ N}$ isoline = 45 dB), i.e. on the area of approx. 400 ha.

12. Presentation of issues in graphic form

The following data and illustrations in this report are presented in graphical form:

- Photo 1. One of the first wind farms in Poland, Cisowo I near Darłowo - construction year 1999 - page 6,
- Photo 2. Wind farm Cisowo II near Darłowo - - construction year 2002 - page 6
- Photo 3. The profiles of typical wind farms with a capacity of 1.2 - 2.5 MW - page 12,
- Photo 4. NORDEX Power plant – page 13
- Photo 5. Place of the planned location of wind farms - view from the village of Karzćino - page 14,
- Photo 6. July 2003, Great Britain, a fire on the wind farm at the NISSAN factory (source: BBC Internet) - page 25
- Photo 7. Articles “Walka z wiatrakami”, „Wiatraki za plecami” posted in “Głos Pomorza” in years 2002 - 2003 r. – page 29
- Photo 8. Subsequent articles from "Głos Pomorza" from 2007, "Przeminęło z wiatrem" and „Obietnice na wiatr są rzucane", indicating the occurrence of conflicts related to wind farms - page 29
- Photo 9. Współczesne konflikty i kontrowersje - article from September 2007 (Dziennik Bałtycki) - page 30,
- Photo 10. Articles from X and XI 2007 ("Głos Pomorza") with a positive opinion regarding wind farms and energy reception from wind to the power grid - page 31
- Table 1. Leading countries in Europe in terms of the capacity of wind power equipment (over 1000 MW), as of 1999-2006 – page 7
- Table 2. Selected parameters of the power plant with similar capacities of 1.2 MW - 2.5 MW - page 12
- Table 3. Predicted types of hazardous waste - page 24
- Fig. 1. Graphical representation of power in wind farms in Europe at the end of 2006 - page 7
- Fig. 2. The fragment of the road map - the red circle indicates the place of the planned wind farm complex in the area of the village of Karzćino - page 8
- Fig. 3. Location of wind farms against the topographical map of the Karzćino village - page 9

- Fig. 4. The concept of the location of the GPZ 110/30 kV substation, south of the village of Lubuczewo, for the needs of the discussed power plant complex in the area of Karżcin
- Fig. 5. Map of protected areas NATURE 2000 - the area of location of wind farms in the area of the village of Karzczino is symbolized by a red rectangle - page 16
- Fig. 6. The most valuable archaeological monuments in the country in the area of Słupsk and the investment site (red rectangle) - page 18
- Fig. 7. Acoustic map showing the range of impact of noise from 16 wind farms in the area of the village of Karzczino - blue insulation concerns 45 dB - page 22
- Fig. 8. Distribution of field intensity under power lines at different distances "x" from axis - page 23
- Fig. 9. A cross-section of a typical circular foundation with a diameter of 17 m for a wind turbine with a tower about 100 m high - page 24

13. Analysis of possible social conflicts related to the planned project

Signals concerning social conflicts related to this type of undertakings took place, for example, in the municipality of Ustka. At the stage of setting the spatial development plan for parts of the Ustka commune for the needs of wind farms, residents of Starkowo protested fearing excessive noise, threats from electromagnetic fields and building disasters. In the years 2002 - 2003, the local press wrote about the protests (Photo 7). Residents of the area covered by the plan after the meeting with the mayor of the Ustka commune, the author of the plan and the investor's representative accepted the plan's findings.

Subsequent protests had a different basis (Photo 8). Some landowners affected by the change of plan expressed dissatisfaction with the fact that wind farms will not be located on their plots. The basis for this dissatisfaction was primarily the fact that with the provision of land for power plants is associated with a fee constituting a regular income of the lessee. In a region with a high unemployment rate, the location determination increases to an existential problem. But the dissatisfaction is also caused by the situation in which the company does not pay farmers for renting land for planned power plants.

Photo 7. Articles "Walka z wiatrakami" and „Wiatraki za plecami” posted in "Głos Pomorza" in the period 2002 - 2003

GMINA USTKA. Mieszkańcy nie chcą pół wiatrowych

Walka z wiatrakami

Sesję Rady usteckiej gminy zdominowały kontrowersje wokół lokalizacji pół wiatrowych. Protest złożyli mieszkańcy wsi Starkowo.

Radni poprzedniej kadencji opracowali plany zagospodarowania przestrzennego przewidujące budowę trzech parków wiatrowych: Duninowo-Wodnica, Moździanowo-Starkowo i Zaleskie. Plany wystawiono do wglądu. We wtorek radni rozpatrywali zgłoszone protesty.

- Jestem właścicielką dwóch działek w pobliżu planowanej wiatrakowni - mówi Helena Znajdek ze Starkowa. - Jeden z wiatraków ma stać około 400 metrów od mojego domu. A słyszałam, że nie można ich stawiać bliżej niż 500 metrów, z powodu nadmiernego hałasu. Pomiędzy domem a wiatrakownią jest moja druga działka, na której chcą budować się dzieci. Jak staną wiatraki, nie będą mogły postawić domu na własnej działce. Złożyłam protest. Wójt odpisał, że zagrożenia przekroczenia dopuszczalnej granicy 40 decybeli nie będzie, bo można zastosować urządzenia o mniejszej mocy. Ale już następnego dnia po tej odpowiedzi był u mnie przedstawiciel inwestora i namawiał, bym podpisała zgodę. Niczego nie podpisałam. Mój syn w Niemczech pracował przy takich wiatrakach. Mówił, że jest tam hałas nie do wytrzymania.

Podobne wątpliwości ma Renata Rzczykowska, także ze Starkowa. - Słyszałam o polu magnetycznym wokół takich wiatrakowni - mówi. - Nieoficjalnie dowiedziałam się, że w ich pobliżu nie można przebywać



Fot. SŁAWOMIR ŻABICKI

Radni odrzucili protesty do planu miejscowego. Oznacza to, że PEW będzie mogła rozpocząć przygotowywanie planów budowy trzech parków. Łącznie ma na nich stanąć 120 wiatraków. Wójt Wszółkowski ogłosił, że ma już zapewnienie Zakładu Energetycznego, iż ten kupi wiatrową energię.

dłużej niż cztery godziny. Wiatrak ma stać niemal na granicy pomiędzy terenem inwestycji a moim polem. To znaczy, że na moim polu będę mogła przebywać tylko 4 godziny? Słyszałam też, że może dojść podczas wichury do oderwania śmigła, a nawet przewrócenia się masztu. Protest podpisało 32 mieszkańców Starkowa. Osobne zło-

żyli niektórzy mieszkańcy Wodnicy i Duninowa.

- Jestem zaskoczony, że tych socjologicznych protestów jest i tak niewiele - przyznaje Witold Sikorski, główny projektant parków wiatrowych. - Na razie mamy do czynienia z planem miejscowym. A on ma tylko umożliwić inwestorowi uruchomienie dalszych prac projektowych, w tym także stworzenie raportu o wpływie inwestycji na otoczenie i środowisko. Każda z tych osób będzie stroną w postępowaniu inwestycyjnym i będzie miała wiele możliwości skutecznego protestowania.

- Nikt nie wybuduje wiatraka, którego potem nie będzie mógł eksploatować - uspokajał Zbigniew Wojciul, przedstawiciel inwestora, spółki Polska Energetyka Wiatrowa. - Nie zainwestujemy przecież miliona dolarów na każdy jeden megawat, jeśli lokalizację wiatraków zakwestionuje chociażby inspektorat ochrony środowiska.

Protesty wzburzyły wójtę Tomasza Wszółkowskiego. - Nie upewniam się, że to szkodliwe, jeśli nie będzie raportu - grzmiał. - A nie będzie go, jeśli nie pozwolimy inwestorowi dalej pracować. Chcemy zrobić mieszkańcom tej gminy bogatymi ludźmi. Niektórzy za lokalizację parków na swoich gruntach będą dostawać nawet kilkukrotność emerytury. Ale błagam, nie rzucajcie mi kłód pod nogi, gdy sprowadzam inwestorów.

(borg)

Wiatraki za plecami

Przeciwko lokalizacji farmy wiatrowej protestują mieszkańcy Charnowa w gminie Ustka. Zapowiadają złożenie doniesienia o przestępstwie. Nie wykluczają też zwołania referendum w sprawie odwołania władz gminy.



Fot. SŁAWOMIR ŻABICKI

Ryszard Kucharski chciał wspólnie z synem wybudować dom. Świdztwa wiatraków może mu w tym przeszkodzić.

- Na tablicy wywieszono informację o zmianie planu zagospodarowania przestrzennego, ale o co z tego, skoro nikt jej nie widział - mówi Jolanta Kijewska, siostra Charnowa. - Uważamy, że gmina naruszyła procedurę uchwalania zmiany planu zagospodarowania przestrzennego. Nam wiatraki nie przeszkadzają, chcielibyśmy mieć jedynie wpływ na ich lokalizację.

Mieszkańcy zaskoczeni zostali przedstawionymi im planami. Zgodnie z nimi wiatraki mają stać bliżej ich domów niż się spodziewali. - Nikt nie mówił o szkodliwości urządzeń, teraz okazuje się, że w odległości 700 metrów można tylko zbierać pościół, bo w takiej odległości przebywać można najwyżej pięć godzin dziennie - denerwuje się Ryszard Kucharski. - A my przecież tam mieszkamy.

Mieszkańcy czują się oszukani również przez inwestora. - Obiecano nam, że wiatraki

będą daleko od wsi, że postawią je za torami - mówi Hanna Piech. - Tymczasem zamierza się je stawiać w naszym sąsiedztwie. Okazuje się, że na działkach które tam mamy nie możemy się budować.

Inwestor zaprzecza, że kogokolwiek wprowadził w błąd. - Dokładana lokalizacja wiatraków jest jeszcze sprawą otwartą - zapewnia Marek Jarozyk, prezydent zarządu firmy Enertrag Polska. - Poza tym niezależny rzeczoznawca sporządził raport oddziaływania na środowisko. Wynika z niego wprost, że wiatraki nikomu nie szkodzą, a w ich pobliżu można mieszkać i uprawiać ziemię.

Wójt Włodzisław Lesiecki przyznaje niezadowolenia mieszkańców tłumaczy kilkoma powodami. - Konflikt powstał dlatego, że wszyscy mieszkańcy Charnowa chcą mieć wiatraki na własnej ziemi, bo jest dobry

interes. Niewstępy, urządzeni może być tylko kłopot.

Wójt odpiera również zarzuty, że procedura uchwalania planu zagospodarowania przestrzennego była utajniona. - Plan był wywieszony, trzy lata trwała procedura jego uchwalania, każdy miał prawo wnieść swoje uwagi - mówi. - Zapewniam, że obywateli o interesach mieszkańców wsi i nie robimy nic przeciwko nim.

Mieszkańcy Charnowa od uchwały Rady Gminy przyjmującej plan zagospodarowania przestrzennego odwołali się już do Samorządowego Kolegium Odwoławczego. Swoją protest zamierzają złożyć również w Naczelnym Sądzie Administracyjnym. O popełnieniu przestępstwa zamierzają powołać prokuraturę. - Jakże to nie może, zwołamy referendum w sprawie odwołania wójtów i Rady Gminy - zapowiada radny Bernard Lipczyński.

MAGDALENA GRYSKO

*Photo 8. Subsequent articles indicating the occurrence of conflicts related to wind farms -
from 2003 and 2007, both from "Głos Pomorza"*



Another story is related to the construction of wind power plants set planned in the area of the village of Swołowo. The investment has moved the local community for reasons other than the above. The project was an impulse to take action to protect existing landscape assets. And it all started with the fact that in 1995 the historic nature of the Swołowo village was unveiled in public with an unchanged spatial layout and historic farms with skeletal structures unchanged from the Middle Ages (the so-called half-timbered buildings). Two years later, in the village, the centre of the village (pond, parking lot) was cleaned - from European funds - and both historically valuable bypasses and the "Plaid Land" itself were marked. In 1998, the promotion of the village as a centre of rural tourism began. Local authorities hoped that these activities would contribute to the activation of society. However, the pace of change was not satisfactory. It was only the construction of windmills that liberated the inhabitants of the energy, which, as a result, led to the recognition of Swołowo and the surrounding area as a protected landscape area. In this situation, the wind farm was abandoned - the article below (Photo 9).

Photo 9. Contemporary conflicts and controversies - article from September 2007 ("Dziennik Bałtycki")

Słupsk. Karząca ręka PiS-u czy wpływy środowisk chroniących środowisko naturalne?

Wiatraki przegrały z ekologami

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Piotr Karczewski, wojewoda pomorski, zablokował budowę farmy ponad stu wiatraków w Swołowie pod Słupskiem. Powodem - ochrona środowiska, a ściślej - zamiar zachowania sielskiego krajobrazu. Ekology są zachwyceni. Gmina straciła na tym 7 mln zł rocznie.

Decyzja wojewody dotyczy gminy, na terenie której miałyby stać amerykańskie tarcze antyrakietowe. Jej wójt, Mariusz Chmiel, od miesięcy zadaje rządowi niewygodne pytania w tej sprawie. Lokalni samorządowcy są przekonani, że teraz wojewoda dał za to gminie nauczkę.

- W sprawie wiatraków decydujące zdanie powinien mieć gospodarz terenu, czyli wójt Chmiel - ocenia Sławomir Ziemiłowicz, słupski starosta powiatowy z Platformy Obywatelskiej. - Nałożenie się tych decyzji w czasie każdej przysuszcza, że nie są one ekologiczne czy gospodarcze, ale polityczne, karzące wójta za jego działalność i kradzież wobec PiS-u.

Swołowo to mała, historyczna wieś położona kilkanaście kilometrów od Słupska. Leży w centrum tzw. Krainy w Kratę, która była sztandarowym produktem turystycznym powiatu słupskiego. Jednak gmina Słupsk zaplanowała tam budowę ponad setki elektrowni wiatrowych.

- Moim zdaniem, Kraina w Kratę nie wypaliła - mówi wójt Mariusz Chmiel. - Ile osób żyje w Swołowie z turystyki? Ile pieniędzy z podatków wpływa z tego tytułu do kasy gminy? Niewiele, żeby nie powiedzieć, zero. Dlatego postanowiliśmy wykorzystać ekonomicznie

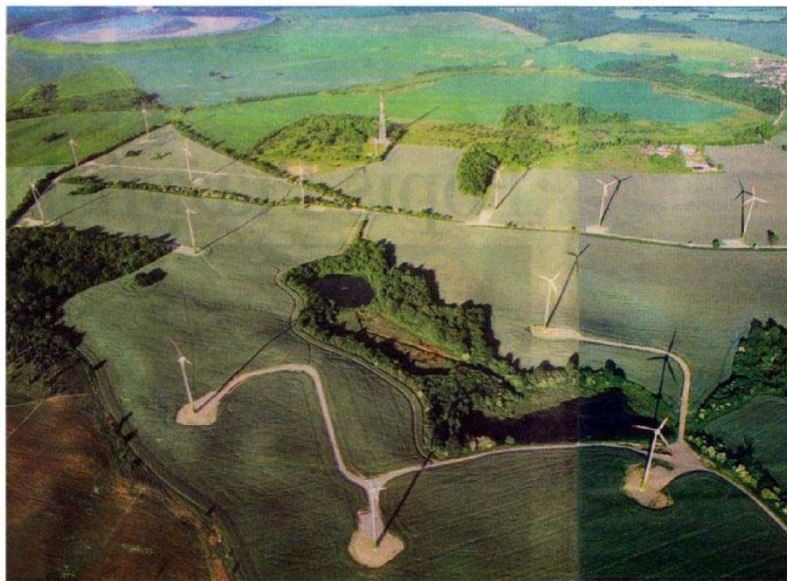
drugi walor okolicy Swołowa, czyli pobliskie wzgórza, na których prawie cały rok wieje wiatr. Budując tam ponad setkę wiatraków, wzbogacilibyśmy gminę o 7 milionów złotych rocznie z podatków. Kolejne pieniądze wpłynęłyby do rolników dzierżawiących grunty pod siłownię. Kilka osób znalazłoby też zatrudnienie w firmach budujących i eksploatujących wiatraki.

Jednak mieszkańcy Swołowa, Krzemienicy i Starkowa, bo te trzy wsie tworzą Krainę w Kratę, od początku byli sceptycznie nastawieni do budowy wiatraków. Zawiazali nawet stowarzyszenie, które konsekwentnie sprzeciwiało się budowie farm wiatrowych w tej okolicy. - To zbyt cenne miejsce, żeby niszczyć je siłowniami - uważa Adam Piekarec z „Pomorskiego Stowarzyszenia Nasze Środowisko” w Bierkowie. - Swołowo i okolice powinny rozwijać się gospodarczo, ale wyłącznie poprzez rozwój turystyki i ekoturystyki.

Stowarzyszenie poruszało niebo i ziemię - przez dłuższy czas bez skutku. Wniosekowało także do wojewody o uznanie Krainy w Kratę za obszar chronionego krajobrazu. W ostatnich dniach wreszcie się udało.

- Uznaliśmy ten wniosek za uzasadniony. Plany budowy elektrowni wiatrowych w tym miejscu uważamy za nieracjonalne - tłumaczy decyzję wojewody Danuta Makowska, dyrektor Wydziału Środowiska i Rolnictwa Urzędu Wojewódzkiego w Gdańsku. - Swołowo i okolice to bardzo cenne przyrodniczo i kulturowo regiony Pomorza. Powiedziałabym wręcz, że są naszą perełką.

Wójt Chmiel zwraca jednak uwagę, że Piotr Karczewski w dość krótkim czasie zmienił swoje nastawienie do sprawy. - Jeszcze w czerwcu wojewoda



Wiatraki wytwarzają wprawdzie ekologiczną energię, ale zdaniem ekologów mogą przyczynić się do dewastacji krajobrazu. Na zdjęciu farma wiatrowa w gminie Gniewino.

FOT. KIPAL, KOWALSKI

przysłał mi projekt rozporządzenia i zgodnie z nim budowa wiatraków była dozwolona! Teraz się okazuje, że podpisał rozporządzenie o innej treści, której ze mną już nie uzgadniał.

Obecnie wójt konsultuje z prawnikami możliwość zaskarżenia decyzji wojewody. - Straty gminy to co najmniej 7 milionów złotych z bezpośrednich podatków - argumentuje Chmiel. - Wojewoda musi się liczyć z kosztami swojej decyzji.

KRAINA W KRATĘ

Jest to zespół kilku historycznych miejscowości, w których dominuje architektura szkieletowa zwana także szachulcową. To charakterystyczny styl stosowany przez Kaszubów zachodnich, zwanych Słowinami.

Polega na budowie drewnianego szkieletu, wypełnianego następnie słomą, trzciną i gliną. W stylu szachulcowym zbudowane są nie tylko domy mieszkalne, ale też szkoły, kościoły, budynki gospodarcze i inwentarskie (stodoły, chlewiki i kumiki).

Centrum Krainy w Kratę jest Swołowo, a w jej skład wchodzi także Mołdzanowo i Starkowo. Od kilku lat jest promowana jako markowy produkt turystyczny Pomorza ze względu na swoje walory kulturowe i przyrodnicze.

PIŚ NIE MŚCI SIĘ NA WÓJCIE JOLANTA SZCZYPYŃSKA słupska posłanka PiS.

■ Nie rozumiem, skąd mogły się wziąć podejrzenia o mścność naszej partii wobec wójta Chmiela. Sprawa wiatraków w Krainie w Kratę jest dla mnie oczywista. Sama, wielokrotnie spotykałam się z mieszkańcami, którzy byli przeciwni ich budowie. Nie ukrywam że interweniowałam w tej sprawie i uważam, że wojewoda podjął słuszną decyzję. Nie była ona polityczna a merytoryczna, a wojewoda podjął ją pod wpływem nacisków środowisk ekologicznych.

The presented press articles are an example that the location of wind farms may be controversial.

Photo 10. Articles from X and XI 2007 ("Głos Pomorza") with a positive overtone regarding wind farms and the collection of energy from wind to the power grid



The goal is this report on the environmental impact of the wind power plant complex in the vicinity of the town of Karzczino is to present the impact of the power plant on individual elements of the environment, thus to bring the issue of their actual impact to the fore and contribute to minimizing conflicts arising at the interface between technology and people and nature.

14. Presentation of proposals for monitoring the impact of the planned project at the stage of its construction and operation

Taking into account the type of the project and the size of the forecasted emissions, there are no circumstances to oblige the investor to monitor the environmental impact of the planned project both at the construction stage of the wind farm and its operation. The current state of the art enables remote monitoring of the work of the wind farm, including remote response to irregularities (e.g. turning off the turbine, disconnecting electricity, etc.), which is also indirectly monitoring and preventing emergency situations.

Monitoring, as well as controlling the devices, will be provided by the automation and work control system of individual power plants, including the control of the return of generated energy to the energy system.

Nevertheless, at the stage of operation of the project, the investor declares monitoring of the impact of wind farms on avifauna.

15. Indication of difficulties resulting from technical shortcomings or gaps in contemporary knowledge encountered in the preparation of the report

In the preparation of the report, there were no problems - as far as the analyzed issues were concerned - due to the shortcomings of technology or gaps in contemporary knowledge.

16. Summary of the information contained in the report in non-technical language

The project involves the construction of a group of sixteen wind turbines NORDEXN90 of the same type in the Karzcin area, each with a capacity of 2.5 MW and tower height up to 120 m ($\pm 5\%$) and rotor diameter up to 100 m ($\pm 5\%$). The accompanying installation will include adapters for the electrical energy for collection received at individual power plants, such as transformers in power plant nacelle, 30 kV MV connection cables between the power stations and the GPZ power station being a separate investment.

Environmental impact of wind farms will be mainly caused by: noise emission, electromagnetic radiation, as well as through periodic waste generation. For the mentioned interactions:

- *in the field of noise emission*

The noise will be accompanied by rotating the rotor blades of each wind turbine, as well as the generator and engines operating in the nacelle of individual power plants located on the tubular towers, at a height of up to 120 m ($\pm 5\%$) above the ground level. The analysis of sound propagation showed that the noise penetrating the environment from individual power plants and as a result of their combined impact does not cover the areas of housing and farm buildings subject to acoustic protection. Noise limits in these areas will not be exceeded.

- *in the field of electromagnetic radiation*

Electricity from the area where seven wind power plants will be located will be discharged to the GPZ power station being a separate project and then to the Słupsk - Wierzbien station. A 30 kV medium voltage underground line will run through the investment area, from which the values of electromagnetic fields are many times lower than the limit values.

- *in the field of waste generation*

During the operation of wind farms, hydraulic and transmission oils used in the power plant mechanisms (cylinders, gears) will be generated as hazardous waste. This kind of waste will be produced on average in the amount of approx. 0.8 Mg/year. During the construction of the waste, earth masses from excavations may be provided, unless a method of dealing with them is specified. Their number is estimated at approx. 31 700 m³.

The environmental impact would also take place through emergency situations. Selected NORDEX N90 power plants can potentially threaten the water and ground environment, because there is the possibility of lubricating oil leakage from transmission systems and hydraulic fluid, used in the mechanisms placed in the power plant nacelle. The leakage of oils from the nacelle to the ground is unlikely, due to the tight construction of the base and the nacelle housing. Potentially possible are also emergency situations regarding the operation of electrical and electronic systems, which may lead to short-circuits and fire, for example. In such situations, there would also be indirect environmental effects that cannot be estimated at this stage. Prevention of such situations consists in periodic inspections and maintenance of equipment and subassemblies in a proper technical condition.

Due to the acoustic protection of areas of farm buildings, housing and related to the stay of children and young people - restrictions should be introduced covering the prohibition of this type of construction within the limits set by the wind farms ($L_{Aeq N} = 45$ dB), i.e. on the area of approx. 400 ha.

The closest special area of habitat protection from the Natura 2000 network - PLH220036 Dolina Łupawy - is located approx. 6 km eastwards from the planned project. Other areas, such as PLH220023 and PLB220003 Ostoja Słowińska, PLB990002 Przybrzeżne Wody

Bałtyku, PLB220002 Dolina Słupia and PLH220024 Przymorskie Błota are distant by at least 10 km towards the north-east, north, west and south-west. Wind turbines create a potential risk of birds colliding with turbines, hence the investor declares the adoption of specific solutions limiting this risk and constituting deterrent factors (painting end of propellers, tower lighting with rotational light).

To harmonize the landscape values of the discussed area, the rotors of each wind turbine should rotate in the same direction. The principle of the same colours and the way of painting for all power plants should be applied.

17. Names of the persons preparing the report

The report was prepared by the team consisting of: Ewa Tymińska i Edward Tymiński.

18. Sources of information forming the basis for the report

While preparing this report, legal acts and materials made available by the investor were used, as well as the manufacturer's data and data from publicly available publications, in particular:

1. Collective work edited by Andrzej Tyszecki, Wytyczne do procedury i wykonywania ocen oddziaływania na środowisko, IUCN Poland Foundation, Warsaw 1996,
2. Energetyka a ochrona środowiska - WNT Warsaw,
3. Environmental Assessment Sourcebook, The World Bank, Washington, D.C.
4. A plan for action in Europe - Wind Energy, European Commission, London 1997 - 2004,
5. Renewable Energy for Europe (1999 - 2003) - European Renewable Energy Council, Brussels 2004,
6. Materials from the conference: Energetyka wiatrowa na lądzie i morzu - Sopot 2000,
7. Concerted Action on Offshore Wind Energy in Europe - Final report, December 2001,
8. Energetyka wiatrowa - planowanie i realizacja - Gdańsk 2002,
9. Witold M. Lewandowski, Proekologiczne źródła energii odnawialnej, Wydawnictwa Naukowo- Techniczne, Warsaw 2002,
10. Źródła odnawialne OZE - conference in the Ministry of the Environment – Warsaw 2002,
11. Provincial Inspectorate for Environmental Protection in Gdańsk, Ocena roczna jakości powietrza w województwie pomorskim za rok 2006, Gdańsk 2007,
12. Provincial Inspectorate for Environmental Protection in Gdańsk, Raport o stanie środowiska województwa pomorskiego w 2005 r., Biblioteka Monitoringu Środowiska, Gdańsk 2006,
13. Provincial Inspectorate for Environmental Protection in Gdańsk, Raport o stanie środowiska Województwa pomorskiego według badań monitoringowych przeprowadzonych w 2003 r., Biblioteka Monitoringu Środowiska, Gdańsk 2004,
14. Pola elektromagnetyczne wielkiego miasta z punktu widzenia ochrony środowiska, Biblioteka Monitoringu Środowiska, Warsaw 1996,
15. Zbigniew Engel, Ochrona środowiska przed drganiami i hałasem, Wydawnictwo Naukowe PWN, Warsaw 2001,
16. Mirosław Szklarczyk, Ochrona atmosfery, Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego, Olsztyn 2001,
17. Wykorzystanie niekonwencjonalnych źródeł energii, 1st Scientific and Technical Conference, 2.12.2004,
18. Materials from the International Conference „Perspektywy rozwoju energetyki wiatrowej na morzu i lądzie” - Bałtycka Agencja Poszanowania Energii S.A., Gdańsk 2005 r.,
19. Jerzy Olczak, Kazimierz Siuchniński, Sprawozdanie z badań weryfikacyjnych grodzisk

przeprowadzonych na terenie powiatu słupskiego (jesień 1968 - 1970), UAM Poznań,
20. Polska mapa archeologiczna - największe odkrycia, najcenniejsze zabytki, Wydawnictwo
Kartograficzne EKO-GRAF Sp. z o.o., Wrocław 2007.

19. Conclusions

It is proposed that in the decision on environmental conditions for the project consisting in the construction of a team of sixteen wind farms, type NORDEXN90, each with a capacity of 2.5 MW, including access roads, manoeuvring areas and power infrastructure, located as follows on plots with registration numbers 147/2 - 5 power plants, 147/4 - 2 power plants, 148/1 - 2 power plants, 164/1 - 2 power plants, 154 - 1 power plant, 166/1 - 1 power plant, 156 - 1 power plant, 13 - 1 power plant and 28 - 1 power plant within Karzcin in the Słupsk commune, the following conditions regarding environmental protection are to be taken into account:

- use the earth masses necessary for the movement within the boundaries of the project or in a place agreed with the local authorities,
- in the case of encountering objects that may constitute archaeological monuments during earthworks, stop work and immediately notify the Monument Conservator in order to determine the appropriate supervision,
- within the boundaries covered by the investment, install power plants with the same colour scheme and having the same rotational direction of the rotor blades.

Prepared by:

Attachment:

1. Decision of the Head of the Słupsk Commune regarding the imposition of the obligation to prepare a report on the environmental impact, and its scope, for the project entitled construction of a set of 16 wind farms of the same type with a capacity of not less than 2 MW each, including access roads, manoeuvring areas and power infrastructure, within Karżcino on plots with registration numbers 13, 49, 50, 57, 58, 59, 61, 62, 63, 148/1, 150, 151, 153, 154, 155, 156, 164/1, 166/1, 28, 145, 146, 147/2 and 147/4 - letter of 6 August 2007 with ref. no. OŚ/DŚ - 7625/23/4/07.

MAYOR OF THE SLUPSK
MUNICIPALITY
76-200 SLUPSK, ul. Sportowa 34

Slupsk on August 6, 2007

OŚ/DŚ - 7625/33/4/07

DECISION

On the basis of:

♦ Art. 123 § 1 of the Act of 14 June 1960 - the Code of Administrative Procedure (unified text Journal of Laws of 2000, no. 98, item 1071 as amended: Journal of Laws of 2001 No. 49, item 509, Journal of Laws of 2002. No. 113. item 984, No. 153, item 1271, No. 169, item 1387, Journal of Laws of 2003 No. 130, item 1188, No. 170, item 1660, Journal of Laws of 2004, item 162, item 1692, item, Journal of Laws of 2005 No. 64, item 565, No. 78 item 682 and No. 181 item 1524),

♦ Art 51, par. 3 point 1 in connection with art. 376 of the Act of 27 April 2001 on Environmental Protection Law (consolidated text, Journal of Laws of 2006 No. 129, item 902, as amended)

in connection with the conducted administrative proceedings at the request of EEC Slupsk sp. z o. o. with headquarters in Legnica, ul. M Rataja 21, regarding the issue of a decision on environmental conditions of consent for the implementation of the project named Construction of a set of 16 wind plants of the same type with a capacity of not less than 2 MW each, along with access roads, manoeuvring areas and power infrastructure. The planned investment will be implemented within Karzcin, at plots: 13, 49, 50, 57, 58, 59, 61, 62, 63, 148/1, 150, 151. 153, 154. 155, 156, 164/1, 166/1, 28, 145 146, 147/2, 147/4.

I decide as follows:

to impose on the Applicant an obligation to prepare a report for the aforementioned undertaking, which pursuant to Art. 52 point 1 of the Environmental Protection Law should contain:

1. Description of the planned project, in particular:

a) the characteristics of the entire project and the conditions for the use of the land during the construction and operation phase.

b) the main characteristics of production processes,

c) the types and quantities of pollutants anticipated resulting from the operation of the planned project

2. Description of environmental elements, falling within the scope of the expected impact of the planned project on the environment,

3. Description of monuments protected in the vicinity or in the immediate range of the impact of the planned project on the basis of the provisions on the protection of monuments and the care of monuments,

4. Description of the analyzed variants of the planned project in this variant consisting in not taking the project and the most favourable for the environment, along with the justification for their selection,

5. Determination of the expected environmental impact of the analyzed variants, also in the event of an extraordinary environmental threat,

6. Analysis and assessment of possible threats and damage to monuments protected under the

provisions on the protection of monuments and the care of monuments, in particular archaeological monuments, within the area where the project is to be implemented,

7. Justification of the variant chosen by the applicant, with an indication of its impact on the environment, in particular:

- 1) people, animals, plants, water and air.
- 2) the surface of the earth, including ground mass movements, climate and landscape,
- 3) material goods,
- 4) monuments and cultural landscape, covered by existing documentation, in particular a register of monuments,
- 5) interaction between these elements.

8. Description of potentially significant environmental impacts of the planned project, including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary environmental impact resulting from:

- 1) the existence of the undertaking,
 - 2) the use of environmental resources,
 - 3) emissions,
- and a description of the forecasting methods used by the applicant.

9. Description of the activities envisaged to prevent, reduce or compensate for adverse environmental impacts.

10. Indication whether it is necessary to establish a limited use area for the planned project (if it is necessary to define the boundaries of such area, restrictions on the use of land, technical requirements for construction works and ways of using them).

11. Presentation of issues in a graphical form.

12. Analysis of possible social conflicts related to the planned enterprise.

13. Presentation of proposals for monitoring the impact of the planned project at the stage of its construction and operation.

14. Indication of difficulties resulting from technical shortcomings or gaps in contemporary knowledge encountered in the preparation of the report

15. Non-technical summary of the information contained in the report.

16. The name of the person or persons drawing up the report.

17. Information about sources constituting the basis for preparing a report.

At the same time, I would like to mention that the environmental impact assessment report should take into account the impact of the project at the stage of its implementation, operation and decommissioning.

Substantiation

On May 30, 2007 I received an application from EEC Słupsk sp. z o.o. based in Legnica, submitted to the Commune Office in Słupsk regarding a decision on environmental conditions of consent for the implementation of a project consisting in the construction of a set of 16 wind plants of the same type with a capacity of not less than 2 MW each, including with access roads, manoeuvring areas and power infrastructure in Karzcinno. On 11 June this year, the Applicant was requested to complete the application. On June 25, 2007, a completed application was provided. In the course of administrative proceedings, the Head of the Słupsk Commune on July 2 this year asked the State Poviast Sanitary Inspector in Słupsk and Słupsk Starosta to issue an opinion on the need to prepare a report and the scope of its impact on the environment for the project consisting in the construction of a wind plants of the same type with a capacity of less than 2 MW each along with roads access roads, manoeuvring areas and power infrastructure within the city of Karzcinno, on plots: 13, 49, 50, 57, 58, 59.61, 62, 63, 148/1, 150, 151, 153, 154, 155, 156, 164/1, 166 / 1.28. 145, 146, 147/2, 147/4.

In accordance with the decision of the State Poviat Sanitary Inspector No. OISZNS/6/83/2007/2049 of 16 July 2007 (date of receiving - 17/07/2007), in which it decided to recognize the necessary preparation of a report for the aforementioned project in the scope specified in 52 par. 1 of the Act on Environmental Protection Law and the provisions of ŚRII.7631-35/07 of 6 July 2007 (date of receiving - 9/07/2007) received from the Starosta of the Słupsk Poviat, in which it stated that for the aforementioned investment it is advisable to prepare a report on the impact on environment.

The wind plants in question, according to the information provided by the investor (EWG Słupsk Sp z o.o 59-220 Legnica, Rataja 21), is a venture belonging to the so-called projects that may significantly affect the environment in accordance with § 3, para. 1 point 6 of the ordinance of the Council of Ministers of 9 November 2004 on determining the types of projects that may significantly affect the environment and detailed conditions related to the qualification of projects for the preparation of the report on environmental impact (Journal of Laws No. 257, item 2573 with amendments)) for which the report is optional. Improperly located and constructed investment of this type can cause significant impact on the natural environment.

Taking into account the above matters and the opinions of the Reconciling Bodies, as well as the conditions related to the qualification of the undertaking in § 5 of the above mentioned regulations concerning, among others, issue, preparation of a report on the impact of this investment on the environment is justified.

NOTICE

The party has a right to make a complaint for this decision through my mediation to the Self-Government Board of Appeals in Słupsk within 7 days from the date of its receipt.

The complaint does not suspend the execution of the decision (Article 143 of the Administrative Code).

For:

1. EWG Słupsk Sp. z o.o.
ul. M. Rataja 21, 59-220 Legnica
2. Gmina Słupsk
ul. Sportowa 34
76-200 Słupsk

CC:

1. a/a

[RECTANGLE STAMP: With auth.
OF COMMUNE HEAD Bernard
Rybak, DEPUTY OF COMMUNE
HEAD]
[SIGNATURE]
[ROUND SEAL: SŁUPSK
COMMUNE HEAD]

RECEIVED

14.08.2007

date

[SIGNATURE]

signature