Combined Non-Technical Summary
BALTIC POWER OFFSHORE WIND FARM

May 17, 2023

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1. Abbreviations and definitions

ADD	acoustic deterrent devices
AIS	Automatic Identification System for all vessels with a gross tonnage exceeding 300 Mg. It provides automatic exchange of data useful for avoiding collisions between vessels and identifying a vessel for the coast vessel traffic systems.
Baltic Power DA	Baltic Power OWF development area
Baltic Power OWF Area	Baltic Power Offshore Wind Farm Area in accordance with the permit of May 9, 2012 for erection and use of artificial islands, structures and devices issued by the Minister of Transport, Construction and Maritime Economy (ref. No.: GT7/62/1165483/decyzja/2012)
Baltica 2	Baltica 2 Offshore Wind Farm
Baltica 3	Baltica 3 Offshore Wind Farm
Bałtyk II	Polenergia Bałtyk II Offshore Wind Farm (previously known as Bałtyk Środkowy II)
Bałtyk III	Polenergia Bałtyk III Offshore Wind Farm (previously known as Bałtyk Środkowy III)
biogenic substances	essential chemical elements (biogenic substances) present in each organism include: carbon, hydrogen, nitrogen, oxygen, phosphorus and sulfur
BirdLife International	international NGO dealing with the protection of birds and their habitats
Birds Directive	Directive of the European Parliament and of the Council 2009/147/EC of November 30, 2009 on the conservation of wild birds (OJ L of 2010, No. 20, p. 7, as amended)
dB	decibel – a logarithmic measure of sound (pressure) intensity
DBBC	double big bubble curtain
DEC	decision on environmental conditions within the meaning of the Act of October 3, 2008 *on access to information on the environment and its protection, public participation in environmental protection and on environmental impact assessments*
DHI	DHI Polska Sp. z o.o.
EEZ	Exclusive Economic Zone within the meaning of the Act of March 21, 1991 on *marine areas of the Republic of Poland and maritime administration*
EIA	Environmental Impact Assessment – procedure being a part of the proceedings for issuing the decision on environmental conditions, which is carried out by the authority competent to issue the decision
EIA Act	Act of October 3, 2008 *on access to information on the environment and its protection, public participation in environmental protection and on environmental impact assessments*
EIA Report	This Environmental Impact Assessment Report within the meaning of the Act of October 3, 2008 *on access to information on the environment and its protection, public participation in environmental protection and on environmental impact assessments*
EMF	electromagnetic field
epifauna	a group of invertebrate organisms inhabiting the surface layer of bottom sediments
EU	European Union
euphotic zone	uppermost layer of a body of water, the lower limit of which is determined by the depth to which 1% of photosynthetically active radiation reaches

GBS	Gravity-base foundation
GD	Grab Dredger – a type of vessel used for dredging works
HF	High Frequency
HFC	Hydrofluorocarbons
HSD	Hydro Sound Damper
Hz	hertz – unit of frequency, where 1 Hz is 1 cycle per second
ICES	The International Council for the Exploration of the Sea
IMO	International Maritime Organization
ind.	individual(s)
infauna	a group of invertebrate organisms living inside the sediment
IUCN	International Union for Conservation of Nature
kHZ	kilohertz – unit of frequency, where 1 kHz is 1,000 cycle per second
LC	by IUCN category of endangerment the least concern species (species not qualifying for one of the endangerment or near threatened categories; common species, widespread) *Least concern*
LOI	organic matter content of the sample determined as lost on ignition *Lost Of Ignition*
LUA	limited use area
Macrozoobenthos	a complex of invertebrate organisms living on the surface of bottom sediments (epifauna) or inside the sediment, remaining during the sediment flushing on a screen with a mesh size of 1 mm
MARPOL 73/78	International Convention for the Prevention of Pollution From Ships, adopted in London on November 2, 1973 along with Appendices I, II, III, IV and V and Protocol of 1978 relating to the this Convention, along with Appendix I, adopted in London on February 17, 1978
MOSB	Monitoring of Wintering Seabirds carried out as part of the State Environmental Monitoring
MW	megawatt – SI power unit
NM	nautical mile
NMFS	American Federal Agency responsible for the management of national marine resources, which published criteria for assessing the impact of noise on marine mammals, taking into account the weighted frequency of received sound *National Marine Fisheries Service*
NPS	National Power System
NRS	noise reduction system.
NT	by IUCN endangerment category, near threatened species (species close to, but not yet qualifying for, VU) *Near Threatened*
OPA	project option proposed by the Applicant
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic of September 22, 1992 (OJ L of 1998 No. 104, p. 2, as amended)

OWF	offshore wind farm
OWT	offshore wind turbines
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
phenological periods	changes in living nature phenomena occurring in annual cycles
phytobenthos	hydrophytes, which include vascular plants rooted in the seabed (e.g. sea grass) and macroalgae, which attach themselves to a hard surface (cobbles, wrecks, structures) or lie freely on the seabed
POM	within the meaning of the Act of March 21, 1991 on *maritime areas of the Republic of Poland and maritime administration* (consolidated text, Journal of Laws of 2022, item 457, as amended)
POP	persistent organic pollutants
PSE	Polskie Sieci Elektroenergetyczne S.A. (Polish Power Grid Company)
PTS	Permanent Threshold Shift
PTS (1-h accum.)	permanent shift in the threshold of hearing due to accumulated noise from 1 hour of piling
PZPWP	Spatial Development Plan for the Pomorskie voivodeship
RAO	reasonable alternative option for the project
RES	renewable energy sources
resuspension	repeated turbidity, disturbance of deposits laying on the bottom of the water body, caused e.g. by waving, drilling, drawing nets; it may be an internal source of water enrichment with (biogenic) nutrients accumulated in sediments
rms	root mean square
ROV	remotely operated underwater vehicle
RP	Republic of Poland
SAR	Maritime Search and Rescue Service
sea ducks	ducks from the Mergini tribe
SEL	Sound Exposure Level
SEL_{cum}	Sound Exposure Level accumulated over a period of one hour, such as from multiple pile driver impacts
soft-start	procedure consisting in gradual increase of the energy of driving impacts (pile driver impacts) and, consequently, gradual increase of the noise intensity in order to enable fish, birds and marine mammals to leave and move away from the area of the performed works
SPEC	the status of special concern assigned to a given bird species by BirdLife International, taking into account the category of endangerment and the nature of the occurrence of the given species in Europe and in the world
SPEC 2	an upgraded SPEC 2 rank status (species whose global populations are concentrated in Europe, with an unfavorable conservation status in Europe)

SPEC 3	an upgraded SPEC 3 rank status (species whose global populations are not concentrated in Europe, but have an unfavorable conservation status in Europe)
SPL	average sound pressure level
TBT	tributyltin – an organic compound containing tin
territorial sea	an offshore area of 12 nautical miles (22,224 m) wide, measured from the baseline of that sea
TOC	total organic carbon
TSS	Traffic Separation Scheme
TTS	Temporary Threshold Shift
VU	by IUCN endangerment category, vulnerable species (species that may extinct relatively soon, although not as quickly as endangered species) *Vulnerable*
zoobenthos	invertebrates inhabiting bottom sediments, living both on their surface and in the depth

1. Introduction

1.1. Introduction

This document constitutes a summary of the Environmental Impact Report for the Baltic Power Offshore Wind Farm (hereinafter referred to as: Baltic Power OWF). The applicant planning the implementation of the Baltic Power OWF is Baltic Power Sp. z o.o., a subsidiary of Polski Koncern Naftowy ORLEN and Northland Power NP BALTIC WIND B.V. ("Northland Power"). This document was prepared by Northland Power combining the non-technical summary sections of two Environmental Impact Assessments completed in 2021 and 2022, respectively: Report On The Environmental Impact Assessment Of The Baltic Power Offshore Wind Farm Connection Infrastructure ("EIA 2021"), and Environmental Impact Assessment Report For The Baltic Power Offshore Wind Farm ("EIA 2022"). EIA 2021 focused primarily on the onshore and connection infrastructure portion of the Baltic Power Offshore Wind Farm project, whereas EIA 2022 focussed on the offshore portion. The EIA 2021 was prepared in cooperation with MEWO S.A. and the Maritime Institute of the Gdynia Maritime University with the following subcontractors: National Marine Fisheries Research Institute and EKO-KONSULT Sp. z o.o. Company. The EIA 2022 was prepared by the Consortium of MEWO S.A. and the Maritime Institute of the Maritime University in Gdynia (formerly: Maritime Institute in Gdańsk) in cooperation with subcontractors: MIR-PIB, IFAO, Marea Sp. z o.o., DHI Polska Sp. z o.o.

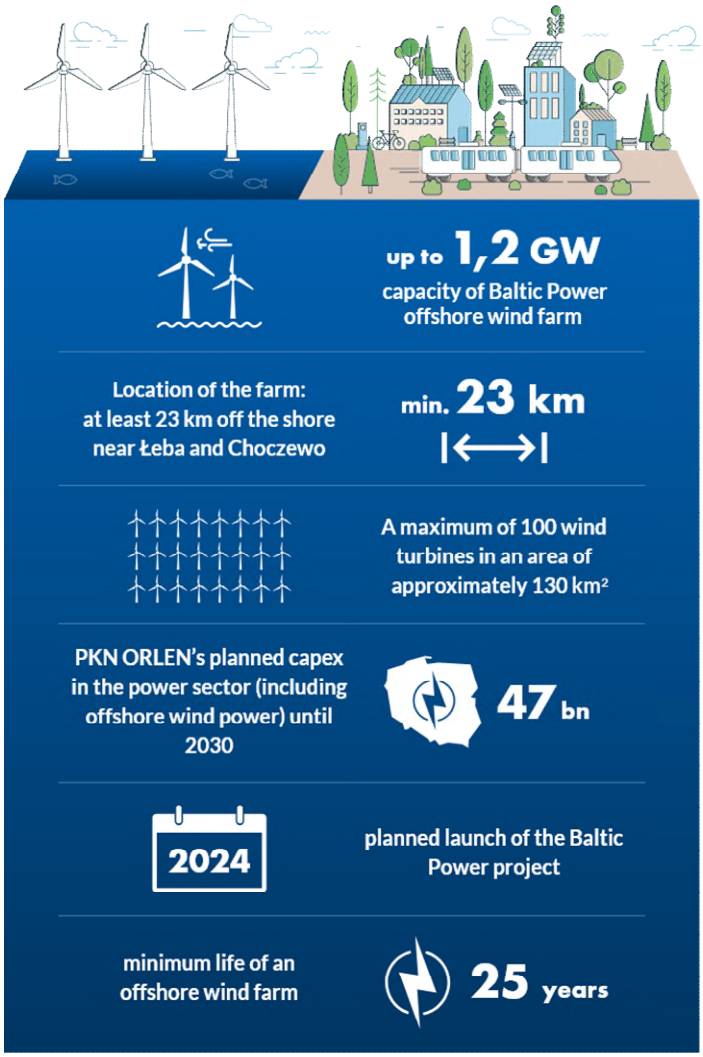

Figure 1. Key highlights of the Baltic Power OWF project

The planned project is the Baltic Power OWF and connection infrastructure, which consists of 76 wind turbines, up to 120 km of cable routes and 2 offshore substations, located in the maritime areas of the Republic of

Poland in the Exclusive Economic Zone. The purpose of the planned project is to generate electricity using a renewable energy source – wind – with a total maximum power output of 1200 MW.

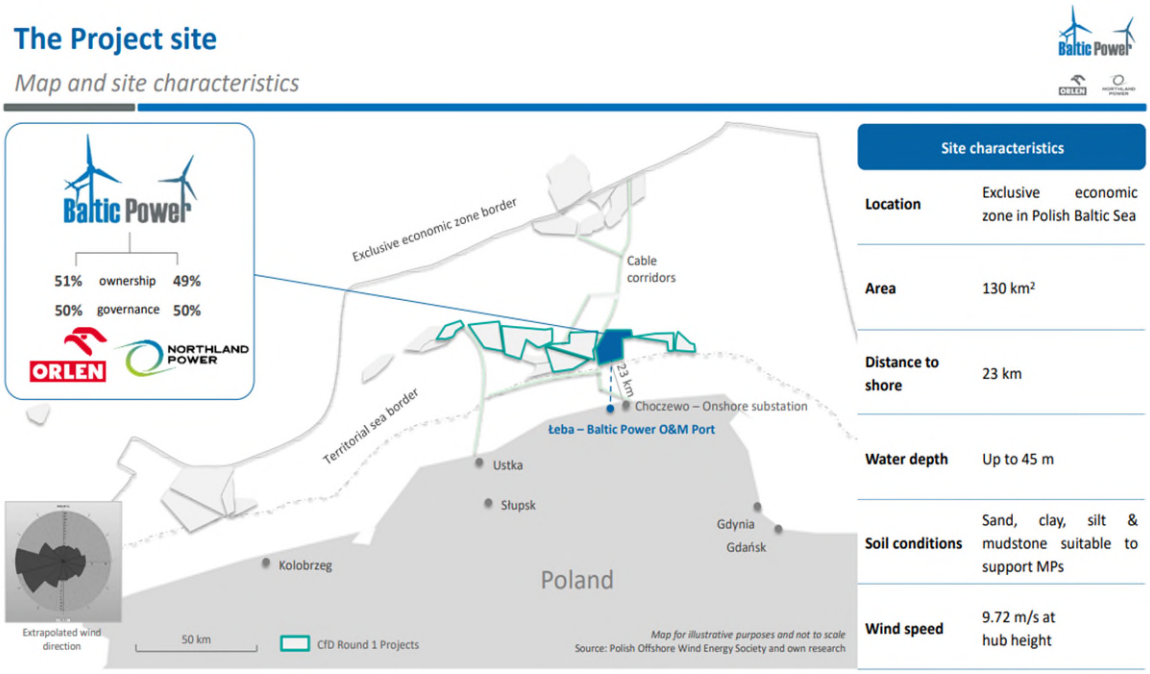

Figure 2. Site characteristics of the Baltic Power OWF project

On May 9, 2012, Baltic Power Sp. z o.o. obtained a permit No. MFW/6/12 from the Minister of Transport, Construction and Maritime Economy to erect and use artificial islands, structures and devices in the Polish maritime areas for the project entitled: "Offshore wind farm with a maximum total power output of 1200 MW, including technical, measurement, research and service infrastructure related to development, construction and operation stage", amended in 2013, 2020 and 2021.

The EIA 2021 includes an Appendix to the application for the amendment to the decision on environmental constraints, based on the act of October 3, 2008, on providing access to information about the environment and its protection, participation of the public in the environment protection, and assessment of the environmental impact. In addition, it includes a summary of the status of the decision on environmental conditions in Chapter 20.7.1. The decision on environmental conditions in question was issued by the General Director for Environmental Protection on June 29, 2022. Therefore, the authority competent to issue the amendment decision on environmental conditions for the planned project is the General Director for Environmental Protection. Pursuant to Article 87 of the Act of October 3, 2008 on providing access to information about the environment and its protection, participation of the public in environmental protection and environmental impact assessment, the provisions indicating the issue of the decision on environmental conditions shall apply accordingly to any amendments in the decision on environmental conditions.

The area of the planned project is covered by the development plan resulting from the Regulation of the Council of Ministers of April 14, 2021 on the adoption of a spatial development plan for internal sea waters, territorial sea, and Exclusive Economic Zone at a scale of 1:200,000.

1.2. Project classification

Pursuant to §2 section 1 point 5b of the Regulation of the Council of Ministers of September 10, 2019 o*n projects that may have a significant impact on the environment*, the planned project was classified as a project that may always have a significant impact on the environment because the project will have plants using wind energy for electricity generation located in maritime areas of the Republic of Poland.

The Regional Director for Environmental Protection in Gdańsk on July 22, 2021, acting pursuant to: the Resolution of the President of the National Water Management Authority, River Basin Management in Gdańsk; the Resolution of the Director of the Maritime Office in Gdynia and the Opinion of the State Border Sanitary

Inspector in Gdynia, decided to recognize, due to the impact on the Natura 2000 sites, the necessity to carry out an environmental impact assessment for the Baltic Power OWF.

The Regional Director for Environmental Protection in Gdańsk specified the scope of the Environmental Impact Assessment Report compliant with Article 66 of the EIA Act including the impact assessment for Natura 2000 sites pursuant to Article 6.3 of the Council Directive 92/43/EEC in the scope of the project impact on the subjects of protection of the Natura 2000 sites Białogóra (PLH2200030) and Przybrzeżne wody Bałtyku (PLB990002) and also on the species under legal protection. Moreover, the environmental impact assessment will cover the scope indicated by the Director of the Maritime Office in Gdynia.

The main component of the planned project will be a multi-circuit power line connecting the Baltic Power OWF with the substation of Polskie Sieci Elektroenergetyczne S.A. (hereinafter referred to as: PSE). The connection of the customer substation with the PSE substation – the power line will take the form of overhead wires, hence according to § 3(1)(7) of the Regulation of the Council of Ministers of September 10, 2019 on projects likely to have a significant impact on the environment (Journal of Laws of 2019, item 1839), the planned project is qualified as a project with a potentially significant impact on the environment.

The implementation of the planned project in the onshore area will require a permanent deforestation of an area larger than 1 ha, which also qualifies the project as potentially having a significant impact on the environment, in accordance with § 3(1)(88) of the above-mentioned regulation. Moreover, as part of the planned project, along the cable line route, paved access roads will be constructed with a length of approx. 5 km, which, pursuant to § 3(1)(62) of the above-mentioned resolution are also considered projects that may potentially significantly affect the environment.

The classification of a project that may always have a significant impact on the environment means the obligation to obtain a decision on environmental conditions (DEC) after conducting an environmental impact assessment of the project.

1.3. Premises for the implementation of the project

The construction of an offshore wind farm (OWF) is one of the strategic objectives of PKN Orlen. It is in line with the updated Energy Policy of Poland, assuming the construction, in the Polish Exclusive Economic Zone (EEZ) of offshore wind farms with a total power output of 5.9 GW by 2030 and ca. 11 GW in 2040. These actions will allow the transformation of the Polish energy industry towards the use of zero-emission energy sources, which is a response to the current climate challenges facing Poland, Europe and the world.

An important premise for the implementation of the project is the necessity to develop offshore wind energy as one of the pillars to achieve climate neutrality, which is the assumption of the EU and national policies.

1.4. Scope of changes in the decision on environmental conditions

EIA 2022 indicates in detail the requested amendments to the decision on environmental conditions issued for the Baltic Power OWF.

1.5. Objective and scope of the report

The report was prepared for the purpose of conducting an environmental impact assessment of the planned project in the context of the amendment to the decision on environmental conditions issued for the Baltic Power OWF.

The purpose of the report is to determine or specify in detail:

- Characteristics and scale of the project;
- Possible variants of the project;
- Environmental conditions, resources and values of abiotic, natural, cultural and landscape environment;
- Existing and planned use and development of sea water areas;
- Other conditions resulting, among others, from special regulations, e.g. concerning the prevention of failures or construction disasters;
- Nature, range and significance of the expected environmental, spatial and social impacts related to the construction and operation of the Baltic Power OWF;
- The possibility of avoiding, preventing, limiting and possibly compensating the identified adverse effects of the project or hazards, taking into account potential emergency situations;

- The need to formulate recommendations to be applied at the stage of designing and preparation of the investment project, its implementation and operation, as well as decommissioning;
- The need to protect people, health and living conditions of the population against negative impacts; and,
- Proposal of environmental monitoring carried out at all stages of the project.

1.6. Report background

The basis for the preparation of this report was:

- Applicant's Documentation:
  - Permit for erection and use of artificial islands, structures and devices;
  - Plan for prevention of hazards and oil pollution;
  - Navigation risk assessment;
  - Expert opinion on the impact on the safety related to surveys on exploration and exploitation of mineral resources of the seabed;
  - Documentation containing the results of environmental surveys and environmental inventory carried out in the period from October 2018 to March 2020 for the purpose of the original Environmental Impact Assessment Report (EIA);
  - Decision on environmental conditions for the project named: “Baltic Power Offshore Wind Farm” of the Regional Director for Environmental Protection in Gdańsk of September 17, 2021;
  - Decision of the General Director for Environmental Protection of June 29, 2022 repealing the decision of the RDEP in Gdańsk of September 17, 2021 in its entirety and specifying the environmental conditions for the implementation of the project named: Baltic Power Offshore Wind Farm;
  - Opinion of March 31, 2022 of the Director of the National Maritime Museum in Gdańsk in the scope of handling monuments located within the area of the project “Offshore Wind Farm complex with a maximum total power output of 1200 MW and technical, measurement, research and service infrastructure related to the preparation, execution and operation stages (“Baltic Power OWF”);
- Strategic documentation, programming and planning documents at international, national, regional and local level;
- Applicable laws.

Moreover, when preparing the EIA reports, sources of information were used, in particular environmental impact reports and other documentation for projects completed, implemented or planned, located closest to the planned project.

1.7. Findings of strategic and planning documents

The main premises for the implementation of the project include: increasing the share of renewable energy and reducing greenhouse gas emissions to the atmosphere. These premises result from strategic and planning documents.

The planned project remains in line with the expectations of many policies and strategies, in particular concerning environmental protection (reduction of pollutant emissions), sustainable development (use of renewable energy sources) and energy security (independence from external energy sources) and remains in line with the environmental objectives of the analyzed applicable strategic and planning documents.

1.8. Information on the connection of the Baltic Power OWF with other projects

In the Baltic Power OWF Area, it is planned to launch OWFs of other investors. At the moment none of these projects have been implemented. These projects are at different stages of development. Seven of them have decisions on environmental conditions, i.e. Bałtyk II OWF, Bałtyk III OWF, Baltica 2 and Baltica 3 – as Baltica OWF, FEW Baltic II, B-Wind and C-Wind.

1.9. Methodology of assessment of impacts of the planned project

The purpose of the EIA Report is to determine potential impacts of the planned project on the environment, including three phases of the planned project: construction, operation and decommissioning.

The assessment is an analytical and study work. When preparing the EIA Report, analyses of descriptive and cartographic materials were carried out, the impact assessment methodology was applied, as well as

interpretation of the results of the conducted surveys and inventories.

The EIA Report contains an analysis of the planned project in terms of applied techniques and technologies and operating conditions. Among others, the information contained in the documentation of the planned project was used and the potential impact of similar projects, which may accumulate, was analyzed.

On the basis of available data, environmental surveys and environmental inventories, significant environmental, spatial and social conditions were determined. On this basis, potential impacts and risks related to the planned project were identified. The scope and reach of the expected environmental impact were determined. Comparisons were made with analogous cases in terms of environmental conditions and the size and nature of impacts.

The approach used to assess the scale and significance of impacts results from the experience gained during the environmental impact assessments of projects planned to be implemented in offshore areas, including OWF.

The adopted approach identified comprehensive actions aimed at avoiding, preventing and limiting negative impacts related to the planned project.

Specific impacts are assigned characteristics in four categories: nature, type, range and time range of impacts.

At the same time, the resistance of receivers (environment elements) to impacts in cases of possible interaction between the impact and receiver was determined. Taking into account the assigned characteristics of impacts and the determined resistance of receivers to them, the scale (size) of impacts, specific for individual relations between the impact and receiver, was determined.

The size (scale) of the impact is described in a five-step scale: insignificant, small, moderate, large and very large.

Taking into account the prevalence of presence of the receiver, its significance and role in the environment, and in particular its protection status, the receiver, treated as an environmental resource, was assigned a value (significance) on a five-stage scale: insignificant, small, moderate, large and very large.

At the next stage of the assessment, taking into account the assigned size (scale) of the impact and sensitivity of the receiver, the significance of the impact was determined on a five-stage scale: negligible, insignificant, moderate, significant and substantial.

In accordance with the described methodology of the environmental impact assessment, a significant impact may occur if a “very large” scale of impact is determined and at the same time at least a “high” sensitivity of the receiver and a “high” scale of impact with a “very high” sensitivity of the receiver.

2. Description of the planned project

2.1. General characteristics of the planned project

2.1.1. Subject and scope of the project

The project in question is the construction and operation of the Baltic Power OWF with a total maximum installed capacity of 1200 MW, together with technical, measurement, research and service infrastructure related to the preparatory, execution and operation stages, located in the offshore and onshore area of the Republic of Poland.

The scope of the project covers its implementation consisting of three basic stages: construction, operation and decommissioning. The project will be composed of the following components:

- Wind turbines consisting of nacelles with rotors, a tower, transition pieces and monopiles embedded in the seabed;
- Two offshore substations;
- Internal power and communication lines; and
- Connection infrastructure including a 400 kV overhead line and underground EHV power cable lines (offshore and onshore).

2.1.2. Location of the project and area of the occupied water region

The Baltic Power OWF Area is located in the Republic of Poland, north of communes of Łeba and Choczewo at a distance of 22.5 km from the coastline – in the Exclusive Economic Zone, in the area of the territorial sea and

internal sea waters, as well as onshore, in the Choczewo commune area (Wejherowo district, Pomeranian voivodeship). The starting point of the planned project shall be the exit of the cables from the substations that constitute part of the Baltic Power OWF. The Baltic Power OWF will be implemented entirely in the area indicated in the permit for erection and use of artificial islands, structures and devices.

Figure 3. Location of the planned Baltic Power OWF project [Source: EIA 2022]

The land-sea interface of the offshore and onshore area, i.e. the cable line landfall, is in plots No. 3/7 and 3/6, Kierzkowo precinct, Choczewo commune (Wejherowo district, Pomeranian voivodeship). The corridor through which the Baltic Power OWF Connection Infrastructure shall be located in the area of 160.5 km of the seashore (according to the Maritime Office shoreline chainage). The planned project will be implemented within the boundaries of the coastal strip.

The planned substation is located in plot no. 17/129, Kierzkowo precinct, Choczewo commune on arable land of class 5. The current terminals of the PSE substation constitute the endpoint of the planned project.

The surface area of the Baltic Power OWF Connection Infrastructure Development Area in the offshore area is 34.60 km^2 (including: 8.46 km^2 in the Exclusive Economic Zone, 27.57 km^2 in the territorial sea and 0.01 km^2 in the internal sea waters), as well as in the onshore area – 0.54 km^2 (including: 0.45 km^2 of the cable route construction area, 0.08 km^2 customer substation construction area and 0.003 km^2 construction area of the overhead cable line that connects the planned project with the PSE power substation).

The area of the construction works shall be limited to the necessary minimum within the Connection Infrastructure Development Area boundaries. It is planned that in the offshore area the largest seabed surface area covered by the construction works (for all 4 cable lines) shall be up to 4.0 km^2 , representing up to approx. 11.5% of the Development Area.

In the onshore area, the surface area covered by construction works shall be approx. 0.16 km^2 . In the onshore Connection Infrastructure Development Area, a land with a surface area of approx. 6000 m^2 (0.006 kms) shall be designated. The maximum surface area covered by the protection area of each of a maximum of 4 cable chambers shall be approx. 80 m^2 (up to 320 m^2 in total).

The area of the Baltic Power OWF Area is 131.08 km ^{2}, while the area of the Baltic Power DA is 113.72 km ^{2}.

2.1.3. Distribution of individual components of the project

The Applicant acknowledges that the planned project may be implemented continuously as well as in stages.

EIA 2022 presents the detailed location of individual components of the planned project, i.e. wind turbines, substations, and inner array cable routes. In accordance with the practice, the applicant assumes that, as part of further project development and acquisition of further information, the final locations of wind turbines or substations and inner array cables may change up to 100 m for foundations and 200 m for cables. Such location changes will not cause changes in the environmental impact of the Baltic Power OWF.

2.2. Description of the technology

The planned technological solutions of the electricity generation process in the OWF are presented below.

2.2.1. Description of the production process

Wind turbines are plants for the conversion of kinetic wind energy into electricity by driving the power generator with the rotor driven by wind force. Mechanical energy of the rotating rotor is converted in the generator to alternating current with low voltage, which is most often transformed to medium voltage, and then to high voltage for its further transmission.

Due to the location conditions, wind farms located in offshore areas are constructed as groups of single wind turbines together with accompanying infrastructure, the purpose of which is to supply the generated electricity to an onshore substation or to supervise the availability of the OWF.

Wind turbines for electricity generation do not require the supply of other fuels and raw materials. Their proper operation does not cause pollution of the natural environment. A small amount of electricity demand occurs only in the case of windless weather. The demand for raw materials and energy, as in the case of other power systems, is associated with the process of construction and installation of structural elements of individual components of the wind farm, operation of service vessels and decommissioning.

2.2.2. Description of the technology of individual elements of the project

The Baltic Power OWF consists of four main components connected together functionally and structurally:

i) wind turbines,

ii) monopiles,

iii) inner array power cables and

iv) substations.

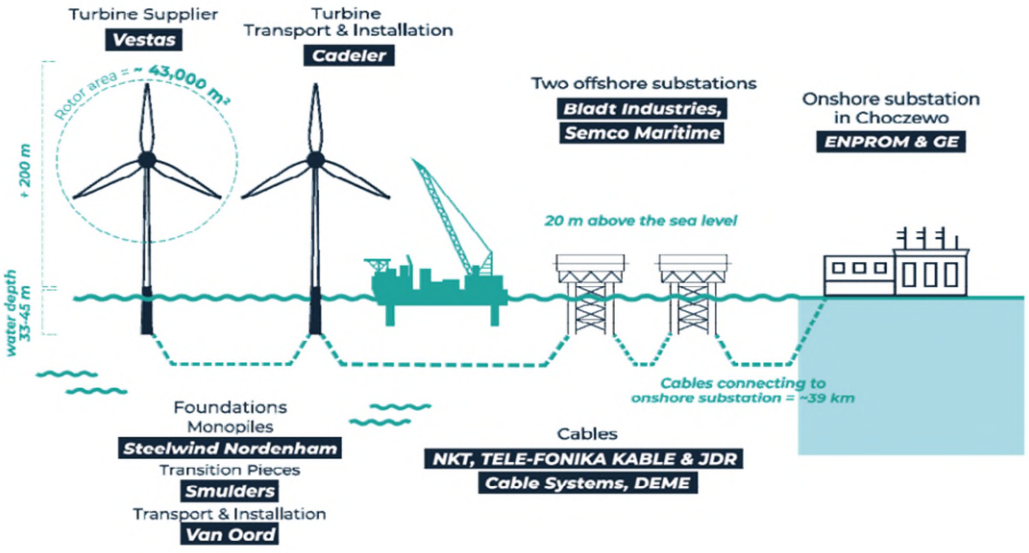

Figure 4. project contracting for the Baltic Power OWF project

2.3. Wind turbine

A Vestas wind turbine model V236-15.0 MW ™ with the blade length of 115.5 m and hub diameter of 5 m will be used in the Baltic Power OWF..

2.3.1.1. Monopiles

The wind turbine tower will be mounted on a monopile which is permanently affixed to the seabed. As part of the Baltic Power OWF, monopiles (with a diameter of 9.5 m and weight of up to 2000 tonnes) are planned to be used for the foundation of both wind turbines and substations.

2.3.1.2. Connection infrastructure

The OWF connection infrastructure includes: power grid (inner array cables) and substations.

Inner array cables of the farm connect the wind turbines with substations located within the wind farm. **Substations** are used to transform energy generated by wind turbines and transfer it to the shore.

The task of **substations** is to increase the voltage of the current from the wind turbines to the transmission level, which, in consequence, is to reduce losses, increase the transmission power and/or enable a reduction of conductor cross-section in the cables.

Electric power will be transmitted from the Baltic Power OWF with three-wire power cables of the highest voltage with an operating voltage of 220 kV or 275 kV. Power cables will be used including a necessary telecommunication infrastructure (optical fibre), which shall enable communication with the Baltic Power OWF.

2.4. Considered project options

2.4.1. Approach to determination of project options

The planned project was described using the same parameters for two options analyzed further in the EIA Report, i.e.: the option proposed by the Applicant (OPA) and the reasonable alternative option (RAO). With respect to these parameters, in the case of the OPA, these are values corresponding to the target parameters of the Baltic Power OWF, and in the case of the RAO, the maximum possible values were adopted. Such an assumption allows to perform an environmental impact assessment taking into account the highest expected level of project environmental impact.

The project was characterized by determination of the following parameters for each of the options:

- maximum total installed capacity of the OWF;
- maximum total number of wind turbines;
- maximum rotor diameter of the wind turbine;
- minimum clearance between the rotor operating area and water surface;
- maximum height of the wind turbine structure, including the rotor;
- maximum length of cable routes of the internal OWF system.

2.4.2. Considered project options together with justification of their selection

In accordance with the requirements for preparation of EIA Reports, both options adopted for assessment are reasonable, i.e. possible to be implemented in the current legal status (including as part of the issued permit for erection and use of artificial islands, structures and devices), technical and process conditions and in the current state of knowledge on environmental conditions.

2.4.2.1. Option proposed by the Applicant (OPA)

The option proposed by the Applicant uses, to the greatest extent possible, the latest technological solutions available on the market. It also assumes that the Baltic Power OWF will reach the total maximum nominal power output defined in the permit for erection and use of artificial islands, structures and devices. This option assumes possible use of 15 MW wind turbines. It is planned to use monopiles. Implementation of the Baltic Power OWF project with the total maximum power output specified in the permit for erection and use of artificial islands, structures and devices (up to 1200 MW) assumes installation of 76 wind turbines.

2.4.2.2. Reasonable alternative option (RAO)

The reasonable alternative option was based on the existing technologies currently applied and available on

the market. In this option, it was assumed that the wind turbine will have the power output of 5 MW. The assumed wind turbine power output, with the maximum total nominal power output of the OWF complex, indicated in the permit for erection and use of artificial islands, structures and devices, determines the number of wind turbines, which in this option is 240. In the RAO, it is assumed that it will be possible to use wind turbines of different types and on different types of foundations or support structures.

Figure 2 [titled Table 20.3] and Figure 3 below presents a summary of the technological and technical parameters of the planned project that differentiate the OPA (APV) and RAO (RAV).

Table 20.3. Technological and technical parameters differentiating the Applicant Proposed Variant (APV) and the Rational Alternative Variant (RAV) [Source: internal materials]

Technical parameters	Applicant Proposed Variant (APV)	Rational Alternative Variant (RAV)
Offshore area		
Length of the multi-circuit cable line (assuming that the export cables are led from each of a maximum of three Baltic Power OWF substations)	Approx. 46.8 km	Approx. 53.6 km
Onshore area		
Length of the cable line	Approx. 6.5 km	0 km
Length of the overhead line	Up to 270 m	Approx. 5.2 km
Technical belt width	Cable line – approx. 25 m, cable chamber – 80 m	Approx. 100 m
Depth and width of the trenches	Depth approx. 2m, width a maximum of 2 m for each of a maximum of four-cable circuits. In the area of cable joints, the width of trenches may be up to 6 m	Trenches will be excavated at tower locations. Trench dimensions approx. 10 x 8 m, depth approx. 4 m
Technical characteristics of the cables	Alternating current single-wire cables. Cross-linked polyethylene (XLPE) insulation	-
Number of power lines	A maximum of 4 circuits, 3 cables each	A maximum of 4 circuits, 3 conductors each

Table 23.1. List of key parameters of the Baltic Power OWF for the option proposed by the Applicant (OPA) and the reasonable alternative option (RAO) [Source: own study] analyzed in the EIA reports.

Parameter	Unit	OPA	RAO
Maximum installed capacity	MW	1,200	1,200
Maximum number of wind turbines	-	76	240
Parameter	**Unit**	**OPA**	**RAO**
Rotor diameter	m	236	180
Minimum clearance between the area of the rotor operation and water surface	m	22.3	20
Maximum height of the wind turbine	m a.s.l.	258.3	250
Maximum number of additional structures	-	2	12
Maximum length of cable routes inside the OWF	km	120	600

Both variants adopted for assessment are rational, they are feasible given the current legal status, technical and technological conditions, as well as the current state of knowledge about environmental conditions. According to further analyses of the environmental impact, the OPA is an option more favorable for the environment compared to the RAO.

2.5. Description of individual phases of the project

2.5.1. Construction phase

The construction phase requires mobilization and involvement of the largest number of vessels, equipment and human resources. It is necessary to create a complex supply chain process for both goods and specialized services in various areas: manufacturing, transport, construction, erection and installation. Depending on the adopted project implementation strategy, the activities can be carried out sequentially or in parallel.

It is assumed that the construction phase will take place in 2024-2026. Prior to the commencement of the Baltic Power OWF construction phase, the Investor will use the onshore site equipped with appropriate infrastructure (site back-up facilities and storage yards) where the preliminary erection of the wind turbine components will be performed and structural components of the OWF will be stored. This area will be located in the port or shipbuilding infrastructure existing for the duration of the project, with direct or very good access to the quayside dedicated to loading and unloading operations of vessels participating in the construction process and subsequent maintenance of the OWF. Individual elements of the OWF shall be transported from this area by vessels to the area of their foundation or installation.

Offshore area

The construction phase shall consist in the following three main stages:

1. transport and arrangement of export cables on the seabed;
2. burying of export cables in the seabed sediment;
3. export cable landing.

These works shall be carried out sequentially. Before the commencement of construction, a detailed schedule of works shall be prepared, because they require the use of specialist vessels and equipment, which must be booked well in advance.

Construction works shall be carried out by specialist vessels, for example, Cable Laying Vessels, service vessels, cable barges, and barge towboats. It is assumed that the construction phase (laying up to four cable lines and bringing the cables ashore) will be completed as quickly as possible and will be finalised within a maximum of 9 months from commencement. The start date of construction works will not depend on the time of year.

It is not expected that leveling of the seabed along the cable line routes shall be necessary. The seabed sediment which will be disturbed during the underwater works, shall be used only for burying the cables and shall not be transported to other places of the sea area or transported to the land. It is expected that part of the sediment disturbed will be subject to resuspension into the water depth and re-sedimentation at a certain distance from the location of the underwater works.

Depending on the depth and geological conditions in the Baltic Power OWF Area, the activities shall be carried out to prepare the seabed for substations and before laying inner array cables.

It is planned to use two cable laying organizations:

i) laying and burying the cable at the same time, and

ii) burying the cable after it has been laid on the seabed.

It is assumed that the disturbed sediment will be entirely managed within the Baltic Power OWF Area. The sediment will be transported only in the immediate vicinity of the work site. The monopiles will be driven into the seabed by means of special equipment (pile drivers with weight and impact energy appropriate to the size of driven piles) from the deck of vessels adapted to these works (jacking platforms or vessels or other solutions available during construction). During the construction phase, the contractor of installation works will apply the noise reduction system (NRS) during driving of monopiles.

Maritime transport will be crucial and the impact of land transport should be minimal. Land transport will be carried out as part of the existing communication solutions.

Vessels and underwater vehicles involved in the construction of the cable lines shall generate underwater noise. In the case of vessels, the noise shall be generated by the engine running, the sound of the propeller and the operation of the steering engines. In the case of equipment for underwater operations, the highest noise levels will be generated by underwater vehicles operating in the mechanical trenching technology.

In the Baltic Power OWF Connection Infrastructure construction phase, various types of waste shall be generated as a result of operation of vessels and equipment used for laying the cable line. In the process of the OPA implementation, the same types of waste will be generated as in the RAO. The variants will differ in terms of the amount of waste generated. Due to a longer cable line route in the RAO, it is anticipated that the amount of waste generated during the construction phase will be greater than in the case of the OPA implementation.

The waste and sewage generated during the construction phase shall be properly stored and secured on vessels, in accordance with a pollution prevention plan in force on each vessel, drawn up in accordance with the requirements of the Act of March 16, 1995 on the prevention of sea pollution from ships (Journal of Laws of 1995, No. 47, item 243, as amended). In harbours, waste and sewage shall be transferred to harbour reception facilities and handled in accordance with the applicable ship-generated waste and cargo residues management plan [Regulation of the Minister of Infrastructure of December 21, 2002 on ship-generated waste and cargo residues management plans (Journal of Laws of 2002 No. 236, item 1989, as amended)].

The vessels and equipment involved in offshore work will consume electricity produced by the combustion of fuel – low sulphur diesel oil (<0.1%).

Onshore area

For the purposes of the project implementation, the performance of the following work is predicted: felling of trees in the area both the area of direct construction works, as well as the areas surrounding the access roads.

The waste and wastewater generated during the construction phase will be managed in accordance with the Waste Act of December 14, 2012 (Journal of Laws of 2013, item 21, as amended). Earth masses will be managed under the conditions and in the manner specified in the decision on the construction permit. Pursuant to Article 2(3) of the Waste Act of December 14, 2012 (Journal of Laws of 2013, item 21, as amended), uncontaminated soil and other naturally occurring material excavated in the course of construction activities, providing it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated, is not treated as waste. The trenches made in connection with the implementation of the planned project will be backfilled with the excavated soil. Small quantities of excess soil, if any, will be handed over to specialist companies in accordance with the applicable regulations.

The drilling fluid remaining after the drilling process completion shall be collected by a specialist company and treated off-site. The Applicant shall allow the use of biodegradable drilling fluid. The type of drilling fluid shall be specified at a later stage of the design work.

Water will be used for drilling fluid in the amount of approx. 930 000 l and for the everyday needs of the staff in the expected quantity of approx. 4 m3 ·d.-1 . During the construction phase, diesel oil will be used by the equipment operating at the construction site in an expected amount of approx. 2500 l·d.-1 .

2.5.2. Operation phase

The OWF operation phase will be a multi-year project. Offshore wind farms will be connected with the offshore substations by means of power grids and communication networks.

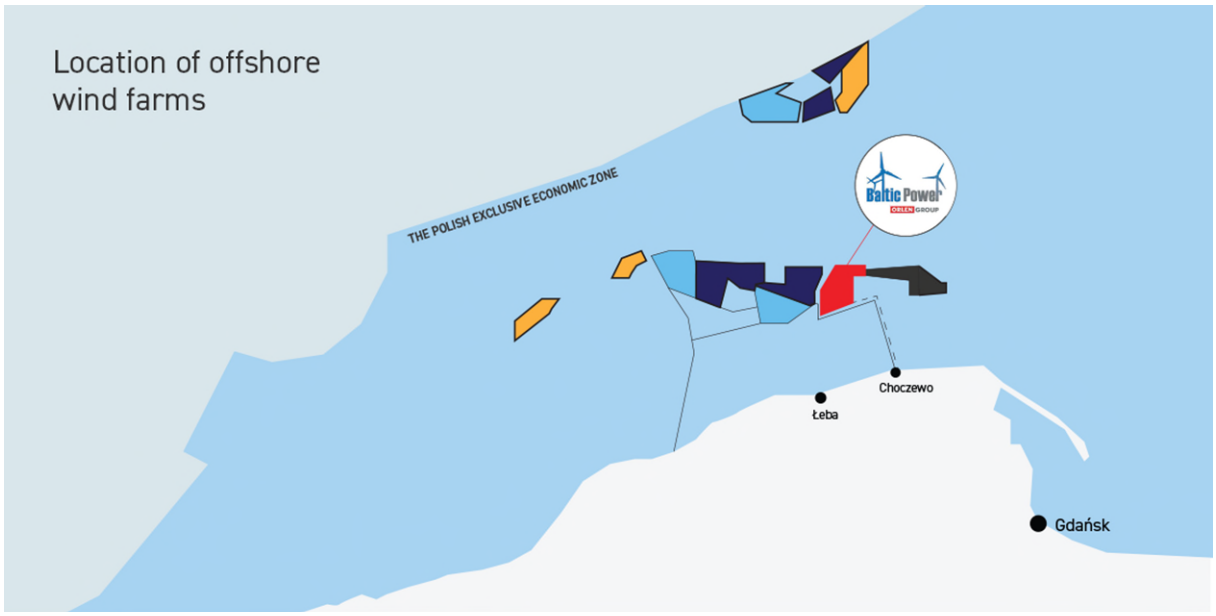

Figure 5. Location of the offshore wind farms Baltic Power OWF project

Offshore area

In the operation phase, cyclical inspections of particularly sensitive places (e.g. crossings with the existing infrastructure), as well as of the entire length of the cable lines, are expected to take place at least once every five years. In the case of a cable line failure, a cable repair may be necessary. This will result in a periodical, increased traffic of vessels in the location of failure.

The relatively small service vessels will be able to use the ports located at a smaller distance from the area of the planned project than the ports envisaged for the supporting of vessels in the construction phase, i.e. the ports of Władysławowo, Ustka, Łeba, Hel, Darłówek and Kołobrzeg or Dziwnowo.

The waste and wastewater generated during the operation phase will be properly stored and secured on vessels in accordance with the same requirements as the ones described for the construction phase.

In the operation phase, the demand for power will result exclusively from the planned maintenance works of the Baltic Power OWF Connection Infrastructure offshore part. The consumption of fuel will be mainly determined by the type and intensity of the work carried out, the size of wave motion as well as the strength and direction of wind, which affect the method of vessel manoeuvring as well as the load of power engines.

Water will be used for the everyday needs of the service vessel crews. The drinking water tanks shall be refilled during port stopovers. Once used, the water is stored in waste water tanks and transferred for treatment during the next port call.

The operation of the power cables shall involve the generation of an electromagnetic field. The special design of the cable sheath significantly reduces the range and strength of the EMF emitted, but it does not eliminate it completely. In order to significantly reduce the impact of EMF on the marine environment, it is planned to bury the cable in the seabed sediment along its entire route up to a maximum depth of 4 m. The EMF intensity decreases with the distance from the conductor. As the analyses have shown, in the case of extra high voltage AC export cables, already at a distance of approx. 1.5 m from the cable, the EMF intensity levels are negligible in the context of the impact on the marine environment. The burying of a cable at this depth or greater will neutralise the impact of EMF on the benthic and pelagic marine organisms sensitive to EMF.

Electric current, flowing through a cable, causes it to heat up, as a result of power losses on the resistance. As the temperature of the cable increases above the ambient temperature, the transfer of heat from the cable to the surrounding environment commences. The heating of sediments may lead to a change in the taxonomic composition of the benthos living on and in the seabed in the immediate vicinity of the cables. According to the OSPAR's (Convention for the Protection of the Marine Environment of the North-East Atlantic) guide on the best environmental practices in the laying and use of subsea cables, the burial of the cable at a depth of 1 to 3 m under the seabed is sufficient to prevent the rise of the sediment temperature within 0.2 m below the seabed surface, which is associated with heat emission through the power cables under load, to more than the

recommended 2°C.

Onshore area

The operation phase of the underground cable line is a maintenance-free process. Due to the necessity to ensure access to the underground cable infrastructure, a 25m strip of land will need to be deforested.

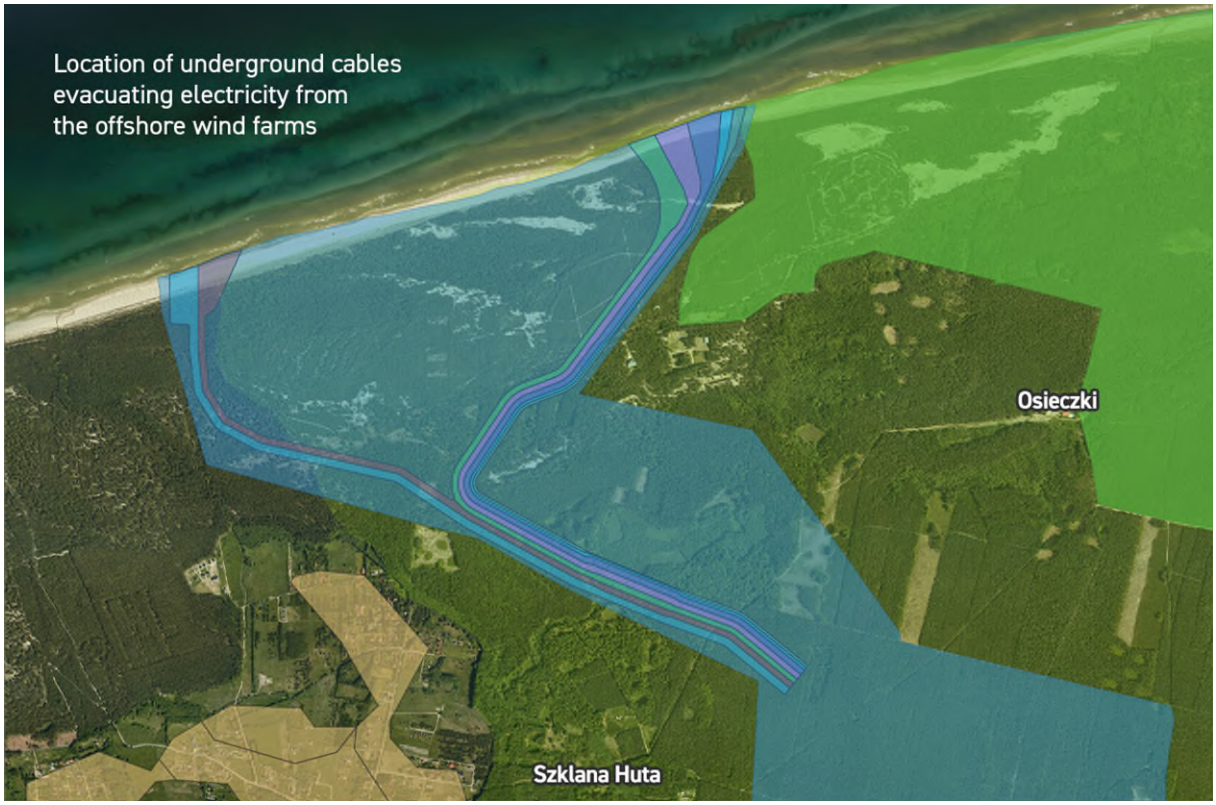

Figure 6. Location of the underground cables evacuating electricity from the offshore wind farms

During the underground cable line operation phase, there will be no need for water, raw materials, other materials, fuels, nor energy.

Power cables will be the source of an EMF, which in certain situations, at significant values of the intensity of individual field components, may unfavourably affect the environment and the health of people. In order to significantly reduce the impact of EMF on the terrestrial environment, it is planned to install the cable line in trenches with a depth of approx. 2 m. The customer substation will also be the source of the electromagnetic field.

The operation of power cables will also involve heat emission. To ensure the best conditions for cable heat dissipation into the environment, the cable lines will be covered.

Numerous results of the noise measurements conducted on the 400 kV upper voltage power substations indicate that the level of the noise emitted from the substations is constant; whereas, the noise of low-level, originating at the substation bus bar systems as well as the linear insertions depends on the atmospheric conditions to a large degree.

2.5.3. Decommissioning phase

In technical terms, the decommissioning phase is the reversal of the Baltic Power OWF construction phase. In the reverse sequence to the construction phase, individual elements of the OWF will be removed and transported to the disposal sites.

The number of specialist offshore operations related to the decommissioning phase of the Baltic Power OWF will be proportional to the number of facilities installed and constructed in the OWF Area, including also to the length of the installed power grids. Therefore, the number of operations and their impact for the OPA will be lower than for the RAO.

In the decommissioning phase, waste will be generated. When comparing its amounts for the OPA and RAO, it can be assumed that the amounts of waste and wastewater will be much higher for the RAO than for the OPA.

It is expected that the decommissioning of structures in the Baltic Power OWF Area will take place to the seabed level. In the case of decommissioning of the Baltic Power OWF, the generation of waste is related mainly to the physical removal of worn-out elements of the Baltic Power OWF, and to operations of vessels used during decommissioning.

2.5.4. Information on the energy demand and consumption

The most important factor determining the demand for energy and its consumption is the selected type of structures constructed in the Baltic Power OWF Area, and organization of the construction process, as well as the selection of the OWF operation method. The energy needed and consumed for construction of the OWF is, in nearly 100%, fuel used for transport, reloading and installation of the wind turbines and other OWF facilities. The number of specialist offshore operations related to the construction, operation and decommissioning phase of the Baltic Power OWF will be proportional to the number of facilities installed and constructed in the OWF Area, including also the length of the installed power cables. Therefore, the quantities of fuel and emission values related to transport for the OPA will be lower than for the RAO.

2.6. Risk of serious failures or natural and construction disasters

2.6.1. Types of failures resulting in contamination of the environment

The project being a subject of the EIA reports is not a place of storage of substances decisive for classification of the project as a plant with an increased or high risk of a serious industrial failure.

The main hazards that may occur during the construction, operation and decommissioning of the Baltic Power OWF are spills of oil derivative substances (mainly diesel, hydraulic, transformer and lubricating oils from ships) which will pollute the water and bottom sediments. Spills may occur due to a failure or collision of vessels, their collision with the OWF facilities, sinking or grounding of the vessels, as well as during spills and operational leaks from the vessels, spill from the oil system of the wind turbine, spill from the transformer at the substation or spill of oil related to inspections and overhauls of the Baltic Power OWF components. The number of potential leakages is proportional to the number of vessels used to implement, operate or decommission the project. To a lesser extent, the marine environment may be incidentally endangered by materials containing hazardous substances, if used. During the construction of a wind farm, on vessels, at onshore site back-up facilities and in the place where the projects are to be implemented, waste related to the construction process will be generated. The possibility of releasing waste or chemical substances into water is proportional to the activity related to the use of chemical agents.

Other types of releases include:

i) release of municipal waste or domestic sewage,

ii) pollution of water and bottom sediments with antifouling agents and

iii) release of pollutants from anthropogenic objects at the bottom.

In the worst case scenario, at the construction or decommissioning stage, there will be medium-sized spills. In the worst-case scenario, during the construction stage, III degree spills (catastrophic spills, exceeding 50 m2) will occur. It has been calculated that the probability of serious accidents of vessels is very small, ranging from 10-5 (practically impossible – 1 in 100 000 years) to 10-2 (rare – 1 in 100 years). Assuming the worst-case scenario and the release of several hundred cubic metres of diesel fuel into the marine environment, as well as taking into account its type, behaviour in seawater, the time of oil dispersion and drift, it is estimated that the range of pollution will not exceed 5 to 20 km from the Baltic Power OWF Connection Infrastructure Development Area.

It is not anticipated that during the construction and operation phases, other chemicals could be released in quantities that could cause damage to the natural environment.

Negative impact on humans and the environment may be connected to the disturbance of UXOs and chemical warfare potentially deposited on the seabed. Before the commencement of the construction, the Applicant shall conduct detailed surveys on the presence of unexploded ordnances (UXO) on the seabed. In case any chemical warfare agents/UXOs are found during these surveys, the Applicant shall notify the relevant authorities and institutions of that, and shall comply with their instructions. In order to determine the way of

dealing with such finds, the Applicant will prepare a plan for handling dangerous objects, both from the point of view of operational work at sea (for example, rules for conducting works in the vicinity of potentially hazardous objects) and from the point of view of possible removal or avoidance of such objects. The basic assumption of the plan for dealing with dangerous objects is to avoid threats to human life and health and to avoid the spread of contaminants from such objects.

Within open sea waters and close to the shore, pollution of sea waters may pose negative long-term effects on fauna, flora, fishing and beaches subject to the contamination. In order to counteract this hazard, the Baltic Power OWF systems will be equipped with measures protecting against the spill of hazardous substances. All vessels involved throughout the project will meet the requirements and will comply with the regulations resulting from the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), including in particular the procedures contained in "Shipboard Oil Pollution Emergency Plans".

Various petroleum products (lubricating and diesel oils or petrol) may spill during normal vessel operation. It should be assumed that these will be small (I degree spills, up to 20 m^3).

Areas particularly sensitive to potential pollution are protected areas. From the environmental point of view, the most sensitive areas in case of possible spillages will be the coastal area approximately between Ustka in the west and Dębki in the east. Considering the prevailing westerly wind direction and the occurrence of coastal currents, the coastal strip with tourist resorts (Jarosławiec, Rowy) and the harbours in Ustka and Łeba to the west, as well as the town and harbour in Władysławowo, are at risk.

The area of the planned Baltic Power OWF Connection Infrastructure runs through the Natura 2000 site Przybrzeżne wody Bałtyku (PLB990002), where large concentrations of wintering birds occur periodically. It should be emphasised, however, that in case of a I degree spill, the dispersal of oil derivative substances threatening the protected areas and the objects of protection in those areas is unlikely, providing that proper organisation of prevention and counteraction is ensured.

2.6.2. Environmental hazards

Potential events during the Baltic Power OWF Connection Infrastructure **construction and operation phases**, which may become a source of negative environmental impacts of the OWF, include:

i) spill of oil derivative substances as a result of ship collisions, failures or construction disaster,

ii) accidental release of municipal waste or domestic sewage,

iii) accidental release of construction materials or chemicals,

iv) pollution of water and bottom sediments with antifouling agents and

v) contamination of soil caused by hazardous substances from spills from vehicles and devices involved in construction work.

Waste and sewage will be generated by persons on the vessels and will be generated during operation, maintenance of towers and transmission infrastructure.

As a direct result of emergency situations and incidents, the abiotic environment, especially seawater and to a lesser extent, seabed sediments can become contaminated. Indirectly, these events may affect living organisms, those inhabiting or otherwise using the seabed, water depth and the surface area of the sea. The pollution of water or bottom sediments with municipal waste or domestic sewage is a negative impact, direct, temporary or short-term, reversible, of local range. The impact significance is **negligible**.

The biggest environmental hazards may result from the emergency release of petroleum products into the sea (e.g.: as a result of vessel collisions). In the case of III degree oil spill, the oil slick spatial range will be from 5 to 20 km from the spill location. The probability of such events can be considered as low.

The basic threat to Natura 2000 sites during the construction phase is the release of hazardous substances into the environment as a result of the collision of vessels. It can be assumed that this factor will not have a significant impact on protected areas.

During the **decommissioning phase** of the Baltic Power OWF, there may occur impacts resulting from the occurrence of emergency situations and other environmental hazards, in particular pollution of water and bottom sediments:

i) with accidentally released municipal waste or domestic sewage,

ii) with oil derivative substances and

iii) with antifouling agents.

There is a risk that the wastewater from the vessel enters the water at the time of collection of wastewater from the vessels by another entity and in case of failure. This may result in local increase in the concentration of biogens and deterioration of water quality. However, the contaminants should be quickly dispersed, and thus they will not contribute to a permanent deterioration of the environment in the project area.

The impacts related to the environmental hazards during the decommissioning phase are identical to the impacts described above for the OWF construction and operation phases.

2.6.3. Prevention of failures

The prevention of failures is a set of activities related to the protection of human health and life, natural environment and property, as well as reputation of all participants of the processes related to the construction, operation and decommissioning of the Baltic Power OWF CI. The highest risk of a breakdown resulting in a serious threat to the environment concerns the works performed in the offshore area. In order to eliminate or minimise such risks various actions will be taken, including among others:

- development of plans for the safe construction, operation and decommissioning of the Baltic Power OWF Connection Infrastructure in accordance with the applicable legal regulations for the duration of the project implementation;
- developing rescue plans and training of crews and personnel, including the principles of updating and verification by conducting regular exercises, in particular determining the procedures for the use of own vessels and external vessels, including helicopters;
- developing a plan for counteracting threats and pollution arising during the construction and operation of the Baltic Power OWF Connection Infrastructure;
- the selection of suppliers and certified components of the OWF;
- the designation of protection zones;
- marking of the OWF area, its facilities and vessels;
- the planning of maritime operations;
- applying the standards and guidelines of the International Maritime Organisation (IMO), recognized classification societies and maritime administration recommendations;
- providing adequate navigational support in the form of maps and navigational warnings;
- providing direct or indirect navigational supervision using a surveillance vessel or remote radar surveillance and Automatic Identification System (AIS);
- continuous monitoring of vessel traffic regarding the vessels involved in the construction and operation phase;
- establishment of a coordination center supervising the implementation of the OWF;
- maintaining permanent communication lines between the OWF coordination center, the coordinator of works at sea, and other coordination centres (Maritime Rescue Coordination Centre in Gdynia and maritime administration).

The likelihood of a major accident in the onshore part of the Baltic Power OWF Connection Infrastructure is lower than in the offshore section. Regular maintenance and servicing are intended to prevent failures.

Equipment failures in power substations are extremely rare, of low scale and are local in terms of impact. In the event of a failure, procedures are in place to limit the consequences by locating the site of the failure and controlling it as quickly as possible in order to secure the uninterrupted operation of the substation.

2.6.4. Design, process and organizational protections planned to be used by the Applicant

Design, process and organizational protections consist of carrying out navigation risk assessments and developing plans to prevent:

- hazards to human life – evacuation plans, search and rescue plans;

- fire hazards on ships involved in the construction and operation phases;
- hazards of pollution of the natural environment – plan for prevention of hazards and oil pollution;
- hazards of construction disasters.

2.6.5. Potential causes of the failure taking into account extreme situations and the risk of occurrence of natural and construction disasters

OWF structures are designed and built to withstand extreme weather conditions. All components, although subjected to extremely heavy loads, are adapted for long-term operation. All devices are continuously monitored. The rotor is stopped automatically at wind speed exceeding safe operation of the wind turbine. The service plan shall ensure failure-free operation.

In the case of the offshore area, the greatest potential risks will occur during the construction phase; however, the risk of a disaster is minimal due to the fact that the planning of offshore operations always takes into account weather conditions and the possibility of their change. Every offshore operation has its limitations in terms of visibility, wind speed, sea state or ambient temperatures. Adverse weather conditions such as extremely strong winds or high waves can only result in the extension of the construction cycle and an increased demand for energy (fuel consumption). It is not expected that during the construction and operation phases extreme situations could occur that would result in serious damage to the export cables or to the vessels involved in the construction and maintenance work. The nature of the project – laying of cable lines – also excludes the possibility of a construction disaster.

In the operation phase, damage to the underground cable line may be caused by seismic shocks and landslides (i.e.: as a result of a natural disaster within the meaning of the Act of April 18, 2002 on the state of natural disaster (Journal of Laws of 2002, No.62, item 558, as amended)). However, these events are unlikely in the planned project location. With regards to seismic phenomena, the territory of Poland is classified as aseismic (no tremors) and penseismic (rare and weak tremors), where earthquakes rarely occur and are not strong. The area of the planned project is located beyond landslides and areas prone to mass movements, and in the majority of the area, there is no risk of flooding.

Overhead lines are at much higher risk of damage, since their spans and towers can break and become overturned in exceptional cases, such as during unfavourable weather events like hurricanes and icing. Pursuant to Article 73 of the Construction Law of July 7, 1994 (Journal of Laws of 1994, No. 89, item 414, as amended), a construction disaster is understood as an unintentional, sudden destruction of a civil structure or its part, as well as structural elements of scaffolding, elements of forming devices, sheet piling and excavation lining. In this context, the planned project, due to its specificity, the location of implementation and the construction of the greatest part of the power line route in the form of cable lines buried at a shallow depth (average depth of trenches will be 2 m), will be (to a very small degree) a potential source of construction disasters and hazards to the immediate surroundings, including to the people present there. The construction of a short section of an overhead line (up to 270 m in length) will be conducted on a flat land, not overgrown with trees and shrubs, outside urbanized areas, which will favour its smooth and trouble-free implementation minimizing the possibility of construction disasters.

2.6.6. The risk of occurrence of major accidents or natural disasters and structural collapses, taking into account the substances and technologies used, including the risk of climate change.

The risk of a major accident, natural and construction disasters is minimal. The Applicant intends to use state-of-the-art technologies to ensure high reliability of electricity transmission and to comply with the relevant environmental and economic standards and requirements. The implementation of these tasks will be achieved through:

- the use of conductive, insulating and structural materials characterised by high operating parameters;
- selecting the most reliable and safest methods of power line construction;
- conducting maintenance operations.

The most significant risk may be related to the spills of petroleum products at sea, which can adversely affect the marine and coastal environment. With the standard preventive measures applied and the ones developed for the planned project, the risk of such a spill will be minimal. The probability of such events as ship collisions belongs to the category of very rare events (1 per 100 years). Taking into account the effects in the form of 200

m^3 of diesel oil emission, the risk level is within an acceptable range. Emission of 200 m^3 of diesel oil will cause insignificant damage to the environment because it will disperse within 12 hours.

The effects of climate change observed in recent decades are manifested in particular by an increase in temperature as well as in the frequency and severity of extreme events. Extreme events (heavy rainfall, floods, deluges, landslides, heat waves, droughts, storms, landslides, etc.) resulting from climate change are projected to increase in frequency and intensity in the future. These phenomena will occur with increasing frequency and intensity and will affect larger areas of the country. Climate change is associated with adverse changes in hydrological conditions. Although the annual sums of precipitation do not change significantly, their character becomes more random and uneven, resulting in longer periods without rainfall, interrupted by sudden and heavy rainfalls. It is not anticipated that climate change should contribute to the occurrence of major failures or natural and construction disasters in the context of the construction and operation of the planned project. The construction of the connection and its maintenance will be carried out taking into consideration the possibility of sudden deterioration of weather conditions, which will be especially important in the case of the offshore area. Procedures for responding to and counteracting such situations will be developed and applied. The fact that a major part of the connection is executed in the form of buried cable lines will help protect their structures from damage or destruction. Constructing the cable line landfall using trenchless methods to bypass the dynamic coastal zone and the coast, which in the long-term perspective are under the greatest influence of the factors resulting from climate change (erosive processes), will enable safe and failure-free functioning of the planned project within the entire operation period.

2.7. Relations between the project parameters and impacts

Figure 4 (Table 23.2) presents a matrix of relations between the parameters of the planned project and the impacts.

Table 23.2. Matrix of relations between the project parameters and the impacts [Source: own study]

Parameter	Type of emission or disturbance																
	Topside structures	**Substructures**	**Heat**	**EMF**	**Above-water noise**	**Underwater noise**	**Waste**	**Light effects**	**Seabed disturbances**	**Suspended matter**	**Resuspension of impurities**	**Re-sedimentation**	**Creation of artificial reef**	**Water pollution**	**Air pollution**	**Increased traffic and collision risk**	**Barrier effect \ displacement or habitat loss**
The number of wind turbines	X	X			X		X	X								X	X
Number of monopiles		X				X	X		X	X	X	X	X	X			X
Width of scour protection						X			X	X	X	X	X	X			X
Monopile diameter		X				X			X	X	X	X	X				X
Piling parameters						X											
Total height of wind turbines	X				X			X								X	X
Rotor diameter	X																X
Length and type of cables		X	X	X						X	X	X				X	X
Depth and method of cable laying/burying			X	X		X			X	X	X						
Number and size of substations	X	X		X	X			X									X
Process organization (number of vessels, time)					X	X	X	X						X	X	X	

Table 20.5. Matrix of connections between the project parameters and impacts – onshore part [Source: internal materials]

Parameter	Type of emission or disturbance							
	Destruction of the ground surface - tree felling	**New buildings**	**Noise**	**Waste**	**Sewage**	**EMF**	**Heat**	**Air pollutions**
Length and quantity of cables	X					X	X	
Voltage range						X	X	
method of cable line construction, width	X		X	X	X			X

3. Environmental constraints

3.1. Location and topography

Offshore:

The Baltic Power OWF area (1 NM) is located to the east of the Słupsk Bank and covers a fragment of the seabed with a depth ranging from 28.1 to 45.4 m. Based on the analysis of bathymetric and sonar data, a map of seabed surface types was prepared.

Within the analyzed area, three types of seabed were distinguished, different in terms of their structure and specificity, including as follows: abrasion-accumulation plain, kame terraces and accumulation platform.

In the northern and central part of the Baltic Power OWF Connection Infrastructure area, the seabed surface takes the form of an accumulation plain with areas of kame terraces. They cover the seabed with a depth ranging from approximately 20.0 to 41.0 MBSL. The seabed is slightly undulated with small height differences (0.5–1.0 m, maximally up to 3.0 m) associated with the presence of sand formations and outcrops of older sediments. The seabed slopes reach 2–3°, up to a maximum of over a dozen degrees within the slopes of the outcrops of older sediments.

In the southern part of the area analysed, there is a foreshore slope. It covers the seabed with a depth from approximately 13 to approximately 25 MBSL. In the southern and central part of the foreshore slope, the seabed is located at a depth of approximately 13 to 19 MBSL. In the northern part, it gently inclines from approximately 16–17 m to approximately 25 m of depth. In this part of the foreshore slope, the seabed slope is approximately 1–2°.

The shallowest part of the seabed in the Baltic Power OWF Connection Infrastructure route variants analyzed is the sandbank zone. It covers a strip of sandy seabed with a width of 1200–1300 m, stretching from the shore into the sea, up to a depth of approximately 13 m. Within this strip, three sandbanks have developed. The sandbank closest to the shore (sandbank 1) has the most varied, wavy course. At the time of the surveys, its ridge was at a depth of approximately 1–2 m and it was located 100–150 m from the waterline. The ridge of sandbank 2 was approximately 300–400 m from the waterline at a depth of 3.5 to 4 m. The ridge of sandbank 3 was located 800–900 m from the shore at a depth of 5–6 m.

Onshore:

In administrative terms, the planned project in both variants is located in the north-eastern part of the

Choczewo commune, Wejherowo district, in the northern part of the Pomeranian Voivodeship.

The planned project is located within the boundaries of the coastal belt: technical and protective, which is located at the boundary between two mesoregions – the Słowińskie Coast and the Żarnowiecka Upland, constituting the Koszalin Coastland macroregion. The route of the planned project in both variants is characterised by considerable diversity of terrain topography: starting with the beach and a wide strip of spit with the Wydmy Lubiatowskie dunes, running across the upland foreground with the Bezimienna Stream valley, reaching the undulated moraine plateau in the area of the customer substation.

In the area of cable landfall, the beach has a width of approximately. 30–40 m. This area is located within the shore section described as stable: for the period between the years 1875–1979, the changes of the shoreline location were minor. According to the classification of dune shore changeability, the section analysed should be classified as balanced, with possible occurrence of minor changes.

3.2 Geological structure, bottom sediments, raw materials and deposits

3.2.1. Geological structure, geotechnical conditions

Offshore:

Within the area analysed, the crystalline basement is located at a depth of approximately 3000 m. The sedimentary cover is made up of Palaeozoic formations (Cambrian sandstones and silt clay sediments, Silurian clays and Zechstein dolomites, anhydrides and rock salts), Mesozoic formations (claystones, siltstones and sandstones), as well as Cretaceous quartz glauconite sands and sands with phosphorites. Quaternary formations lie directly on the Paleogene and Neogene sediments represented by sands and silt clays often mixed with carbonaceous substances. The top of the Paleogene and Neogene formations can get easily eroded and is located at a depth of approx. 2 to more than 40 m.

The thickness of the Quaternary formations in the survey area is between 20–30 m on average. These are mainly glacial till and sandy-till sediments, fluvioglacial sandy and sandy-gravelly sediments, as well as local accumulations of clays, silts, and fine-grained sands of glacio-lacustrine origin covered with modern marine sands.

Onshore:

The planned project in both variants is located entirely within the Precambrian East-European platform within the boundaries of the Peribaltic Syneclise. On the Paleozoic sediment cover with a thickness of approximately. 2500 m, a cover of Mesozoic sediments is deposited with a thickness of approximately. 400 m. The sub-Quaternary sediments are represented by Cretaceous formations in the area of the planned customer substation and a 400 kV line. The route of the planned project in its initial section runs across aeolian sands on dunes, with local inserts of alluvial sands from valley bottoms. In the OPA, there are residual glacial tills, humus sands and alluvial muds of valley bottoms as well as endorheic depressions, and also alluvial and aeolian sands. In the RAO, after dunes and valley bottoms, the route runs across humus sands and alluvial mud as well as glacial till residuals, and also alluvial and aeolian sands. The area of the customer substation and the 400 kV line is located on glacial tills on fluvioglacial sands and gravels, as well as sandy-silty eluvia of glacial tills. For both variants, the youngest formations are the Holocene dune and beach sands.

3.2.2. Bottom sediments and soil

Offshore:

Almost the entire seabed of the area analysed is covered with a discontinuous layer of fine- and medium-grained sands with a stone and gravel abrasive boulder bed and sand cover.

The fine- and medium-grained sands create a flat and rippled cover of several meters of thickness. In the layers below these sandy sediments, glacio-lacustrine sediments and glacial and fluvioglacial Pleistocene sediments can be found.

Following the parameters established by the Regulation of the Minister of the Environment on the recovery of waste outside installations and facilities (Journal of Laws of 2015, item 796), there was no exceedance of the concentration of metals, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) found in the sediment. For example, the content of biogenic substances (total phosphorus) in the surveyed area did not exceed the values typical of sediments of the southern Baltic Sea. Likewise, nitrogen concentration levels in

the seabed labels were below the limit of quantification, i.e. 200 mg N·kg-1 DW.

Concentrations of persistent organic pollutants and harmful substances, such as metals or mineral oils, were low in the surveyed area and did not exceed the values typical for sandy sediments of the southern Baltic Sea. The surveyed sediments were also characterized by low activity of radioactive caesium isotope, typical of sandy sediments.

Onshore:

The route of the planned project in both variants runs mostly across soils of forest areas, with only the customer substation and the 400 kV line are located in non-forest areas.

In the OPA, podzols and brunic podzols are dominant. Arenosols as well as brunic brown and brown soils also account for a large share. In the RAO, podzols are dominant. Brunic podzols and brown soils, brunic brown soils and arenosols also have a large share.

3.2.3. Raw materials and deposits

Offshore:

In the structure of the seabed of the analyzed area, no appropriate parameters of accumulation of fine- and medium-grained sands, which may constitute a mineral deposit, were identified. The identified sands form a layer with a thickness ranging from 0.5 to 2 m. Sands are deposited on silty and loamy substrate, locally on clayey substrate.

Onshore:

The planned project in both variants is located entirely within the Żarnowiec concession No. 5/2019/Ł for the prospecting, exploration and production of hydrocarbons of June 13, 2019, owned by ShaleTech Energy.

No mineral resource deposits nor mining areas are located within the boundaries of the planned project in none of the variants considered nor the areas of their potential impact.

3.3. Water quality

Offshore (sea water):

The concentrations of the surveyed chemical parameters of water in the Baltic Power OWF Area (1 NM) did not differ significantly from the contents typical of the southern Baltic waters.

These waters are characterized by an alkaline pH and a relatively good oxygenation, with seasonal variations characteristic of southern Baltic waters. The assessment of the water quality indicator in the Baltic Power OWF Area (1 NM) based on the oxygen content in the demersal (near-seabed) layer in the summer period indicates a good condition (Class 2) (pursuant to the Regulation of the Minister of Maritime Economy and Inland Navigation of October 11, 2019 on the classification of ecological status, ecological potential and chemical status and the method of classification of the status of surface water bodies and the environmental quality standards for priority substances (Journal of Laws of 2019, item 2149)). The suspended matter content in the individual measurement periods occurred at the level typical of the southern Baltic waters.

The content of biogenic substances was characterized by seasonal variations characteristic of southern Baltic waters. Waters of the surveyed area were characterized by low content values of harmful substances. The surveyed waters also contained low values of activity of radioactive elements typical of southern Baltic waters. The area studied contained slightly higher concentrations of aromatic hydrocarbons than what was found in Baltic waters according to the literature.

Considering the distance of the Baltic Power OWF development area from the nearest homogeneous surface water body (i.e. Jastrzębia Góra – Rowy CWIIIWB5) and the expected impacts of the project, it should be assumed that the implementation of the Baltic Power OWF will not affect the achievement of environmental objectives for this surface water body.

Onshore (surface water):

The planned project in both variants, according to the hydrographic division of Poland, is situated in the Vistula River basin, in the Lower Vistula water region; in most part in the direct catchment area of the sea and in the catchment area of the Łeba River. Forest-agricultural type of land use is dominant there.

In the surroundings of the planned project in both variants, the hydrographic network comprises small water courses: Lubiatówka, Bezimienna, and the Biebrowski Canal with the tributary from Kierzkowo.

In the area of the planned project in both variants, there are no surface water intakes nor protection zones for surface water intakes established under local law.

The planned project, situated, in both variants, in the water area of the Lower Vistula, shall be implemented within the boundaries of the catchment area of the sea CWDW1801 and the following surface water bodies: the Chełst River to its outlet into Lake Sarbsko RW200017476925.

Onshore (groundwater):

The occurrence of groundwater in the area of the planned project in both variants is connected to water-bearing formations in the Quaternary and Tertiary horizons.

In the OPA, along the majority of the section, the planned project will be located in an area where the depth of the first aquifer is approximately 10–20 MBGL. Groundwater is at its lowest level just before the waterlogged valley of the Bezimienna Stream. Low water level at a depth of 2–5 MBGL is present along two sections.

In the RAO, along the majority of the section, the planned project will be located in an area where the depth of the first aquifer is approximately 10–20 m. Groundwater is at its lowest level in the area of the waterlogged valley of the Bezimienna Stream. The nearest groundwater intake point is the Lubiatowo intake.

3.4. Climate conditions and air purity conditions

3.4.1. Climate and risk of climate change

Offshore:

Based on the available data and analysis, it is possible to indicate the most important forecasts of changes in particular elements of the atmosphere and water in the Baltic Sea region:

- the air temperature rise is faster than the average global rise, and this trend will continue;
- the water surface temperature rise is greater than its deeper layers, which may result in greater thermal stratification and stabilization of the thermocline during the year;
- forecast changes in salinity are not clearly defined however, a decrease in salinity is expected;
- precipitation is forecast to increase throughout the Baltic Sea basin during the winter season, while only in the northern part during the summer; the frequency of extreme precipitation will increase;
- in terms of forecast of sea level changes, the effects of its global growth will not be significantly felt;
- forecasts of wind climate change are subject to considerable uncertainty, it is assumed that with an increase in average surface water temperature there will be an increase in average wind speed over sea areas;
- wave climate changes are mainly related to an increase in the frequency and intensity of storms;
- an increase in the surface area of areas with low oxygen content in water and anaerobic areas at the seabed is expected.

Due to the increase in the average water temperature and the increased inflow of biogenic pollutants to the sea, the negative phenomenon will be the progressive eutrophication (algae blooms), especially on the water surface.

Onshore:

The planned project in both variants is located in the transitional climate zone in Pomerania region, the specificity of which involves high changeability of weather conditions. A typical maritime climate is present there, characterised by small annual, seasonal and daily amplitude of air temperatures, high humidity and windiness. Short and mild winters, cool summers and significant amountsamount of precipitation are typical there.

Extreme events (heavy rainfall, floods, deluges, landslides, heat waves, droughts, storms, landslides, etc.) resulting from climate change are projected to increase in frequency and intensity in the future. Impacts of climate change in the coastal zone primarily include an increase in the frequency, intensity and duration of storms.

3.4.2. Meteorological conditions

Offshore:

Meteorological conditions of sea areas covering the Baltic Power OWF Area were determined on the basis of measurements of the surface layer parameters. The average wind speed for the entire measurement period was approx. 7.3 $m \cdot s^{-1}$, and the maximum speed reached almost 20 $m \cdot s^{-1}$. The prevailing winds here were from the west and southwest sector. Air temperature ranged from approx. -3.1 °C to approx. 28.3 °C. Atmospheric pressure varied from 975.7 to 1046.4 hPa. Relative humidity was highly variable, oscillating between approximately 40% and 100%.

Onshore:

In the area of the planned project, west and north-west winds predominate. The average number of days per year with strong wind (v >10 m·s-1) and very strong wind (v >15 m·s-1) may reach up to 70 here. Further inland, the number of days with strong and very strong wind decreases 5–6 times. Breezes as well as frequently passing low pressure areas causing strong winds, storms and heavy rainfall are all characteristic phenomena.

In the area of Choczewo, the average annual air temperature is 7.2°C. In the area of the planned project, the vegetation period is approx. 180 days. The average annual sum of precipitation is approx. 500 mm, with a predominance of summer precipitation.

3.4.3. Air quality

Offshore:

The onshore area in the coastal zone near Łeba has air quality class A. Similar values should be expected for the nearshore areas. As these sea areas are located away from onshore SO2 and NO2 emission sources, these substances are emitted solely by ships while ship traffic intensity is relatively low. The offshore areas surveyed are free from any terrain obstacles impeding the spread of these substances. Therefore, the mean concentrations of the compounds in the air should have significantly lower values.

Onshore:

The main sources of air pollution in the area of the Choczewo commune are municipal, domestic, and transport sources, secondary dusting from exposed terrain surfaces; as well as allochthonous pollution coming from outside the commune.

The Low-emission Economy Plan for Choczewo Commune, includes an action plan with regard to decarbonisation. The cable line runs across forest areas, and as a result it should be assumed that there are no excesses of pollution emission into the air. In the vicinity of the planned project, there are no exceedances of the permissible air pollution concentrations.

3.5. Ambient Noise

Offshore:

The planned project is located in the area of the ambient noise dominated by anthropogenic acoustic sources: vessels, fisheries (and the associated fishing vessels). The results of the collected acoustic data analysis showed that they present values characteristic for the Southern Baltic area. Due to the importance of areas in the vicinity of the planned project route, for activities related to the implementation of offshore wind farms and linear infrastructure as well as commercial fishing, the levels of underwater noise in the environment are likely to increase when compared to areas with less industrial activity.

The main anthropogenic component of the Baltic Sea ambient noise is the continuous sound generated by vessel traffic. The frequency of this noise is mostly below 1 kHz but high frequency components are also present. The centre frequency of 2 kHz is within the hearing range of the harbour porpoise, grey seal, ringed seal, and Atlantic herring.

The results of the background noise monitoring in the Baltic Power OWF Area indicate that underwater noise levels (and their variability ranges) show characteristic values for the southern Baltic Sea area.

An increase in ambient noise levels as a result of the introduction of anthropogenic noise exerts a significant pressure on the marine environment, with probable adverse effects. In the area of the planned project, animals live in an environment with a relatively constant ambient noise level, in which the potential impact increases

with the increasing frequency. However, the total noise levels are most likely not high enough to lead to any impact on hearing.

Surveys of the effects of ship-generated medium- to high-frequency noise components in Danish waters show that noise from different types of ships significantly increases ambient noise levels across the frequency spectrumMasking effects may occur due to high frequencies, but the range of these impacts is low.

Harbour porpoises held in semi-natural conditions showed a response even to low levels of high-frequency noise from passing ships. Most sounds of the ambient noise captured at the stations in the survey area do not exceed the harbour porpoise hearing threshold.

Onshore:

The main acoustic nuisance in the Choczewo commune area is communication noise, mainly along the voivodeship road no. 213 Słupsk–Celbowo and along the district and commune roads.

Within the area of the planned project potential impact, there are acoustically protected areas. This is the area of the Rehabilitation and Holiday Centre for disabled people (ul. Spacerowa 38, Lubiatowo).

In the RAO, within the area of the planned project potential impact, there are no acoustically protected areas. This variant is located at a distance of approx. 420 m from the area of the Rehabilitation and Holiday Centre for disabled people. At a distance of approx. 430 m in the eastern direction at km 41+720, there is a scout hall in Szklana Huta.

The buildings of the village of Osieki Lęborskie nearest to the planned customer substation and 400 kV line are situated at a distance of approx. 900 m to the west, and the buildings of the village of Lubiatowo approx. 530 m from the OPA and approx. 1.7 km from the RAO. Single residential homestead housing in Szklana Huta is located at a distance of 630 m from the OPA and 1 km from the RAO.

3.6. Electromagnetic field

Offshore:

In the marine environment, the values of the electric field and geomagnetic field are similar. There are no artificial sources of electromagnetic field (EMR) in the Baltic Power OWF Area. The existing DC transmission system between Poland and Sweden (SwePol Link) is located at a distance of several dozen kilometers from the planned OWF location.

Changes in natural electric fields have no direct impact on living organisms. Natural magnetic fields vary according to geographical location. They have a significant impact on some living organisms.

Electromagnetic fields generated as a result of electric current flow may change natural migratory behavior of sea mammals and fishes, and may also be a source of thermal energy introduced into the marine environment.

Onshore:

The Choczewo commune area is supplied from the National Power System (NPS) from a transformer station MTS Jackowo 110/15 kV. The MTS transformer station is supplied by two HV power overhead lines: HV 110 kV line Opalino and HV 110 kV line Wojciechowo. Back-up supply for the MV lines is provided by 110/15 kV MTS Opalino and Bożepole stations.

The commune power supply infrastructure system includes:

- MTS 110/15 kV Jackowo station (main transformer station);
- the transmitted 15 kV power supplying individual settlement units – 8 overhead lines;
- a series of 15/04 kV transformer stations supplying the end customers.

3.7. Biotic Elements in the maritime area

3.7.1 Phytobenthos

In the OPA of the offshore part of the Baltic Power OWF Connection Infrastructure, no vascular plants were present in the sandy coastal zone . However, macroalgae were found in the depth range >20movergrowing boulder surfaces very scarcely (macroalgal cover of the seabed <1%). It should be noted that the hard bottom (boulders and cobbles), to which macroalgae can attach, occupies less than 1% of the total area of the OPA.

Within the boundaries of the RAO of the offshore part of the Baltic Power OWF Connection Infrastructure, no phytobentos occurrence was recorded.

Lack of vascular plants in the nearshore zone and lack or scarce occurrence of macroalgae in deep water areas (>20 m) is typical for Polish maritime areas.

3.7.2. Macrozoobenthos

In the OWF Area (1 NM), 25 taxons of macrozoobenthos were found on the soft seabed. On the hard seabed, 16 taxons belonging to 6 classes and one subclass were recorded..

3.7.3. Ichthyofauna

In the Baltic Power OWF Area (1 NM), **fishes** belonging to 22 taxons were caught. The area is poor in terms of species diversity, and . is not a significant breeding area; a breeding area of sprat of minor importance was found only in the summer period.

3.7.4. Marine Mammals

The results of acoustic monitoring of porpoises, visual observations from the air and additional observations of **sea mammals** from vessels carried out as part of seabird surveys indicate a low number of porpoises and seals in the surveyed Baltic Power OWF Area (2 NM).

3.7.5. Seabirds

In total, 95 species were recorded over the OWF Area (2 NM) during the surveys of **migratory birds**; flight paths were prepared for 67 species and 28 species were identified on acoustic recordings. The analysis indicated intensive migration in March, both during the day and at night, but peak migration activity was in April.

Seabird surveys were carried out in the Baltic Power OWF Area (2 NM) and in three additional areas of significant importance for birds: Słupsk Bank, a fragment of the Coastal Waters of the Baltic Sea area, and the Polish part of the South Central Bank area.

In the Baltic Power OWF Area (2 NM), a total of 22 species of birds staying on water were recorded, including 13 species related to the marine environment and 6 species of aquatic birds rarely encountered at sea away from the coast. In the additional areas, a total of 23 species of birds staying on water were recorded, including 15 species related to the marine environment and 8 species of aquatic birds rarely encountered at sea away from the coast. The results of observation of seabirds showed that the Baltic Power OWF Area (2 NM) is not a place of very high concentration of birds sitting on water in the period of their most numerous presence in the Baltic Sea.

During spring and autumn migration, the presence of **bats** over the Baltic Power OWF Area was found (2 NM).).

3.8. Biotic elements in the onshore area

3.8.1. Fungi

The occurrence of fungi of high natural value in the area of the planned project in both variants is quite scarce and concentrated only in the northern part of the area. The fungi species occurring there are quite common and widespread, with a high naturalness rate in lowland forest areas.

Among the species of high natural value occurring in the OPA, the following should be mentioned: red ring rot, yellow knight, woolly tooth, and dune brittlestem.

Among the species of high nature value occurring in the RAO, the following should be mentioned: chaga, Postia guttulata, yellow knight, woolly tooth, Leccinum niveum, dune brittlestem, jellied bolete, European destroying angel, and bluing bolete.

3.8.2. Lichens

The OPA route, runs across two areas characterised by significant richness and diversity of lichen, with a large share of species of high nature value (protected, rare, endangered); there are approx. 36 species, among others, silver-lined wrinkle, bristly beard lichen, Zwackhia viridis, reindeer lichen, grey reindeer lichen, rim lichen, eagle’s claws lichen, cartilage lichen, dotted ribbon lichen, and farinose cartilage lichen.

The RAO route is characterised by less common occurrence of lichen than the OPA and runs across two areas

characterised by significant richness and diversity, both from the point of view of coniferous species and old-growth deciduous species. Among the lichen species occurring there, the following should be mentioned: silver-lined wrinkle, bristly beard lichen, Zwackhia viridis, tree reindeer lichen, reindeer lichen, grey reindeer lichen, Griffith's cliostomum lichen, and farinose cartilage lichen.

3.8.3. Mosses and liverworts

Along the entire route of the OPA, there are common terrestrial coniferous forest species, part of which is under partial protection. Among the moss and liverwort species occurring there, the following should be mentioned: white pincushion moss, mountain fern moss, pointed spear-moss, Bruch's pincushion, common hair-cap moss, bog groove-moss, red-stemmed feathermoss, bluntleaved bog moss, red bog-moss, and wavy broom moss.

A vast majority of bryophytes typical for groundcover of deciduous and coniferous forests and forest peat depressions, which were recorded in the area of the potential impact of the RAO, are species widespread in Poland and in Gdańsk Pomerania region. They are not endangered on the national or regional scale. In the RAO area, the following species can be found: white pincushion moss, Eurhynchium angustirete, mountain fern moss, pointed spear-moss, crisped pincushion moss, neat feather-moss, common hair-cap moss, red-stemmed feathermoss, wavy broom moss, and broom forkmoss.

3.8.4. Vascular plants and natural habitats

The vegetation of the area in both variants includes the communities of strips of white dunes, then grey dunes and coastal deciduous and coniferous forests, which further transform into fresh pine forests and mixed coniferous forests.

Along the OPA route, 8 plant species of high nature value were confirmed: marsh Labrador tea, black crowberry, one-flowered wintergreen, broad-leaved helleborine, creeping lady's-tresses, sand sedge, stiff clubmoss, and cross-leaved heath. The inventory survey of natural habitats carried out confirmed the presence of four natural habitats: 2120 – Shifting dunes along the shoreline with Ammophila arenaria ("white dunes"), 2130 – Fixed coastal dunes with herbaceous vegetation ("grey dunes"), 2180 – Wooded dunes of the Atlantic, Continental and Boreal region, and 9110 – Luzula Fagetum beech forests.

The area that is crossed by the RAO is characterised by a strip-like arrangement of habitats, parallel to the seashore, with relatively well-preserved vegetation. 8 plant species of high nature value were found here – the same as in the OPA, with the only difference being the presence of the stag's-horn clubmoss instead of the stiff clubmoss. Three natural habitats are present there: 2130 – Fixed coastal dunes with herbaceous vegetation ("grey dunes"), 2180 – Wooded dunes of the Atlantic, Continental and Boreal region, and 91D0 – Bog woodland.

3.8.5. Forrest complexes

The forests of the Choczewo Forest District represent the typical communities of coastal forests located at the back of grey dunes. The forest health status for pine and mixed stands with their share is good. The stands are characterised by good quality and health. In both variants, fresh mixed coniferous forest and fresh coniferous forests, as well as dry coniferous forests are dominant, giving way in the southern part to fresh mixed forests. These are mainly commercial forests. In the northern part, forests with protective functions are dominant: mainly soil-protective and water-protective. Moreover, there are commercial forests and tree-felling is carried out there.

3.8.6. Invertebrates

Within the area of the potential impact of both variants, the following invertebrate species were found − blue-winged grasshopper and European paper wasp.

3.8.7. Ichthyofauna

Due to the extremely low water levels, which have been observed for many years despite the presence of potential hiding places, shading, stream bed diversity etc., the watercourses surveyed are characterised by low diversity. In the watercourses inventoried, the presence of the following fish and lamprey species was confirmed: three-spined stickleback, nine-spined stickleback, and European river lamprey.

3.8.8. Herpetofauna

Two species of amphibians were found in the survey area: the common toad and the common frog, and 3 species of reptiles: the sand lizard, the viviparous lizard, and the slow worm. All the species found are under legal protection in Poland.

3.8.9. Birds

In the planned project potential impact area, in both variants, 63 bird species were found – both in the breeding period, as well as during the migration and wintering periods.

3.8.10. Mammals

In both variants, mammals are represented by species quite common across the entire country. With the exception of small mammals connected to a particular habitat, the remaining animals inhabiting the area analysed use large areas of land and many habitats;, they are not assigned to any specific site. The following species were identified: grey wolf, Eurasian otter, northern white-breasted hedgehog, stoat, Eurasian beaver, European water vole, wood mouse, red squirrel, common shrew, Eurasian pygmy shrew, European mole, and bats (Chiroptera).

3.9. Protected areas, including Natura 2000 sites

Offshore:

The Baltic Power OWF Area is located outside the boundaries of **protected areas**, including the areas of the European ecological network Natura 2000. Two Natura 2000 Marine Protected Areas are located closest. At a distance of approx. 9 km, Coastal waters of the Baltic Sea (PLB990002), and, at a distance of at least 25 km, Słupsk Bank (PLC990001). There is the onshore and offshore Słowińska Refuge Natura 2000 site (PLH220023) and the onshore Słowińskie Coast area (PLB220003) located at a distance of approx. 21 km from the Baltic Power OWF Area. In the area of Ostoja Słowińska (PLH220023), there is the main complex of the Słowiński National Park, including its section located in the maritime areas.

The southern part of the offshore area of the planned project, stretching over 11.1 km, crosses the eastern part of the Natura 2000 site Przybrzeżne Wody Bałtyku (PLB990002) in the north-south axis.

Onshore:

The OPA in its onshore area, is located within the boundaries of the Coastal Protected Landscape Area. Additionally, it is located in direct vicinity to the Natura 2000 sites – special habitat protection area Białogóra (PLH220003) and special bird protection area Przybrzeżne wody Bałtyku (PLB990002), as well as the ecological area “Torfowisko” [Peat Bog] in Szklana Huta.

The RAO is located within the boundaries of the Coastal Protected Landscape Area, the ecological area “Torfowisko” [Peat Bog] in Szklana Huta, and the Natura 2000 site Białogóra (PLH220003). Additionally, it is located in the vicinity of the Natura 2000 site – special bird protection area Przybrzeżne wody Bałtyku (PLB990002).

3.9.1. Wildlife corridors

Offshore:

Ecological corridors do not pass through the Baltic Power OWF Area. They are not identified within the entire Baltic Sea area.

The biodiversity of the Baltic Power OWF Area does not differ from the typical biodiversity of the southern Baltic Sea. No species not present at the same time in other parts of the southern Baltic Sea were found in the Baltic Power OWF Area.

The results of environmental surveys indicate that the Baltic Power OWF Area is in most cases homogeneous in terms of abiotic conditions. Therefore, fragments of areas of different **natural values** cannot be indicated, except for the issue related to the depth of the water region. The southern shallower part of the water region is characterized by higher densities of seabirds .

Onshore:

The project is located in the Kashubian Coast wildlife corridor (code KPn-20C).

3.9.2. Cultural values, monuments and archaeological sites and objects

Offshore:

There are no elements of underwater **cultural heritage** in the Baltic Power OWF Area. During the surveys in the Baltic Power OWF Area, five wrecks were found, including three as yet unidentified wrecks.

Two shipwrecks are located within the Baltic Power OWF Connection Infrastructure area, one of which – a wreck of a steamer from the first half of the 20th century – was acknowledged as a historical object. It is located in the southern, coastal part, at a distance of approx. 800 m from the shore. The second ship wreck is located in the RAO area at a distance of approx. 12.4 km from the shore. This wreck is not considered to be an object of cultural heritage.

Onshore:

No archaeological objects were identified, however within the vicinity are the following archaeological sites:

Osieki Lęborskie site 1 – barrow-type cemetery (approx. 150m west of the OPA potential impact area and approx. 1.1 km of the RAO potential impact area);

Osieki Lęborskie site 2 – box(shaped) graves (approx. 85m west of the OPA potential impact area and approx. 700m of the RAO potential impact area).

In addition, ongoing preparatory works have identified 6 archaeological sites – barrows, located approx. 85 m south-west of the OPA and approx. 810 m west of the RAO.

3.9.3. Resource management

Offshore:

The Baltic Power OWF Connection Infrastructure area is used mainly for navigation and fishery. The Baltic Power OWF Area is characterized by a low degree of use in terms of **navigation** and is used to a small extent by pleasure craft. In the section from the boundary of the territorial sea up to a distance of about 10 km from the shore, the area crosses one of the most important in the Baltic Sea, the customary transport route, leading, among others, to the sea ports in Gdynia and Gdańsk. In addition to transport vessels in the Baltic Power OWF Connection Infrastructure area, fishing vessels conduct catches in this sea area or sail to other fisheries, and small recreational boats (e.g. sailing yachts) appear there. The analysis of the catch volume and effort in the area planned for the Baltic Power OWF show that it is characterized by low fishing productivity and they did not constitute important fishing grounds for commercial species in the Polish Maritime Areas.

Onshore:

The projects are located in areas mainly composed of forests, waterlogged meadows (Bezimienna Stream Valley), arable lands (near customer substation and 400 kV overhead line, local road (Spacerowa street)), fire break lanes and surface waters (watercourses and small water reservoirs).

In summer, the area is popular with tourists, including a blue tourist trail along Spacerowa street to Wydmy Lubiatowskie Dunes. The area also includes a rehabilitation and holiday centre for disabled people (ul. Spacerowa 38, Lubiatowo), and a fire observation tower.

3.9.4. Landscape, including the cultural landscape

Offshore:

The potential zone of the Baltic Power OWF impact on the landscape includes an area of land from Ustka in the west to Jastrzębia Góra in the east. Due to the shape of the coastal zone, structural components of the Baltic Power OWF may be visible from beaches at this part of the coast. In the Baltic Power OWF Area, there are no structures permanently connected to the seabed. Nor are licenses issued for prospecting, exploration and extraction of hydrocarbons from submarine deposits.

Commercial ships moving along the customary shipping route to and from the ports of Gdynia and Gdańsk, as well as other smaller vessels, e.g. recreational and fishing boats, constitute the permanent structural element of anthropogenic origin in the natural marine landscape of the Baltic Power OWF Connection Infrastructure sea area. In the future, the northern part of the sea area will be developed with the wind turbines of the Baltic Power

OWF and other offshore wind farms. The seashore in the subsea cable landfall area is made of a sandy beach, several dozen meters wide.

Onshore:

The planned project is located on the Słowińskie Coast and the Choczewo Upland. It runs mainly across forest areas and to a small extent across arable land, which are visible in the area of the designated customer substation – the landscape of these areas should be considered as culturally disharmonious, where human activity relatively strongly transforms the surrounding landscape. The manifestations of the cultural landscape in the vicinity of the planned project are archaeological sites in the form of cemeteries (Osieki Lęborskie 1 and Osieki Lęborskie 2). Moreover, in the town of Osieki Lęborskie, an object entered into the Voivodeship Register of Monuments is located – a Roman Catholic Church of the Saint Mary's Star of the Sea with a church graveyard.

The planned project will be located within the area of the Coastal Protected Landscape, which is characterised by very high landscape values due to the strip-like arrangement of moraine uplands, extensive coastal plains, dunes and beaches and the seashore. In the area of the shoreline, the planned project runs in direct vicinity of a viewing axis.

3.9.5. Population and living conditions of people

Offshore:

The presence of people in the offshore area of the Baltic Power OWF Connection Infrastructure is only temporary, resulting from the current use of the sea area (shipping). The Baltic Power OWF Connection Infrastructure Development Area crosses at a distance of 10 km from the shore the customary shipping route to and from the ports of Gdynia and Gdańsk. It is also located within the boundaries of five statistical rectangles: N7, N8, O6, O7 and O8, where fishing activities are conducted.

Onshore:

The Rehabilitation and Holiday Centre for disabled people is situated in the planned project impact area within the OPA. In the RAO, within the area of the planned project impact, there are no developed areas. At a distance of approx. 430 m in the eastern direction, there is a scout hall in Szklana Huta.

The buildings nearest to the planned customer substation and 400 kV overhead line are located in Osieki Lęborskie, Lubiatowo, and Szklana Huta, none closer than 630 m.

3.9.6. Biodiversity

Offshore:

N/A

Onshore:

Both variants show relatively high biodiversity for the region, the greatest being Wydmy Lubiatwskie Dunes and Bezimienna Stream valley areas.

4. Modelling performed for the purpose of project impact assessment

For the purposes of the EIA reports, the model studies were carried with the objective to:

- obtain information about the range and intensity of underwater noise generated during installation and construction works;
- obtain information about the thermal impact of HV cable lines;
- obtain information about the range of suspended matter propagation and concentration in water as a result of works that disturb bottom sediments;
- obtain information on the potential number of collisions of flying seabirds with wind turbines.

Based on the results of the seabirds survey, their density in the studied areas was modeled.

4.1. Modelling of underwater noise propagation

As part of the modelling, the following analyses were carried out:

1. the expected noise levels resulting from the construction and operation of subsea cables were specified;
2. the potential effects on marine mammals and fish that may result from noise emission were determined; and,
3. the range from the source at which the impact may be expected were estimated.

Underwater noise will be emitted to the environment at every stage of the Baltic Power OWF construction. However, its greatest impact is expected during construction due to the high noise levels generated during monopile driving. The receptors sensitive to noise, which may be present in the vicinity of the planned project, include marine mammals and fish. A wide spectrum of anthropogenic sounds that may occur during the implementation of the planned project is not equally audible by animals.

The underwater noise emissions predicted for the construction and operation of subsea cables do not pose a risk of injuries to marine mammals or fish, but may cause disturbances in their behaviour.

4.2. Modelling of noise propagation in the atmosphere

The results of the calculations of sound level distribution in the vicinity of the designed 220 and/or 275 kV overhead line will be presented in the tabular and graphical forms (diagrams), and commented.

4.3. Modelling of the distribution of electric and magnetic components of the electromagnetic field

The distribution of the intensity of the electric field E and magnetic field H was calculated using the PolE-M software. In order to model a specific overhead line, it is required to provide the following technical data:

- coordinates of conductor suspension in the design cross-section, compliant with the series and type of towers in a given span;
- the minimum (smallest permissible) distance between the phase conductors and the ground;
- the maximum line working voltage;
- the maximum line load (maximum long-term phase load current);
- the type of phase conductors and bundle structure (if there is more than 1 conductor per phase); and,
- phase system in individual circuits.

The calculations of the electric field distribution (similarly to magnetic field) were carried out for a representative span of the analysed 4-circuit power line routed on towers.

The calculations were carried out for the smallest (depending on many factors, the most important of which are: the height of towers, span length, tension of conductors, topography and the presence of facilities under the line) of the designed distance between the phase conductor and the ground of hmin = 6.7 m for the line operating at the voltage of 220 kV and hmin = 7.1 m for the line operating at the voltage of 275 kV.

4.4. Modelling of the thermal impact of HV cable lines

The model was developed on the basis of the image method and Kennelly formula assuming the existence of two linear heat sources. Thermal calculations were made on the basis of an alternative diagram consisting of a system of thermal resistances connected in series. Design assumptions for soil conditions are compliant with the IEC 60287-3-1 standard for Poland.

4.5. Modelling of suspended solids propagation

The analysis of the spatial distribution and intensity of the propagation of suspended solids released into the water depth during the underwater works related to the laying of the Baltic Power OWF Connection Infrastructure cable lines was carried out using the MIKE 21 Coupled Model FM 2020 software created and developed by DHI.

To conduct calculations of the suspended solids generation and mode of spreading during power cable laying and burying in the seabed, numerical models were created using MIKE21 software. The model enabled conducting calculation simulations according to the following scenarios:

- based on the Baltic Power OWF Connection Infrastructure cable route adopted:
  - the Applicant Proposed Variant (APV),
  - the Rational Alternative Variant (RAV);
- based on the technology of subsea cable burying in the seabed:
  - construction phase: jetting method with soil displacement, two speeds of the cable laying vessel: 2

km/day and 5 km/day (85 m·h-1 and 210 m·h -1 , respectively), forcings: sea currents, wind,
    - operation phase: mass flow excavation method, two speeds of the cable laying vessel: 2 km/day and 5 km/day (85 m·h-1 and 210 m·h-1 , respectively), forcings: sea currents, wind;
- based on the environmental conditions:
    - spring period – predominance of winds from the W–N sector,
    - summer period – varied wind directions.

Various soil conditions along the cable route were considered as part of the analysis of both technologies, which could have been implemented to the model thanks to the preliminary geophysical identification of the designed Baltic Power OWF Connection Infrastructure routes. Such an identification enabled the identification of route sections with non-cohesive and cohesive soils. Performing all the planned simulations produced the following results:

- for the APVroute, the scope of disturbance for the **jetting method** assumes the following values:
    - **i**n non-cohesive (sandy) soils: the largest size of the suspended solids cloud with a concentration of 30 mg·l-1 → approximately 0.2 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 2.2 km from the cable route;
    - in cohesive soils: the largest size of the suspended solids cloud with a concentration exceeding 100 mg·l-1 → approximately 0.3 km from the cable route, more than 30 mg·l-1 → approximately 1.3 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 11.5 km from the cable route,
    - the thickness of sediments generated from the suspended solids sedimentation in the prevailing area of disturbance does not exceed 1 mm, only locally in the close vicinity of the cable, in the conditions of current stagnation it can reach up to 4.3 mm;
    - the prevailing part of the sea area with suspended solids, outside the route corridor, is characterised by a suspended solids concentration of 5–50 mg·l-1 ;
    - suspended solids concentration exceeding 30 mg·l-1 lasts shorter than 16 hours;
- for the RAVroute, the scope of disturbance for the **jetting method** assumes the following values:
    - **in non-cohesive (sandy) soils:** the largest size of the suspended solids cloud with a concentration exceeding 30 mg·l-1 → approximately 0.5 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately6 km from the cable route,
    - **in cohesive soils:** the largest size of the suspended solids cloud with a concentration exceeding 100 mg·l-1 → approximately 0.3 km from the cable route, more than 30 mg·l-1 → approximately 1.3 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 9 km from the cable route,
    - the thickness of sediments generated from the suspended solids sedimentation in the prevailing area of disturbance does not exceed 1 mm, only locally in the close vicinity of the cable, in the conditions of current stagnation it reaches up to 3 mm,
    - the prevailing part of the sea area with suspended solids, outside the route corridor, is characterised by a concentration of 5–50 mg·l-1 ,
    - suspended solids concentration exceeding 30 mg·l-1 lasts shorter than 11 hours;
    - for the OPA route, the scope of disturbance for the **mass flow excavation** method assumes the following values:
    - **in non-cohesive (sandy) soils**: the largest size of the suspended solids cloud with a concentration exceeding 100 mg·l-1 → approximately 0.3 km from the cable route, more than 30 mg/l-1 → approx. 1.5 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 7.5 km from the cable route,
    - **in cohesive soils**: the largest size of the suspended solids cloud with a concentration exceeding 100 mg·l-1 → approximately 3 km from the cable route, more than 30 mg·l-1 → approximately 8.5 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 18.5 km from the cable route,
    - the thickness of sediments generated from the suspended solids sedimentation in the prevailing area of

disturbance does not exceed 5 mm, only locally in the close vicinity of the cable, in the conditions of current stagnation, it can reach up to 26 mm,
    - the prevailing part of the sea area with suspended solids, outside the route corridor, is characterised by a concentration of 5–150 mg·l-1 ,
    - suspended solids concentration exceeding 30 mg·l-1 lasts shorter than 30 hours;

- for the RAV route, the scope of disturbance for the **mass flow excavation** method assumes the following values:
    - **in non-cohesive (sandy) soils**: the largest size of the suspended solids cloud with a concentration exceeding 100 mg·l-1 → approximately 0.1 km from the cable route, more than 30 mg·l-1 → approximately 1.2 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 7.5 km from the cable route,
    - **in cohesive soils**: the largest size of the suspended solids cloud with a concentration exceeding 100 mg·l-1 → approx. 3 km from the cable route, more than 30 mg·l-1 → approximately 9.5 km from the cable route; the largest distance at which the suspended solids concentration drops below 4 mg·l-1 → approximately 15 km from the cable route,
    - the thickness of sediments generated from the suspended solids sedimentation in the prevailing area of disturbance does not exceed 5 mm, only locally in the close vicinity of the cable, in the conditions of the current stagnation it can reach up to 20 mm,
    - the prevailing part of the sea area with suspended solids, outside the route corridor, is characterised by a suspended solids concentration of 5–150 mg·l-1,
    - suspended solids concentration exceeding 30 mg·l-1 lasts shorter than 30 hours.

The main objective of the calculations was to conduct numerical simulations for these methods of cable laying and burying, which cause the greatest disturbance in the marine environment (i.e.: the jetting method and the mass flow excavation method). The analysis of the calculation results leads to the following conclusions:

- the momentary values of the maximum suspended solids concentrations, which locally reach up to 200 mg·l-1 for the jetting method with soil displacement and exceed 500 mg·l-1 for the mass flow excavation method, are definitely higher than the natural concentrations occurring in the survey area. The duration of concentrations higher than 100 mg·l-1 is short-term, not exceeding 16 hours for the former method and 30 hours for the latter method. Moreover, such high concentration values are limited spatially to the direct vicinity of the cable route;
- increase in the speed of cable laying vessels increases the concentration and the suspended solids' scope of impact. Speed is a factor that enables controlling, to a certain extent, the disturbing effects of suspended solids on the environment;
- the calculated durations of the environmental conditions deterioration caused by cable burying (exceedance of the defined suspended solids concentrations) are short-term, and such impacts should be considered short-term as well;
- the thickness of the newly-formed sediment layers for the jetting method in the area adjacent to the Baltic Power OWF Connection Infrastructure area may reach up to 4.5 mm, and the range, in which the thickness exceeds 1 mm, may reach up to 3 km. These parameters are 3 to 6 times lower compared to the mass flow excavation method;
- with the mass flow excavation method used to bury the cable, the area of the sediment structure disturbed with a high-performance intense water jet is significantly larger than in the case of any other possible method. The water jet disrupts the sediment bonding structure, allowing much of the finest soil to become suspended. In practice, this method is most commonly used only along limited sections, for example, in the location of the crossing of two linear installations, in order to limit the level of sinking of the previously buried installation;
- the burying of cable to the level of 3 m below the seabed is practically the maximum level of burying used. For every project, this level is adopted depending on the present soil conditions and the intensity of the sea area use. The adoption of various (shallower) levels of power cable burial in the area of the Offshore

Connection Infrastructure is highly probable in the project analysed;

- during the actual design of individual cables of the offshore connection infrastructure, the results of geotechnical surveys may lead to slight cable route corrections;

After identification, the soil conditions may enable the application of the ploughing technology, in which the area of soil structure disturbance is smaller, and the amount of sediments becoming suspended is significantly smaller than for the methods analysed in this report.

The results of the performed simulations indicate, among others, that: I) higher suspended matter content is local in relation to the place of works that disturb the seabed and does not exceed 15 $mg \cdot l^{-1}$ at the distance of 2000 m; II) the thickness of newly formed sediments at a distance of 100 m from the place of works does not exceed 2 mm, III) the concentration above 4 $mg \cdot l^{-1}$ does not last longer than 13 hours.

5. Description of the expected environmental effects in the case of a decision not to implement the project, taking into account the available environmental information and scientific knowledge

Failure to implement the project consisting in the construction and exploitation of the Baltic Power OWF Connection Infrastructure may take place in two cases:

1) Complete abandonment of offshore wind energy in the PMA, which in consequence means the necessity to generate energy from the existing or other sources;
2) Abandonment of the Baltic Power OWF project with a power output of 1200 MW with the simultaneous implementation of other OWFs within the Polish EEZ.

There are environmental advantages and disadvantages of stopping the implementation of the project, which consists in the construction and operation of the Baltic Power OWF. Failure to implement the project may result in the necessity to compensate for the assumed amount of energy obtained from conventional sources with similar power output. This can result in emissions of gaseous and dust pollutants from fuel combustion, generation of waste from fuel combustion, and indirect environmental effects in the areas of fossil fuel extraction.

On the other hand, if the project is not implemented, there will be local benefits related to abandoning the development of offshore areas. Lack of investment in the OWF will mean that complex impacts related to the construction, operation and decommissioning of OWF components will not occur within several dozen years. This also means an absence of restrictions on the availability of these areas to existing and potentially new users.

6. Identification and assessment of project impacts

The analysis of impacts was carried out separately for the construction, operation and decommissioning phases of the OWF.

6.1. Option proposed by the Applicant (OPA)

6.1.1. Construction phase

6.1.1.1. Impact on geological structure, seabed sediments, access to raw materials and deposits

Offshore:

Activities related to the construction of the project can cause impacts on the geological structure of the seabed and bottom sediments, including: changes in the structure, shape and level of the seabed, disturbances in the geological structure and changes resulting from the disturbance and sedimentation of suspended matter.

The general impact of the project during the construction phase on the geological structure of the seabed was assessed as **negligible** for the general nature of the seabed and its structure. The changes will be on a relatively small surface area of the seabed.

In geological terms, taking into account the nature of deposits forming the seabed surface of the Baltic Power OWF Area (1 NM), no significant changes in the nature of deposits are expected. In the places of individual locations of the wind turbine, the nature of surface sediments and locally in points where monopiles are to be driven into the seabed will change. The impact on surface sediments will be **negligible**.

Onshore:

The main construction phase impacts on geology and surface formations will be connected to:

- the construction of open trenches for cable laying, cable chambers and inlet and outlet chambers at the sections planned for trenchless passages;
- levelling works related to the ground levelling for the erection of a customer substation and cable chambers.

The impacts will also involve wind erosion and possible contamination of the open trenches with greases, oils, etc. as well as carrying out excavations for the two towers of the 400 kV overhead line. As a result of the assessment, the impact on geological and surface formations was found to be moderate at most. The significance of impact connected to wind erosion was identified as negligible, with the exception of aeolian sands, which are planned to be crossed by an open trench, where the significance of impact was assessed as moderate. The pollution with greases and oils was assessed as **negligible** and of **low importance** and **moderate** with reference to the alluvial muds and humus sands.

The main impacts on the topography and dynamics of the coastal zone will be related to:

- levelling works related to the ground levelling for the construction of cable chambers;
- construction of inlet and outlet chambers at the sections planned for trenchless crossing.

The ARV will have a minimal effect on the character change of the terrain relief of the area during the construction phase. The important issue during the restoration of the area to its original condition is to ensure the appropriate condition of the vegetation growing on the dune surface, because in the case it was neglected, aeolian processes may be initiated, and consequently, a burial or exposure of the elements of the planned project could take place.

The main construction phase impacts on the soils will be connected to:

- carrying out open excavations and levelling works;
- movement of heavy construction and assembly equipment;
- drainage of excavations;
- preparation of inlet and outlet chambers for the needs of trenchless crossings;
- the occupation of land for the construction of a customer substation, a 400 kV overhead line, access roads and storage yards.

As a result of the assessment, only moderate impacts related to wind erosion as well as the contamination with greases and oils along the sections of poorly-developed soils located outside the Wydma Lubiatowska dune were found. In the event of oil leaks and spills, potentially the most at risk are the sections of poorly-developed soils on which the new access roads are planned.

6.1.1.2. Impact on the quality of sea waters and bottom sediments

The Baltic Power OWF during the construction phase may have an impact on the water and bottom sediments through:

- release of pollutants and biogenic compounds from sediment into water;
- pollution of water and sediments with oil derivative substances;
- pollution of water and sediments with antifouling agents;
- pollution of water and sediments with accidentally released municipal waste or domestic sewage;
- pollution of water and sediments with accidentally released chemicals and waste generated during construction.

The significance of the impact of the release of pollutants and biogenic substances from bottom sediments in the construction phase within the OPA was determined as **insignificant** for sea waters and as **negligible** for bottom sediments.

The significance of the impact of the pollution of sea waters or seabed sediments with oil derivative substances released during normal operation of vessels during the construction phase in the OPA was assessed as **negligible** for sea waters and bottom sediments.

The significance of the impact of the pollution of water or seabed sediments with oil derivatives released during an emergency during the construction phase in the OPA due to the random and sporadic nature of failures and collisions was assessed to have **low** significance for sea waters and bottom sediments.

The impact significance of contamination of water or seabed sediments with antifouling substances covering

ship hulls forms during the construction phase within the OPA was determined as **negligible**.

The significance of the impact of the pollution of water or seabed sediments with municipal waste or domestic sewage during the construction phase in the OPA was assessed as **negligible** for sea waters and bottom sediments.

The significance of the impact of the pollution of water or bottom sediments connected with the OWF construction process in the OPA was assessed as **negligible** for sea waters and as of **low** significance for bottom sediments.

As a result of the project implementation within the permanent and temporary technical belts as well as access roads, storage yards, customer substation and a 400 kV overhead line, surface waters may be exposed to a deterioration of their quality. This regards especially:

- wetlands in the vicinity of the Spacerowa street;
- waterlogged valley with a system of watercourses constituting tributaries of the Bezimienna Stream;
- drainage ditch in the area of the customer substation;
- drainage ditch in the area of the 400 kV overhead line; The implementation of the project may have a local and short-term negative impact on the elements of water quality, which is primarily related to:
- possible runoff of slurry from the construction site adjacent to the waterlogged areas and watercourses – temporary impact related to torrential rainfall;
- possible pollution as a result of accidental leaks from machines and vehicles – impact in emergency situations which will not take place during the proper conduct of construction works;
- the removal of trees and shrubs within a 25 m wide strip – a local decrease of watercourse shading.

The impacts connected to the runoff of slurry from a construction site will be negative, direct, primary, reversible, local and short-term. The scale of impact is moderate. With regard to the ponds in the ecological area “Torfowisko” [Peat bog] in Szklana Huta, the impacts will be irreversible, permanent, large-scale and of important significance.

The impacts connected to the contamination as a result of accidental leaks from machinery and vehicles will be negative, direct, primary, reversible, local and short-term. The scale of the impact is moderate and negligible for the HDD or HDD Intersect section.

If the lighting conditions for watercourses change, the impacts will be: negative, indirect, primary, irreversible, local and permanent. The scale of impact is low and moderate.

6.1.1.3. Impact on the climate, including emission of greenhouse gases and impact significant in terms of adaptation to climate changes, impact on the air quality

During the construction phase of the Baltic Power OWF, an increased emissions and decrease in air quality is expected to be isolated to this phase of the project. There will be periodic, local increase in greenhouse gas emissions (movement of vehicles and machinery on site, deforestation, waste generation); periodic increase in energy demand for construction purposes, leading to an indirect increase in greenhouse gas emissions; emission of greenhouse gases indirectly related to the energy consumption of the project, e.g. in connection with the use of energy for the production of materials, transport, etc. The impacts affecting climate will be low.

6.1.1.4. Impact on the ambient noise

The ambient noise in the area will temporarily increase during the construction phase due to the high volume of vehicles and will be low frequency range. The construction of the underground cable lines, customer substation and 400 kV overhead line will generate a temporary increase in noise including general construction noise from machinery including bulldozing and digging. The noise will be limited in time, with a local impact range and with the application of minimising measures the impact on the Rehabilitation and Holiday Centre in Lubiatowo, will not have a significant negative influence on people's living conditions. The impacts of the planned project will be low.

6.1.1.5. Impact on nature and protected areas

6.1.1.5.1. Impact on biotic components

6.1.1.5.1.1. Phytobenthos

During the construction phase of the Baltic Power OWF, there will be no impact on **phytobenthos**.

6.1.1.5.1.2. Macrozoobenthos

During the construction phase of the Baltic Power OWF, the macrozoobenthos habitat will be impacted by disturbance of the structure of seabed sediments, increase in the concentration and sedimentation of suspended matter in water and redistribution of pollutants from sediments to water.

The analysis of impact during the construction stage are assessed as **negligible** or of **low significance**. The most adverse impact will be the disturbance of the structure of bottom sediments in places where the macrozoobenthos currently occurs (especially in the southern and north-eastern part of the examined water region).

6.1.1.5.1.3. Ichthyofauna

The main impacts on **ichthyofauna** will be: noise and vibration emission, increase in suspended matter concentration, release of pollutants and biogens from sediment to water, change of habitat, and construction of a barrier. The impact of noise and vibration on adult fish was assessed as **moderate** for all investigated fish species. The impact of releasing pollutants and biogenic substances into the water, the use of the barrier and the change in habitat has been assessed to be **negligible** for all investigated fish species..

6.1.1.5.1.4. Marine mammals

Marine mammals during the construction stage of the Baltic Power OWF have been assessed as moderate and may be subject to impacts resulting from: underwater noise, increased suspended matter, pollutants, disturbance, habitat changes and potential vessel breakdown. The underwater noise generated from foundation works was assessed as moderate and is significantly reduced with the use of NRS. The highest impact on mammals will be connected to the tree felling and traffic of vehicles.

6.1.1.5.1.5. Seabirds

During the construction phase, the area above the sea area where erection and construction works will be carried out is gradually disturbed. Migratory birds' flight pattern will be impaired, the overall impact is assessed as low. The installation of transmission cable will result in bird scaring from the worksite which is expected to be local and short-term, as the impact will cease immediately after construction, and the noise generated by the project will not be different from the one generated by numerous ships in the Baltic Sea. The European herring gull is a species accompanying vessels and its abundance in the survey area may temporarily increase during project construction/decommissioning. The impact for the long-tailed duck, the velvet scoter, the razorbill, the common guillemot and the common scoter is low, and for the European herring gull – negligible. The noise generated by transmission cable laying will reduce fish densities in the worksite, reducing the razorbill and common guillemot ’s food supply. The impact is expected to be localised, short-term and reversible due to the proximity of neighbouring sea areas that are rich in ichthyofauna, and will have a low significance. Seabirds wil be impacted by vessel traffic, nois, vibration, lighting, creation of a barrier, collisions with vessels,

(vi) destruction of benthic habitats, and

(vii) increase in suspended matter content in water and sedimentation of disturbed sediments.

The impact assessment was carried out for the five most numerous birds: long-tailed duck, velvet scoter, razorbill, common guillemot, and European herring gull. The significance of the above-mentioned impacts for the European herring gull was assessed as **negligible**, for the razorbill and common guillemot as **moderate** at most, and for the sea ducks (velvet scoter and long-tailed duck) as **significant**.

During the construction phase of the Baltic Power OWF, there can also be impacts on **bats** resulting from the presence of vessels and gradual spatial development. Therefore there can be a risk of collision with vessels and structural members in the construction area. Moreover, the presence of vessels will result in an increase in noise levels and disturbances resulting from their use of lighting.

The impact on bats during the construction phase will be negative, direct, local, short-term, whereas the

significance of this impact was assessed as **negligible**.

6.1.1.5.2. Impact on protected areas

Given the location of the Baltic Power OWF at a significant distance from the protected area of the Słowiński National Park, there will be no significant impact on this area, including any element for which it was established (i.e.: biodiversity, resources, objects and elements of inanimate nature and the landscape of the Park).

The impacts of the planned project construction phase on the Natura 2000 site Przybrzeżne wody Bałtyku (PLB990002) will affect the subjects of protection in this area – seabirds. The scaring effect caused by the traffic of vessels, the potential depletion of the food supply of benthivorous birds such as the razorbill and the velvet scoter, as a result of macrozoobenthos destruction along the cablelaying route, the noise scaring the fish which are the food basis of the razorbill as well as the water turbidity making it difficult for diving birds to search for food, were assessed as negative impacts of low significance. In one case, the scaring effect was assessed as negligible – the European herring gull often accompanies sailing vessels in marine areas, thus, the individuals of this species will not be affected by the scaring effect.

The construction phase impacts were of local, reversible and in most cases short-term character (medium-term in the case of the depletion of food supply for benthivorous birds – regeneration of macrozoobenthos resources may take up to several years).

The impacts will not affect the integrity of the area nor its coherence with other sites of the Natura 2000 network.

The construction phase of the planned project will have a moderate impact on the Coastal Protected Landscape Area due to the recreational function of this area. The planned project impacts in the case of the pollution of the ecological area “Torfowisko” [Peat Bog] in Szklana Huta as a result of accidental leaks from machines and vehicles will be important. The implementation of the planned project in the OPA will have no direct or indirect impact on the Natura 2000 habitats Białogóra (PLH220003), due to a significant distance of the planned works and the route of the access road from those habitats. The project will not have a significant negative impact on the subjects of protection of the Natura 2000 site, and especially, the following outcomes will be avoided: significant deterioration of the status of natural habitats or habitats of plant and animal species, for the protection of which the Natura 2000 site was established; significant negative impact on species, for the protection of which the Natura 2000 site was established; significant deterioration of the Natura 2000 site integrity or its interconnection with other sites. Moreover, the planned project will not affect the possibility of implementing conservation measures and achieving targets set out in the Protective task plan for the Natura 2000 site Białogóra PLH220003.

6.1.1.5.3. Impact on wildlife corridors

In the spring and autumn periods, regular bird migrations take place in the Baltic area; however, the migration tactics and their routes are poorly recognised.

Given the lack of information on the occurrence, functioning and significance of wildlife corridors in maritime areas, it was conservatively assumed that the value of this resource is **medium**. Taking into account the spatial scale of the Baltic Power OWF Area in relation to the size of the Baltic Sea, including the increasing effect of spatial development, it was assessed that the impact of the Baltic Power OWF during the construction phase on the potential migration routes of migratory species will be **negligible**.

The construction phase will cause the interruption of the spatial continuity of the Coastal Wildlife Corridor. The implementation of the planned project related to the use of heavy machinery will result in the migration of species to the neighbouring areas. Since the construction works will generally be carried out during daytime, the scaring will result in a slight and short-term limitation of the functionality of wildlife corridors. Breaking the spatial continuity will occur within a negligible area in relation to the entire wildlife corridor, and the felling of trees carried out in appropriate periods will minimise the potential impacts. The impacts of the planned project will be moderate.

6.1.1.5.4. Impact on biodiversity

Taking into account the nature of impacts during the construction phase of the Baltic Power OWF and animal species present in the area, including the role played by this area for them, it can be assumed that at this stage of the project there may be a short-term change in the number of species present in the development area.

Individual species may be temporarily scared off to the adjacent areas where they will not be exposed to disturbances. However, such a movement of individuals does not mean a change of biodiversity at the species level. The works carried out will also not lead to changes in the level of ecosystem and genetic diversity. Therefore, the impact of the project on biodiversity was considered **insignificant**.

The planned project does not pose a risk to biodiversity. The analysis of the planned project impact on biotic as well as abiotic elements indicated that apart from short-term, local and, in most cases, reversible impacts of the construction phase, there will be no impacts which could cause a serious risk of a permanent loss of habitats and species. As a result of the assessment, the impacts were found to be low.

6.1.1.5.4.1. Phytobenthos

Impacts on macroalgal species diversity in the OPA are analogous to those found for phytobenthos, i.e.:

- disturbance of the substrate – destruction of macroalgae may occur, which may cause a decrease in the number of species in the area. This is a negative, direct and temporary impact of a large size. The sensitivity of macroalgae species to the impact was determined as moderate, because after the impact cessation, there is possibility that the seabed will become overgrown with other species within a year or several years. The significance of impact on biodiversity was assessed as moderate. It should be remembered, however, that the significance of macroalgae in the area is irrelevant, which means that their loss is not significant for the ecosystem;
- increase in the concentration of suspended solids leading to increased turbidity of the water depth and increased sedimentation – may cause photosynthesis disruption. The impact will be negative, indirect, local and momentary, while its scale will be moderate. The sensitivity of macroalgae to this impact is irrelevant, because naturally in the environment, the macroalgae are buried by sandy sediment as a result of storms and strong seabed currents. The significance of the impact was determined as negligible;
- redistribution of nutrients and contaminants from sediments to the water depth – phytobenthos communities will be temporarily exposed to an increased concentration of nutrients (which may cause an increase in plant mass) and contaminants in the water (which may cause physiological disruption).

The impact will be negative, indirect, local and momentary, while its scale will be moderate. The results of sediment chemical analyses, performed for the preparation of EIA 2022, indicate that the concentrations of nutrients (total nitrogen and total phosphorus) in the OPA do not exceed values typical of the southern Baltic sediments. Moreover, the concentrations of persistent organic pollutants (i.e. PAHs, PCBs and TBT) and toxic substances such as metals or mineral oils are low and do not deviate substantially from the data from literature regarding sandy sediments of the Southern Baltic. Consequently, the sensitivity of macroalgae to this impact was assessed as irrelevant and the significance of the impact as **negligible**. The redistribution of nutrients and pollutants from sediments to the water depth will not affect the number of macroalgal species in the area.

The impact on **benthic** communities will be short-term as it will cease upon the completion of the works and their resources will return to their original state after some time. Recolonisation of the disturbed seabed area will be gradual and will result in the restoration of the food supply for benthivorous and piscivorous birds. This impact will be local, short-term and reversible and will have a low significance. Water turbidity resulting from the re-suspension of seabed sediments due to cable laying will make it more difficult for piscivorous birds to locate food. This will reduce their food supply. The range of this impact will depend on a number of factors, including:

1. current direction;
2. wave motion;
3. volume of the sediment disturbed.

The impact will be local, short-term, reversible and, due to the proximity of neighbouring sea areas which are rich in ichthyofauna, will have a low significance.

6.1.1.5.4.2. Macrozoobenthos

The impact of the project that has the most adverse character, possibly leading to a change in biodiversity of the macrozoobenthos in the Baltic Power OWF Connection Infrastructure Area is the disturbance of seabed sediment structure. Due to a limited area of macrozoobenthos destruction (a maximum of 3 km2 for 4 cables),

and the destruction occurring in fragments, because individual corridors will be at a distance of 100 to 200 m away from one another, this impact will not lead to a significant change in the quality structure of the macrozoobenthos community from the soft and hard bottoms, consisting of taxa typical and common for the shallow and medium-deep seabed (up to 35 MBSL) of the coastal and open waters of the Southern Baltic. The impact will be reversible and up to several years from its cessation its quality structure – biodiversity of macrozoobenthos – will be restored.

6.1.1.5.4.3. Ichthyofauna

During the construction phase, negative impact on the ichthyofauna biodiversity can be expected (reduction of the number of species present in the area). It can be assumed that it will mainly result from the avoidance of the area during cable laying works. The noise associated with the process (increased ship traffic, operation of cable laying equipment) may deter particularly the fish with a low reaction threshold such as the clupeids and cod. Area avoidance may also be associated with an increase in suspended solids concentration. However, for both of these factors, the negative impact will be local and short-term, directly related to the area where the work front is focused at a given time.

Habitat alteration associated with the destruction of some of the benthic organisms may result in a reduction of the food supply for benthivorous fish and consequently in the abandonment of the area by benthivorous fish. However, considering the width and surface area of the belt within which the works will be conducted (80 m and 4 km2 , respectively), such an effect seems unlikely.

6.1.1.5.4.4. Seabirds

The analysis of the possible impacts resulting from the construction activities conducted during the Baltic Power OWF Connection Infrastructure construction phase indicates that their effects will be mostly short-term and local. This applies to all types of emissions (noise, suspended solids and the release of nutrients from the sediments). Therefore, this project's impact on biodiversity can be assessed as low.

6.1.1.5.4.5. Marine mammals

A potential negative impact of the project on marine mammals is the temporary exclusion of the area from use as a result of deterrence by the noise generated. This impact was assessed to be low.

6.1.1.5.5. Impact on cultural values, monuments and archaeological sites and facilities

The Baltic Power OWF at the construction stage will not have a negative impact on potential objects of high importance for the protection of cultural heritage from the Stone Age. The surveys carried out in the area in question did not show any archaeological objects or strata related to the settlement in the Stone Age.

The only historical object – a wreck of a steamer from the first half of the 20th century – lies in the Baltic Power OWF Connection Infrastructure area at a distance of approx. 800 m from the shore, i.e. outside the zone impacted directly by underwater operations involving interference with the surface layer of the seabed sediment, which will end at 1200 to 1300 m from the seashore. In the construction phase, no direct impact on the ship wrecks located outside the construction site boundaries is expected, whereas, the indirect impact resulting from the re-sedimentation of the seabed sediments disturbed during construction works will be insignificant. Taking into consideration the results of the analysis of suspended solids dispersion, its sedimentation outside the area of underwater operations may cause the wreck to be covered with a layer of very fine sediment with a thickness of no more than a few millimetres. The sedimentation of the sediment will not result in the deterioration of the preservation state of the wrecks and will most probably be removed in a short time as a result of hydrodynamic processes. The significance of this impact was assessed to be **negligible**.

6.1.1.5.6. Impact on the use and development of the water region and on tangible property

During the Baltic Power OWF Connection Infrastructure construction phase, the impact on the use and development of the sea area will result almost exclusively from the establishment by the Director of the Maritime Office in Gdynia, of the protection zone for the cable lines within which restrictions will apply to protect the subsea cables from damage or destruction. Out of the existing uses of the sea area, the safety zone will limit fishing activities in terms of the use of demersal fishing gear. The analysis of commercial fishing and fishing effort in the statistical rectangles N7, N8, O6, O7 and O8 showed that there are no significant commercial fisheries within their boundaries. It was assessed that the impacts of the Baltic Power OWF Connection Infrastructure on fisheries during the construction phase will be **negligible**.

Limitations resulting from the gradual exclusion from the Baltic Power OWF Area previous use will have the greatest impact on fishing, including as the area of fishing, as well as the necessity to extend the routes to other fishing grounds, this impact will be negative and direct. Moreover, due to the assumed duration of the construction phase, this impact will be long-term and local.

Taking into account the fact that the previous use of the Baltic Power OWF Area for fishing activities was small and that this activity can be carried out in neighboring water regions, it should be assumed that the significance of the Baltic Power OWF impact on fishing will be of **low importance**.

6.1.1.5.7. Impact on landscape, including the cultural landscape

During the construction phase of the Baltic Power OWF, potential impacts of the project on the landscape, including the cultural landscape, were identified, resulting from:

(i) vessel traffic,

(ii) transport of structural elements of the OWF and

(iii) gradual development of the area.

In the Baltic Power OWF Connection Infrastructure construction phase, the potential impact of the project on the landscape, including cultural landscape, will result exclusively from the traffic of vessels involved in the construction works – cable line installation. The largest vessels expected to participate in the construction works are cable-laying vessels, which are up to 150 m long. The length of cable barges and service vessels is up to 100 m, while that of tugboats – up to 50 m. However, their presence will not interfere with the landscape of the sea area covered by the planned Baltic Power OWF Connection Infrastructure construction, as it is already used for navigation to and from the ports in Gdynia and Gdańsk. It should be noted that the usual navigation route runs at a considerable distance from the shore, i.e. approx. 10 km, while in the case of the construction of the near-shore section of the cable lines, large vessels such as cable-layers, will temporarily sail much closer to the shore and will be clearly visible to observers on the shore. However, this phenomenon will not be a significant deviation from the existing character of the maritime area landscape. The construction of the Baltic Power OWF Connection Infrastructure will not involve the construction of elements extending above the water surface, so the impact on the landscape resulting from the presence of vessels participating in the cable line construction will cease immediately after the completion of the construction phase. The landfall of export cables will be executed using a trenchless method, thanks to which, no impact on the coastal landscape, including beaches, will occur. Considering the manner of implementation of the planned project and the current use of the sea area, the impact significance on the landscape, including cultural landscape, was assessed as **negligible**.

6.1.2. Impact on population, health and living conditions of people.

During the Baltic Power OWF construction, there will be impact on the population at different intensity levels in onshore and offshore areas. This impact will directly affect the persons involved in the construction process. The entire process will be subject to regulations resulting from occupational health and safety regulations. During the construction period, fishermen will have to abandon fishing in the area of work and carry them out in other water regions. An increase in vessel traffic related to construction can also affect navigational safety.

During the construction phase, temporary impediments are expected for ships navigating along the usual route to and from the ports in Gdynia and Gdańsk, i.e. the necessity to modify the sailing course due to the presence of vessels involved in the cable line construas considered **negligible**.

During the construction phase, temporary impediments are expected for ships navigating along the usual route to and from the ports in Gdynia and Gdańsk, i.e. the necessity to modify the sailing course due to the presence of vessels involved in the cable line construction. However, this will be a minor impediment and will cease after the construction phase is completed. Cable line construction will also result in a partial exclusion of the statistical rectangle areas from fishing activities – providing a safety zone for subsea cables. Within the entire Polish Maritime Area, the statistical rectangles N7, N8, O6, O7 and O8 do not constitute important fishing grounds for commercial species and are not intensively used by fishermen. During the Baltic Power OWF Connection Infrastructure construction phase, no impacts on navigation and fisheries are expected that could lead to negative impacts on the well-being and living conditions of people. Therefore, the impact significance was assessed as **negligible**.

The scale of impact on people's population, health and living conditions during the construction phase will be

"small", and when assessing the significance of the receiver as "very large", it can be assumed that the significance of impact will be **moderate**.

6.1.2. Operation phase - offshore

6.1.2.1. Impact on the geological structure, bottom sediments, access to raw materials and deposits

Changes within the seabed associated with the impact of the project will be local and within the entire area occupied by the project – insignificant for the overall character of the seabed and its structure. It is not expected that there will be any changes in the seabed structure during the project operation phase. The overall impact of the project in the operation phase can be assessed as **negligible**.

6.1.2.2. Impact on the dynamics of sea waters

As a result of the presence of structural elements of the Baltic Power OWF, water flow rates and directions as well as water pressure in the immediate vicinity of each structure can change, which will manifest itself in a local increase in water flow velocity due to narrowing of the flow stream and formation of whirlpools around the structure. This means that overlapping of these impacts should not be expected and disturbances will be only local. The resulting modifications of the wave motion can be noticed only in the close vicinity of individual offshore wind turbines. However, they are of local nature and should not be present outside the Baltic Power OWF Area. The impact of wind turbines on the wave field and sea current field will not have a key impact on these elements. Significance of the impact of the Baltic Power OWF on the dynamics of sea waters in the OPA during the operation phase was assessed as **negligible**.

6.1.2.3. Impact on the quality of sea waters and bottom sediments

During the Baltic Power OWF operation, works affecting the quality of water and bottom sediments will be carried out in its area. This will be mainly maintenance and intervention works in the event of an emergency situation. The impacts will be similar as in the case of the construction phase, however, their scale, due to the size of resources used in both phases of the project, will be many times smaller than in the construction phase.

New impacts not occurring during the construction phase will result from: (i) contamination of water and the bottom sediments with compounds from anti-corrosion agents and (ii) change of bottom sediments and water through the reception of heat from transmission cables.

Contamination of the environment with aluminum or zinc released during operation with the use of galvanic cathodic protection is a direct, negative impact of local range, being long-term, irreversible, permanent, and of medium intensity. The significance of this impact during the operation phase in the OPA was assessed as **negligible** for sea waters and bottom sediments, whereas in the case of a breakdown or collision, it was assessed to be **moderate**.

Increasing the temperature of sediments in which the cable is buried and waters filling the spaces between sand grains in the sediment can cause:

(i) increased bacteria activity,

(ii) reduction of oxygen content in water,

(iii) release of harmful substances, including metals, from sediment into water, and

(iv) adverse effects on benthic organisms. The most important parameters influencing the impact size are the depth of cable burial and the seabed type.

The heat emission around the Baltic Power OWF cables in the sediment will be local and the effect will be imperceptible, which is compliant with the technical assumptions of the project for inner array power cables to be buried at a depth of up to 3 m.

Heat emission by the cables is a direct, negative impact of local range which are long-term, irreversible, permanent over the operation period, and of medium intensity. The impact significance in the construction phase for sea waters and bottom sediments was determined as **negligible**.

6.1.2.4. Impact on the climate, including emission of greenhouse gases and impact significant in terms of adaptation to climate changes, impact on the air (atmospheric purity)

The wind turbines will locally reduce wind energy and disturb atmospheric pressure directly in the area of the rotor operation. The wind turbine towers may locally disturb the velocities and directions of water flows and

reduce the energy of sea waves locally, which is reflected in their height drop.

During the operation phase of the Baltic Power OWF, direct and local impact of the planned project (related to the use of vessels and fuel consumption by them) will not have a significant impact on the change of climatic conditions. Despite long-term impact, its range will be local. However, indirectly the operation of the wind farm will result in reduction of greenhouse gas emissions to the atmosphere by other sources, e.g. coal-fired power plants located in other areas of the country. Therefore, despite the significant importance of the climate and air quality and the small scale of impact of the Baltic Power OWF in the OPA during the operation phase, it may be concluded that the impact in terms of greenhouse gas emissions from vessels to the atmosphere will be **negligible**.

6.1.2.5. Impact on ambient noise

Cables used for energy transmission, buried in the seabed, will not generate noise. Periodic maintenance and repair of the cable, requiring activities similar to those described in detail for the construction phase, will be limited to a smaller area and will be temporary in nature. The impact of ambient noise in the operation phase will be negligible.

6.1.2.6. Impact on systems using EM field

It follows from the operation of the OWF so far that the operation of wind turbines and certain types of tower structures may adversely affect the operation of marine and onshore navigation support equipment or other applications. This applies in particular to radars, communication systems and radar equipment.

In accordance with the conditions included in the permit for erection and use of artificial islands, structures and devices, the Applicant will be obliged to make arrangements with users using EMF systems to implement remedial measures that will allow to accept the impact of the Baltic Power OWF on communication and radiolocation systems for these users. Therefore, it should be assumed that the significance of the impact of the Baltic Power OWF on these systems will be negligible.

6.1.2.7. Impact on nature and protected areas

6.1.2.7.1. Impact on biotic components in offshore area

6.1.2.7.1.1. Phytobenthos

During the operation phase, support structures of wind turbines and accompanying infrastructure located under the water surface in the euphotic zone can be overgrown by macroalgae. Despite the fact that **phytobenthos** does not occur in the area of the planned OWF, macroalgae spores may appear in this area due to various natural and anthropogenic factors.

Macroalgae and animal organisms (e.g. mussels) overgrowing components of the OWF will create the "artificial reef", a factor causing local increase in biodiversity of plant and animal species per se and indirectly affecting the increase in the species richness and quantitative resources of the marine fauna – mainly fish and nekton crustaceans, which will search for food and places convenient for refuge and reproduction within it. Therefore, the effect of overgrowing submerged structures of the OWF by macroalgae should be considered as positive, however it should also be noted that the natural character of the maritime area will be disturbed. Locally and in the long term, the functioning of the marine ecosystem will be changed, for which the anthropogenic factor will be responsible. The significance of the impact was considered positive and **negligible**.

6.1.2.7.1.2. Macrozoobenthos

The operation of the Baltic Power OWF will cause the following impacts on **macrozoobenthos**: (i) loss of a fragment of the habitat, and (ii) artificial reef effect.

The main impact in this phase of project implementation will be the loss of a fragment of macrozoobenthos habitat. The seabed development will eliminate biological life from the seabed surface, in the worst case scenario it will be occupied by the GBS with the largest base diameter from among the proposed types of support structures (in the RAO), including a scour-protection layer.

The loss of a part of the habitat is a negative impact occurring during the operation phase.

Given the moderate scale of the impact on the soft seabed macrozoobenthos, the importance of this impact will be **insignificant**.

Taking into account the high capacity of recovery of the hard seabed macrozoobenthos resources, this impact

was assessed as **insignificant**.

Once the support structures are introduced into the environment, taking into account the high reproductive potential of zoobenthos, the colonization of artificial hard substrates by animal periphyton communities, as well as mobile epifauna – the so-called artificial reef effect, should be expected here. This artificial reef will partially compensate for the destroyed macrozoobenthos complex occurring there before human interference with the environment. The artificial reef effect is a long-term and permanent phenomenon, but due to its local range, the impact significance was considered **moderate**.

6.1.2.7.1.3. Ichthyofauna

During the Baltic Power OWF operation phase, the impacts on **ichthyofauna** will result from: (i) noise and vibration emission, (ii) habitat change, (iii) creation of a barrier, and (iv) EMF emission.

The impact of noise at the operation phase of the Baltic Power OWF should be much lower than observed during construction and decommissioning. It will depend on the environmental conditions (depth, type of sediment, seabed morphology) and the type and size of the wind turbine and wind speed.

Emission of noise and vibrations generated during the OWF operation may directly affect the ichthyofauna. The above impacts will be of negative, direct, local, long-term and permanent nature. The significance of the impact is assessed to be negligible for all investigated fish species.

The presence of structural elements of wind turbines involves the creation of additional hard substrates forming a new habitat. Such artificial structures constitute the so-called artificial reef – a new habitat. As early as after several months, numerous populations of fishes will appear in the reef area, both those returning after the end of disturbances related to construction and those not present in this area so far, affecting the increase in biodiversity. The development of a stable artificial reef system usually takes 1–5 years.

Moreover, the introduction of possible restrictions for fishing and navigation in the Baltic Power OWF Area will reduce anthropogenic pressure, and the areas of artificial reefs can constitute a specific refuge for fishes, both adults and early stages of development. However, it is possible that artificial reefs can create an environment that also favors foreign fish species.

The impact related to the change of habitat will be positive, direct, local, permanent and long-term. The significance of the impact is assessed to be **negligible** for all investigated fish species.

The construction of underwater structures may constitute a migration barrier for economically important fish whose routes run in this place. The impact related to the creation of a barrier will be negative, direct, local, long-term and permanent. The significance of the impact is assessed to be **negligible** for all investigated fish species.

The sensitivity of ichthyofauna to EMF impact depends on: (i) a species-specific detection threshold, (ii) a type of fish sensory (magnetic or electrical) and (iii) a species lifestyle (demersal or pelagic).

The impact related to the EMF emission will be negative, direct, local, long-term and permanent. The significance of the impact is assessed to be **negligible** for all investigated fish species.

6.1.2.7.1.4 Marine mammals

During the operation phase of the Baltic Power OWF, the impacts on **sea mammals** will result from: (i) emission of noise generated by wind turbines, (ii) emission of noise generated by vessels, (iii) changes in the habitat, (iv) collisions of vessels, and (v) collisions with vessels.

The most significant impact on marine mammals during the operation phase of the Baltic Power OWF will result from a potential collision of vessels and, consequently, from the risk of a significant spill of fuel. In this case, the significance of the impact was assessed as **moderate**. In other cases, the significance of the impact was assessed as **insignificant**.

6.1.2.7.1.5. Seabirds

During the operation phase of the Baltic Power OWF, the impacts on **migratory birds** will result from two elements, i.e. the barrier effect and risk of collision with the OWF structures. Due to the largest assumed

occupation of space above the Baltic Power OWF Area, the size of these impacts will be higher than in the construction phase.

The significance of the impact of the barrier effect was assessed for all migratory bird species as **negligible**. However, the significance of the impact in the form of collision risk was considered **moderate** in the case of common cranes, insignificant in the case of geese, long-tailed duck, common scoter and velvet scoter and **negligible** for other species.

The most important impacts on **seabirds** during the operation phase include: (i) vessel traffic, (ii) scaring away and displacement from the habitat, (iii) creation of a barrier, (iv) collisions with wind turbines, (v) creation of an artificial reef and (vi) creation of a closed water region. The impact assessment was carried out for the five most numerous birds: long-tailed duck, velvet scoter, razorbill, common guillemot and European herring gull.

The significance of the above-mentioned impacts for the European herring gull was assessed as **negligible**, for the razorbill and common guillemot as **moderate** at most, and for the sea ducks (velvet scoter and long-tailed duck) as significant at most. The impact of the Baltic Power OWF on **bats** during the operation phase will be caused by: (i) collisions with wind turbines, (ii) noise and light emissions, (iii) barrier effect, and (iv) habitat changes. The significance of the impact of the Baltic Power OWF during the operation phase was assessed as **insignificant**.

6.1.2.7.2. Impact on protected areas

Given the location of the Baltic Power OWF at a significant distance from the Słowiński National Park, no significant impact on this area will occur during the operation phase, including any element for which it was established, i.e. biodiversity, resources, objects and components of inanimate nature and landscape values of the Park.

As a result of the conducted specific assessment of the impact of the Baltic Power OWF, it can be concluded that the planned project will not cause significant impacts on the analyzed Natura 2000 sites.

6.1.2.8. Impact on wildlife corridors

Due to the same pre-conditions in terms of knowledge about wildlife corridors in maritime areas and the spatial scale of the Baltic Power OWF Area in relation to the size of the Baltic Sea, including the constant effect of space development, it was assessed that the impact of the Baltic Power OWF in the operation phase, similarly as in the construction phase, on migration routes of migratory species will be **negligible**.

6.1.2.9. Impact on biodiversity

During the Baltic Power OWF operation phase, structures permanently submerged in water will be found in the environment, creating favorable conditions for the development of animal and plant periphyton organisms. On a local scale, within the range of structural members, there will be an increase in species diversity, although the character of the natural value of this habitat may be ambiguous. This results from the fact that, on the one hand, periphyton communities will be a new biocenosis component of this area, additionally increasing the food base for fish, birds and, incidentally, for marine mammals. On the other hand, this location may favor the spread of foreign species, which lowers the ecological quality of this micro-habitat.

An artificial reef will create favorable conditions for living and reproduction of many fish species. A positive impact on biodiversity can have a long-term reduction or cessation of fishing in the Baltic Power OWF Area. Probably, the artificial reef effect will have only a local impact, without increasing diversity in a larger area.

In the case of seabirds, as a result of scaring away and displacement from habitats, there can be changes in the distribution of birds in the Baltic Power OWF Area. After the disturbance period, birds will gradually become accustomed to the new situation. In the case of species sensitive to the presence of wind turbine structures, the OWF Area can be clearly avoided and thus the biodiversity of this area could be reduced.

6.1.2.9.1 Phytobenthos

When artificial reefs (communities of lichen flora and fauna) are formed on cable protection systems placed on the hard bottom, and macroalgae are part of it, species diversity in the area may increase. The cable protection elements may host not only species native to the area, but also new species whose spores have been brought in from other parts of the Baltic Sea with the sea currents. The impact of introduction of additional hard substrate in the area should be assessed as negative (disturbance of the original conditions existing before the commencement of the project) / positive (local increase in species diversity), indirect, local and long-term. The

size of this impact will be irrelevant, as the boulder areas on which the protection can be built constitute less than 1% of the total surface area of the OPA, which means that the surface which could possibly be overgrown will be small. The sensitivity of macroalgal species was assessed as high because they have a high potential to thrive in the presence of hard substrates to which they easily attach. The significance of the impact was assessed as **negligible**.

6.1.2.9.2 Macrozoobenthos

In the Baltic Power OWF Connection Infrastructure operation phase, essentially, no significant changes will take place, let alone an increase in biodiversity in terms of the structure of the seabed-inhabiting benthic habitat, as the cables are planned to be buried in the seabed. The possible destruction of the hard-bottom macrozoobenthos within the OPA corridor on a very small surface area, smaller than 0.3 km2 , will be compensated by the overgrowth of the concrete material protecting the cable laid in this location by artificial reef, thus, the project will not change the benthic habitat biodiversity status in the medium term.

6.1.2.9.3 Ichthyofauna

The assessment of impacts occurring during the operation phase (noise and vibration, electromagnetic field, release of harmful substances) indicates that they will not be significant. Therefore, no impact on biodiversity is expected. However, a possible impact on ichthyofauna biodiversity can be assumed given the presence of cable protection structures in places where, due to the seabed type, cable burial in the sediment will prove impossible. Structures such as riprap and concrete structures will provide a substrate for the formation of an artificial reef. This may result in a more abundant presence of certain fish species in their vicinity and a possible increase in certain biodiversity indicators. However, it should be emphasized that this phenomenon will have a very localised impact, given the probably small area on which the construction of such structures will be required.

6.1.2.9.4 Marine mammals

A potential negative impact of the project which may affect marine mammals is the disturbance by the noise generated by ships and underwater equipment used during system maintenance or repair works. However, given the local and short-term nature of this impact, the lack of evidence of significance of the area for particular marine mammal species and the sporadic occurrence of such species, the significance of this impact was assessed as **low**.

6.1.2.9.5 Seabirds

The analysis of the possible impacts resulting from the Baltic Power OWF Connection Infrastructure operation indicates that their effects in terms of the changes in biodiversity of seabirds will be exclusively of local and short-term nature and will mainly involve a temporary loss of habitats. This impact was assessed as insignificant for the marine avifauna.

6.1.2.10 Impact on cultural values, monuments and archaeological sites and facilities

During the operation phase, no underwater works are anticipated that would result in seabed interference, except for the ad hoc cable repairs in case of damage. Potential impacts on wrecks during the operation phase will result from the sedimentation of sediments mobilizsed into the water column during the uncovering of a damaged subsea cable section. Mass flow excavation (MFE) of damaged sections of cable lines is associated with more intense resuspension and sedimentation than the technologies planned to be used during the construction phase. It should be noted, however, that the need for the application of MFE technology will only arise in emergency situations and that underwater works will cover only short cable line sections. For this reason, the impact of sedimentation on the surface of wrecks is expected to be smaller than during the construction phase, and will not affect the conservation status of the wrecks. It should be assessed that the scale of impact of the Baltic Power OWF Connection Infrastructure during the operation phase on the conservation status of the wrecks located within its boundaries and in the surrounding area will be irrelevant and the impact will be **negligible**.

In the Baltic Power OWF Area, no risk of impact on the objects of great importance for the protection of cultural heritage was found. One cannot exclude that the wrecks reported to the Pomeranian Voivodeship Heritage Conservation Officer will be covered by conservation care and will require determination of protection zones in which the possibility of development will be limited.

The Applicant assumes preventive limitation of activities that involve disturbance of the seabed at a distance of up to 100 m from the discovered wrecks.

6.1.2.11. Impact on the use and development of the water region and on tangible property

During the Baltic Power OWF Connection Infrastructure operation phase, the impact on the use and development of the sea area will result almost exclusively from the establishment, by the Director of the Maritime Office in Gdynia, of the protection zone for the cable lines, within which prohibitions and restrictions will apply in order to protect the subsea cables from damage or destruction. Out of the existing uses of the sea area, the protection zone will impose the strongest restrictions on fishing activities because the use of demersal fishing gear will most likely be prohibited within the zone. The analysis of commercial fishing and fishing effort in the statistical rectangles N7, N8, O6, O7 and O8 showed that there are no significant commercial fisheries within their boundaries. It was assessed that the impacts of the Baltic Power OWF Connection Infrastructure on fisheries in this sea area will be **negligible**. During the operation phase, the cable lines will be inspected periodically, at least once every five years. This type of work is usually performed by one vessel. Therefore, no impacts on navigation and other uses of the sea area are anticipated.

During its operation, the Baltic Power OWF Area will be excluded from navigation due to safety reasons. Decisions on permits for vessels other than vessels handling the OWF in the Baltic Power OWF Area will be made by relevant maritime administration authorities.

As a result of the Baltic Power OWF occupying the maritime area, this area may be excluded from the possibility of fishing. The Baltic Power OWF Area is located within four fishing squares. This area is characterized by low fishing productivity, therefore the significance of the impact was assessed to be of low importance.

6.1.2.12 Impact on landscape, including the cultural landscape

During the operation phase of the OWF, potential impacts of the project on the landscape, including the cultural landscape, resulting from the presence of marine structures and vessels were identified.

Objectively the landscape within the OWF will be industrial, but its impact will be subjective and will depend on individual characteristics of the receiver and may be perceived negatively and positively.

The significance of impacts was assessed as **negligible**.

6.1.2.13 Impact on population, health and living conditions of people

The operation of the Baltic Power OWF will require regular maintenance services. All related works will be performed by specialized teams of employees and will be subject to high occupational health and safety requirements.

The access to the Baltic Power OWF Area may be limited for fishing vessels and may mean, for instance, limitation of availability to the currently exploited fishing grounds and extension of routes for fishing vessels from certain ports to the fishing grounds located north of the Baltic Power OWF Area. During most meteorological situations, the Baltic Power OWF will not be noticeable from the shore. Only from higher viewing points and under suitable visibility conditions will it be possible to observe a larger number of wind turbines.

Other types of events that may affect health and living conditions may involve different types of collisions of vessels at sea. Such events are random, and the presence of the OWF may hinder rescue operations at sea.

Although the human population resources, and both the health and living conditions of people, is of great value, due to the fact that the distance of the Baltic Power OWF from permanent places of residence and work of people is large, the impact of the Baltic Power OWF was assessed as **negligible**.

6.1.3. Operation phase - onshore

Underground cable lines in the operation phase are practically maintenance-free, servicing is carried out once a year. During the operation phase, the highest impacts will be related to the customer substation and the 400 kV overhead line.

6.1.3.1 Impact on geological structure, coastal zone, soils, and access to raw materials and deposits

6.1.3.2 Impact on geological structure

During the operation phase of the 400 kV overhead line, no impact on geological structure will occur. Only in the event of the necessity to perform maintenance works and works necessary to repair a failure, may the surface formations be contaminated with petroleum substances from damaged vehicles and machines. In connection with the cable operation, heat will be emitted to the ground.

To ensure the best conditions for cable heat dissipation into the environment, the cable line along its entire length will be laid surrounded by bentonite.

6.1.3.3 Impact on the topography and dynamics of the coastal zone

During the operation phase, there will be no impact of the planned project in the OPA on the topography and dynamics of the coastal zone.

6.1.3.4 Impact on soils

According to the results of the analysis of the heat emission by the planned power cable, the impact on the soil resulting from the emission of heat to the ground was assessed as moderate and local. The soil resistance to this impact was assessed as moderate. The emitted heat is not expected to change habitats nor species. The impact related to the permanent land occupation for cable chambers concerns arenosols. The impact related to the permanent occupation of land as a result of the construction of a customer substation and a 400 kV overhead line concerns brown soils. They show high resistance to this impact, they were assessed to be of low importance. The impact on all types of soils (with the exception of hydrogenic soils) was assessed as moderate.

6.1.3.5 Impact on the access to raw materials and deposits

In the operation phase, no impacts on the deposits are expected.

6.1.3.6. Impact on the quality of surface waters

The impacts connected to the contamination as a result of accidental leaks from machinery and vehicles was assessed as low and local. Only the scale of impacts on ponds in the vicinity of the ecological area “Torfowisko” [Peat bog] in Szklana Huta was assessed as high, and the significance of impact as important. The impacts related to the accidental leaks at the customer substation were considered to be low and have local scope.

6.1.3.7 Impact on hydrogeological conditions and groundwater

A particularly significant impact of the operation phase on groundwater is associated with the passage of vehicles along the road leading through the "Torfowisko" [Peat bog] ecological area in Szklana Huta. The scale of impact on groundwater in this area was assessed as high, and the impact significance as important. The importance of impact on hydrogeological conditions and groundwater was assessed as low. Due to the scale and nature of the planned project, there will be no impact on Groundwater Bodies in the operation phase. Also, the achievement of environmental objectives was not found to be threatened.

6.1.3.8 Impact on climate, including greenhouse gas emissions and impacts relevant for adaptation to climate change, impact on atmospheric air (air quality)

No operation phase impacts of the planned project on the climate are expected; also, there will be no greenhouse gas emissions nor impacts relevant to the climate change adaptation.

6.1.3.9 Impact on ambient noise

Noise impact of the Baltic Power OWF Connection Infrastructure in the operation phase will be associated with the functioning of the customer substation and the 400 kV overhead line connecting the customer substation with the PSE substation.

The results of the noise level distribution calculations in the vicinity of the two single-circuit 400 kV overhead lines to be built parallel at a distance of 30 m, indicate that:

- the maximum value of the sound level in the most unfavourable operating conditions of the line will not exceed at any point beneath the line the value of 52.8 dB, which means an exceedance by 7.8 dB of the permissible value established in the Regulation of the Minister of the Environment of June 14, 2007 on permissible noise levels in the environment (Journal of Laws of 2007, No. 120, item 826, as amended) for

the residential areas at 45 dB;

- the area of land under the above-mentioned system of parallel 400 kV overhead lines, where the calculation analyses indicate that the permissible value of 45 dB (for the areas of residential development) is exceeded, extends (at the height of 4.0 MASL) to the distance of 39 m from the line axis in both directions;
- in the vicinity of the system of 400 kV overhead lines running in parallel, it is not possible to implement housing development due to the possibility of exceeding the permissible noise level (45 dB) in an area with a width of 78 m (2 x 39 m).

The impacts on ambient noise were considered to be moderate and local. The calculations conducted for the noise levels from the customer substation show that at all observation points at the boundary of the planned residential development, the night-time (40 dB) and daytime (50 dB) noise limits for single-family development will not be exceeded. The impact of noise from a customer substation in the operation phase will be low.

6.1.3.10 Electromagnetic field impact

The results of magnetic field intensity maximum value calculations, which can be expected over the power cable route for both distance between cable circuits (5.0 and 17.0 m), as well as the graphs with magnetic field intensity distributions indicate that the EMF impact in the operation phase will be negligible

6.1.3.11 Impact on nature and protected areas

6.1.3.11.1 Impact on biotic elements in the onshore area

6.1.3.11.1.1 Fungi

In the project operation phase, potential impacts on the fungal biota may be related to: the change of habitat conditions due to the location of the cable connection and the surface area of land occupied; service works as well as local damage to the top layer of the soil and habitats. The significance of these impacts will be low.

6.1.3.11.1.2 Lichens

In the project operation phase, potential impacts on the lichen biota are similar to those on the fungal biota and may be associated with the change of habitat conditions and the performance of service works. The significance of these impacts will be low.

6.1.3.11.1.3 Mosses and liverworts

In the project operation phase, potential impacts on mosses and liverworts may be associated with the change of habitat conditions and damage to the top layer of the soil and habitats during service works. The significance of these impacts will be low.

6.1.3.11.1.4 Vascular plant and natural habitats

In the project operation phase, potential impacts on vascular plants and natural habitats may be associated with the change of habitat conditions as well as damage to the top layer of the soil and habitats during service works. The significance of these impacts will be low.

6.1.3.11.1.5 Forrest complexes

The underground cable line route will involve permanent tree-felling within the permanent technical belt – covering a maximum of 15 ha. Permanent deforestation will have a local scope. The impacts of the planned project connected to tree-felling will have important significance.

6.1.3.11.1.6 Invertebrates

During the project operation phase the potential impacts on the fauna of invertebrates may involve the destruction of habitats and microhabitats as a result of maintenance works. The significance of these impacts will be low.

6.1.3.11.1.7 Ichthyofauna

The planned project will have no impact on ichthyofauna.

6.1.3.11.1.8 Herpetofauna

In the project operation phase, the potential impacts on the herpetofauna may involve the destruction of

habitats as a result of service works. The significance of these impacts will be low.

6.1.3.11.1.9 Birds

In the project operation phase, potential impacts on birds may be related to:

- the location of the underground cable lines:
  - the change of habitat conditions due to the location of the cable connection and the surface area of the land occupied,
  - performance of service works and scaring of birds;
- the location of the 400 kV overhead line connecting the customer substation with the PSE substation:
  - the risk of bird collisions with the wires,
  - impediments to migration.

In the long-term, the project involving the construction of underground cable line will not have a negative impact on birds including breeding species, wintering species as well as migrating species. These will be moderate impacts of a local scale.

During the operation phase of the 400 kV overhead line connecting the customer substation with the PSE substation, significant negative impacts may occur.

6.1.3.11.1.10 Mammals

During the project operation phase the potential impacts on mammals may involve animal disturbance as a result of maintenance works. The significance of these impacts will be low.

6.1.3.11.2 Impact on protected areas

6.1.3.11.2.1 Impact on protected areas other than Natura 2000 sites

Coastal Protected Landscape Area The main impacts will involve the emergence of a deforested space with a width of 25 m along and approx. 5 km in length. However, this space will not be occupied by anthropogenic elements, which will be visible in the space of the area. Paved roads will be constructed along the infrastructure of the underground cable lines. The impact of the project in the OPA on the Coastal Protected Landscape Area during the operation phase will be moderate and of local range. Ecological area “Torfowisko” [Peat bog] in Szklana Huta The road leading across the ecological area will be used as access road to cable chambers, which poses potential risk of the surface water, ground water and soil contamination. The scale of impact on the ecological area was assessed as large, and the significance of impact as important. However, it should be remembered that the contaminations of soil and water are unlikely and concern only short-term maintenance works. Ecological area of the “Źródliska Bezimiennej” site In the operation phase, the planned project will be limited to service works carried out once a year. As a result, no impacts on the ecological area, located away from the access roads, will occur.

6.1.3.11.2.2 Impact on Natura 2000 sites

Thanks to the application of measures minimising the negative impact on habitat 2180 Wooded dunes of the Atlantic, Continental and Boreal region, no significant negative impact on the integrity of the Natura 2000 site Białogóra (PLH220003) is expected. This will be a local impact of low significance.

6.1.3.11.3 Impact on wildlife corridors

The planned project in the form of underground cable line will not cause impacts which could affect the migration routes of birds or other plant or animal species. The planned project will not be an obstacle for the movement of animals. These will be local impacts of low significance. The operation of the designed 400 kV line along a 270 m section, connecting the customer substation with the PSE substation, may negatively affect the East Atlantic Flyway, due to high risk of bird collision with the planned HV line. These will be significant impacts.

6.1.3.11.4 Impact on biodiversity

The planned project does not pose a risk to biodiversity. With the application of minimising measures, the impacts of the Baltic Power OWF Connection Infrastructure operation phase were assessed as moderate, due to the potential impacts in the area of the ecological area “Torfowisko” [Peat bog] in Szklana Huta and potential impacts of the 400 kV overhead line on birds.

6.1.3.11.5 Impact on cultural values, monuments and archaeological sites and features

In the operation phase, the planned project will not affect the cultural values, monuments, archaeological sites or objects.

6.1.3.11.6 Impact on the use and development of the sea area and tangible property

In the operation phase, the planned project in the permanent technical belt with a width of 25 m, will be subject to some limitations connected to the necessity to ensure power transmission safety. Paved roads ensuring access to cable lines will be constructed along cable lines. The land use near the customer substation will change from agricultural to industrial. These will be local impacts of low significance.

6.1.3.11.7 Impact on the landscape, including the cultural landscape

Due to the nature of the planned project, including, first of all, its underground construction, no negative impact on landscape, including the cultural landscape is expected, since the planned project is to have a mid-forest location. In that case, the significance of these impacts will be low. The customer substation will constitute a new man-made element in the agricultural landscape, against the forest background, which will make its impact on landscape smaller than in the case of an open-space location. These will be important impacts. The designed 400 kV line will be visible from the near-by communal road Osieki Lęborskie – Lublewko, as well as the neighbouring development of the Osieki Lęborskie and Lublewko villages. Due to the presence of forests in the surroundings, it will not be visible from Lubiatowo. The 400 kV line impacts on landscape will be important.

6.1.3.11.8 impact on population, health and living conditions of people

The most important nuisances related to the functioning of the project discussed involve emission of heat, noise and electromagnetic radiation from the underground cable lines and the 400 kV overhead line. In the OPA, the planned project will not result in the deterioration of the environmental living conditions for humans, and its operation will improve the living conditions of the inhabitants in terms of power supply for domestic and commercial needs. These will be moderate impacts.

6.1.3. Decommissioning phase - offshore

During the decommissioning phase, most of the OWF facilities will most likely be removed from the seabed, in accordance with international regulations. These regulations define the conditions for removal of components and installations of wind farms. Decommissioning works should be carried out in such a manner that they do not hinder navigation and do not adversely affect the marine environment. These standards also define exceptional situations in which there is no obligation to completely remove infrastructure components of the OWF. It is possible to leave such structures, among others, when:

- the weight of the foundation in the air exceeds 4000 tons or it is located at a depth of more than 100 m, provided that it does not hinder the use of maritime areas by other sectors of the economy;
- removal of the components is technically impossible or too expensive;
- there is a threat to the life of the OWF decommissioning personnel;
- decommissioning involves an unacceptable risk of polluting the marine environment.

If some components are left on the seabed, relevant tests and analyses should be carried out to determine whether the remnants of the OWF will not interfere with vessel traffic and will not have a negative impact on biotic and abiotic elements of the environment. It should be ensured that the left-behind parts of the structure do not start to move under the influence of waves, tides, currents or storm surges, causing a hazard to maritime navigation.

The decommissioning process of the Baltic Power OWF will start in several dozen years. During this time, there will be experiences resulting from the decommissioning of other OWFs. This will allow for the development of a detailed plan for the decommissioning of the OWF, taking into account all environmental aspects, including the determination of the part of structural elements removed from the environment. There is no doubt that all above-water components will be removed, transported onshore and disposed of there. To a large extent, the underwater parts will also be removed. Most probably, parts of monopiles in the seabed will remain in the environment, as their total extraction will involve too much effort and resources, and at the same time their removal could cause significant environmental impact. When assessing the impact of the planned activities during the decommissioning phase of the Baltic Power OWF, no higher significance of these impacts on individual assessed elements of the environment than during the construction or operation phase was found.

As a result of the decommissioning process of the Baltic Power OWF, the condition of biocenotic balance created during the several decades of operation will be disturbed. Removal of structural components from water will lead to removal of the substrate for the development of periphyton fauna and flora. Periphyton communities living on these structures will be destroyed. This applies in particular to plant organisms which, without the OWF structure, did not occur in the Baltic Power OWF Area. As a last resort, depending on the scale of decommissioning, a new state of biocenotic equilibrium, closer to the current one, will be established. This balance will also be affected by natural processes taking place in the southern Baltic Sea. The release of the marine space from the structural components of the Baltic Power OWF will enable its reuse by the existing users, in particular in navigation. The possibility of using this area in terms of fishing will depend on the degree of removal of structural components in water.

6.1.3.1. Fungi

The main construction phase impacts on the biota of macroscopic fungi will be connected to: the construction of open trenches for cable laying, cable chambers and inlet and outlet chambers at the sections planned for trenchless passages; the levelling works related to the levelling of the area for the customer substation, 400 kV overhead line towers and the cable chambers. In such cases, the mycelium will be destroyed, and consequently the plot of species will be eliminated. As a result of the assessment, the impacts were found to be of low significance

6.1.3.2. Lichens

The main construction phase impacts on the biota of lichen will be connected to: the construction of open trenches for cable laying, cable chambers and inlet and outlet chambers at the sections planned for trenchless passages; the levelling works related to the levelling of the area for the customer substation, 400 kV overhead line towers and the cable chambers. In such cases, the thalli will be destroyed, and consequently the plot of species will be eliminated. Sulphur oxides and nitrogen oxides will be emitted as a result of construction machinery operation during the construction phase. As a result of the assessment, the impacts were found to be important.

6.1.3.3. Mosses and liverworts

The main construction phase impacts on the biota of mosses and liverworts will be connected to: the construction of open trenches for cable laying, cable chambers and inlet and outlet chambers at the sections planned for trenchless passages; the levelling works related to the levelling of the area for the customer substation, 400 kV overhead line towers and the cable chambers. The species plots will be eliminated. As a result of the assessment, the impacts were found to be negligible.

6.1.3.4. Vascular plants and natural habitats

The main construction phase impacts on vascular plants and natural habitats will be connected to: the construction of open trenches for cable laying, cable chambers and inlet and outlet chambers at the sections planned for trenchless passages; the levelling works related to the levelling of the area for the customer substation, 400 kV overhead line towers and the cable chambers. The plot of species will be eliminated and the habitat patch reduced in size. As a result of the assessment, the impacts were found to be important.

6.1.3.5. Forrest complexes

The route of the Baltic Power OWF Connection Infrastructure will require tree felling: in the 25 m wide and 5 km long permanent technical belt (no clearings are planned in the area of trenchless crossings) which covers a maximum area of 15 ha; in a temporary technical belt, with a width of 25 m from the external cable lines and an approx. length of 5 km, in connection with the conduct of construction works (except for the area of horizontal drillings) which covers a maximum area of 25 ha. As a result of the assessment, the impacts were found to be important.

6.1.3.6. Invertebrates

The main construction phase impacts on the invertebrate fauna will be connected to: the construction of open trenches for cable laying, cable chambers and inlet and outlet chambers at the sections planned for trenchless passages; the levelling works related to the levelling of the area for the customer substation, 400 kV overhead line towers and the cable chambers. In such cases, the disturbance of invertebrates and a possible destruction of nests will take place. Such impacts due to the presence of common coastal species of insects in this area may be considered negligible, and not leading to the elimination of the species site. Moreover, the impacts will be

connected to aeolian erosion and possible contamination of open trenches with greases, oils, etc. – which may negatively affect the bumblebee nests.

6.1.3.7. Herpetofauna

The construction phase impacts will involve mainly the environment transformation, which will be caused by partial destruction of the habitats. Most construction phase impacts on herpetofauna will be moderate.

6.1.3.8. Impact on cultural values, monuments and archaeological sites and features

The construction of the Baltic Power OWF Connection Infrastructure will not affect the cultural values, monuments, archaeological sites or objects.

6.1.3.9. Impact on the use and development of the sea area and tangible property

The phase of underground cable lines construction will involve a temporary and local restriction of the tourism function of the forests in the area. After the construction of the customer substation, it will become impossible to continue agricultural activities in that area. The impact on tangible goods in the construction phase will involve the use of the road infrastructure. As a result of the assessment, the impacts were found to be low.

6.1.3.10. Impact on landscape, including the cultural landscape

In the construction phase of the project, the main impact on the landscape will be the temporary appearance of the construction sites. During the construction phase, tree felling and grubbing will take place, earthworks will be carried out and vehicle traffic related to the transport of materials will occur. Storage yards for the storage of machinery and construction materials will appear. Waste from construction works and sanitary sewage will be generated. As a result of the assessment, the impacts were found to be moderate.

6.1.3.11. Impact on population, health and living conditions of people

The construction will potentially affect people due to periodical nuisances of the construction works, causing emission of pollutants and noise as well as vibrations of the ground. The only periodical nuisances of the construction phase may concern the people staying in the premises of the Rehabilitation and Holiday Centre for disabled people. As a result of the assessment, the impacts were found to be moderate.

6.1.5. Decommissioning Phase - onshore

Due to the fact that no decommissioning phase of the Baltic Power OWF Connection Infrastructure is envisaged, no impact on the environment in that phase will occur.

6.1.6. Reasonable alternative option (RAO)

Offshore:

The Option Proposed by the Applicant (OPA) and the Reasonable Alternative Option (RAO) differ in two key parameters, i.e. the maximum number of wind turbines and the maximum rotor diameter. These two main parameters of the Baltic Power OWF may generate different environmental impacts.

When assessing the impact on individual elements of the environment in all phases of the project implementation no differences were found in the significance of the impact between the two options under consideration. There were only differences in modeling results between the OPA and the RAO in the assessment of collision on migratory birds during the operation phase. The results of collision modeling showed the same or higher risk of collision of migratory birds for the RAO.

Onshore:

For the purposes of the planned project implementation in the RAO the following belts have been designated: permanent 70 m wide – the area directly connected to construction works, includes point locations of towers. Within the permanent belt, the surface layer of ground and forest floor litter will be destroyed, the trees and shrubs will be removed due to the location of the overhead line. The removal of trees and shrubs is permanent; technological 25 m wide from the external overhead lines – the area indispensable for the correct operation of the overhead line and the equipment related, involving permanent clearance; additional 250 m wide from the external cable lines – area through which access roads may run.

6.1.6.1. Construction phase

6.1.6.1.1. Impact on geological structure, coastal zone, soils, and access to raw materials and deposits

6.1.6.1.1.1. Impact on geological structure

The main construction phase impacts on geology and surface formations will be connected to: construction of 4 boreholes at a distance of approximately 210 m from the shoreline and a distance of approximately 20 m from one another; construction of excavations for overhead line towers as well as for the purposes of cable chambers and boreholes; pile driving; levelling works related to levelling of the area for the erection of a customer substation and in the area of cable chambers. The areas most vulnerable to the construction phase impacts of the planned project are dune areas as well as areas with a high level of groundwater deposition. The impact of the planned 220 or 275 kV overhead line on geological structure will be as insignificant as in the case of the OPA.

6.1.6.1.1.2. Impact on the topography and dynamics of the coastal zone

Similarly to the OPA, the shore structure will not be disturbed as a result of drilling. The impact on the topography and dynamics of the coastal zone will be higher in the case of the RAO implementation, due to a definitely greater scale of the tree falling areas as well as the higher probability of aeolian processes triggering within the Wydmy Lubiatowskie dunes. These will have important impacts.

6.1.6.1.1.3. Impact on soils

As a result of the assessment, the impacts on soils were confirmed to be **moderate** at most, similarly as in the case of the OPA. They are related to the impact of wind erosion and the risk of contamination of poorly-developed soils with oils and greases.

6.1.6.1.1.4. Impact on the access to raw materials and deposits

Since the planned project is located at a distance of more than 4 km from the nearest deposit, no construction phase impacts on deposits and the access to mineral deposits are expected.

6.1.6.1.1.5. Impact on the quality of surface waters

As a result of the implementation of the planned project according to the RAO, the impact on the surface waters was found to be smaller than in OPA, due to the passages over hydrographic objects conducted without any collisions. The possibility of water contamination as a result of accidental leaks from machinery and vehicles will be analogous. In the case of the RAO, the insolation conditions will be changed within a belt of greater width, which may lead to a change in hydrological conditions.

6.1.6.1.1.6. Impact on hydrogeological conditions and groundwater

The impact on hydrogeological conditions and groundwater in the RAO will be identical with reference to the ecological area “Torfowisko” [Peat bog] in Szklana Huta and the potential risk of dewatering in that area. It must be noted that the risk of the formation of a cone of depression or potential dewatering of the ecological area is minimal, due to the depth of the groundwater deposition in that area, which was confirmed by drilling. The impact on hydrogeological conditions and groundwater will be the same in both variants, although the type of impacts will be different: the OPA involves open trenches and the use of trenchless methods, while the RAO will involve point excavations for the construction of towers. The impacts connected to the implementation of the RAO will be important.

6.1.6.1.1.7. Impact on climate, including greenhouse gas emissions and impacts relevant for adaptation to climate change, impact on atmospheric air (air quality)

It can be expected that the impact on climate, including greenhouse gas emissions, in the case of the RAO, will be lower due to the short duration of the construction phase as well as a smaller quantity of equipment necessary for the implementation of the project.

6.1.6.1.1.8. Impact on ambient noise

In the case of the overhead line construction, the acoustic impact of noise sources at the construction phase will be irregular, varying daily due to the movement of the equipment, which makes it impossible to present the distribution of the sound field representative for a longer period of time. The line construction will be carried out away from the acoustically protected areas in the mid-forest environment. It can be expected that the impact on the ambient noise in the case of the RAO will be lower, due to a shorter duration of the

construction and a different type of the technology used.

6.1.6.1.2. Impact on nature and protected areas

6.1.6.1.2.1. Impact on biotic elements in the onshore area

6.1.6.1.2.1.1. Fungi

The main impacts of the construction phase on fungi will be connected to the construction of excavations for the overhead line towers and cable chambers; pile driving; levelling works related to the levelling of the area for the erection of a customer substation, 400 kV overhead line towers and in the area of cable chambers. As a result of the assessment, the significance of impact was assessed as low.

6.1.6.1.2.1.2. Lichens

The main construction phase impacts on the biota of lichen will be connected to: the construction of excavations for overhead line towers and cable chambers; pile driving; levelling works related to the levelling of the area for the erection of a customer substation, 400 kV overhead line towers and in the area of cable chambers. In such cases, the thallus will be destroyed and consequently the plot of species will be eliminated. In the construction phase, sulphur oxides and nitrogen oxides will be emitted as a result of construction machinery operation, which epiphytic lichen species are especially vulnerable to. As a result of the assessment, the impact was found to be important.

6.1.6.1.2.1.3. Mosses and liverworts

Due to construction works and the elimination of species plots, it was determined that these will be important impacts.

6.1.6.1.2.1.4. Vascular plants and natural habitats

As a result of the construction works conducted in the permanent technical and technological belts, plots of species will be eliminated and the habitat patch surface area will be reduced. As a result of the assessment, these impacts were found to be important.

6.1.6.1.2.1.5. Forrest complexes

The route of the 220 or 275 kV overhead line will involve a permanent clearing of trees. In total, the maximum surface area of tree felling will cover approximately 60 ha. As a result of the assessment, the impacts connected to tree-felling, soil erosion and potential contamination of individual forest habitat types with greases and oils were found to be important.

6.1.6.1.2.1.6. Invertebrates

Due to the presence of common coastal species of insects in this area, the impacts may be considered negligible and not leading to the elimination of the species site. Moreover, the impacts will be connected to erosion and possible contamination of open trenches with greases, oils, etc. – which may negatively affect the bumblebee nests.

6.1.6.1.2.1.7. Ichthyofauna

During the construction phase, no impact on ichthyofauna is expected.

6.1.6.1.2.1.8. Herpetofauna

Similarly to the OPA, herpetofauna in the area of the alternative line is represented by species relatively common across Poland. Most of them adapt well to the changes in the environment. As a result of the assessment, the impacts were found to be low and moderate in relation to the felling of trees.

6.1.6.1.2.1.9. Birds

The greatest impacts on birds will be connected to the construction of HV towers and a 220 or 275 kV overhead line. These impacts will be important.

6.1.6.1.2.1.10. Mammals

Most of the construction phase impacts on mammals will be similar to the ones in the OPA and will have a moderate or small scale and be of low significance. The highest impact on mammals will be connected to the felling of trees and the traffic of vehicles. These impacts will be moderate.

6.1.3.11.1.1.1. Impact on protected areas

6.1.3.11.1.1.1.1. Impact on protected areas other than Natura 2000 sites

The construction phase impact on the Coastal Protected Landscape Area in the RAO will be higher than in the OPA. These will have important impacts. This is mainly connected to the larger surface area of land occupied as well as the felling of trees planned for a 120 m wide strip of land along a 5.2 km section. The overhead line construction will be implemented in sections, a spot concentration of work will occur in the locations of towers. The construction phase impacts on the ecological area "Torfowisko" [Peat bog] in Szklana Huta in the RAO will be greater due to the necessity to erect 10x8 m overhead line towers dug in up to a depth of 4 m. These impacts will be important.

6.1.3.11.1.1.1.2. Impact on Natura 2000 sites

The construction phase impact on the special habitat protection area Białogóra PLH220003 will be definitely higher than in the case of the OPA due to a larger surface area occupied. The planned project will cause a direct threat to habitat 2180, i.e. Wooded dunes of the Atlantic, Continental and Boreal region. As a result of the overhead line construction, habitat 2180 will be destroyed on a surface area of 12 600 m2 . This will be a permanently deforested area without the possibility of returning to the previous condition. The impacts of the planned project will be important.

6.1.3.11.1.1.1.3. Impact on wildlife corridors

The construction phase involving the felling of trees, construction of trenches and erection or towers, as well as the construction of a customer substation and a 400 kV overhead line will cause a spatial discontinuity of the Coastal wildlife corridor of a supra-regional importance. The impact on the wildlife corridors will be greater than in the case of the OPA. The impacts of the planned project will be important.

6.1.3.11.1.1.1.4. Impact on biodiversity

The construction phase impact on biodiversity in the RAO will be higher than in the case of the OPA due to a larger surface area occupied and intended for tree felling, which entails loss of habitats. The main impacts will affect birds as a result of the construction of HV towers and a 220 or 275 kV overhead line. These will have important impacts.

6.1.3.11.1.1.1.5. Impact on cultural values, monuments and archaeological sites and features

As a result of the assessment, no impact on cultural values, monuments, archaeological objects, nor sites was confirmed.

6.1.3.11.1.1.1.6. Impact on the use and development of the land area and tangible goods

The impact on the use and development of the land area and tangible goods in the RAO during the construction phase will be greater than in the case of the OPA, due to a larger surface area of land occupied and greater limitation of the forest tourist function in this area.

The impact on tangible goods in the construction phase will involve the use of the same road infrastructure as in the OPA. The construction phase impact on the use and development of land and on tangible goods was assessed as important.

6.1.3.11.1.1.1.7. Impact on landscape, including the cultural landscape

The RAO impact on landscape in the construction phase will be greater than in the case of the OPA due to a larger surface area occupied. The differentiating factor will be the specific appearance of the high 4-circuit towers and the overhead line. As a result of the assessment, the impacts were found to be important.

6.1.3.11.1.1.1.8. Impact on population, health and living conditions of people

The construction phase impact on population, health and living conditions of people in the RAO will be similar to the one in the OPA. The differentiating factor for the RAO will be a greater distance (approximately 420 m) from the Rehabilitation and Holiday Centre for disabled people and shorter duration of the construction works. In consequence, the construction phase impact of noise and pollution on the people present at the premises of the Centre will be lower. The significance of the construction phase impact on population, health and living conditions of people was assessed as low.

6.1.3.12. Operation Phase

In the operation phase, the planned project in the form of a 220 or 270 kV overhead line is practically maintenance-free. The operation phase will entail the highest impact in relation to the customer substation and the 400 kV overhead line.

6.1.3.12.1. Impact on geological structure

The impact on aeolian sands connected to permanent deforestation was assessed as negative and important, since as a result of deforestation the aeolian processes may be triggered.

6.1.3.12.2. Impact on the topography and dynamics of the coastal zone

Deforestation of dunes in an approximately 120 m wide strip and the erection of power grid masts involves a high probability of triggering aeolian processes within the Wydmy Lubiatowskie dunes. As a result of triggering such processes, important changes to the relief character may occur both within the investment belt as well as in the neighbouring areas. The impact on the topography and dynamics of the coastal zone was assessed as important for the RAO operation phase.

6.1.3.12.3. Impact on soils

The impact connected to the permanent deforestation concerns all types of soils. The significance of impact was assessed as important in the case of poorly-developed soils, in the area of which as a result of deforestation aeolian process may be triggered and the thin soil cover may be destroyed. In the case of hydrogenic (peat) soils, the impact was assessed as moderately positive.

6.1.3.12.4. Impact on the access to raw materials and deposits

Since the planned project is situated at a distance of more than 4 km from the nearest deposit, no operation phase impacts on deposits are expected.

6.1.3.12.5. Impact on the quality of surface waters and groundwater

The assessment of impact on surface water and ground water quality was specified as low, local in extent and important in relation to the potential contamination of ponds within the boundaries of the ecological area “Torfowisko” [Peat bog] in Szklana Huta.

6.1.3.12.6. Impact on climate, including greenhouse gas emissions and impacts relevant for adaptation to climate change, impact on atmospheric air (air quality)

No operation phase impacts of the planned project on climate are expected. Also, there will be no greenhouse gas emissions nor impacts relevant to the climate change adaptation.

6.1.3.12.7. Impact on ambient noise

The calculation results obtained indicate clearly that regardless of the line voltage (220 or 275 kV) and the type of phase conductors used, the permissible sound level value adopted for residential areas (45 dB) will not be exceeded in any location below the 4-circuit line and in its vicinity. As part of the RAO, a customer substation will be erected, the operation of which involves emission of noise. As the modelling has shown, at all observation points at the boundary of the planned residential development, the night-time (40 dB) and daytime (50 dB) noise limits for single-family development will not be exceeded. The impacts on ambient noise were considered to have low significance.

6.1.3.12.8. Electromagnetic field impact

The operation phase impacts of the EMFs for a 4-circuit overhead line, due to the possibility of the permissible electric field intensity value to be exceeded, will be significant. The EMF impact for the two single-circuit 400 kV overhead lines in the RAO will be the same as in the OPA.

6.1.3.12.9. Impact on nature and protected areas

6.1.3.12.9.1. Impact on biotic elements in the onshore area

6.1.3.12.9.1.1. Fungi

During the project operation phase, the potential impacts on the biota of fungi and lichens will be the same as in the case of the OPA. The differentiating factor will be a larger surface area of permanently deforested land. The significance of these impacts will be low.

6.1.3.12.9.1.2. Lichens

During the project operation phase, the potential impacts on the biota of lichens will be the same as

in the case of the OPA. The differentiating factor will be a larger surface area of permanently

deforested land.The significance of these impacts will be low.

6.1.3.12.9.1.3. Mosses and liverworts

During the project operation phase, the potential impacts on mosses and liverworts will be the same as in the case of the OPA. The differentiating factor will be a larger surface area of permanently deforested land.

6.1.4.2.9.1.4 Vascular plants and natural habitats

During the project operation phase, the potential impacts on the vascular plants and natural habitats will be the same as in the case of the OPA. The differentiating factor will be a larger surface area of permanently deforested land. The significance of these impacts will be low. The significance of these impacts will be low.

6.1.4.2.9.1.5 Forest complexes

The route of the 220 or 275 kV overhead line will involve a permanent deforestation within a technical belt with a width of approximately 70 m and a length of approximately 5.2 km – it covers a maximum surface area of 35 ha, as well as within the technological belt with a width of 25 m from the external overhead lines and a length of approximately 5.2 km – it covers a surface area of approximately 25 ha. The route of the underground cable lines within the permanent technical belt will run across 57 forest plots belonging to the RDSF in Gdańsk. Fresh coniferous forests (62%) and fresh mixed coniferous forests (13%) with pine as a dominant species are predominant in this area. More than 66% of the surface area of forests is occupied by commercial forests. The following categories of protective forests are also present here; soil-protective and water-protective forests. In compliance with the Environmental Protection Plan for the years 2014–2023 of the Choczewo Forest District (RDSF in Gdańsk), the surface area of the Choczewo Forest District is 17 572 ha. Permanent deforestation will have a local scope. The loss of forest resources for the entire Choczewo Forest District will be 0.35%. The impacts of the planned project connected to forest clearance will be important.

6.1.4.2.9.1.6 Invertebrates

During the project operation phase the potential impacts on the fauna of invertebrates will be the same as in the case of the OPA and may involve the destruction of habitats and microhabitats as a result of maintenance works. The differentiating factor will be a larger surface area of permanently deforested land. The significance of these impacts will be low.

6.1.4.2.9.1.7 Ichthyofauna

During the operation phase, no impacts on ichthyofauna are expected.

6.1.4.2.9.1.8 Herpetofauna

The space along the entire project length will be dominated by HV towers and lines. This will result in long-term moderate impacts, as it will not be significantly negative for the amphibians and reptiles. The animals will be able to adjust to the new space. The significance of these impacts will be low.

6.1.4.2.9.1.9 Birds

In the operation phase, the space along the entire project length will be dominated by HV towers and lines. These can result in collisions of birds with overhead lines and permanent habitat fragmentation.In the case of migratory birds, the impact will also be on a continental scale.

6.1.4.2.9.1.10 Mammals

During the project operation phase the potential impacts on mammals will be the same as in the case of the OPA and may involve animal disturbance as a result of maintenance works. After the construction phase is completed, the land will be subject to a succession process, new habitats that will be used by animals will be formed which will mitigate the effects of the land transformation and fragmentation. In a long-term perspective, the project will not generate negative impacts on mammals.

6.1.4.2.10 Impact on protected areas

6.1.4.2.10.1 Impact on protected areas other than Natura 2000 sites

Coastal Protected Landscape Area

The operation phase impact of the 220 or 275 kV overhead line will greatly affect the landscape protected as part of the Coastal Protected Landscape Area. The operation phase involving the need to maintain permanent deforestation within a 120 m wide belt over a length of approximately 5.2 km will result in the creation of an empty space dominated by the silhouette of 4-circuit towers. The remaining operation phase impacts will mainly concern birds. The operation phase impact on the Coastal Protected Landscape Area will be higher than in the case of the OPA. These will have significant impacts.

Ecological area "Torfowisko" [Peat bog] in Szklana Huta

The impact on the ecological area "Torfowisko" [Peat bog] in Szklana Huta in the RAO will be the same as in the case of the OPA and limited to the impacts connected to maintenance works. These will have significant impacts. No impact on the ecological area "Źródliska Bezimiennej" [the Bezimienna Springs] will occur.

6.1.4.2.10.2 Impact on Natura 2000 sites

The planned project will pose a direct threat to habitat 2180 Wooded dunes of the Atlantic, Continental and Boreal region, which is subject to protection within the boundaries of the Special Area of Conservation "Białogóra" (BLH220003). As a result of the overhead line construction, habitat 2180 will be destroyed on a surface area of 12 600 m2 . This will be a permanently deforested area without the possibility of returning to the previous condition. This will have a significant impact.

6.1.4.2.11 Impact on wildlife corridors

The planned project crosses the Coastal wildlife corridor of a supra-regional scale. The creation of a deforested space with dominant 4-circuit towers will interrupt the spatial continuity of the Coastal wildlife corridor within a 120 m wide and 5.2 km long strip. These will have significant impacts.

The location of the Mediterranean flyway migratory route poses a risk of high bird mortality as a result of collisions with the planned HV line. In the case of migratory birds, the impact will also be on a continental scale. This will be a significant impact of a transboundary range.

6.1.4.2.12 Impact on biodiversity

The impact on biodiversity can be considered significant, as birds can collide with the overhead line.

6.1.4.2.13 Impact on cultural values, monuments, and archaeological sites and features

In the operation phase, there will be no impact on cultural values, monuments and archaeological sites and objects due to a significant distance from them.

6.1.4.2.14 Impact on the use and development of the land area and tangible goods

The necessity to maintain a permanent deforestation due to the operation of a mid-forest overhead line will have a major impact on the use and development of the land area.

6.1.4.2.15 Impact on landscape, including the cultural landscape

The 220 kV or 275 kV overhead line will be a new, linear element of landscape in the mid-forest environment. The interference with the landscape will be significant.

6.1.4.2.16 Impact on population, health and living conditions of people

The most important nuisances related to the functioning of the project discussed involve the emission of noise and electromagnetic radiation from the 220 kV or 275 kV overhead line. These will have significant impacts.

6.1.4.3 Decommissioning phase

A complete removal of the 220 kV or 275 kV overhead line is predicted. At that point, the impacts that will occur will be the reverse of the construction phase.

6.1.4.3.1 Impact assessment for Natura 2000 sites

Preliminary assessment

The primary objective of protecting Natura 2000 areas is to maintain or restore the proper conservation status of species and natural habitats being protected and for the protection of which these areas have been designated.

The Baltic Power OWF project is not directly related to or necessary for the management of Natura 2000 sites, however, it follows the necessity to carry out an assessment of the impact on these areas to determine whether the project may have impacts on the Natura 2000 protected areas, the distance between a protected area and the project execution area, and the range of potential impacts. The Baltic Power OWF area is located outside the areas of the European Natura 2000 network. Therefore, when determining the impact of the planned project on Natura 2000 sites, impacts that go beyond the Baltic Power OWF Area were assumed, i.e.: (i) increased concentration of suspended matter in water and its sedimentation, (ii) underwater noise, and (iii) space disturbance.

As a result of the preliminary assessment of the impact of the planned project on Natura 2000 sites, given the ranges and nature of impacts, both of the Baltic Power OWF and of the impact cumulative with impacts from other projects, it was indicated that none of the Natura 2000 sites is within the range of the impacts: (i) increased concentration of suspended matter in water and its sedimentation, and (ii) underwater noise. The absence of these impacts applies in particular to the subjects of protection (species and habitats) within the areas for which protection was established.

The actual impact assessment of the Baltic Power OWF on Natura 2000 sites covered the aspect related to the probable impact caused by the disturbance of the airspace over the Baltic Power OWF development area in the context of integrity of the Coastal waters of the Baltic Sea ("Przybrzeżne wody Bałtyku") area (PLB990002) and coherence of the Natura 2000 network.

Actual assessment

The Baltic Power OWF operation stage was included in the actual assessment due to the fact that the airspace above the maritime area will be occupied by the wind turbines and substations, creating the greatest amount of impact in relation to the remaining phases of the project.

In the context of the protection of seabird populations within the Natura 2000 network, the following are important features of the Słupsk Bank (PLC990001) and Coastal Waters of the Baltic Sea (PLB990002) areas: (i) the location of these areas along the migration route of birds, (ii) appropriate habitat conditions, and (iii) the availability of these areas for the populations of wintering birds and birds resting during migration.

Although the availability of the Baltic Power OWF area for the populations of birds wintering and resting during migration and subject to protection in the neighboring Natura 2000 sites will be limited, this impact was assessed as negligible for the long-tailed duck and the European herring gull, and there will be no impact for the black guillemot and the common scoter. Moreover, the existence of corridors (areas free from development) to the west and east of the OWF development area and between the Baltica 2 OWF and the Baltica 3 OWF will significantly increase the possibility of migrating birds flying within offshore wind farms in this area.

The results of the actual assessment of the impact of the Baltic Power OWF on the bird species subject to protection in the Słupsk Bank (PLC990001) and Coastal waters of the Baltic Sea (PLB990002) areas, the integrity of the Coastal waters of the Baltic Sea area (PLB990002) and coherence of the Natura 2000 network, **it can be concluded that the planned project, both in the OPA and in the RAO, will not cause any significant impacts on the analyzed Natura 2000 sites.**

7. Cumulative impacts of the planned project (taking into account the existing, implemented and planned projects and activities)

In the assessment of the cumulative impacts of the implementation of the Baltic Power OWF in connection with other projects, projects that were implemented, and projects that are in the process of implementation or are planned, have been included. In the case of projects at the planning stage, projects for which decisions on environmental constraints that were issued were taken into account.

At present, no other projects currently being implemented or are planned in the Baltic Power OWF Area may cause cumulative impacts. Due to the correct and safe functioning of this project, the implementation of the OWF in all phases prevents carrying out other activities in the same area. Therefore, the impacts that may accumulate with the impacts of the Baltic Power OWF will have their source outside its area.

7.1. Existing, implemented and planned projects with the decision on environmental conditions

In the Polish maritime areas, there are many projects currently being implemented or are planned related to the extraction of hydrocarbons and gas from underneath the seabed. Their distance from the Baltic Power OWF and the different specificity of these projects suggest that no cumulative impacts may occur during their implementation.

At the moment, nine projects related to the construction of the OWF and connection infrastructure have received decisions on environmental conditions, which indicates that the construction phase may commence within several years. However, these projects are at different stages of progress, therefore, the dates of construction works commencement and their detailed schedules are unknown. There is a low possibility of cumulative impacts occurring during the construction phase, due to the temporary limitation of the impacts themselves and may only take place in the case of carrying simultaneous or short time interval works of the same nature.

After completion of the construction phases, the operation phases of individual OWFs will start. The beginning of the operation phase is expected to cause the highest possible cumulative impact resulting from the cumulation of individual impacts indicated for this project phase.

In the case of the OWF decommissioning phases, both the time and the scale of their implementation are currently unknown. With the assumed OWF lifetime, the decommissioning phases will start in several dozen years. The environmental impacts associated with this phase will differ and will be significantly smaller than in the case of the construction and operation phases. As the above-water structures are removed, the space will be gradually released until it is restored to its original condition.

7. 2. Types of impacts that may cause cumulative impacts

Cumulative impacts of the Baltic Power OWF with other projects implemented in the Polish maritime areas may occur if the activities generating similar impacts are carried out simultaneously. In the case of impacts that have been classified as temporary, simultaneous implementation of the same activities by different Investors should be considered as rare. The impacts that have been identified as local will not cause cumulative impacts, as in most cases their range will not exceed the Baltic Power OWF Area.

The impacts of the Baltic Power OWF that may cause cumulative impacts with other projects (other OWFs: Bałtyk III, Bałtyk II, Baltica 2 and Baltica 3) include those resulting from: (i) underwater noise, (ii) the increase of suspended matter concentration and sedimentation and (iii) space disturbances, including those in terms of a barrier to free movement of birds, disruption of the landscape, and disturbances in the operation of radar and restrictions in fishing. The first two indicated impacts will occur during the construction phase, while the third one will occur during the operation phase.

7.3. Assessment of cumulative impacts

7.3.1. Underwater noise

The noise impact range is relatively small for individual vessels, however, in the case of two or more noise sources resulting from the simultaneous implementation of similar projects, an increase in the noise level may be substantial, especially in the area between them. Although the noise generated by vessels used for the construction and operation of planned projects increases the environmental noise, it has a small range which is only significant within a few hundred metres of the sound source. However, the scale and scope of this impact increases with the number of vessels involved in the construction of all the planned cable connections, hence, the noise increases in a larger area and the impact duration is longer. The accumulation of underwater noise may result in this phenomenon extending to a larger sea area than in the case of the activities carried out by one investor.

Taking into account the specificities of the project's construction phase, including its linear nature and the progress of work, the increased underwater noise levels will occur in sea areas around vessels in operation, while relieving the areas in which the cable has already been buried or laid on the seabed. For reasons of safety of underwater operations, the vessels used for cable laying and burying will have to operate at considerable

distances from each other, which will additionally mitigate the possible accumulation of underwater noise.

Considering the above, including a significant possibility of marine mammals and fish avoiding sea areas characterised by a temporarily increased level of underwater noise, it can be assumed that this cumulative impact will be short-term (in the context of the entire southern part of the offshore connection infrastructure development areas), local, and its significance will be moderate. In the case of underwater noise, the results of various possible scenarios regarding simultaneous piling indicate that these impacts will not be significant in any case provided that only two simultaneous piling operations are carried out within all OWF areas.

7.3.2. Increase in the concentration and sedimentation of the suspended matter

The modelling results for the dispersion of suspended solids as a result of works related to cable laying and burial indicate that short-term changes in both an increase in the suspended solids content in the water depth and their sedimentation on the seabed are expected to occur.

In the northern routes of the transmission infrastructures, the distances between areas where the works are to be carried out are so long that even if the works are carried simultaneously, they will not result in the accumulation of the increase in suspended solids content in the water depth nor will the accumulation of sedimentation on the seabed occur.

The situation may be different in the southern part of the offshore connection infrastructure development areas. The maximum width of the corridor in which the cables of all three investors are planned to be laid is approximately 3.4 km. If the works are carried out simultaneously, the impact accumulation within the impact range is likely to occur, particularly with an increase in the concentration of suspended solids in the water depth. Depending on the choice of the cable burial method, the hydrodynamic conditions prevailing during the works and the type of seabed sediments, may last up to several dozens of hours (in the case of the mass flow excavation method) from the moment of the interference in the seabed. After the geological reconnaissance, the soil conditions may enable the application of the ploughing technology, in which the area of soil structure disturbance is smaller and the amount of sediments becoming suspended is significantly smaller than for the methods analysed in this report.

Considering different development stages of the projects of individual investors, possible deliveries of offshore power cables and order of engagement of specialist vessels and equipment used during cable burial, it is unlikely that these projects are implemented simultaneously. In addition, investors will carry out their work differently depending on the safety of underwater operations at sea and designating safety zones around the areas where works are to be carried out. Therefore, despite the theoretical possibility of accumulation of the impacts related to an increase in the concentration of suspended solids in the water depth and their subsequent sedimentation, the actual accumulation will be a short-term, reversible and local phenomenon, and the significance of this impact will be moderate at most.

The results of modeling of suspended matter impact on the marine environment also indicate that dredging works carried out simultaneously in two locations of installation of foundations located 3 km apart do not affect each other in terms of mutual impact of suspended matter when performing works in non-cohesive soils, and feature minimum impact in the case of cohesive soils.

7.3.3. Noise

As a result of implementing two projects in the onshore area, i.e. the Baltic Power OWF customer substation and the PSE substation, the accumulation of impacts regarding noise, both during the construction and operation phase, is likely to occur.

The construction works for the PSE substation are planned for August 2023–May 2026 and may occur along the section of the access road leading from Osieki Lęborskie to the substation. The construction of the PSE substation, as well as of the Baltic Power OWF Connection Infrastructure, will involve the operation of machines and equipment used in construction work, i.e. excavators, bulldozers, lifting devices, self-propelled graders and vehicles transporting building materials – rigid dump trucks. As indicated in the database for prediction of noise on construction and open sites developed by Hepworth Acoustics Limited at the request of DEFRA (Department for Environment, Food and Rural Affairs) [154], a typical noise level at a distance of 10 m from its source is around 70–85 dB.

Although the construction phase is characterised by a relatively high noise emission into the environment, it should be noted that its duration is episodic in nature, will progress quickly, the accumulation of impacts will

occur for a short time and will be local, and upon completion, the acoustic environment will return to its natural state. Therefore, the accumulation of impacts related to noise emission may result from the increased volume of traffic of the vehicles involved in the construction works and material transportation. As part of the EIA reports, the cumulative sound level was calculated for the operation phase of the planned customer substation and the PSE substation. The acoustic data concerning the substation were introduced to the calculation program on the basis of the Project Information Sheet entitled "Construction of the 400 kV Choczewo substation" [187]. There are 32 sources of noise with a sound power level of 64.1 dB that were introduced to the program including elements of busbar systems and outgoing line sections installed (in accordance with the design assumptions) at a height of 14 m.

The calculations conducted for the noise levels show that at all observation points at the boundary of the planned residential development, the night-time (40 dB) and daytime (50 dB) noise limits for single-family development will not be exceeded. The sound levels established for night-time and daytime in the area of the nearest protected development, including the planned and existing residential developments, will also not be exceeded in the situation when both substations, i.e. the Baltic Power Sp. z o.o. customer substation and the PSE substation Choczewo, operate simultaneously.

In view of the above, the cumulative impact of noise during the operation stage of the Baltic Power Sp. z o.o. substation and the PSE substation has been considered to be of low significance.

7.3.4. Space disturbances

7.3.4.1. Physical barrier creation

Within the Baltic Power OWF and on other OWFs, there will be a partial, long-term reduction in the use of airspace. There will be significant distances between individual OWF structures and undeveloped areas between the OWFs will result in the disturbance of space not being continuous and uniform. This unevenness will also occur within the wind turbine structures and the greatest space disturbance will occur within the operating range of the rotor, i.e. more than 20 m above the water surface.

The results of the assessment of the cumulative impact on migratory bird species indicate that, in most cases, the significance of this impact will be negligible, and will be insignificant only in the case of long-tailed duck and common scoter.

7.3.4.2. Landscape disturbances

Landscape disturbances in the case of cumulative impact related to simultaneous operation of the OWFs depend on the weather conditions – visibility and the Earth curvature. As in the non-cumulative case, the impact was assessed as negligible, although it varies depending on the distance of the observer from the OWF.

7.3.4.3. Disturbances in the operation of systems that use EMF

The necessity to perform actions aimed at compensation of disturbances in the operation of systems using electromagnetic fields indicates that the impact of the Baltic Power OWF and other OWFs on these systems should be considered only as hypothetical and which in fact will not occur.

7.3.4.4. Fishing

The development of wind energy will result in a change in the use of the maritime space by existing users, in particular, in the context of fishing.

The presence of above-water structures will cause two possible types of impacts resulting from space limitations including the inability to fish within the OWF and the necessity to bypass the OWF on the way to and from the fishing grounds located north of the OWF. In the case of transmission infrastructure in its immediate vicinity, fishing, in particular with bottom trawl nets, will not be possible either.

Movement of fishing vessels using bottom-set gears may cause conflicts with existing users of fishing grounds where the number of used fishing gears will increase. Excessive concentration of gillnets should not be expected after shifting the effort from the area occupied by the OWF. In view of this, the cumulative negative impact of the relocation of the fishing fleet can be considered insignificant.

The creation of a barrier for free passage of fishing vessels shall constitute a negative impact of the presence of OWFs in neighboring locations. The location of other wind farms, from the east and west side in relation to the Baltic Power OWF, without setting out the navigation corridor for vessels, will extend the route of fishing

vessels to productive fishing grounds located north of the OWF in the Słupsk Furrow area. This may result in additional costs, mainly for fishing vessels stationed in the ports of Ustka and Łeba, due to the increase in the amount of fuel and extended time of arrival to the fishing ground.

The significance of the cumulative negative impact related to extending the route of fishing vessels to fishing grounds should be considered as moderate. In order to limit the negative impact on fishing, navigation corridors with the width necessary to maintain the safety of navigation should be left between the OWFs. In such a case, the significance of the cumulative impact of the project on fisheries may be considered insignificant. Another solution may be to allow the transit of fishing vessels through the Baltic Power OWF Area, however, each of these solutions remains the responsibility of the competent director of the maritime office.

8. Cross-border impact

The Baltic Power OWF Area is located in the Polish EEZ. The distances of this area to the EEZ borders of other countries are as follows: (i) more than 58 km from the Swedish EEZ, (ii) 100 km from the Danish EEZ, (iii) more than 85 km from the Russian EEZ and more than 189 km from the German EEZ. The connection infrastructure project development area is located at least approximately 117 km from Poland's land border, and approximately 61.5 km from the sea border, i.e. from the Polish Exclusive Economic Zone. Considering the planned project location, scale and implementation method, it is not expected that the implementation thereof would result in transboundary impacts on most of the environmental elements at any stage. The exception is the identified negative impact on birds undertaking migration along the East Atlantic Flyway.

Almost all species passing through this Baltic Power OWF Area are birds covering long distances between nesting areas and wintering areas or birds moving locally. This means that the barrier effect and risk of collision affect birds that spend at least part of their lives in north-west Russia and Scandinavia. Additionally, some of the species exposed to the impact are included in Annex I to the Birds Directive or included in the Natura 2000 protected areas program in the neighboring countries, and therefore the impacts of the Baltic Power OWF may affect the abundance of birds in these protected areas.

Studies carried out as part of the survey of migratory birds indicate that the impacts of the barrier effect and collision for the vast majority of species were considered negligible and insignificant. The significance of the barrier effect at the level of a single OWF was assessed to be negligible for all species. The cross-border impact was considered to be of little importance at the most.

The significance of the collision impact on the common crane was assessed as moderate. It will not affect the population of nesting and overwintering common cranes in other Baltic States. During periodic shutdowns of individual wind turbines in the course of intensive flight of common cranes, the significance of the impact of the collision risk on this species was assessed to be insignificant at the most. The predicted mortality resulting from collisions will not pose a threat to the population, which will be able to compensate for the lost specimens as a result of the project impact. In the case of a larger number of OWFs in this area of the Baltic Sea, the accumulated mortality may theoretically exceed the mortality threshold (1887 specimens per year) allowing to maintain the population in good condition, but this will depend on the mitigation measures applied in other projects in the vicinity of the Baltic Power OWF. The application of the system for shutting down the elements of the Baltic Power OWF will allow the minimization of the impact of this project on the migration of cranes.

The OWF Area is a place of periodic (winter season) concentration of the long-tailed duck, the velvet scoter, the razorbill and the European herring gull, and also the common guillemot in the summer period. The nearest Coastal waters of the Baltic Sea Natura 2000 site is an important overwintering area for the long-tailed duck and velvet scoter. It can be assumed that birds appearing in the area of the planned project come from this site. Compared to the Baltic populations, the size of the population of the long-tailed duck, velvet scoter and razorbill in the Baltic Power OWF Area is small. There is no data on the size of the population of the Baltic European herring gull, however, the presence of this species is strongly dependent on fishing activity. No cross-border impacts of the Baltic Power OWF are expected.

It is necessary to leave undeveloped space between OWF areas as a mitigation measure. This will allow the continuity of migration routes to be maintained between overwintering areas and will minimize the cross-border impact in the context of cumulative assessment concerning seabirds.

2. 9. Analysis and comparison of the considered options and the most environmentally beneficial option

Taking into account the issued permit for erection and use of artificial islands, structures and devices for the Baltic Power OWF, it would be unreasonable to analyze another location option of the planned project.

Therefore, both the OPA and the RAO were considered for the same area.

The differences between the OPA and the RAO were based on the existing and feasible technological solutions in the coming years, resulting from the intensive development of OWE. The maximum installed capacity of the Baltic Power OWF, i.e. 1200 MW, was assumed as the limit parameter in both options considered. Therefore, with the use of higher power wind turbines, it becomes possible to build a smaller number of wind turbines.

The RAO assumes 5 MW wind turbines for the analyses. Taking into account the maximum installed power of the Baltic Power OWF, in this option it would be necessary to construct 240 wind turbines. With the wind turbine power output of 15 MW assumed in the OPA, the maximum installed power will be achieved already after the construction of 76 wind turbines.

Construction and operation of a smaller number of wind turbines under the OPA in relation to the RAO, consequently, means less interference with the environment as a result of: (i) shorter duration of the construction and decommissioning phase, (ii) fewer risky lifting and offshore operations and (iii) less consumption of construction materials and consumables. Also in the OWF operation phase, a smaller number of wind turbines under the OPA will require a smaller number of maintenance and operation activities in relation to the RAO, and consequently it will contribute to a smaller environmental impact.

A significant difference indicating that the OPA compared to the RAO will have a smaller impact on the environment is the issue of the risk of collision of birds migrating with the wind turbine structures. The results of collision modeling indicate that in most cases this risk is higher for RAO and in no case lower. Given the long-term nature of this impact (several decades of operation are assumed), these differences are an important reason to indicate that the OPA is a more environmentally advantageous option than the RAO.

In the case of the RAO, an alternative offshore route for the cable lines has been proposed. The type and scope of offshore works to be carried out according to this variant would be the same as in the OPA. The factor differentiating both variants is the route length, i.e. approximately 46.8 km in the case of the OPA and approximately 53.6 km in the case of the RAO.

The method and location of the power cable landfall are identical for both variants.

In the case of the offshore part, the Baltic Power OWF Connection Infrastructure starting point – the cable chamber location, as well as the end point – the current terminals at the PSE substation, are the same. The Applicant had to make a decision on the type of line which would be optimal in this case. The decision also concerned the line location. The OPA would involve conducting the connection in the form of a multi-circuit underground extra-high voltage cable line over a distance of approx. 6.5 km. In the case of the RAO, the entire onshore section would be an approximately 5.2 km long overhead power line with a different route.

The RAO was developed as a guarantee that the project to connect the Baltic Power OWF to the NPS will be implemented. Should construction of the power connection according to the OPA be unfeasible, e.g. due to adverse environmental conditions or a serious conflict with other users of the area, which could not be predicted before conducting environmental surveys and spatial analysis, the Applicant would initiate the process of applying for the issuance of a location decision for alternative routing of connection and the implementation of the project in a different spatial and/or technological configuration.

The analysis of environmental data and the previous use of the area intended for the construction of the Baltic Power OWF Connection Infrastructure indicates that it is possible to implement the project according to the OPA. The implementation of this variant will be more beneficial to the environment compared to the RAO.

When comparing both options, including in particular the resulting possible environmental impacts, it should be indicated that the OPA is the most advantageous option for the environment.

3. 10. Comparison of the proposed technology with the technology meeting the requirements referred to in Article 143 of the Environmental Protection Law

Pursuant to Article 143 of the Environmental Protection Law, technologies used in newly commissioned plants should meet specific requirements beneficial from the environmental point of view.

Due to the process specificity and special conditions of operation in the marine environment, offshore wind farms require verification of these requirements at the planning and design stages.

Structural components of the Baltic Power OWF will be made of materials neutral to sea water and seabed, including those that are resistant to erosion, corrosion, or activity of chemical compounds that may occur in

water. The efficiency of electricity generation and transmission will be one of the basic criteria determining the most important parameters of the Baltic Power OWF, including, among others, the selection of turbines, the arrangement of wind turbines within the area, and the arrangement of cable routes. The primary criterion of energy efficiency is its generation, with obvious limitations related to the wind speed in the area, without the use of energy raw materials – in a fully renewable manner. In the case of the renewable energy sector, the actual efficiency of energy use involves non-returnable energy consumption for the production of OWF components and their installation at sea.

Consumption of water, materials, raw materials and fuels will take place at the construction and decommissioning phase of the Baltic Power OWF components. During its operation period, the wind turbines will require the use of consumables and fuels during service activities.

Emissions and their range will mainly relate to acoustic impacts accompanying the operation of wind turbines. They will not have a significant impact on marine organisms or cause noticeable electromagnetic impacts.

The experience in the use of offshore wind turbines will enable the installation of the most efficient and proven solutions meeting the requirements of the most advanced technologies.

4. 11. Description of the planned actions aimed at avoiding, preventing and limiting negative environmental impacts

The conducted environmental impact assessment of the Baltic Power OWF indicates that no significant negative impacts will occur as a result of this project. However, the occurrence of impacts of minor importance is unavoidable. Therefore, reasonable measures aimed at avoiding, preventing and limiting negative environmental impacts as a result of the Baltic Power OWF project are indicated below, broken down into individual stages.

The proposed mitigation measures during the construction phase include:

- use of trenchless methods in the form of Horizontal Directional Drilling in the area of the Wydmy Lubiatowskie dunes and the waterlogged valley;
- use of mitigation measures preventing drainage of the area;
- construction of subsea cable lines in the shortest possible time, using high-tech equipment and vessels;
- commencement of piling with soft-start procedure in order to enable fish, birds and marine mammals to leave and move away from the area of works being performed;
- piling in the period from August to March under ornithological monitoring;
- observations of marine mammals carried out by observers just before piling – construction works should not be commenced as long as animals are detected in the impact area;
- use of acoustic deterrent devices – devices generating sounds with frequency and intensity that may deter sea mammals from a specific area;
- construction of subsequent wind turbines starting from one place, so that the water region intended for the project is filled with structures gradually, extending the OWF area with subsequent wind turbines (assuming that, at certain implementation stages, the entire OWF or its specific parts may be built sequentially, i.e. a specific category of works will be carried out on more than one wind turbine and other types of works will be undertaken only after its completion);
- simultaneous piling in a maximum of two locations (in order to reduce noise), regardless of whether the two sources are located in the Baltic Power OWF Area or whether one of them is located in the area of a neighboring OWF;
- intensifying the progress of construction works in the period from March to September, when the number of birds in this water region is the lowest;
- limitation of sources of strong light at night directed upwards; this applies mainly to bird migration periods. The Applicant declares that it will limit light emission to the necessary level resulting from applicable occupational safety regulations and standards;
- limit the number of vessels operating simultaneously in the construction area to the necessary minimum;
- application of the least environmentally harmful technologies for the construction of subsea cable lines – ploughing preferred;
- proper planning of cable laying activities to avoid the mating, moulting, and breeding periods of sensitive

species – ideally from May to October;
- proper planning of cable laying operations with regard to other projects to be implemented in the area of the project in question in such a manner that different operations do not overlap in time;
- carrying out the work in the best possible weather conditions and with good quality equipment (particularly important in the case of vessels with DP) in order to reduce as much as possible the level of the noise generated;
- before the construction begins, herpetological supervision shall protect amphibian migration sites and areas adjacent to the key sites of amphibian occurrence with newt fencing preventing animals from entry into the construction site and onto the access roads;
- tree felling works will be carried out outside the bird breeding season, in the autumn-winter period, between September 15 and February 28;
- installing bird scarers on the 400 kV line connecting the customer substation with the PSE substation;
- fencing the construction site to protect the area against the possibility of animals falling into the trenches;
- location of construction site facilities outside of river valleys, wetlands and protected areas;
- construction sites will be protected against the ingress of harmful substances into the soil and will be equipped with a sufficient quantity of sorbents;
- good technical condition of construction and transport equipment and adequate planning of works within the construction site will be ensured;
- possible spills of petroleum products from the equipment and machinery operating at the construction site will be eliminated immediately, and the contaminated soil will be removed and disposed of;
- construction works will be carried out in such a way as to maximally reduce the amount of construction waste generated;
- the contractor will designate the location for the storage of waste at the construction site, and will also provide bins and containers for their selective collection;
- environmental supervision of a botanist, a herpetologist, an ornithologist, and a mammalogist will be ensured during the phase of construction in the field;
- construction works which may potentially impact the residents of the Rehabilitation and Holiday Centre for disabled people (ul. Spacerowa 38, Lubiatowo) will be carried out only during daytime with the exception of Sundays and holidays to the extent possible (with the exception of works which have to be carried out in a continuous manner, e.g. drilling), and the schedule of works will be communicated to the management of the centre;
- noise-generating equipment will be positioned as far as (technically) possible from the buildings of the Rehabilitation and Holiday Centre for disabled people and equipment providing effective noise protection will be used;
- during the construction, the access road to cable chambers will be delineated along the eastern boundary of the Natura 2000 site Białogóra (PLH220003) and habitat 2180, and information boards with the following message “Protected habitat. No trespassing” will be displayed;
- use of methods preventing the formation of a cone depression and drainage of protected peats within the ecological area "Torfowisko" [Peat bog] in Szklana Huta. During the construction phase of the cable chambers, in case dewatering is necessary, it will be short term;
- the final section of the access road to the cable chambers will be separated from the ecological area with a fence on both sides of the road. The preservation of the ecological areas in their present state will be the primary protective measure along this section of the project;
- in the permanent and temporary technical belts as well as within the area of collision of the planned project route with the resources of lichen species of high nature value, a Permit of the Regional Director for Environmental Protection must be obtained for derogations from the prohibitions concerning the plant species under protection;
- in places where tree felling will not be necessary, the work related to the protection of trees and fencing should be carried out under the supervision of a lichenologist;
- within the permanent technical belt, there are 2 species of the following protected mosses and liverworts:

bog groove-moss (Aulacomnium palustre) and crisped pincushion moss (Ulota crispa). The mitigation measures consist of Horizontal Directional Drilling across the Wydmy Lubiatowskie dunes and across the waterlogged valley.

The proposed mitigation measures during the operation phase include:

- painting the blade tips with bright colors, which should increase the probability of seeing a working turbine by flying birds. The Applicant declares that the painting of blade tips will be in accordance with industry standards, technical conditions specified by the wind turbine supplier and will be agreed with competent authorities;
- lighting the turbines at night by installing small, weak and pulsing light sources. Permanently lit bright lights and flashing white lights increase the risk of collision. It is also proposed that lighting should be changed from continuous to pulsing with a long interval when visibility is limited. The Applicant declares that it will limit light emission to the necessary level resulting from applicable occupational safety regulations and standards;
- from dusk to dawn, no positioning of lighting upwards;
- provision of equipment for the OWF in the form of a system enabling short-term stopping of selected turbines of the wind turbines during bird migration periods, if the results of operational monitoring indicate that intensive migration of cranes at a collision height takes place over the Baltic Power OWF Area;
- renouncing from the use of steel jacket structures of wind turbine towers (not applicable to monopiles) due to a greater probability of bird collision with wind turbines having such a structure (less visible for birds from a greater distance);
- in the area of cable chamber location and the collision of the planned project route with the resources of vascular plant species of high nature value, it is possible to apply minimisation measures consisting in replanting the specimens together with an appropriate portion of the substrate beyond the direct impact zone carried out under the environmental supervision. If protected plant species and habitats collide with the planned project, a Permit of the Regional Director for Environmental Protection must be obtained for derogations from the prohibitions concerning the plant species under protection;
- the environmental supervision entity shall be notified of any emergencies, cases requiring intervention or unforeseen situations involving animals.

The proposed mitigation measures during the decommissioning phase include:

- removing subsequent wind turbines starting from one place, so that the structures are gradually removed from the water region occupied by the OWF.
- maximizing the progress of dismantling works in the period from March to September, when the number of birds in this water region is the lowest.

12. Proposal for monitoring of the impact of the planned project and information on the available results of another monitoring, which may be important for determining the obligations in this regard

12.1 Proposal for monitoring the impact of the planned project

Due to the length of the construction process, the schedules of individual monitoring were described in a continuous manner, indicating three clear moments of the project implementation, i.e.: (i) commencement of construction, (ii) commencement of operation and (iii) completion of construction.

More specifically,the results of the environmental surveys of the Baltic Power OWF Connection Infrastructure development area as well as the identification of potential impacts have shown that the environmental resources in the project area are typical for the coastal waters of the southern part of the Baltic Sea and that such resources would not be affected by significant impacts. The project will have the greatest impact on the marine environment in the construction phase, mainly due to the disturbance of the seabed during the laying of cable lines, which will result in the destruction of the animal and, to a lesser extent, sporadically recorded plant benthic communities within the strip of the cable line construction, as well as in the scaring of fish and marine mammals from the area of underwater operations. The restoration of benthic communities will begin directly after the completion of underwater operations. The qualitative and quantitative benthic resources will stabilise after a few days from the completion of the construction phase at the latest. The restoration time is

likely to be much shorter as the zoobenthos species travelling on the seabed (including most mussel species) will relocate from the seabed areas adjacent to the construction area. Underwater operations will also generate underwater noise which will scare away fish and marine mammals. It is anticipated that due to the noise characteristics and its duration, the scaring of animals will have a local scale and will cease after the completion of such works. The traffic of vessels involved in construction works will also temporarily scare away the marine mammals and seabirds within a small area. It should be underlined that the Baltic Power OWF Connection Infrastructure area is constantly used for navigation and fishing, thus, the presence of vessels involved in the project will not change the nature of this area and will not cause, with the exception of activities directly related to the interference in the seabed, the emergence of new environmental impacts in this part of the Baltic Sea.

In the operation phase, the impact will be much smaller than during the construction phase and will result from the inspections of cable lines carried out at least once every 5 years using non-invasive methods.

The decommissioning phase will in fact be the discontinuation of the use of the connection infrastructure, without dismantling its components and will not generate environmental impacts. On the basis of the previous experiences describing the response of the marine environment elements on the impacts generated by projects with characteristics similar to the project in question as well as due to the relatively small anticipated impact of the Baltic Power OWF Connection Infrastructure on the marine environment in every phase of its implementation, it is suggested that no environmental monitoring be carried out to identify and assess the impact of the investment on the marine environment. The information cited above indicate that such a monitoring is not justified in the context of gaining new knowledge and will not contribute to improving the protection and status of the environment, because the scope of impacts identified, their influence on the elements of the environment as well as the receptors' response to the impacts are known and do not require further studies.

Detailed methodologies of monitoring surveys will be presented to the Regional Director for Environmental Protection in Gdańsk for approval prior to the commencement of surveys.

12.1.1 Information on the available results of another monitoring which may be important for determining the obligations in this regard

As part of the State Environmental Monitoring, a number of environmental monitoring activities are carried out in the Polish maritime areas. These monitoring activities include surveys of physical-chemical parameters in water and sediments as well as biological parameters. The results of these monitoring activities are collected and made available to the Chief Inspectorate of Environmental Protection.

The Ministry of Maritime Economy and Inland Navigation collects data on the volume of fishing carried out in the Polish maritime areas. An analysis of these data will enable the assessment of the impact of the planned project on fishing in the future.

In the perspective of several dozen years for which the Baltic Power OWF is planned to be implemented, the obtained results of surveys as part of monitoring and information on other activities performed in maritime areas may be used to monitor the environmental impact of the project. This is due to the fact that the scope of these monitoring activities and information covers those elements of the marine environment which may be directly and indirectly affected by the planned project. Long time series of data will allow short-term changes in the environment, i.e. those resulting from the specificity of the complex marine ecosystem and not being a consequence of the impact of the planned project, to be eliminated from the assessment.

5. 13. Area with restricted use

The analysis of the electromagnetic field and noise impacts included in theEIA Reports showed that the environmental quality standards will not be exceeded. The results of the calculations of the noise levels in the area of the proposed 400 kV overhead lines show that the maximum value of the sound level in the most unfavourable operating conditions of the line (bad weather) will not exceed at any point beneath the line (at the height of 4.0 MAGL) the value of 52.8 dB, which means an exceedance by 7.8 dB of the permissible value established in the Regulation of the Minister of the Environment of June 14, 2007 on permissible noise levels in the environment (Journal of Laws of 2014, item 112). However, in accordance with the local spatial development plan "Wiatraki w Lublewie" [Windmills in Lublewo], the area intended for the 400 kV line is an agricultural area; field cultivation, breeding, horticulture, orcharding; where the location of residential functions within agricultural settlements is excluded.

In this respect it is not an acoustically protected area; therefore, no need for introducing mitigation measures and a LUA has been indicated.

14. The analysis of the possible social conflicts related to the planned project, including the analysis of impacts on the local community

The beginning of the period of informing about the planned Baltic Power OWF should be the year 2011 and subsequent years when: (i) the Applicant submitted an application for the permit for erection and use of artificial islands, structures and devices in the Polish maritime areas and obtained a decision of the Minister of Maritime Economy on the permit for erection and use of artificial islands, structures and devices, and (ii) basic documents defining the spatial policy of the country and region were adopted. This decision and the arrangements of the planning documents provide for the construction of the OWF as an element of the National Power System.

Draft strategy documents together with environmental impact forecasts were subject to a public participation procedure, together with social consultations conducted by competent administrative authorities prior to their adoption in accordance with the provisions of the Act on spatial planning and management.

The analysis of the location of the planned project in relation to the current and planned use of sea space indicated that fishermen may submit their concerns regarding the continuation of their activities in an unchanged manner. Such a situation may take place especially when safety zones are delineated for cable lines on the basis of the decision of the Director of the Maritime Office in Gdynia. This conflict seems unlikely due to the low importance of the statistical rectangles in which the project will be located in the overall fishery and the overall minor importance of the fishing grounds within these rectangles in the context of fishery in all Polish sea areas.

Potential conflicts in the offshore area may also arise from the identification of, objects of cultural heritage (e.g. historical wrecks) or objects hazardous to the environment and humans (UXO, unconventional warfare) in the development area of the planned project. In such a situation, the Applicant will notify the relevant state bodies and will closely cooperate with them on solutions protecting the newly-discovered objects of cultural heritage as well as the environment and humans against exposure to post-war warfare.

The analysis of the hitherto use and the future development of the sea area, in which the implementation of the planned project is planned, does not indicate that there are probable social conflicts other than those indicated above, caused by the construction and operation of the offshore Baltic Power OWF Connection Infrastructure.

In the onshore area, the planned project will be located in a mid-forest surroundings, far from residential, service and tourist developments of the Lubiatowo and Osieki Lęborskie villages, on the land belonging to the Choczewo Forest District, within the range of the Coastal Protected Landscape Area. Such a location of the project means that potential social conflicts may involve:

- protests of the land owners against the occupation of plots for the location of the customer substation;
- protests of the inhabitants of residential, residential-service and tourist buildings in the surrounding area, fearing the electromagnetic fields emitted by underground cable lines and fearing the electromagnetic fields and noise emitted by the customer substation;
- protests of the inhabitants and ENGOs against the location of the Baltic Power OWF Connection Infrastructure within the reach of the environmental protection forms and the Wydmy Lubiatowskie dunes.

Considering, on the one hand, the necessity to locate the transmission infrastructure, and on the other the tourist potential of the commune, from the very beginning, the Applicant conducted a series of activities aimed at familiarising the inhabitants and the commune authorities with the nature of the project, thus significantly reducing the risk of social conflicts. The community of the Choczewo commune and its local authorities were included in the information process on the project already at the designing stage. For this purpose, a number of meetings both with the authorities and inhabitants of the Choczewo commune took place.

The construction of the customer substation on arable land class 4b and 5, outside the boundaries of the environmental protection forms and at an appropriate distance from the residential development of the Osieki Lęborskie village (approx. 900 m), eliminates the nuisance, such as noise or deterioration of the landscape values. It also eliminates the concerns of the inhabitants about the acoustic and electromagnetic fields impacts on human health and living conditions.

The analyses of the distribution of the electromagnetic field revealed that there are no objective health reasons for social conflicts due to this issue. Also, in terms of the predicted noise levels, there are no objective health reasons for social conflicts.

The current forest use and large-scale tree-felling within the boundaries of the Coastal Protected Landscape Area associated with the planned project may give rise to conflicts concerning the ecology. Protests of environmental non-governmental organisations against the project implementation are probable. Taking into account the biodiversity and the significant value of the area, in the case of the Wydmy Lubiatowskie dunes – the value for tourists, a series of measures intended to avoid, prevent or environmentally compensate for negative environmental impacts, is foreseen to be implemented. Therefore, the grounds for potential social conflicts in this regard have been kept to a minimum.

The proper public consultation stage is foreseen within the environmental impact assessment procedure, where the environmental report will be made available to the interested parties.

The offshore aspects related to the Baltic Power OWF that may cause social conflicts and potential positive changes that may be caused by the planned OWF were identified. The background to the potential conflict is as follows:

- depending on the decisions of the maritime administration, one can expect difficulties for fishing activities in the water region occupied by the OWF, resulting in a limitation of access to it and thus hindering free fishing and transit through the OWF area;
- non-compliance of the objectives and interests of the parties – the objective indicated by the fishermen community is fishing and transit through the OWF area to further located fishing grounds, as well as ensuring the presence of fish in the Baltic Sea;
- disturbance in the environment that may result from the planned OWF.

Due to the location and scope of the tasks of the planned OWF and the direct users of the sea in this area at the current early stage of the project preparation, the Applicant decided to hold information meetings with representatives of fishermen organizations. Information meetings were held with the representatives of fishermen organizations in March 2020. During the procedure concerning the issue of the decision on environmental conditions – the decision was issued by the General Director for Environmental Protection on June 29, 2022 – the possibility of public participation was also ensured, which included, among others, making public the information on the pending procedure and requesting all the parties concerned to submit comments and conclusions regarding the project. Once again, formal consultation will be held during the environmental impact assessment procedure conducted by the General Director for Environmental Protection as part of the procedure for amending the said decision on environmental conditions for the Baltic Power OWF.

The participants of the said consultation meetings pointed out a wide variety of issues, including environmental ones. The results of the consultations were used in the preparation of the EIA reports for the Baltic Power OWF.

6. 15. Indication of difficulties resulting from shortages in engineering or gaps in contemporary knowledge which have been encountered during preparation of the report

The identification of the elements of the environment that may be affected by the wind farm in the Polish maritime areas is inconsistent. The identification of some aspects, especially biotic ones, is more extensive, e.g. the presence of zoobenthos, and for some aspects, the information is scarce, e.g. the presence of bats over maritime areas. The surveys carried out for the benefit of the EIA Reports allowed more detailed information to be obtained on the environment in the area of the planned project. This allowed a comprehensive wildlife survey to be developed, both in terms of abiotic and biotic elements.

On the basis of the generally available data and the analysis of the records of the Maritime Spatial Plan of the Polish Sea Areas, it can be determined that the offshore area of the planned project will also be intended for the construction of the connection infrastructure of other offshore wind farms. The cable tray common for various projects may involve an accumulation of the environmental impacts resulting from the construction, operation and possible disassembly of some power lines. However, a proper analysis and assessment of the cumulative environmental impact is impossible without the information on technical and technological parameters of the planned projects and the duration of their implementation. Lack of this knowledge constituted the biggest obstacle encountered when preparing the EIA Reports. In order to make the assessment of cumulative impacts as reliable as possible, the most unfavourable variant of the implementation

of the above-mentioned projects was assumed and the time overlap of their construction, operation and decommissioning.

There is no information on potential impacts of the OWF, especially during the operation phase, e.g. in the scope of the phenomenon of overgrowing of underwater structures, environmental effects of an artificial reef or behavior of birds encountering above-water structures during flights. As far as gaps in contemporary knowledge are concerned, it should be noted that there are no data on the impact of the electromagnetic field emitted by the extra high voltage lines on plants, fungi and animals of all taxonomic groups (it is generally acknowledged that such impact does not occur, though it has not yet been scientifically proven). So far, no wind turbines have been built in the Polish maritime areas. Therefore, there is no experience and detailed knowledge based on the results of surveys in the scope of the impact of such projects in the Polish maritime areas.

The environmental impacts associated with the construction, operation and decommissioning phases of the planned project are well recognised for this type of project, therefore the formulation of potential environmental impacts and the formulation of mitigation measures was rather straightforward