Elementum Energy

WIND PARK WEST-R

Non Technical Summary

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1 Introduction

The planned project involves the construction, operation and maintenance of a large-scale wind farm consisting of thirty-two modern wind turbines, each with a capacity of up to 7.8 megawatts (MW) and a total installed capacity of 200 megawatts. The project will be implemented on the territories of several communities across Western regions, but will be located outside settlement boundaries. The project will generate electricity from wind, reflecting national strategic priorities for energy independence, climate mitigation and sustainable development.

The project is classified as an activity that may have significant environmental impacts and therefore requires an environmental impact assessment in accordance with Ukrainian law. The proposed turbines will be sited on an area previously used for agricultural production. The land use will then change to placement and operation of energy-generating facilities. Careful selection and allocation of land plots necessary for wind turbine foundations, cable routes and supporting infrastructure has been based on cadastral information.

The project is connected to an established road network, including regional and European highways, with new access routes where necessary. Delivery of turbine components, including blades, tower sections and nacelles, will require minor local road improvements to ensure safe passage.

The wind turbines will be installed on land plots totalling approximately forty hectares, with each turbine requiring an average of 0.6 hectares for its foundation, hardstandings and crane pad. Additional land will be subject to easements for underground cables, service routes and substations, although those areas will not require changes to land-use designation. The project is designed to minimise the occupation of productive land and to ensure that surrounding plots continue to serve local agricultural needs.

During operation, the facility will not require permanent staff on site and will be managed remotely. Maintenance and inspections will be undertaken periodically by specialised teams. The project lifespan is estimated at twenty-five years, after which the operator may choose either to modernise the site with new turbines or to decommission the facility and fully restore the land, using established land-reclamation procedures.

1.1 Objectives

The primary objective of the planned activity is the generation of renewable, zero-emission electricity from wind, contributing directly to Ukraine’s strategic priorities for clean energy development and reduced dependence on imported fossil fuels. The use of wind energy aligns with national documents such as the Energy Strategy of Ukraine until 2035 and the Low-Carbon Development Strategy until 2050. These frameworks emphasise the importance of renewable energy expansion, improved energy security, mitigation of greenhouse-gas emissions and sustainable economic growth.

The project is designed to support Ukraine’s integration into European energy networks and its commitments under key international environmental agreements. It addresses the urgent need to modernise the energy sector by replacing outdated, carbon-intensive

systems with renewable alternatives. The wind farm will also help diversify local energy supplies, reduce exposure to volatile fuel markets and strengthen regional resilience to energy disruptions. It is part of a broader trend in which many highly developed countries aim for significant shares of wind-generated electricity in their national energy mixes.

A broader set of objectives include promoting technological innovation, stimulating local economies, supporting job creation during construction and operation, and integrating climate-adaptation measures into regional development. The EIA highlights the role of wind power as a clean, efficient and increasingly cost-effective energy source, particularly as technological improvements steadily reduce the cost of electricity produced by wind turbines.

1.2 Contact Details

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2 Project Description

As noted in Section 1, the project proposes the new construction, operation and maintenance of a utility-scale wind farm comprising thirty-two modern wind turbines with individual installed capacities of up to 7.8 megawatts and an aggregate installed capacity of approximately 200 megawatts. The **wind farms will be developed on land located outside settlement boundaries within territorial communities across western Ukraine.**

2.1 Main Technical Characteristics and Resource Use

The primary turbine models assessed in the EIA are the Nordex Delta N163 7MW, the Nordex N163 6MW and the Vestas V172 7.2MW, all including low-noise design and extensive safety systems. The turbines incorporate pitch control of the blades, multi-stage gearboxes, synchronous generators with converters and condition-monitoring and protection systems, including lightning protection and automated shutdown functions. The nacelles and towers are designed for safe maintenance access and harsh-weather operation, with low-temperature packages specified to -30°C. Sound power levels are controlled through operational strategies, and the design has been based on low rotor speeds to reduce both acoustic emissions and collision risk for fauna.

The expected annual electricity generation is modelled at approximately 1,184,000 megawatt-hours, reflecting the wind regime and the turbine selection, although the actual output will depend on final micro-siting and measured wind resource.

There will be no operational water use as there is no process water demand during generation and no permanent on-site staff. The site will employ portable sanitary facilities during maintenance visits, and domestic water for workers will be supplied in bottles. Land take for turbines is estimated at about forty hectares in total, with approximately 0.6 hectares per turbine for foundation, crane pad and access. Areas used temporarily for construction will be restored, while easement strips for underground cables and access tracks will be kept as narrow as practicable.

There is not expected to be any direct impact on biodiversity resources is not expected, as there is no harvesting of such resources associated with the project. Surveys conducted for birds and bats did not identify sensitive ornithological constraints, and avoidance and minimisation measures are provided, including careful siting, use of modern turbines and operational curtailment if warranted by post construction fatality monitoring. Noise assessments show compliance with Ukrainian standards at the nearest dwellings, with a worst-case night-time prediction of 43.8 decibels against a 45 decibel limit.

The power export scheme will employ underground 35 kilovolt arrays to the substation, which steps up voltage to grid levels for onward transmission to the national grid.

2.2 Project location

The selected corridor for the wind farm lies outside settlement limits and is characterised by open agricultural landscapes interspersed with roads, hedgerows and individual shelterbelt plantings. The current land use is principally pasture and arable cropping, and

the intention is to change the land designation on turbine plots while retaining agricultural activity on adjacent lands. The nearest settlements are located at distances ranging from approximately 700 metres to over two kilometres from turbine locations. The corridor is served by regional and major roads as well as local agricultural tracks, which will be used for construction logistics with limited widening where needed for transport of abnormal loads.

Underground medium-voltage cabling will connect turbines to a new collector substation, and then to the transmission grid at higher voltage levels using a combination of underground cables and, where necessary, overhead lines The cable trench depths are likely to be at least one metre deep with a total cable length of roughly 280 km. During trenching the topsoil will be carefully removed, stored and later reinstated to preserve soil structure and fertility. The approach minimises land-take and enables the agricultural function of the land to continue after construction, with only small areas of hardstanding remaining in the long term.

An assessment of landscape character and visual amenity was undertaken as part of the Project's environmental and social impact assessment. This included consideration of baseline landscape characteristics, the visual sensitivity of receptors, the zone of theoretical visibility, and representative viewpoints. Based on this analysis, and taking into account the scale of the Project and the existing landscape context, visual impacts are not expected to represent a significant issue

2.3 Construction activities

Construction will take place over approximately thirty-six months and will require a peak workforce of around 350. Work will include site preparation, installation of temporary access roads, excavation for foundations, construction of crane pads, laying of underground cable lines and the transport and assembly of turbine components using large cranes and specialised vehicles. All activities will be conducted in accordance with Ukrainian construction, labour and industrial-safety regulations.

Each turbine foundation will require substantial earthworks and the placement of approximately ~1200 cubic metres of concrete. A crane platform of ~1400 square metres will be installed next to each turbine location to support heavy lifting operations. Once construction is completed, trenches and disturbed areas will be restored using previously stored topsoil.

Construction will involve temporary increases in vehicle traffic and the use of heavy machinery, resulting in short-term noise and air emissions. Emissions will consist mainly of dust, nitrogen oxides, carbon monoxide and hydrocarbons, all of which have been modelled as part of the EIA. The assessment confirms that the maximum predicted concentrations at the boundary of the nearest residential areas remain below Ukrainian hygienic standards for air quality and do not pose a health risk. Noise from construction machinery will comply with national limits through organisational and technical mitigation measures such as maintenance of equipment, use of modern machinery and reduction of simultaneous operations near sensitive areas.

A comprehensive set of environmental protection measures will be implemented during construction. These include erosion management, stormwater control, proper storage of construction materials, installation of warning signage, operation of fire-safety equipment

and clear protocols for managing hazardous substances. Refuelling of machinery will occur off-site, and all waste will be handled by certified contractors. Upon project completion, all disturbed lands will be rehabilitated, with soil reinstated, vegetation restored and temporary infrastructure removed.

2.4 Policy, Legal and Administrative Framework

The project will be developed in accordance with the Constitution of Ukraine and the codes and laws governing environmental protection, atmospheric air, the nature reserve fund, labour protection, energy, land use, urban planning and, specifically, the Law of Ukraine “On Environmental Impact Assessment.” The EIA refers to the Espoo Convention on transboundary EIA, the Aarhus Convention on access to information and public participation and implements relevant Cabinet of Ministers resolutions and orders of sectoral ministries. The project will comply with the applicable construction and sanitary standards, fire safety rules and standards relating to wind turbine design, noise control and lightning protection. This framework defines the administrative process for approvals, public consultation and licensing of hazardous-waste handlers, ensuring that each project stage is conducted within a clear legal mandate.

2.5 Consideration of Alternatives

It is recognised that strategic alternatives to meeting electricity demand include continued reliance on fossil-fuel generation, increased imports or investment in other forms of renewable energy. The need for wind power in this region has been balanced against resource availability, environmental performance and cost. Within the project, alternatives were considered for turbine technology, hub height and rotor diameter, with the preferred models offering favourable acoustic characteristics and high energy yield at the site’s wind speeds. Routing alternatives were evaluated for underground cable corridors to minimise environmental disturbance and to avoid sensitive features, with a preference for trenching in previously disturbed agricultural margins. Grid connection options were examined to ensure system compatibility and reliable dispatch of generated power without overloading existing assets or introducing unacceptable electromagnetic exposure. The choice of underground cables reflects the lower landscape and ecological impact compared with overhead lines through farmland.

3 Baseline Environmental Conditions

The baseline conditions are based on a temperate continental climate with winter and summer temperature ranges typical for the region and annual precipitation between roughly 570 and 640 millimetres. Wind regimes are sufficient for commercial wind power, with prevailing speeds suitable for large rotors optimised for medium winds.

The landscape consists of gently undulating agricultural land with loess soils in places and moderate erosion potential that is addressed through soil management during construction.

The hydrographic context includes regionally important rivers in each oblast, though the project footprint does not intersect floodplains or wetlands of international significance, and no hydrological alterations are planned.

Biological baseline studies reported common farmland flora and fauna, with higher biodiversity expected in forested patches, meadows and chalk outcrops that have been avoided by turbine siting. Amphibians, reptiles, small mammals and a diversity of birds are present in the broader region, but the agricultural matrix within the footprint is less sensitive. Protected areas such as the “Northern Podillia” National Nature Park and small local reserves like Mount Tsymbal and Mount Krasna are located at buffer distances from the project sites and will not be directly affected.

The EIA confirms that the wind farm corridor lies outside Emerald Network sites and imposes protective stand-off distances from registered conservation units.

4 Environmental Impacts and Assessment

The construction phase is associated with the most significant environmental impacts, the majority of which are temporary and manageable. Movement of soil for foundations, roads and cable trenches can generate dust and sediment-laden runoff. The EIA prescribes staged clearing, stockpiling of fertile soil in separate mounds, silt control at outfalls, and prompt reinstatement of surfaces to reduce erosion risk. Heavy vehicle traffic will be routed on established roads to the extent possible, and where new access is required it will be designed to maintain drainage and avoid ponding. Construction equipment will be modern and maintained to reduce emissions, with any refuelling performed off-site or in controlled conditions with spill containment.

Individual aspects are discussed below.

4.1 Air Quality and Emissions

The project's operational phase produces no emissions to air. Construction emissions have been calculated using Ukrainian methodologies for unorganised sources and mobile machinery. Dust arises from excavation, loading and unloading of soils and aggregates, while exhaust pollutants from diesel engines include carbon monoxide, nitrogen oxides, hydrocarbons, sulphur dioxide and fine particulates. Dispersion modelling indicates that at the boundaries of the nearest residential areas, predicted concentrations for all substances, combined with background levels, remain below maximum permissible concentrations. Mitigation includes limiting vehicle speeds on site, wetting roads in dry conditions, covering loads and ensuring that only equipment in good technical condition is used.

4.2 Biodiversity and Protected Areas

The EIA records that the turbine corridor avoids designated nature reserves and national parks and maintains buffer distances to small local protected sites. The nearest large protected area, the "Northern Podillia" National Nature Park, is not directly impacted by project works. Baseline surveys recorded species typical of agricultural landscapes and identified a subset of protected bird species in the wider region. The wind farm design uses modern turbines with low rotational speeds and controllable cut-in regimes to reduce collision risks. An ecological monitoring programme is embedded in the project as part of Environmental and Social Action Plan covering ornithological and chiropterological observations across seasons with provisions for adaptive management if any significant impact is detected.

4.3 Noise, Vibration and Other Physical Factors

The acoustic analysis was based on established Ukrainian standards for noise in residential areas and uses octave-band calculations to predict levels at sensitive receptors. Source levels for construction machinery and vehicles are tabulated, and attenuation with distance is calculated to demonstrate compliance. For operation, the combined sound power of thirty-two turbines is modelled using conservative assumptions and results in predicted levels at the nearest residences below the 45 decibel night-time limit. The EIA notes that vibration is insignificant at the distances involved, there is no

ionising radiation, and thermal effects from turbines are negligible. The potential for shadow flicker is minimised by distance and geometry.

4.4 Social Environment and Community Relations

The nearest residential areas are set back substantially from turbine locations, with the closest properties approximately 700 metres away. The EIA emphasises transparent communication with residents and local authorities, including the publication of notices and the handling of comments in accordance with the Law of Ukraine on Environmental Impact Assessment. The social benefits identified include direct and indirect employment during construction, the development of access infrastructure that also improves agricultural logistics and local tax contributions to the territorial communities. With noise, shadow flicker and air quality impacts within regulatory limits, and with robust safety controls, no adverse health effects on the population are anticipated.

4.5 Soils and Land Use

Soil conservation is a central construction management theme. The topsoil will be stripped and stored in discrete piles to avoid mixing with subsoil and to preserve soil fertility and the natural seed bank. Where storage exceeds two years, grass will be sown to stabilise stockpiles and prevent erosion. Upon completion of cable laying and foundation works, the soils are replaced in the original sequence and the surface is harrowed and reseeded. The project minimises permanent land take to the turbine footprints and crane pads, keeps linear works within narrow corridors and returns as much land as possible to agricultural production. The EIA also provides for the transfer of surplus fertile soil to local self-government bodies for use in community landscaping or the improvement of low-productivity lands.

4.6 Water Environment

There is no water abstraction or discharge proposed for the project. During construction, it is recognised that there are risks from soil erosion and accidental releases of fuel or oils, and containment and treatment of wheel-wash water have been proscribed together with good housekeeping to prevent contamination. Portaloos with washstands are planned and serviced by licensed companies, and potable water is supplied in bottles that are removed from site. There is no operational process water and no stormwater pathways from turbine pads that contain pollutants, therefore there are no expected changes to hydrological regimes or groundwater quality as a result of the wind farm.

4.7 Waste Management

Waste streams for both construction and operation have been quantified and will be disposed of in accordance with the Law of Ukraine “On Waste Management.” Construction wastes include mixed construction and demolition materials, small quantities of oily rags, sludge from wheel-wash units and municipal waste from workers. The total construction-phase waste is estimated at approximately 645 tonnes, dominated by non-hazardous waste, with small volumes of hazardous waste (in accordance with the National waste list). All wastes will be segregated at source, stored in appropriate containers and removed by licensed operators; on-site incineration is prohibited.

Operational-phase wastes are not significant and include used transformer oils and lubricants from scheduled maintenance, small numbers of spent batteries associated with control systems, minor quantities of ferrous and non-ferrous scrap from component replacements, and a small amount of municipal waste generated by maintenance crews. Across all thirty-two turbines, the EIA estimates annual operational waste at just over 82 tonnes, with oils and lubricants comprising the bulk of hazardous waste (in accordance with the National waste list) that will be stored in drums, labelled and transferred to licensed handlers. Storage at the substation or service facility will comply with fire-safety and environmental standards.

4.8 Cumulative Impacts

The cumulative environmental impact of the wind farm is assessed as acceptable. The combination of air, soil, water, noise, visual and ecological impacts does not exceed regulatory thresholds, and no significant adverse interactions between impact factors are expected. Substantial emphasis is placed on continuous environmental monitoring, public communication and transparent reporting throughout construction and operation, ensuring that all environmental safeguards remain effective and up to date.

4.9 Risk Assessment, Emergency Response and Safety

Technical and natural risks were considered, including equipment failure, fire, severe weather events and geotechnical hazards. Modern turbines incorporate multiple redundant safety systems such as blade pitch control, aerodynamic and mechanical brakes, lightning protection and condition monitoring to detect anomalies and trigger shutdown. The EIA also addresses ice accretion risk and blade throw with reference to setback distances that exceed the theoretical risk radius, with the nearest residents located well outside calculated hazard zones. Emergency response procedures include immediate containment of any accidental spills, notification of authorities and adherence to the relevant Ukrainian codes for water, air and land protection. Personnel are trained in fire prevention and emergency response, and the substation and turbine towers are equipped with fire-safety systems.

4.9.1 Landscape and Visual Impact

An assessment of landscape character and visual amenity was undertaken as part of the Environmental Impact Assessment. The analysis considered the existing agricultural landscape context, the visual sensitivity of nearby settlements and receptors, the zone of theoretical visibility, and representative viewpoints across the wider area.

The wind farm will be located within an open, gently undulating agricultural landscape that already contains roads, shelterbelts and dispersed rural infrastructure. Turbines will be positioned outside settlement boundaries, with the nearest residential properties located at distances of approximately 700 metres or more.

While wind turbines are vertical structures that will be visible from certain viewpoints, the assessment concludes that the scale and layout of the Project, together with the existing landscape character and separation distances, mean that visual effects are not expected to be significant. The use of modern turbine design, careful micro-siting and underground cabling further reduces landscape disturbance.

Overall, the Project is considered compatible with the surrounding rural landscape, and no significant long-term adverse effects on landscape character or visual amenity are anticipated.

5 Conclusions and Environmental and Social Action Plan (ESAP) Commitments

The EIA and E&S assessment have have concluded that ehat the planned wind farm can be constructed and operated in a manner that safeguards environmental quality and public health. Construction-phase impacts are temporary and localised and are mitigated through best-practice site management, modern machinery and restoration of disturbed areas. Operational impacts are limited, with no emissions to air or water, compliance with noise limits at all residential receptors, and low residual risks to biodiversity given siting outside protected areas and the use of current turbine technology. The project contributes to national objectives on renewable energy, energy security and climate change mitigation, while offering socio-economic benefits to the host communities. The developer commits to a comprehensive environmental and social management and monitoring programme, adherence to Ukrainian legal requirements and international conventions, and to transparent engagement with stakeholders throughout the project lifecycle.

The ESAP sets out measures to ensure alignment with IFC Performance Standards and EBRD Environmental and Social Requirements for the wind power plants located in the southern and western parts of Ukraine.

It outlines the mitigation measures, monitoring activities, and institutional responsibilities required to manage environmental and social risks throughout the project lifecycle, from construction through to operation. Key measures include the following:

At the corporate level, the Company will strengthen and formalise its Environmental and Social Management System (ESMS), develop sub-project specific construction and operational Environmental and Social Management Plans (ESMPs), and ensure that E&S requirements are contractually cascaded to contractors. Dedicated ESHS personnel will be appointed at project level.

Under labour and working conditions, a Labour Management Plan and a Workers' Grievance Mechanism will be implemented, alongside enhanced supply chain due diligence procedures. Land acquisition processes will be reviewed against PS5/ESR5 requirements, with remediation measures introduced where gaps are identified.

In relation to biodiversity, supplementary bird and bat surveys will be undertaken for the western WPPs, followed by collision risk assessment and the implementation of construction- and operation-phase Biodiversity Management Plans, including post-construction fatality monitoring and adaptive management measures.