NON TECHNICAL EXECUTIVE SUMMARY

PROJECT OF THE GROUP OF THREE WIND FARMS LOCATED IN WIELKOPOLSKA VOIVOIDSHIP (POLAND):

- MARGONIN WF IN MARGONIN COMMUNE
- PAWŁOWO WF IN GOŁAŃCZ COMMUNE
- PAWŁOWO WF IN BUDZYŃ COMMUNE

INVESTOR: EDP RENEWABLES POLSKA SP. Z O.O. AND SPECIAL PURPOSE VEHICLES – SPV (Relax Wind Park I Sp. z o.o., Relax Wind Park III Sp.z o.o.)

FEBRUARY 2013

1. INTRODUCTION

EDP Renovaveis is a leading international company in the wind energy market, operating in Poland as **EDP Renewables Polska Sp. z o.o. (EDPR) and** its SPV (hereinafter referred to as: **Investor**, **Developer**). The investor is developing a project of wind power park consisting of three individual investments situated in wielkopolskie voivoidship (*województwo*). The complex consists of three wind farms located in Margonin, Gołańcz and Budzyń communes (*gminy*). The total target capacity of the whole project is 281,5 MW.

Construction works in Margonin WF started in July 2008. In early spring 2009 first wind turbines (hereinafter referred to as: **WTGs**) were delivered to the construction site. At present Margonin WF is the largest wind farm in Poland, consisting of 60 wind turbines with the total capacity of 120 MW, allowing to meet the needs of 90 thousand households.

Currently (turn of the year 2012 and 2013) another wind farm of the above mentioned group is under construction. Pawłowo – Gołańcz WF located in Gołańcz commune will finally consist of 53 WTGs with the total capacity of 79,5 MW.

The last part of the complex (currently at the early stage of development) - Pawłowo-Budzyń WF situated in Budzyń commune - will consist of 41 WTGs with the total capacity up to 82 MW. At present the administrative procedure for obtaining environmental decision is undergoing. Expected project completion is planned for 2015.

The aim of this non-technical summary is to present the whole investment of three individual wind farms in the wielkopolska region and to ensure that all interested Parts could become familiar with the project.

According to resolutions of the competent authorities to issue an environmental decision for planned development, in all cases it was considered necessary to prepare the Environmental Impact Assessment (hereinafter referred to as: **EIA**) reports. The most important information included in the reports stated above was presented below.

2. Investor and his environmental policy

EDPR is a company deriving from EDP Group (Energias de Portugal) – the third largest in the world wind power developer, with a number of active wind farms located in the USA, Brazil, Spain, France, Belgium, Portugal and Romania.

As a leading wind developer, the company is committed to guide the business activity in accordance with the sustainable development principles of the EDP Group, including among others:

• efficient use of resources, including the development of cleaner and more efficient energy technology and development of energy generation based on renewable sources;

• environmental protection with minimization of the environmental impact of all business activities and participation in initiatives that contribute to the conservation of the environment;

• support the development of local communities

Additional information on EDP sustainability can be found on the following website:

http://www.edpr.com/sustainability/

EDP has established a set of guidelines to minimise environmental impact during various development phases of investment, including project design phase, construction phase, operating phase and finally dismantling phase. In Margonin WF, which is in operation since 2010, in 2011- the environmental management system in accordance with polish standard PN-EN ISO 14001:2005, and in 2012 - the health and safety management system in accordance with OHSAS 18001:1999 standard, were successfully implemented. Within two years of completing other wind farms of analyzed complex, above mentioned management systems will be constantly implemented also on those installations.

3. General Project presentation

The analyzed complex of wind farms is located in the area of Margonin, Gołańcz and Budzyń communes (*gminy*) in Chodzież and Wągrowiec counties (*powiaty*), wielkopolskie voivoidship (central Poland). In spite of the fact that the individual wind farms are formally independent projects, due to their close proximity to one another, the same type of activity (renewable energy production) and use of the same elements of associated infrastructure, these investments should be treated as one big project divided into several stages. Below chapters present general description of the individual projects.

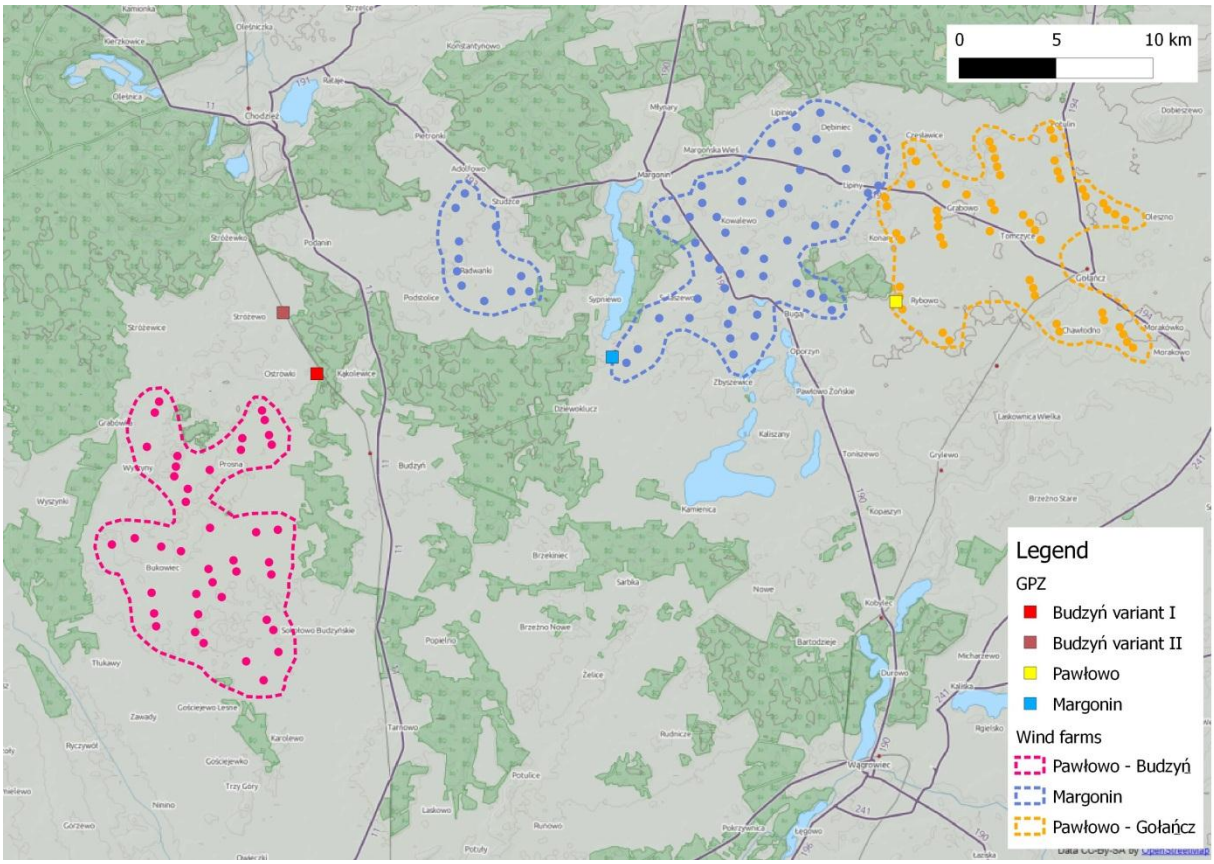
Margonin Wind Farm

The Margonin wind farm comprises 60 single WTGs, with capacity of 2MW each and total capacity of the whole unit of 120MW.

Margonin WF consists of two major parts located on both sides of Margonińskie Lake (Pic. 1):

1. Margonin West wind farm (11 WTGs) with total capacity of 22 MW, and
2. Margonin East wind farm (49 WTGs) with total capacity of 98 MW.

Electrical energy produced in WTGs is transferred via underground cable line to the electrical substation located in the area of Sypniewo village (GPZ Margonin), and further with a 110 kV overhead power transmission line (hereinafter referred to as: **OPTL**) Margonin-Piła Krzewina to the National Electricity System (hereinafter referred to as: **NES**) (Pic. 2 i Pic. 3).



Pic. 1. Location of the individual wind farms (together with their substations) included in the described investment.

Pawłowo - Gołańcz Wind Farm

From the east Pawłowo-Gołańcz WF (currently under construction) is directly adjacent to the Margonin East WF (Pic. 1).

At first the Pawłowo-Gołańcz project consisted of three subprojects implying the construction of 65 WTGs in the area of Gołańcz commune (stage I and II) and 31 WTGs in Wągrowiec commune. In the area of Gołańcz commune administrative procedures were conducted separately for two subprojects: irrespectively for 60 WTGs of stage I (90MW), which were supposed to be developed based on the decizion on zoning conditions and separately for 5 WTGs of stage II (7,5MW), for which local master plan was adopted.

Commune Council of Wągrowiec was not favorable with construction of wind farm in the commune, so EDPR decided to suspend the project in this area.

Due to the noise and nature conservation requirements (therein the necessity to minimize the impact on bats), the project implemented in the area of Gołańcz commune, was reduced to 53 WTGs:

1. Pawłowo WF comprising 49 WTGs (stage I) with capacity of 1,5 MW each and total capacity of the unit of 73,5 MW, and
2. Pawłowo WF comprising 4 WTGs (stage II) with capacity of 1,5 MW each and total capacity of the unit of 6 MW.

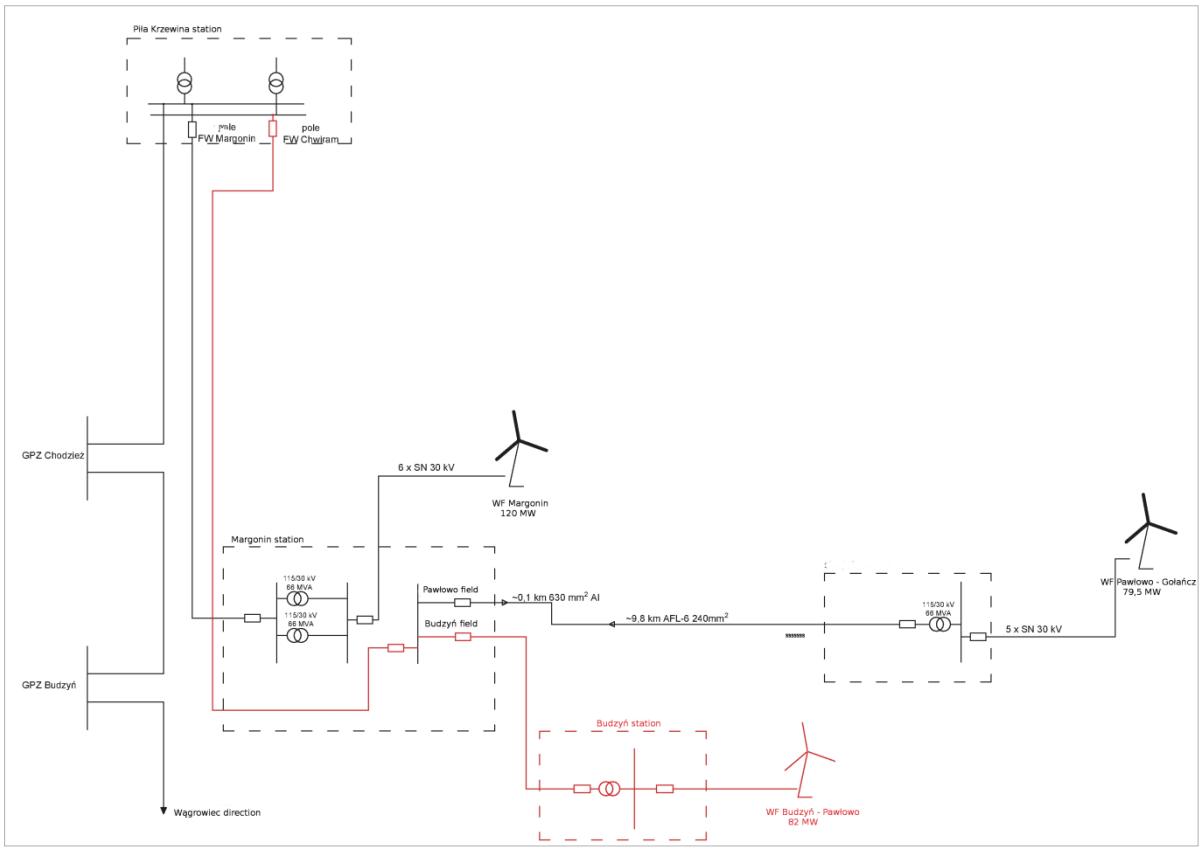
For the whole Pawłowo-Gołańcz WF together with associated infrastructure (the Pawłowo electrical substation, OPTL, enlargement of Margonin electrical substation) building permits were obtained and in the end of May 2012 the construction stage was started. It is planned that Pawłowo-Gołańcz WF will be completed and put into operation in June/July 2013.

WTGs of both parts of Pawłowo-Gołańcz WF will be installed on 80m height towers and with 82 m of rotor diameter. Generated power will be transmitted via the underground cables to the electrical substation in Rybowo village (GPZ Pawłowo), where after change of voltage from 30 kV to 110 kV it will be transferred via OPTL to Margonin substation and further with existing OPTL to Piła-Krzewina substation and to NES.

As a target solution the construction of new transmission line from Margonin substation to Piła-Krzewina substation is planned, which will be used to transfer the energy from Pawłowo-Gołańcz and Pawłowo-Budzyń WFs (Pic. 2 i Pic. 3).

Pawłowo - Budzyń Wind Farm

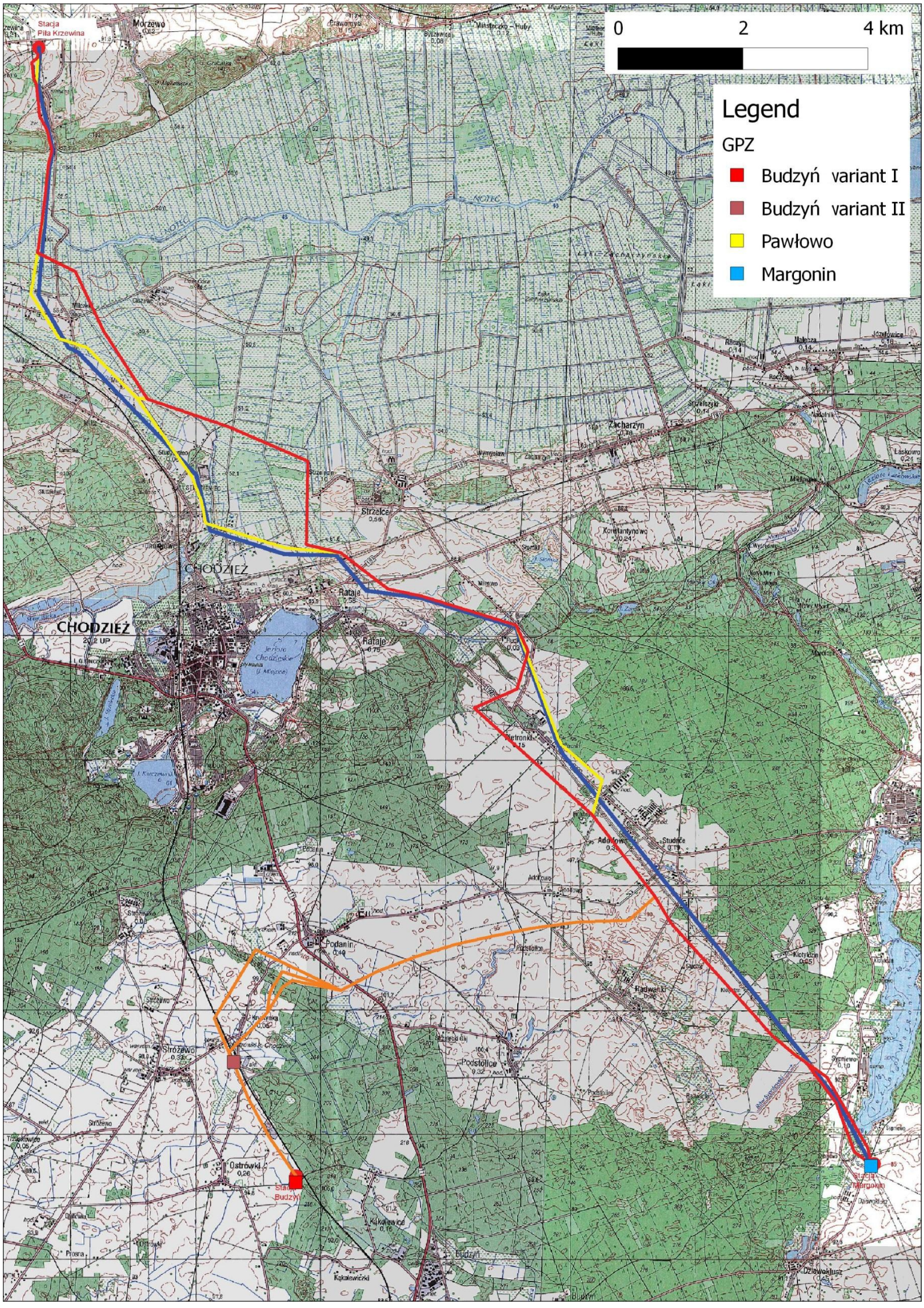
Pawłowo-Budzyń WF (currently at the stage of obtaining an environmental decision) is located 6,2 km in the south-west of Margonin WF (Pic. 1). The energy produced in the farm will be transmitted to substation located 2 km in north-east of the farm (probably in the vicinity of Ostrówki or Stróżewo villages), and then it will be delivered via 110kV cable or overhead power transmission line to Margonin substation and further, together with energy produced on Pawłowo-Gołańcz WF, via newly designed Margonin - Piła-Krzewina 110kV line it will be transmitted to NES. When the new line is completed, Pawłowo Budzyń WF will be capable of transmitting 40,5 MW to the NES, but as a target the possibility of 82MW transmission will be negotiated with NES operator. Below in Pic. 3 the scheme of target connection of the whole complex of wind farms is presented. The elements which are currently on the conceptual stage or which are obtaining any necessary environmental decisions were marked in red.



Pic. 2. The scheme of target connection of the whole planned complex of wind farms to NES.

The several infrastructural investments are connected with construction project of complex of wind farms described above:

1. The existing 110kV OPTL, connecting the Margonin substation (in Sypniewo village) with Piła-Krzewina substation, with the length of 24,3 km.
2. The existing Margonin substation in Sypniewo village;
3. The completed Pawłowo substation in Rybowo village;
4. The completed 110kV OPTL connecting Pawłowo substation in Rybowo village with Margonin substation in Sypniewo village;
5. Designed cable or overhead power transmition line connecting Margonin substation in Sypniewo village with Piła-Krzewina substation (target power evacuation line from Pawłowo-Gołańcz and Pawłowo-Budzyń WFs);
6. Designed cable or overhead power transmition line connecting Pawłowo - Budzyń WF substation with power transmition line from Pawłowo - Gołańcz WF described in point 3 above;
7. Designed Pawłowo - Budzyń WF substation probably located in the region of Stróżewo or Kąkolewice villages.



Pic. 3. The expected course of high voltage power transmition lines to Piła-Krzewina substation.

Explanations: blue line – the existing OPTL from Margonin WF (and – temporarily – from Pawłowo –Gołańcz WF) to NES,
red line – target power evacuation line from Pawłowo-Gołańcz WF and Pawłowo-Budzyń WF to NES,
yellow line – the alternative option of red line course,
orange line – different options of Pawłowo-Budzyń WF connection to Margonin substation in Sypniewo village.

3. Wind turbines

The typical wind turbine consists of the following elements:

- ✓ **Foundations** – according to geological parameters: made of concrete (usually in the shape of circle or octagon with the radius of about 20m, dug to a depth of 3 m) or seated additionally on concrete poles driven into the ground (so called „pile foundation”);
- ✓ **Tower** – usually a construction made of steel and with circular cross-section decreasing in the direction of the top and the whole height of 100m, consisting of steel segments joined together;
- ✓ **Nacelle** placed on the tower and **equipped with power generator** (nacelle rotates towards the wind);
- ✓ **Rotor** – usually consisting of three blades made of fiberglass or carbon fiber, with a diameter of about 100m;
- ✓ **Hub** – the central element of the rotor responsible for the rotation of the blades.

The wind produces the lift force on the aerodynamicaly shaped blades of the rotor and sets the rotor in rotation motion. The blades of the rotor transform the kinetic energy of the speeding air into the mechanical energy of the rotor. Rotating rotor propels generator, which transforms mechanical energy on low-voltage electrical energy. Produced electrical energy is transferred to the transformer, which increases the voltage to the level required by the grid to which the wind farm is connected.

Energy production (the rotor movement) will start at the wind speed of about 3 m/s and at the speed of above 25 m/s the turbine will be swiched off. The safety of devices operation will be guaranteed by modern hydraulic and brake system, which automatically switches off wind turbine when the specified wind speed is exceeded, the devices communication system, and the system of registration and development of operation statistics of individual components (registration of so called „black box” for emergency situations). The turbines will be equipped with lightning protection devices and symbols informing about the objects location.

Wind turbine generators of **Margonin WF** (producer: **Gamesa**, model: **G90**, capacity 2MW) are installed in 100 m height towers with rotor blades of 90 m in diameter. The maximum height of single turbine reaches therefore 145 m (the tower together with rotor blades). The average annual energy production in Margonin WF (years 2011-2012) is about 268,5 GWh. Such amount of produced power corresponds with not introducing to the air over 215 300 tons of CO_2, in comparison with the CO_2 emissions produced during the same amount of energy production in the coal- fired plant.

Pawłowo – Gołańcz WF will be equipped with **Acciona AW 82/1500** turbines with nominal capacity of 1,5 MW. The foundation with the side of about 13,6 m will

be made of reinforced concrete construction. The nacelle with the rotor will be installed on 80 m height tower. Three blades with lenght of 40 m and total weight of 17,3 tons will be attached to the rotor. Currently (February 2013) within Pawłowo-Gołańcz WF 23 WTGs were erected. The Pawłowo substation in Rybowo village as well as 110kV OPTL to substation in Sypniewo village were already completed. Planned annual energy production in Pawłowo - Gołańcz WF (53 WTGs) is about 180,5 GWh. The production of such amount of the energy by conventional power plant would require the use of about 141 000 tons of coal and would correspond with the emissions of respectively: approx. 1100 tons of SO_2 per year; approx. 280 tons of NO_2 per year; approx. 150 000 tons of CO_2 per year, approx. 28 tons of CO per year and approx. 94 tons of particulate matter.

When **Pawłowo-Budzyń WF** is taken in consideration the specific type of WTGs to be installed has not been decided yet. However, for the purpose of the acoustic analysis, four types of WTGs differing from one another of height (from 80 to about 100m), rotor diameter (from 82 to 100m) and noise emission (102,5 dB to 105,5 dB) were adopted.

For Pawłowo-Budzyń WF wind turbines will be selected in such a way as not to cause exceedances of acceptable standards in noise protected areas (detailed acoustic analysis have been carried out in the EIA report).

Planned annual energy production in Pawłowo - Budzyń WF (41 WTGs) is about 175 000 MWh for the maximum WTGs configuration and about 86 411 MWh for the power of 40,5 MW. Estimations reveal that the production of such amount of energy by conventional power plant would require the use of about 83 000 tons of coal. The incineration of such amount of coal corresponds with the following amounts of pollutants emission to the atmosphere: about 165 tons of SO_2 per year; about 20,8 tons of particular matters and about 156 000 tons of CO_2 per year. The operation of the Pawłowo - Budzyń WF can be considered as a measure to avoid such emissions of pollutants to the atmosphere.

4. Project location

The complex of wind farms planned for realization will be located in central-western Poland, between Poznań and Bydgoszcz cities, in eastern part of Wielkopolskie Voivoidship. The individual wind farms included in the project will be located in open farmlands, which are mostly large arable fields intensively cultivated. For the most part the investment area is sparsely populated. The biggest settlements located adjacent to the wind farms are Margonin, Gołańcz and Budzyń, with the inhabitants number of approximately 3,000 for Margonin and Gołańcz and approximately 5,000 inhabitants for Budzyń.

The most eastern part of the complex is Pawłowo – Gołańcz WF. Wind turbines are situated:

- in the area of Gołańcz commune in Wągrowiec county among lines designated by the villages: Rybowo – Konary – Czesławice in the West, Czesławice – Potulin in the North, Potulin – Bogdanowo – Morakowo in the East, Rybowo, Chawłodno - Morakowo in the South (49 WTGs), and
- in the area of Gołańcz in Wągrowiec county –south and north of the town (4 WTGs).

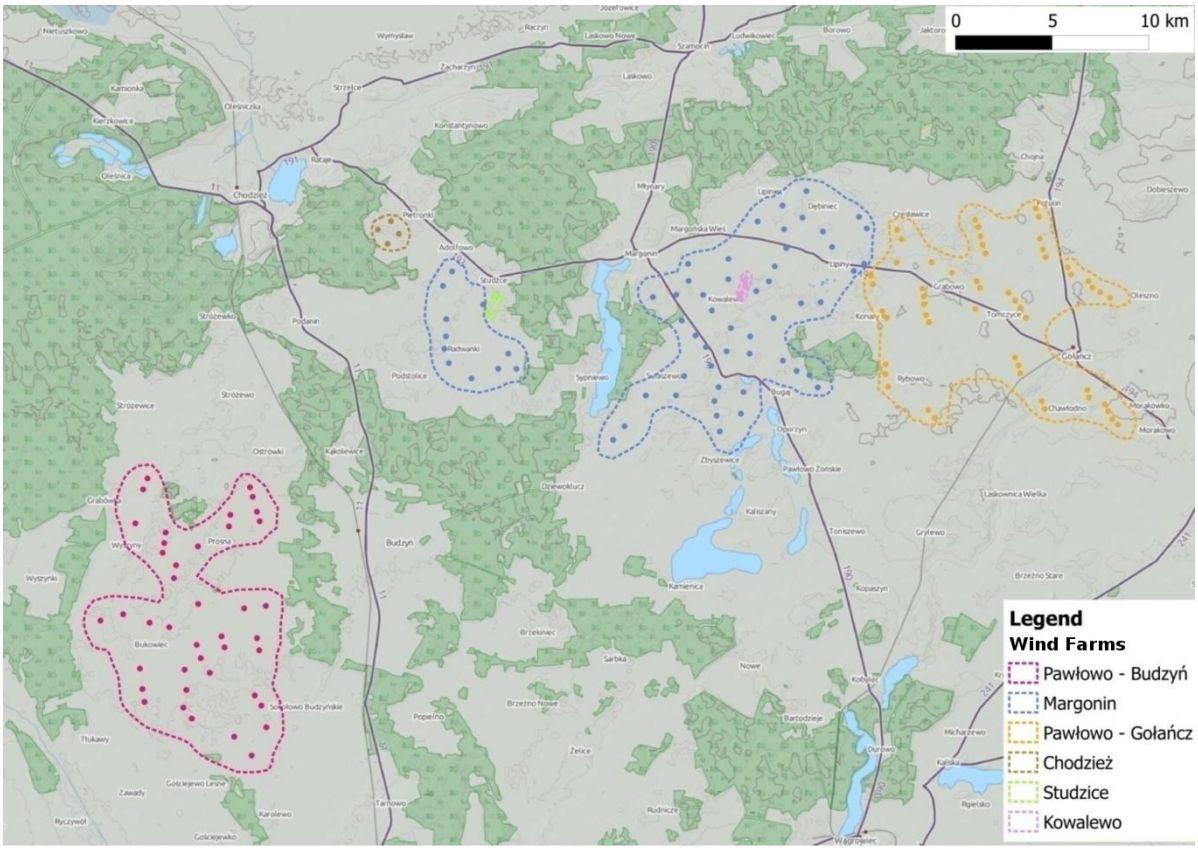
Electrical substation is located nearby Rybowo village in Gołańcz commune. High voltage line with total length of about 10 km is located in Margonin (7643 m) and Gołańcz(2253 m) communes.

The Margonin WF which is in operation since 2010 is located west of the Pawłowo - Gołańcz WF. From administrative point of view this part of the investment is located in Margonin commune in Chodzież county in the area belonging administratively to the villages: Klotyldzin, Sułaszewo, Próchnowo, Zbyszewice, Sypniewo, Kowalewo, Margońska Wieś, Lipiny and Dębiniec (Margonin East) and Studźce-Adolfowo and Radwanki (Margonin West).

The last part of analyzed complex is the Pawłowo-Gołańcz WF situated southwest from Margonin. The designed wind farm will be located in the north part of Budzyń commune on the plots of land that belong administratively to the villages of: Grabówka, Wyszyny, Prosna, Ostrówki, Wyszynki, Nowa Wieś Wyszyńska, Bukowiec and Sokołowo Budzyńskie, in Chodzież county.

All wind farms stated above were located outside major and dense forest complexes, marshy areas or areas identified as valuable for scientific interest.

In spite of the wind farms of described complex, in the analyzed area exist (or are planned to be built) the following investments of the same type (

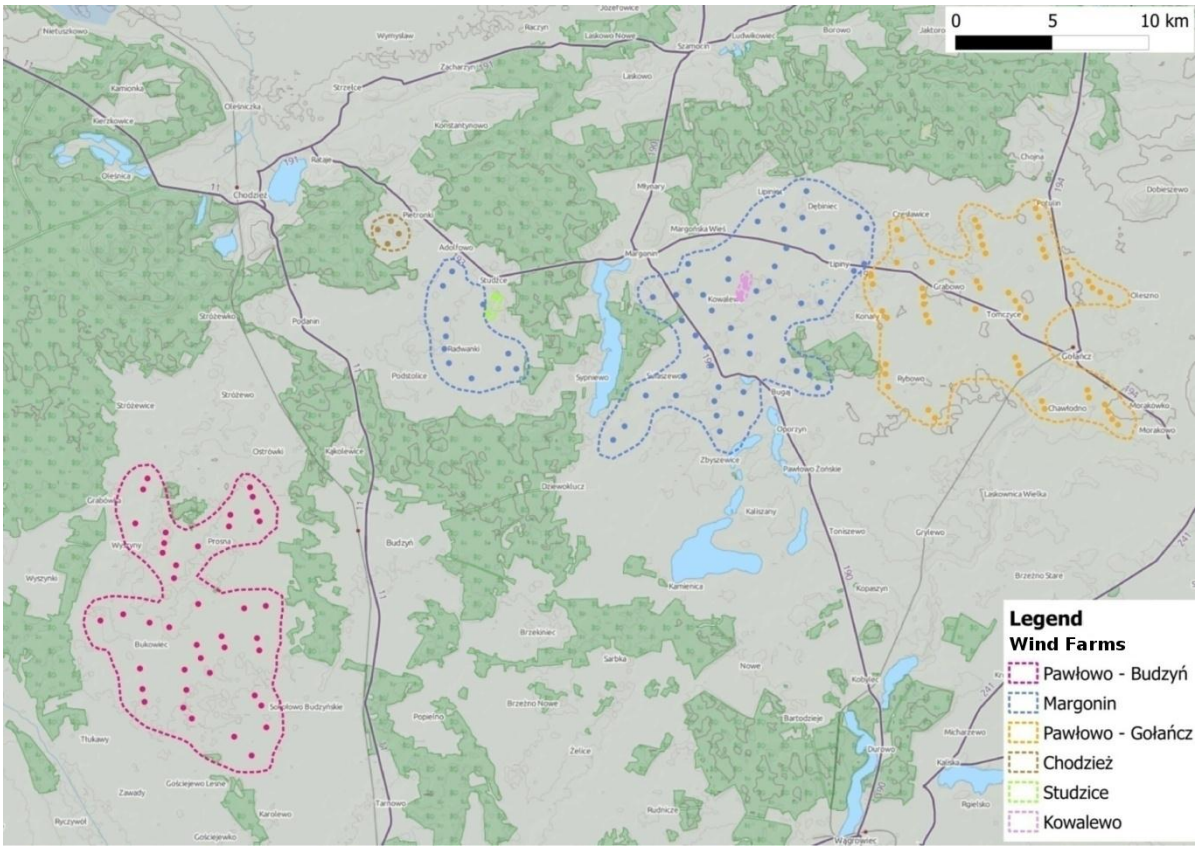


Pic. 4):

- Margonin commune – in Studźce there is an installation consisting of 2 WTGs with capacity of 600kW either;
- Margonin commune – in Kowalewo there is an installation consisting of 6 WTGs with capacity of 150 kW each;
- Chodzież commune – in geodesic precinct Pietronki it is planned to build a wind farm consisting of 4 WTGs with capacity of a single turbine of 2 MW. For the above mentioned investment the environmental decision was issued;
- Kcynia commune – in geodesic precincts Dobieszewo and Rozpiętek it is planned to build a wind farm with total capacity of 28,5 MW.

Furthermore, the information about spacial planning documents which allow the possibility of the realization of wind farm investments in some locations in Czarnków commune was gathered.

In Ryczywół, Rogowiec and Wągrowiec communes do not exist any wind farms or other investments, which could cause the cumulative impact on environment together with Pawłowo-Budzyń WF. There are no undergoing administrative procedures in above mentioned communes for an environmental decisions for wind farms.



Pic. 4. The location of Margonin-Gołańcz-Budzyń complex of wind farms relative to one other and to other investments of the same type.

5. Rationale for the project

The necessity of natural environment protection (mainly the air protection) forces all the countries to search for sources of energy other than burning solid and liquid fuels (coal, petroleum, natural gas). The alternative for such fuels are so called renewable energy sources, for which - according to the Energy Law (Act of 10th April of 1997 with further changes (Dz.U. no 54, item 348 with changes)) - are considered the sources of energy using in the processing i.a. the wind energy. Poland, as the European Union member country, is obliged to fulfill the provisions of the legislation governing the implementation of sectoral policies in Europe. Adopted by the European Union climate and energy package implies the reduction of 20% of CO_2 emission till 2020 and 20% increase of energy efficiency and the use of renewable energy sources.

Under the Directive on *the promotion of energy from renewable energy sources*, each member country is required to set up support systems to ensure maximum use of national potential of renewable energy sources. By the year 2020 Poland is required to achieve contribution of 15% of „green" energy in the whole energy balance. Compliance with these requirements, thus fulfilling the EU requirements, will not be possible without very dynamic development of wind energy sector. Taking into account all the requirements and conditions

of the environmental, social, economic and organizational capabilities, it should be noted that by the year 2020 about 6,5 GW of new capacity in wind energy should be introduced.

Planned investment fully suits the assumptions of the EU environmental policy described above. The development of wind energy is one of the ways to implement the above mentioned recommendations, which at the same time will contribute to a decrease in emissions of air pollutants resulting from thermal energy generation (i.e. greenhouse gases, SO_2, NO_2 and particular matter). Wind energy is considered to be one of the cleanest technologies. During wind farms operation in fact no pollutants are emitted into the air. It is estimated that electric energy produced by the Margonin-Gołańcz-Budzyń complex will reach about 640 GWh annually, which will reduce the greenhouse gasses emission by approximately 531 000 tons of CO_2 annualy. Assuming power limitations in Pawłowo – Budzyń WF down to 40,5 MW this amount will reach respectively 460 000 tons of CO_2. Project realization will also increase the share of energy from renewable sources in the total amount of energy produced in Poland.

Apart from saving the greenhouse gases emission, the project will also result with significant "avoidance" of post-combustion emissions to the air (see also chapter 4).

In local scale the project realization will contribute to:

- the increase of the communes income by taxes paid by the operator for commercial activities in the area,
- the increase of the income of the owners leasing the land occupied by the wind turbines and associated infrastructure;
- promotion of pro-ecological behavior of the local citizens (workshops, festivities and other actions conducted under the auspices of the Investor);
- improvement of local roads quality (repairs of existing roads and construction of new access roads to wind turbines).

6. Legislative context and public consultations

According to environmental regulations: *Regulation on disclosure on environmental information, public participation in environment protection and on environmental impact assessments*, an Environmental Impact Assessment (EIA) procedure must be performed for projects which may always have a significant impact on the environment (group I of projects) or particular ones which may possibly have a significant impact on the environment (group II of projects), or projects which may have a significant impact on an area of 'Natura 2000' protected land. The analyzed investments can be qualified to the group II of projects, for

which the preparation of EIA report can be required at the stage of obtaining an environmental decision for planned investment.

Realization of individual investments of analyzed complex in Wielkopolskie Voivoidship required EIA report preparation. Currently in the preparation phase is EIA report for Pawłowo – Budzyń WF (Decision issued by Major of Budzyń Commune on 13th of July 2012, symbol: GKM.6220.4.2012).

With respect to the wind farms in **Margonin and Gołańcz communes**, that already have the final decisions on the environmental conditions, all information related to the planned investment, together with the EIA reports were made available to the public, involving local communities and potential stakeholders, such as institutions involved in nature conservation and environmental organizations.

An appeal on environmental decision issued on 20th May 2011 (NR OŚ 7624.08/14/10) is pending, in which the environmental conditions for the project involving the construction of „Pawłowo" wind power unit together with associated infrastructure with a total capacity of 73,5 MW located in Gołańcz commune were established. This is subject to legal review.

Announcements of planned construction of Margonin WF and Pawłowo-Gołańcz WF were made available at the place of the investment realization (individual villages). The EIA reports were published on web-site of the commune: www.margonin.pl. and public information bulletin of Gołańcz commune: http://bip.golancz.pl/wiadomosci/archiwum/2/wiadomosc/122023/postanowienie_o_odwieszeniu_postepowania_w_sprawie_wydania_decyzji. Under the current regulations Regional Directorate for Environmental Protection (RDOŚ) in Poznań and State District Sanitary Inspector (PPIS) in Wągrowiec, were informed about planned investments. The environmental impact assessment reports for Margonin, Pawłowo-Gołańcz and Pawłowo-Budzyń wind Famrs are available also on the inwestor web page:

http://www.edpr.com/sustainability/documents-library-and-publications/

Additionally, the municipality of Margonin community was informed about the project by the articles published in the local press (i.a *Margoniński Informator Samorządowy*, local county magazine „*Chodzieżanin*", „*Tygodnik Nowy*"). Decisions on environmental conditions for Margonin East WF were issued on 31st of March 2008 (separately for five circuits, as it was requested by Investor), and for Margonin West WF – on 27th of April (two environmental decisions), and for one single turbine – on 14th of August 2008.

For project in **Gołańcz commune** the local society could take part in the public consultations in June and July of 2009r, in October 2010 and in July and August of 2011, during which the gathered participants were informed about the potential environmental impact of the planned investment, especially about the impact on the landscape, acoustic environment, in the context of phenomenon of shadow flicker and infrasounds. After each of the

consultation meetings representatives of the local community and environmental organizations had the opportunity to submit their comments and proposals on hands of Investor and authority responsible for the issuing environmental decision, and each application was analyzed and discussed. Further consultation meetings were used to discuss the actions taken by the developer to meet the expectations of the local community. As a result of the dialogue with the public, Investor i.a decided to remove two WTGs, despite the lack of environmental contraindications for their implementation. Finally Pawłowo-Gołańcz WF recived environmental decision on 21st of September of 2011 (for 73,5MW) and on 20th of May 2011 (for 6MW). The investor respectively obtained building permits for individual elements of the investment and associated infrastructure.

During the current administrative and planning procedure concerning **Pawłowo-Budzyń WF**, including environmental impact assessment of „the Local Master Plan for Budzyń Commune" no social conflicts were observed. The information contained in the VI/2003 from the Budzyń Council session report dated 30th of June 2003 shows, that the project of the local zoning plan was presented to the public in the period from 24th of April to 22nd of May 2003 and within the statutory time limit any comments or complaints concerning its records weren't received.

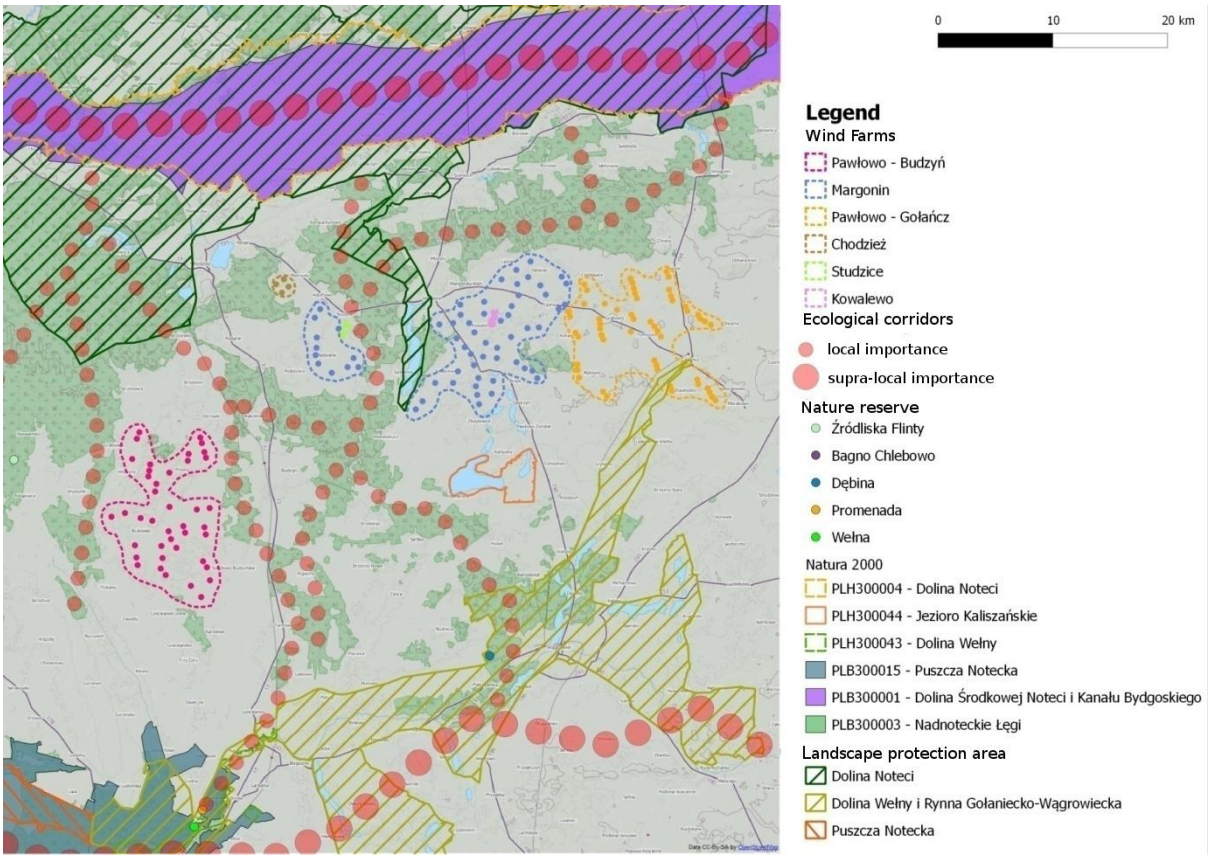
The application for environmental decision for the above mentioned project realization was submitted on 20th of April 2012 to the Mayor of Budzyń Commune. Parties to the proceedings, and so indirectly also the society, were informed about the next stages of the administrative proceedings through announcements placed on the community bulletin board of Budzyń commune and other communes located in the vicinity of the acoustic impact of planned investment (Ryczywół and Chodzież communes), on the website of public information bulletin of Budzyń commune and on notice boards in the areas of villages: Bukowiec, Wyszynki, Wyszyny, Grabówka, Prosna, Ostrówki, Sokołowo Budzyńskie (Budzyń commune), Tłukawy, Zawady, Gościejewko (Ryczywół commune) and Stróżewo and Stróżewice (Chodzież commune). With the decision dated 13th of July 2012 (signature: GKM.6220.4.2012) the investment was imposed the obligation to carry out the environmental impact assessment. From this moment the procedure is conducted with the participation of the public. Additional consultation meetings are planned once the EIA is disclosed with specialists from various fields will answer questions on the implementation of the project described above.

7. The quality of natural environment before project realization

Complex of wind farms planned for the implementation in wielkopolskie voivoidship was located on farmland away from environmentally sensitive areas, including the areas protected under the Nature Conservation Act (Pic. 5). The nearest Natura 2000 special bird

protection zones are situated at a distance of respectively about 6,8 km from Pawłowo-Budzyń WF (the area of „Puszcza Notecka"), about 10 km from Margonin WF, about 11,5 km from Pawłowo-Gołańcz WF (the area of „Dolina Środkowej Noteci i Kanału Bydgoskiego"). Whereas Natura 2000 special habitats protection zones are situated respectively: „Jezioro Kaliszańskie" – about 5 km from Margonin WF, about 7 km from Pawłowo-Gołańcz WF and about 9,5 km from Pawłowo-Budzyń WF; „Dolina Wełny" - about 7,5 km from Pawłowo-Budzyń WF; „Dolina Noteci" – about 10 km from Margonin WF, about 14 km from Pawłowo-Gołańcz WF and about 15 km from Pawłowo-Budzyń WF (Pic. 5). None of the protected areas included in Natura 2000 european network, nor other forms of nature conservation are located within a significant impact of Margonin-Gołańcz-Budzyń wind farms complex.

Through the investment area do not run any ecological corridors of local and supra-local importance (Pic. 5).



Pic. 5. The location of complex of wind farms in Margonin, Gołańcz and Budzyń communes relative to environmentally sensitive areas.

Locations of individual wind farms of analyzed complex were inventoried during pre-investment recognition of birds, bats and vegetation. During observations in **Margonin WF** it was found out, that these terrains do not include areas particularly valuable for birds such as attractive foraging areas, routes of regular migrations, routes of regular flights in search for food or nesting sites. The same as in case of wind turbines, the 110kV OPTL runs mainly

through rural areas, not classified as particularly important from nature conservation point of view. Only part of the line on the distance of 4 km crosses Noteć River, 3,3 km of which takes place in the Natura 2000 areas, including special bird protection zones as well as special habitats protection zone.

Data from **post-construction monitoring** in the period of March 2011 – February 2012 carried out in Margonin WF confirmed that the local avifauna is not particularly rich. During that period about 40 000 bird individuals were observed which represented 128 species – most of them commonly occurring in agricultural areas across the whole country. At the same time about 1200 bat individuals were observed which represented at least 9 species (some voices could not be recognized for specie determination). Data was statistically analyzed to determine the relationship between the observed species versus number of individuals and the distance from the nearest wind turbines and the areas of bats residence. During post-construction monitoring data concerning mortality of birds and bats on individual turbines was also collected.

On the basis of these results the following conclusions were drawn:

- Margonin WF had low impact on birds mortality. During the whole year of observations 17 dead birds were found (among them only one key specie - *red kite*). Birds mortality rate was 0.28 individuals per WTG;
- The bird species assessed as of the largest potential for collisions were: *red kite* (the whole year) and *marsh harrier* (during autumn migration).
- The largest birds concentrations occurred on its outmost parts, however, some predators *(marsh harrier)* preferred internal parts of the wind farm;
- Margonin WF had low impact on bats. 26 casualties were found, which corresponds to the bats mortality rate of 0.43 individuals per WTG.

When the arrangement of individual turbines was decided Investor took into consideration the recommendations of birds and bats monitorings. Communication between water reservoirs valuable for birds (Kaliszańskie Lake, Czeszewskie Lake, fishponds in Łukowo) was enabled. The annual bird surveys revealed that the project does not affect the migration routes of birds. Additionally, it was observed that both intensity and height of bird flights decreases when the wind strength increases. The impact of the investment on protected areas and ecological corridors was not observed. Agricultural character of the investment location means that space is to a small extent used by the animals and vegetation is relatively poor. Therefore, the impact of the project on wildlife will be insignificant, which was shown in EIA procedure.

Data from birds monitoring on **Pawłowo – Budzyń WF** revealed that the area is characterized by typical species of agricultural landscape of Wielkopolska region. A big set of

birds was observed, but it is rather the result of high intensity of bird observations in the area than its actual attractiveness. This is confirmed by the presence of rare and sparse species only during single observations. In the area covered by the study no significant migration routes were identified and occurring flights were typical for land used for agricultural purposes. The majority of birds moved on non-collision height (55,5% moved below and 10,6% above the reach of rotor blades). At a height above rotor blades mainly large birds flew such as *geese*, some *passerines*, *birds of prey*. The migration directions of birds, coincide with the general trends observed in nature. During the period of autumn migration, west and south-west directions were dominating whereas in spring time - north and north-east directions. 19 species of birds nesting at low densities in the study area have been observed. On this basis, the areas excluded from the investment have been proposed. Among other places, the areas with a radius of 500m from the identified *marsh harrier* nesting terrains and foraging places of *lapwings* flock, were excluded from the implementation of wind turbines. The construction of five wind turbines in the vicinity of Wyszyny village in north-west part of the area and 6 wind turbines in south-east part of the terrain was abandoned because of i.a. *red-backed shrike* and *sparrowhawk* observations. For reasons of protection of local bats all necessary shifts of WTGs locations have also been performed in order to maintain a safe distance between the planned investment and water reservoirs, trees and other objects.

As a result of recording of bats voices in inventoried area, 5 bat species have been identified. The total number of recorded meetings of bats at single points shows a very low activity of these mammals in the study area. In the controlled area no activity of bats at points located in open spaces (arable fields - the best places for location of wind turbines) was noted. During winter in none of controlled potential bats hiding places the hibernating mammals were found. Small number of bats indicates a low attractiveness and wealth of this area as an optimal habitat to establish larger breeding colonies.

8. Social impacts

The construction of wind farms in Margonin, Gołańcz and Budzyń communes requires neither resettlements of people nor business - during the current project implementation no resettlements took place. The area for location of wind turbines and associated infrastructure was obtained on the basis of signed lease agreements with the owners of the land.

The investment will have a direct impact on socio-economic issues in the whole area of above mentioned communes as well as on wealth of their individual residents through:

- increase the revenue of the commune from property tax (average income for gmina is 75000 pln per turbine, as example in Margonin commune there was an increase of the commune tax income by approximately 10%);

• increase of the annual income of land leasers for turbine and associated infrastructure location;

• improvement of the local communication routes (approximately 10 km of local roads were built or rebuilt in Margonin commune, and respectively about 30 km in Gołańcz commune; in the area of Budzyń commune it is planned to build about 31 km of new roads and to rebuild about 20 km of existing roads).

9. The impact of project during construction phase

Currently Pawłowo – Gołańcz WF is in construction phase. This phase is performed under environmental supervision, controlling whether the requirements of environmental decision are met during construction works. The aspects of construction phase of wind farm described below concern not only Pawłowo - Gołańcz WF but also the project realized in Budzyń commune.

The impact of this stage of wind farm realization is associated with carried out ground works (related to e.g. setting of the foundations), construction works, increased transport traffic, increased levels of noise and vibration. In situations, when groundwater draining from ground during earthworks is required, the possible disturbance of the soil layers can also cause a temporary change of groundwaters level, which will disappear immediately after the completion of construction works and will not permanently affect the groundwaters.

The construction of Pawłowo - Budzyń WF will contribute to permanent taking of 20 ha of ground in total for wind farm associated infrastructure. Construction of access roads and digging of underground cabling is associated with the movement and operation of vehicles and equipment on the project site. Locally the increased emission of exhausts and noise is expected. Due to the short-term and local nature of the phenomenon it is not expected to provide any specific solutions to protect the environment. Taking into account the distance from the housing development, this impact will be barely noticeable by the residents of the nearest villages. On the basis of sound spread analysis in the environment for the construction phase of the wind farm (based on pouring the foundation for a single wind turbine) no exceedances of the limit values of noise in the nearest noise protected areas were noticed.

During the construction works there will be no devices in use, which work could cause harm to the environment by the emission of electromagnetic field or radiation. Therefore impact of electromagnetic fields is not expected.

Carried out construction works will not also exert any significant effects on plants and animals in the area of the planned investment. Possible impact will be temporary and

may include mechanical destruction of vegetation, deterioration/transformation of habitats, harassing and deterrence of animals, falling of small animals into excavations.

Planned electrical substation will be located on the undeveloped parcel away from the forest areas and the trees.

In situation, when a few wind farms are located side by side, their cumulative effect may occur. Due to the fact that Margonin WF has been in operation since 2010, the effect of cumulation of impacts during the construction phase will not take place. Construction works on Pawłowo-Gołańcz WF are also close to completion, and Pawłowo-Budzyń WF is at the early stage of environmental procedure. Therefore, the cumulative effects of the construction phase of individual investments will not occur.

To limit the possible negative impact of construction phase of the project, the following minimization activities are undertaken:

- construction time will be reduced to a minimum;
- construction - assembly and transport works will be conducted only during daytime, except for periods of construction, during which from the technological point of view the continuity of works is required, and excluding transportation of wind turbines components;
- the operation and layovers of mechanical equipment will be carried out in such a way to eliminate the possibility of contamination of soil and groundwater by petroleum products;
- the bases of construction – assembly sites will be organized in paved areas, protected against the possibility of contamination of soil and groundwater by petroleum substances;
- the work of construction machines will be carried out under the supervision;
- movement of transport vehicles will be planned in such a way to limit the course of heavy equipment routes through built-up areas;
- the bases of construction site will be situated as far as possible from the built-up areas;
- used machinery and equipment will have a good technical condition;
- construction materials and prefabricated assembly will have necessary certificates and will correspond to the appropriate standards;

- works will be carried out taking into account the rational management of the site, with attention to the preservation of its natural values and the possibility of its current use;
- after completion of the construction works, the ground surface will be recultivated and brought to a state prior to the above mentioned works;
- in the case of crossing with electricity and telecommunications cables the water courses or wooded areas not intended for felling, such transitions will be made by jacking or directional drilling in the casing pipe;
- construction sites will be equipped with portable toilets with tightly sealed selectable containers; domestic waste will be disposed to the wastewater treatment plant by vacuum tracks;
- adequate waste management will be provided in accordance with the *Waste Act* and local commune regulations;
- deep excavations will be protected against the entry of animals;
- roads and cables will be carried out in such a way to avoid - as far as possible – any nature valuable areas;
- trees and shrubs not intended for felling adjacent to the areas of construction works or road infrastructure will be protected against damage and works in their neighborhood will be carried out with particular caution;
- in case of trees or shrubs removing it will be required to obtain prior permission for such activities;

10. The impact of project during operation phase

Research conducted for the assessment of the environmental impact of individual investments and the results of carried out public consultations showed, that the impact of the operation phase of the investment can mainly concern the increased noise emissions, landscape changes and the impact of investment on the local fauna of birds and bats. In addition, this summary presents the issues related to the effect of flickering shadows and the electromagnetic field.

Noise generation

Described wind farms form a large complex of investments. Due to that fact the simultaneous operation of individual elements of the project can theoretically lead to cumulative effects occurrence. Wind farm operation will lead to **noise emission** (mechanical noise, aerodynamic noise, infrasounds). Acoustic modeling prepared for the investment purposes forced such placement of turbines, which ensures compliance with the acceptable

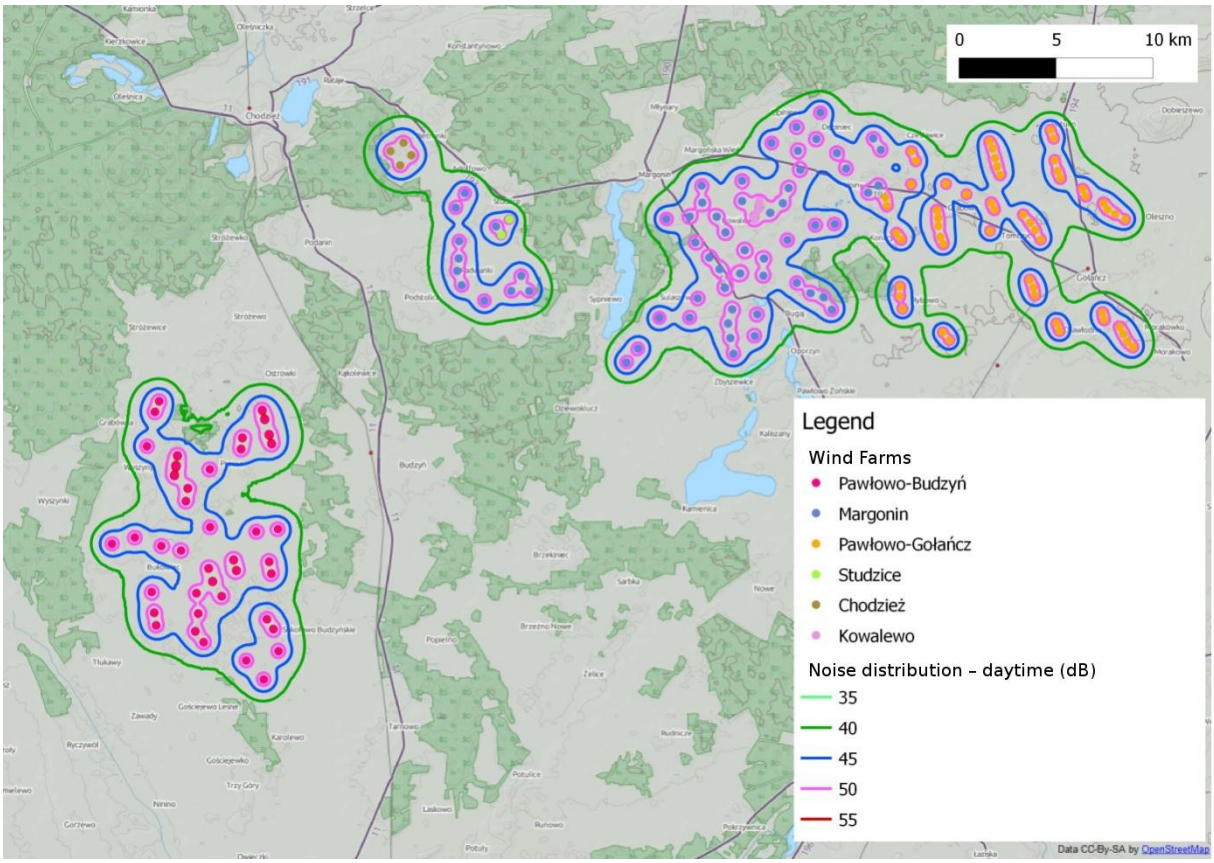
standards in the nearest residential areas. The measurements conducted on Margonin WF in April and May of 2010 (after the start of operation of the Wind Farm) by Eko-Pomiar company and Voivoidship Inspectorate of Environmental Protection (WIOŚ) did not reveal any noise level exceedances for night time, which is more restrictive than during day time.

The analyzes were repeated in January 2011, in less favorable conditions of noise propagation (lack of vegetation, that partially absorbs the sound waves). The measurements were used for preparation of numerical model of noise distribution. The model revealed, that in the least favorable weather conditions occurring during three winter months, noise standards in night time may be exceeded for 45 WTGs and for 11 WTGs also during spring time and in autumn.

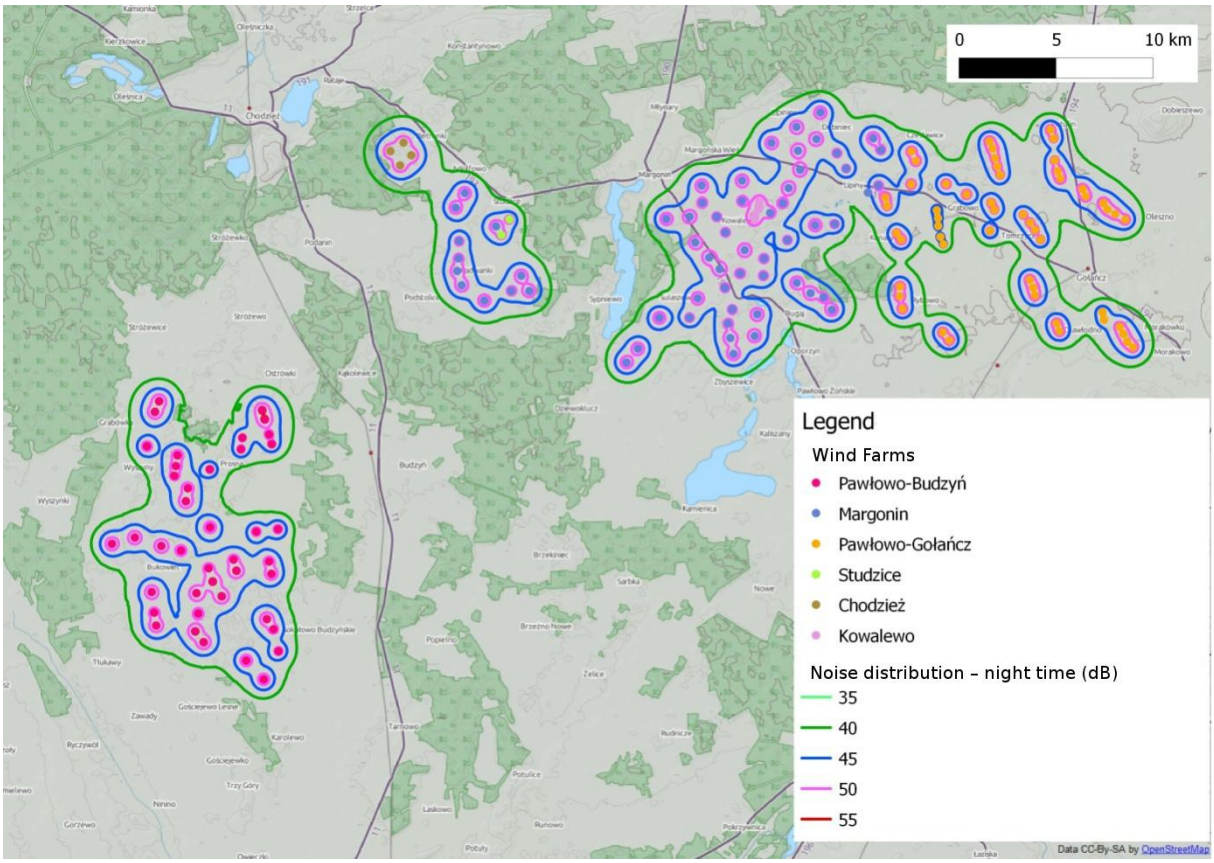
The measurements were repeated at the turn of July and August 2011. On the basis of the results obtained it was decided that implementation of noise reduction systems (NRS) in selected turbines during night time (between 10 p.m. and 6 a.m.) is necessary but only during certain atmospheric conditions (wind speed and its direction). The NRS system has been installed in 32 WTGs and it will be switched on first of all during three winter months (and in case of 10 WTGs also in spring and autumn). Additionally, one of the wind turbines will be switched off in particular meteorological conditions during night time of three winter months.

So far one complaint concerning noise emissions was recieved by the Voivoidship Inspectorate of Environmental Protection (WIOŚ) in 2010, which was submitted by Adolfowo village citizens. Control noise measurements did not reveal any breaches of the noise level standards.

Analogously after the start of operation of Pawłowo-Gołańcz WF and Pawłowo-Budzyń WF, acoustic tests will be carried out. Post-construction measurements will enable the real noise emissions estimation. In acoustic modeling conducted for the purposes of Pawłowo-Budzyń EIA report, the cumulative effect of all mentioned investments was taken into consideration. Due to a significant distance of various elements of individual parts of the investment from Pawłowo-Budzyń WF, the cumulation of **acoustic impacts** that could lead to exceedances in noise levels **will not take place**. This is confirmed by simulations conducted for acoustic analysis for Pawłowo-Budzyń WF (the results of cumulative effects for the whole project does not differ in any way from the values determined in the analysis for the single investment). The above analysis proved that, noise limits during day and night in measurement points (respectively 55dB during day time (Pic. 6) and 45dB during night time (Pic. 7)), will not be exceeded.



Pic. 6. Noise distribution – daytime.



Pic. 7. Noise distribution – night time.

Birds and bats

Post-construction monitoring on Margonin WF (data for the year 2011) indicates, that annual birds mortality caused by wind farm operation was at the level of about 0,28 individuals per WTG. This value is extremely low and significantly smaller than those caused by collisions with e.g. cars, power lines or houses. The location of 154 wind turbines (60 in Margonin WF, 53 in Pawłowo-Gołańcz WF and 41 in Pawłowo-Budzyń WF) will create some threat to local birds and bats but the expected impact will not be significant.

During Pawłowo-Gołańcz and Pawłowo-Budzyń investments planning, the Investor conducted numerous field observations in order to identify local birds population and to take appropriate steps for its protection. In light of the results obtained, the avifauna of the researched area was described as typical for rural lowlands of Wielkopolska. The areas where the investment is realized (including cable or overhead power transmission line outputting power from Margonin substation to Piła-Krzewina substation) were not recognized as valuable from the point of view of nature and its conservation needs.

During pre-investment bird monitorings conducted on Pawłowo-Gołańcz and Pawłowo-Budzyń WFs, a big set of birds was observed, but it is rather a derivative of intense bird watching in the area than its actual attractiveness. This is confirmed by the presence of rare and sparse species only during single observations. Annual pre-investment monitoring in Pawłowo-Gołańcz WF did not reveal bird migration routes. It was assessed that the project will not result in any significant impacts on birds and can be implemented in this form.

In case of Pawłowo-Budzyń WF different localization variants of individual turbines were taken into consideration. The analysed variant consisting of 62 WTGs was rejected in its original form because of the results of nature monitorings. The areas, where the presence of bird species nesting in low density was observed, were excluded from the investment. Because of i.a. *red-backed shrike*, *marsh harrier* and *sparrowhawk* observations the construction of five wind turbines in the vicinity of Wyszyny village in north-west part of the area and 6 wind turbines in south-east part of the site was abandoned.

The cumulative impact on birds of several investments adjacent to one another can occur in case of incorrect turbines location e.g. in the areas particularly valuable for birds such as attractive foraging areas, routes of regular migrations, routes of regular flights in search of food or nesting sites. However, data obtained during individual monitorings indicated that the analyzed complex of wind farms is not situated in the way of important migration routes and should not disrupt the movement of birds. Due to the location of the individual investments in large-scale fields their cumulative impact on bird populations can be relatively small. It is estimated that simultaneous operation of all three wind farms can cause birds mortality at the level of 15-43 individuals per year with 154 WTGs in operation. At this

point it should be noted that according to information gained during post-investment monitoring in Margonin WF, the collisions of birds concerned mainly the dominant species typical for open, agricultural landscape such as *lark* or *yellowhammer*.

Theoretically, layout of turbines belonging to several wind farms adjacent to one another could modify foraging habits and configuration of breeding territories of two-habitat species (e.g. birds of prey) by deterring. However, the concentration of this group of species in the vicinity of considered wind farms, is very low, thus the effect mentioned above is negligible. This was broadly analyzed in the EIA report for Pawlowo-Budzyń based on the results of pre-inwestment monitoring for the project and the outcome of monitoring for Pawlowo-Gołańcza and Margonin. The high class specialists ornithologist assessed the cumulative impact as low.

Potentially numerous turbines can also cause a barrier for migrating birds. However, the analyzed area is situated away from the important migration routes. Although Margonin and Gołańcz WFs are located relatively close to each other, their turbines have been arranged in a way which ensures free migration of birds. What is more wind turbines have been situated in open agricultural landscape, avoided by number of birds even during regular flights. In case of Pawłowo-Budzyń WF distances to other investments are large enough not to constitute a barrier in classical meaning.

What is more, wind turbines are located in large-scale farmlands, in the areas of the lowest density of birds. Therefore, the loss of such habitats for birds has marginal meaning, even if potential effect of deterring is included which means the reduction of density of nesting birds nearby turbines. On the other hand the base of the turbine, where low xerophilous vegetation grows, provides a favorable foraging conditions for many birds - mostly seedeaters.

In case of extensive farmlands which can be observed in Wielkopolska region, the fragmentation of habitats does not take place in ecological sense of this term, as the farmlands themselves are artificial ecosystem and wind turbines erection can be considered as new microhabitats creation. Transformation of fields connected with wind farms construction, creation of system of access roads and maneuvering surfaces, can influence the appearance of dry-habitat birds species, connected with human activity, such as *corn bunting*, *european stonechat* or *crested lark*. The presence of increased number of above mentioned species was indicated in Margonin WF area.

Therefore the cumulative impact of considered wind farms on significant increase in mortality of valuable bird species, their habitats loss, changing the patterns of land use or the occurrence of „cumulative" barrier effect is not expected.

The cumulative impact on **bats** may refer to increase in mortality on both seasonal and daily migration routes as well as the occurrence of loss of hideouts and feeding grounds. Post-construction monitoring on Margonin WF (data for the year 2011) revealed, that bats annual mortality related to wind farm operation was at the level of about 0,43 individual per turbine. This value is extremely low.

On the basis of annual monitorings of bats conducted on Pawłowo-Gołańcz WF and Pawłowo-Budzyń WF, it was found out, that observed bat species belonged to the most characteristic ones in the lowlands of Poland. All identified species belonged to the group of collision risk. However, the spacial and habitat surface systems leads to the conclusion, that the risk was minimized by appropriate placement of future wind turbines, first of all by moving them away from the boarders of villages and forest complexes– the main feeding grounds and flight spaces of bats.

On the basis of field studies in Pawłowo-Gołańcz WF no conflict areas connected with occurrences of bats were indicated and therefore the investment location will not cause any significant negative effects. During reproductive season bats are the animals of relatively short range of flights (up to several hundred meters) and additionally during bats monitoring on Pawłowo-Budzyń WF no bats migration corridors were found in this area. The risk of cumulative impact (there is the possibility of seasonal migration) was taken into account in instructions concerning minimization actions – the necessity to move away of at least 200 m from boundaries of water bodies, forest complexes and some roadside avenue trees – the main sites of bats foraging and flights. Therefore, cumulative negative effect of analysed wind farm complex is not expected. It is estimated, that simultaneous operation of all three wind farms can cause bats mortality in range of 48 to 66 individuals per year at 154 wind turbines in operation.

In spite of the measures to minimize the possible impacts, the risk of birds and bats collisions with wind turbines of Pawłowo-Gołańcz WF and Pawłowo-Budzyń WF still exists. For this reason conduction of post-construction monitoring of above mentioned investments have been planned, which results will allow to assess the impact of wind farms operation on birds and bats. Nature studies will be also continued on Margonin WF. In situation of significant birds (or bats) mortality, modifications in turbine work will be applied. (e.g. temporary switching off during peak of migration, in breeding period ect.).

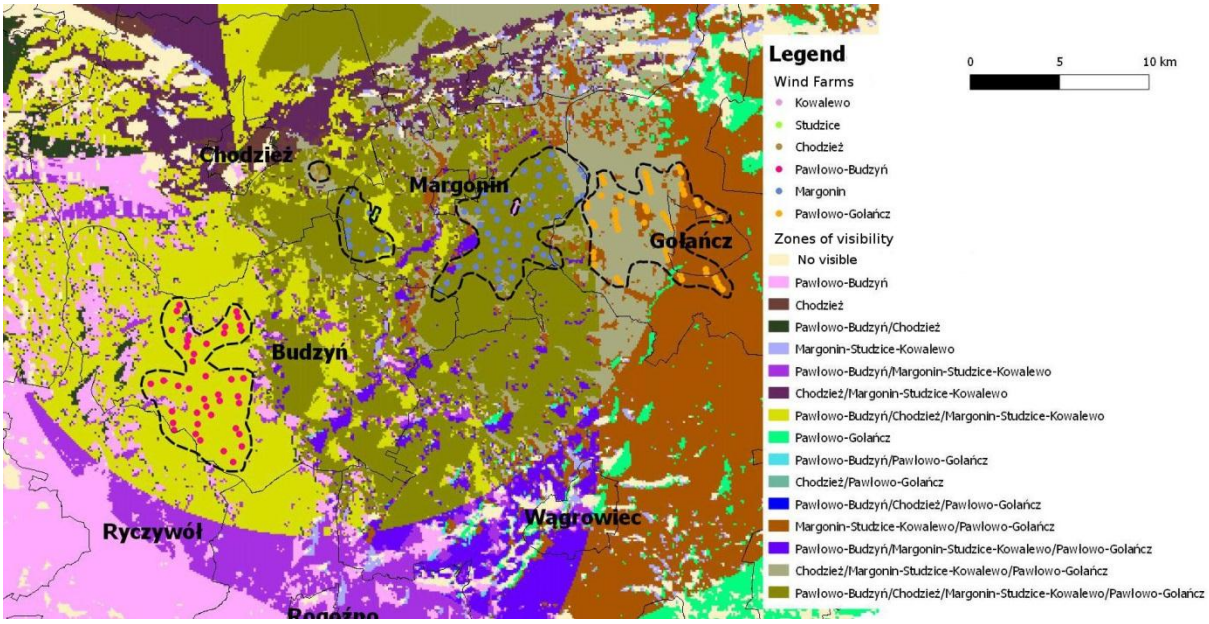
Landscape

Planned complex of wind farms consisting of three individual investments will result in changes in the landscape resulting from the emergence of dominating elements of landscape for about 25 years, which will be visible from several kilometers in favorable weather conditions. These changes, in total, will affect the areas of about 200 km^2. The evaluation of above mentioned changes is subjective and the areas for the implementation of the individual parts of planned investment are not under the landscape protection. It is expected that wind turbines, as elements unfamiliar in the rural landscape, will gain both supporters and opponents.

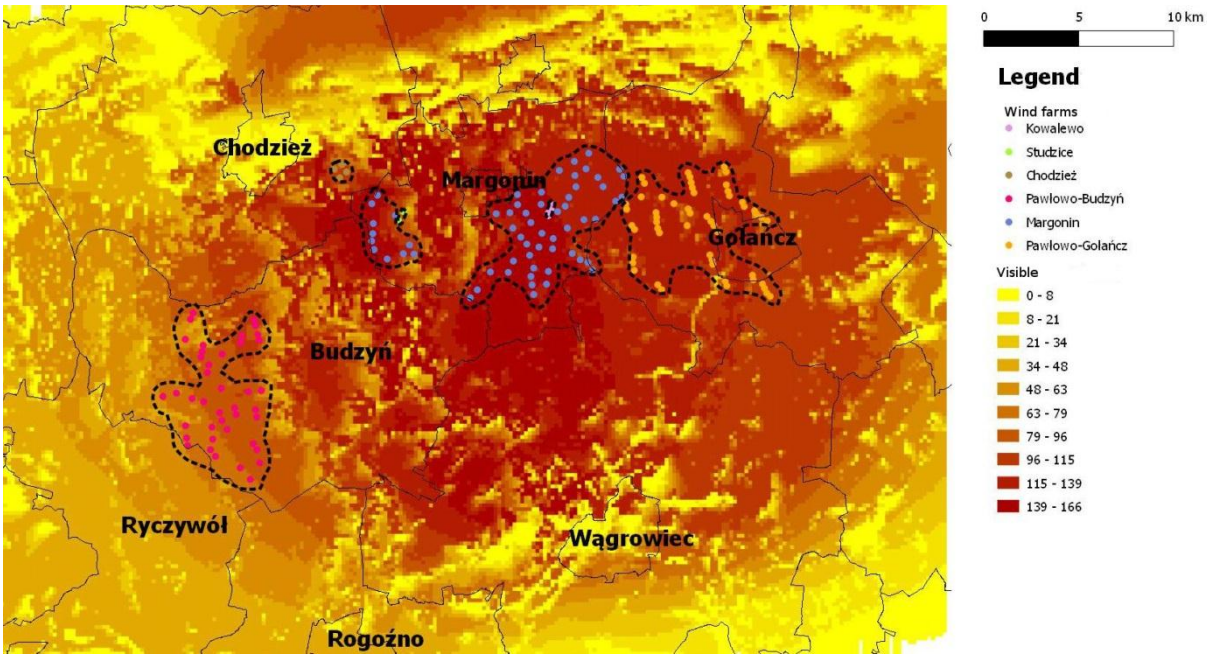
For the purpose of this investment the visualization including the cumulative effect of all existing and planned investments in the analysed area was prepared (Pic. 8 i Pic. 9). As elements dominating in landscape wind turbines will be primarly visible for local residents and to a lesser extent also for people travelling on local roads. Due to the nature of the land, the complete loss of wind turbines visibility is expected at the distance of a few to several kilometers, depending on the point of observation. The visibility will be affected by: wooded areas, dispersion of turbines and weather conditions.

Operating wind turbines will not influence historical objects. Taking into account the lack of both: areas of protected landscape and complexes of parks being under protection of conservation, the influence of the project on landscape will be significantly reduced.

The example of rural landscape with installed wind turbines is shown in Pic. 10 .



Pic. 8. Zones of visibility of individual wind farms.



Pic. 9. The number of wind turbines visible in different locations.

Pic. 10. Rural landscape with existing wind turbines.

According to the information contained in EIA reports for Pawłowo-Gołańcz and Pawłowo-Budzyń WFs, the visual influence of wind turbines will be reduced by undertaking the following minimizing actions:

- use of the same WTG type at the individual wind farm;
- use of the turbines painted a uniform light color with no visible commercial advertisements;
- painting the blades of rotor with matt, anti-reflex paint which reduces gleaming;
- as far as possible all necessary access roads should be first planned along existing ones and the construction of roads in new areas should be reduced to a minimum;
- evacuation of electrical energy from individual turbines via underground cables.

The wind farm construction, in addition to the presence of unfamiliar visual elements, is also connected with so called **shadow flicker effect**. Rotating rotor blades of wind turbines cast a shadow on surrounding areas. This effect affects local residents staying in close distance to the source of phenomenon. In Polish legal system there are no regulations concerning the shadow flicker effect or strobe effect. Therefore there is no possibility to evaluate the legal aspect of such effect. Nevertheless, the large distance of turbines from housing development will considerably mitigate such effect. The results of research conducted in Margonin WF revealed that wind turbines will have an impact on residential communities located in close distance to them in form of shadow flickering occurring during 9 to 105 hours a year, for maximum 0,2 to 1,2 hours a day. In case of Pawłowo-Gołańcz WF, the shadow flicker effect will occur for maximum 0,08 to 1,09 hours a day. In fact, this effect will be smaller when we take into account the meteorological data. The expected real effect of shading caused by the work of turbines in Pawłowo-Budzyń WF will last annually for about 35 hours – based on weather statistics.

Electromagnetic field and radiation

Due to the location of power generator at a height of 80 to 100 m above ground level (depending on the type of turbine), non-ionizing electromagnetic radiation will be limited to the area immediately adjacent to individual wind turbines, which in connection with the distance of a few hundred meters from the nearest residential areas leads to the conclusion that there is no risk of radiation caused by the investment.

The electric substation operation will be connected with the electric and magnetic fields emissions and noise emissions. Above mentioned factors will be minimized and will not lead to exceedances of the limit values outside the station area. The electromagnetic fields

measurements conducted in existing objects of the same type did not reveal any exceedances of acceptable levels in the environment.

The 110 kV line will be also the source of electric and magnetic field. The calculations and measurements conducted by research centers on existing 110kV lines with analogous construction revealed that under the evaluated section of OPTL there will be no exceedances of the permissible limits for areas accessible to humans defined in the Regulation of the Minister of Environmental Protection of 30th October of 2003 concerning permissible electromagnetic field levels in the environment. The results of analysis showed that the maximum magnetic component at the height of 2m will not exceed the permissible electromagnetic limits for areas accessible to humans (10kV/m). The limit value for housing development is 1kV/m which occurs in the distance of 10 m from the axis of the line. The distance between housing development and wires of the line will be larger than this value.. Therefore there will not be any exceedance of permissible limits for the areas intended for housing development. The magnetic component under OPTL line will be less than permissible levels. The terrain under the line was qualified as safe and not endangering people nor environment.

11. Measure aiming at limitation of the impact

The main measure used to prevent eventual negative environmental impacts of planned investment, is a good choice of wind turbines location. Thus, during the project preparation number of different locations of turbines have been analyzed. In case of Pawłowo-Budzyń WF variant consisting of 62 WTGs was analysed. This variant was rejected in its original form due to the results of nature monitorings. As a result of the studies a part of the area originally intended for wind turbines location was excluded from investing.

During the selection of locations of both individual wind turbines as well as the whole wind farms, apart from technological and economic factors the following issues were taken into account:

- existing land development and use of areas, including distribution of residential housing, forests, farming land, protected areas;
- mutual impact of individual wind farm on one another, including also possible adding up of acoustic impact;
- necessity to protect the objects of residential housing against noise;
- location of the investment from the perspective of birds and bats protection.

In order to minimize the possible impact of planned wind farms complex at the stage of operation, the Investor will apply the following preventive actions:

- waste produced during wind farm operation will be taken away by licensed servicing companies on an ongoing basis;
- wind farm will be equipped in sorbents for neutralization of possible leakages of petroleum substances;
- in order to keep the landscape values of the area no commercial advertisements will be allowed in the towers;
- during the whole time of wind farm operation, acoustic standards in the built-up areas located in the investment surroundings will be ensured;
- post-construction bird and bat 3 years monitoring at each wind farms by an ornithogical expert. The specialist hired for such works are well qualified with long years experience and broad knowledge of avifauna. ;
- in case of high mortality of birds or bats, measures to reduce the possibility of collisions will be introduced eg switching off some of the turbines under certain meteorological conditions and seasons of the year or the system which emits warnings signals to dissuade birds. The specific measures will be indentified on the basis of outcomes from post-construction monitorings; The investor keeps track on the latest solution to mitigate impact of wind turbines on birds and bats so as to choose the best option.
- after starting operation of investment the acoustic measurements to confirm the keeping of normative noise levels in the noise protected areas will be performed;
- the ice dispersion zones will be marked with boards informing about an existence of potential risk.

The existing and new overhead power line which is used to evacuate power to the GRID goes over the volley of Noteć River which is protected as the Nature 2000 Area. Currently the investor started to monitor birds, bats and other subject of protection in Nature 2000 areas in order to assess the impact on nature. Based on the results the possible mitigation measures if needed will be proposed. Worldwide very popular tool to mitigate collision of birds with overhead lines are different line marking devices.

12. Post-construction monitoring

In accordance with the acoustic analysis, it is recommended to carry out **post-construction studies of noise** emitted to the environment by the investment. Above mentioned studies will be performed in order to confirm the normative noise levels keeping in the noise protected areas. The possible need to apply the NRS system in chosen turbines will be verified together with designation of a target reduction of sound power levels and definition of trigger levels of meteorological conditions of their eventual activation (speed and direction of the wind).

Due to the necessity to confirm the correctness of conclusions drawn from the pre-investment monitoring it is recommended to conduct **post-construction monitoring of birds and bats**, as it was indicated in pre-investments bird and bats reports of individual investments. Observations will be performed in the period of respectively two (for birds) and three (for bats) years after the start of investment operation. Methodology will be the same as during pre-investment monitoring.

The monitoring of bats will concentrate on activity analysis (especially at the collision height) and the mortality evaluation (searching for dead bats in turbines vicinity). In case of detection of significant bats mortality, developer will be required to introduce appropriate minimization activities and the assessment of their effectiveness.

Birds monitoring should include a search of dead individuals (together with error evaluation resulting from the collection of dead animals by scavengers), the studies on population size, location and species composition of local population, including the assessment of response to wind farms operation of migratory and preying species connected with this area.

The results of the research should be delivered to Regional Directorate of Environmental Protection (RDOŚ) in Poznań.

13. Additional information

Any comments and suggestions on the project can be directed by all interested parties to the Investor or directly via Investor e-mail: pytania@edpr.com

All requests for additional information related to the project of Margonin-Gołańcz-Budzyń wind farms complex should be addressed to the following EDPR employees:

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Documentation connected to Margonin, Pawłowo-Budzyń and Pawłowo-Gołańcz project is available to the public on the investor web page in the documents library and publications, after writing in a search tool the keyword “Margonin”, “Budzyń”, “Gołańcz” or “Pawłowo”:

http://www.edpr.com/sustainability/documents-library-and-publications/