Kelmė wind farm I

ignitis renewables

Non-Technical Summary

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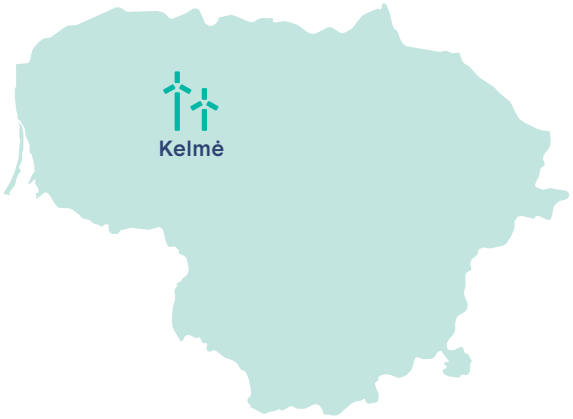


1. Short description of the project

The wind farm is planned in Kelmė district municipality – the land plots are located in the Šiauliai County, Kelmė District Municipality, Vaiguva Eldership, in the villages of Akmeniai, Daustoriai, Gailaičiai, and Juciai (plot cadastral No. 5401/0003:252, 5401/0003:65, 5401/0003:253, 5401/0002:115, 5401/0002:173, 5401/0002:22, 5401/0003:246, 5401/0005:325, 5401/0002:59, 5401/0002:166, 5401/0002:140), as well as in Kelmė Surrounding Eldership, Pliuškaičiai village (plot cadastral No. 5446/0005:115, 5446/0005:66, 5446/0005:159).

During the environmental impact assessment, it is planned to reconfigure 14 land plots and, after forming separate engineering infrastructure plots, to construct up to 18 wind turbines. Each turbine is planned to have a capacity up to 6 MW, a rotor diameter up to 170 meters, and a height up to 250 meters measured to the highest point of the structures.

2. Legal basis and background

An Environmental Impact Assessment (EIA) is a process which ensures that projects that are likely to have a significant effect on the environment are adequately assessed before they are allowed to proceed and facilitates the participation of the relevant authorities and the public in environmental decision making. Annexes (I and II) to the Law on Environmental Impact Assessment of Proposed Economic Activity of the Republic of Lithuania list the types of proposed economic activities that fall under the scope of EIA legislation. The types of proposed economic activities listed in Annex II do not necessarily have significant effects on the environment in every case, and thus are not automatically subjected to an environmental impact assessment. For these activities, the screening procedure is conducted by the competent authority, the Environmental Protection Agency (EPA), which determines on a case-by-case basis whether an EIA is required according to criteria, such as size, location, the potential impact of an activity, etc.

The development of a wind farm was listed in Annex II and the EIA screening procedures were done for wind farm in Kelmė district and in 2019 EPA submitted the final conclusion that EIA is not mandatory.

Lithuania has the ambitious goal that energy from renewable energy resources will become the main in all sectors (electricity, heat, cooling). The achievement of this goal can only be ensured by increasing renewable energy capacities throughout Lithuania by developing new projects. The wind farm contributes to the creation of a more sustainable and cleaner environment by producing green electricity.

The overall environmental impact of a wind farm is undoubtedly minimal as wind energy is a renewable energy source. Wind is a natural and inexhaustible source of energy. The operation of the wind farm ensures the reduction of fossil fuel consumption, contributes to a cleaner environment, reduction of climate change and the goal of Lithuania's energy independence.

3. Site location and description

The plots for the development of WTG are bordered by agricultural land plots. According to the General Plan's provisions, the locations where wind turbine construction is planned fall within agricultural land areas (intensive agricultural lands of medium economic value located in natural framework areas) and areas where afforestation would be appropriate. Additionally, based on the General Plan's renewable energy development scheme, the areas for wind farm development fall within the wind energy development areas. Also, access to the plots where wind turbine construction is planned is convenient, via the existing network of district roads through local roads and/or access roads.

The plots for the wind farm development are located on land, which is not urbanised, it is surrounded by agricultural areas. The nearest households/ residential areas are about 0,4 – 1.5 km away from planned wind park. The nearest public facility is the Vaiguva Vladas Šimkus Primary School in Kelmė District, located approximately 4.1 km to the northwest of the nearest planned wind turbine.

In the plots where the activity is planned and their surroundings, there are no exploited mineral deposits, geological processes, or phenomena. According to the information provided in the GEOLIS database, the nearest mineral deposit is approximately 2.6 km to the northwest of the planned wind turbines—the Kalniškiai sand and gravel deposit (1920, Šiauliai County, Kelmė District Municipality, Vaiguva Eldership).

According to the map of the visual structure of Lithuania's landscape, presented in the study on the visual structure of Lithuania's landscape, the area where the activity is planned is characterized by a highly distinct vertical segmentation (a heavily hilly landscape with deep valleys and 4-5 level videotop complexes) (V3H1). In terms of horizontal segmentation, the landscape is predominantly composed of semi-enclosed, partially visible spaces. The spatial structure of the landscape is expressed solely through vertical dominants.

According to the data from the State Service for Protected Areas under the Ministry of Environment, planned economic activity area does not fall within the network of protected areas. The nearest protected area of the European ecological network Natura 2000 is the surroundings of Paginskiai village (BAST), located approximately 2.7 km to the west.

The nearest water bodies are – the central part is crossed by the Vilbėnas River (identification code: 14010192), and on the western side of the planned wind turbine construction sites flows the Kalnyčia River (identification code: 14010171).

According to VENBIS data, wind farm falls into areas where there is insufficient data to determine sensitivity regarding bats. In terms of Natura 2000 BAST and PAST, the planned wind farm location is also not within the impact zone. However, concerning birds (migratory, breeding, and wintering birds), the planned wind farm location fall into areas where there is insufficient data to determine sensitivity.

According to the data from the Register of Cultural Heritage, the planned wind farm does not fall within the protection and usage regime zones of Cultural heritage objects. The nearest cultural heritage sites are located about 0.1 – 3.1 km from the nearest planned wind turbine.

4. Description of the planned activity

During the environmental impact assessment, it is planned to reconfigure 14 land plots and, after forming separate engineering infrastructure plots, to construct up to 18 wind turbines. Each turbine is planned to have a capacity up to 6 MW, a rotor diameter up to 170 meters, and a height up to 250 meters measured to the highest point of the structures.

The wind turbine equipment will be manufactured in specialized factories, transported to the site, and assembled there. The main equipment will incorporate the most modern and latest technologies. During construction, special-purpose concrete will be used for the foundations, along with steel rods. Once the foundations are formed, the turbine towers, which can be either steel or concrete, will be mounted on them. Subsequently, other structures will be assembled – the rotor and blades will be assembled on the ground, and the entire structure will be lifted and attached to the top of the tower. The blades are made from fiberglass and epoxy resins. Minor earthworks are anticipated during the construction of the wind turbine foundations. The area required for each wind turbine is about 0.20 hectares.

The operation of the wind turbines will be autonomous, controlled in automatic mode. The operation of electrical equipment, turbines, and other electrical mechanisms will be monitored by automatic sensors, with data continuously transmitted via remote communication to the wind turbine control center. In the event of a malfunction, the turbines will automatically shut down.

Hazardous, radioactive and/or chemical substances and preparations (mixtures) will not be used during the operation of the wind farm. Water, land, soil, and/or biodiversity resources will not be used.

The planned economic activity will not influence the generation of waste. Small amounts of metal and mixed construction waste may be generated during the construction of the wind turbines (foundation construction). These wastes will be collected in special containers and transported for further processing under contracts with waste management companies. During the operation of the wind turbines, water will not be used, so this activity will not result in the generation of industrial wastewater. No permanent jobs will be created, so there will also be no household wastewater. The construction and operation of the wind turbines will not affect air, soil, or water pollution.

During the environmental impact assessment, after evaluating the noise dispersion results, it was determined that the planned economic activity (construction and operation up to 18 wind turbines) will not cause the exceedance of noise limit levels in the nearest residential environment. Additionally, after assessing the shadow flicker in the nearest residential environment, it was found that out of 9 shadow-sensitive points, up to five buildings could experience shadow flicker for over 30 hours/year. Therefore, six wind turbines should be equipped with shadow flicker mitigation devices ("shadow shut down"), and by stopping the rotation of the wind turbines during specified periods, the exceedance of shadow flicker at the mentioned residential sites can be avoided.

The overall environmental impact of WTG is undoubtedly minimal, as wind energy is a renewable energy source. Wind is a natural and inexhaustible source of energy, so designing, installing, and constructing wind turbines does not deplete natural resources. Furthermore, wind turbines do not increase air pollution and do not emit any greenhouse gases. The land area occupied by wind turbines is minimal, and the remaining land can be used as usual—for agricultural activities, grazing livestock, and similar agricultural practices.

5. Summary of the impacts and mitigation measures

5.1 Physical pollution (noise and shading)

An assessment of potential noise effects associated with the proposed development has been undertaken using the WindPRO software. The noise modelling for the wind turbines assumed that all planned turbines in the park would operate at full capacity simultaneously. According to the noise dispersion calculations, areas exceeding the daytime limit value of 55 dBA do not form. Zones reaching the evening limit value of 50 dBA extend within a radius of approximately 120-150 meters around each wind turbine. For the nighttime period, the permissible noise level of 45 dBA will be maintained by positioning up to 18 wind turbines at 260-370 meters outward from the turbines. The noise zones around individual turbines merge into a single collective zone. Based on the noise dispersion results, it has been determined that the planned economic activity (up to 18 WTG) will not exceed the noise limit levels in the nearest residential environment.

An assessment of shadow flicker associated with the proposed development has been undertaken using the WindPRO software. The shadow flicker assessment for the wind turbines was conducted under the worst-case scenario, assuming that all windows of all buildings are oriented towards the wind turbines ("Green House Mode"). The calculations determined that by constructing wind turbines with maximum parameters and in maximum numbers (rotor diameter of 170 m, highest point of structures at 250 m), up to five buildings out of nine shadow-sensitive points could experience shadow flicker for more than 30 hours per year.

Mitigation measures

- If it becomes apparent during the activity that the environmental impact exceeds the indicators provided in the screening information or those established by legal regulations, the activity operator must immediately implement additional mitigation measures or reduce the scope of the activity or cease the activity altogether.
- When constructing wind turbines with maximum parameters, six wind turbines should be equipped with shadow flicker mitigation devices ("shadow shut down"), and by stopping the rotation of the wind turbines during specified periods, exceedances of shadow flicker at the mentioned residential sites can be avoided.
- If planning to construct wind turbines with smaller parameters, calculations will need to be performed again to determine the need for shadow flicker mitigation devices.

5.2 Public health

The health problems emphasized by the World Health Organization (WHO) related to noise include hearing impairment, speech comprehension difficulties, sleep disturbances, disruptions of physiological functions, mental disorders, deterioration in academic and other achievements, and social and behavioural changes (such as irritability and aggressiveness). According to WHO, the places most sensitive to noise are residential premises, recreational areas, resorts, schools, preschools, and healthcare facilities. The Lithuanian hygiene norm HN 33:2011 regulates the noise levels in residential premises and residential areas. Planned activity will comply with the requirements of standards that are compatible with a healthy environment.

Mitigation measures

- If it becomes apparent during the activity that the environmental impact exceeds the indicators provided in the screening information or those established by legal regulations, the activity operator must immediately implement additional mitigation measures or reduce the scope of the activity or cease the activity altogether.
- The activity operator must always comply with all relevant legal requirements governing the activity. In the event of changes in legal regulations, the activity indicators must be adjusted accordingly.
- If planning to develop WTG with technical parameters more powerful than those considered in the noise and shadow flicker calculations, modelling, and environmental impact assessment screening procedures, these procedures must be conducted anew.

5.3 Biodiversity

The location of the planned economic activity is agricultural land with low biological diversity. Considering the current technology of intensive agriculture (use of agrarian, pesticides, etc.), which negatively affects local biodiversity, it can be stated that the planned economic activity will not have a significant impact on the local flora and/or fauna. This is because wind turbines are stationary, high-altitude structures that occupy a small land area and do not pollute the environment. The planned economic activity will not have a significant negative impact on biological diversity.

The planned area is not attractive for the formation of large bird migration flows. The area does not form autumn and spring congregations of migrating birds, nor is the area attractive for congregations of wintering birds.

Mitigation measures

- The optimal time for the installation of wind turbines is from August to February. If it becomes necessary to carry out such work during the spring migration period, i.e., from March to May, the installation of wind turbines would only be carried out after consulting with ornithologists about the sensitivity of the area during this period and receiving positive conclusions from specialists. The work would be conducted in the shortest possible time to minimize any disturbance to local birds.
- Due to the potential impact on birds and bats, the Lithuanian Ornithological Society will prepare and coordinate a monitoring program for birds and bats with the responsible institution.
- According to the bird and bat monitoring program, if significant negative impacts of the planned economic activity on birds or bats are identified during research, either before the start of operation or while the wind farm is already in operation, measures to mitigate the negative impact would be proposed.

5.4 Protected areas and areas of high ecological value

The area of the planned wind farm does not fall within established or potential protected areas. The nearest protected area of the European ecological network Natura 2000 is the vicinity of Paginskiai village (BAST), located approximately 2.7 km to the west. Given this distance, it has been determined that the wind turbines will not have a negative impact on the protected areas.

5.5 Soil pollution and erosion

The planned economic activity will be carried out by forming separate engineering infrastructure plots, each with an area of about 0.2 hectares. Therefore, there will be no significant impact on the land or soil, as wind turbines are stationary structures that occupy a small land area, do not pollute the environment, and do not deplete natural resources. These structures do not require extensive land excavation work. During construction, the excavated soil will be used for levelling the local terrain and forming embankments for entrances and access roads. The planned economic activity will not have a negative impact on the land and soil.

Mitigation measures

- During construction, the excavated soil will be stored within the boundaries of the plot and used for levelling the local terrain and forming embankments for entrances and access roads.

5.6 Landscape and visual

According to the map of the most valuable visual structure of the landscape in Lithuania presented in the study of the visual structure of the Lithuanian landscape, the area where the planned activity will take place is characterized by a particularly pronounced vertical segmentation (highly hilly landscape with deep valleys and 4-5 level video top complexes) (V3H1). Based on horizontal segmentation, the landscape is dominated by semi-enclosed partially visible spaces. The spatial structure of the landscape is expressed only by vertical dominants. All activity plots are located away from urbanized areas, surrounded by agricultural land plots. The planned wind turbines will not have a negative impact on the visual-aesthetic quality of the landscape. The nearest regional parks (Varnių, Kurtuvėnų) are located at a sufficiently large distance (14-19 km) from the planned wind farm, so the visual impact will not be felt. No significant impact on the landscape is anticipated.

Mitigation measures

- After the wind turbines are constructed, it is recommended to reassess their visibility from the Kiloniai–Kelmė road (No. 2124) and the Vaiguva–Kelmė road (No. 158). If necessary, in certain sections (near residential areas), linear bio architectural compositions of deciduous and coniferous plantings should be formed parallel to the road. When performing the work and determining the exact planting locations, consult with landscape architects. This way, the lower massive part of the wind turbine towers will not be visible, and their dominance in the landscape will be reduced. The visibility of the remaining higher part of the tower and the wind rotor will be less significant.
- To reduce the impact on the landscape, the wind turbine structures will be painted in light colours. The special composition of the paint prevents the structures from shining and creating reflections.
- To reduce visual pollution of the landscape, the electricity generated by the wind turbines will be connected to the grid operator's designated connection point using underground electrical cables (land plot cad. No. 5446/0004:230). All electrical cables will pass through existing roads (roads designated by existing land management projects). If it is necessary to cross undesignated plots, consent will be obtained from the landowners. If consent from the landowners is not obtained, the cable routing will be adjusted accordingly. In total, approximately 30 km of electrical cable is planned to be laid.

5.7 Hydrology and Hydrogeology

The planned economic activity will not have a negative impact on water, water body protection zones, coastal protection strips or the marine environment. Adequate distances from the nearest water bodies and water sources will be maintained from the wind turbine construction sites. The operation of the wind turbines does not affect air pollution; no pollutants that could harm the quality of surface or groundwater will be emitted during the activity.

5.8 Fire and extreme events

The planned activity is not classified as a hazardous operation that could have catastrophic consequences.

Extreme events that may occur during the operation of wind turbines and could affect the surroundings include accidents related to mechanical damage to the turbine structures, which could cause the collapse of the turbine tower or the fall of the blades, the top part of the tower along with the blades and rotor falling, and similar mechanical accidents. Mechanical collapse of the wind turbine towers could be caused by natural and anthropogenic factors. Natural factors include hurricanes, tornadoes, and heavy rains. The likelihood of ice throw depends on meteorological conditions. Ice throw from the blades is very rare, and a higher likelihood exists for ice/snow falling from stationary parts of the turbine near the wind turbine.

The wind turbine towers are planned to be sufficiently distant from the nearest built-up area, so deformation of the wind turbine towers, which could be caused by natural and/or anthropogenic factors, will not affect existing structures.

Mitigation measures

- Lightning protection and earthing systems will be installed.
- A sanitary protection zone will be established for the wind turbines, into which residential houses/environment will not fall. Even in the case of an extreme situation where a wind turbine falls (breaks), it will not pose a threat to the health of the surrounding residents.
- The wind turbines will be protected against extreme meteorological conditions – an anti-corrosion coating will be installed to protect against marine corrosion; a flexible structure and multi-cylinder damping anchors will be installed in the wind turbines to enhance resistance to earthquakes.

5.9 Cultural heritage and protected areas

The planned economic activity will not have a negative impact on cultural heritage. The wind turbines planned for construction do not fall within the protection and usage zones of protected objects and will not affect the visibility of cultural heritage sites. Therefore, no negative impact is anticipated.

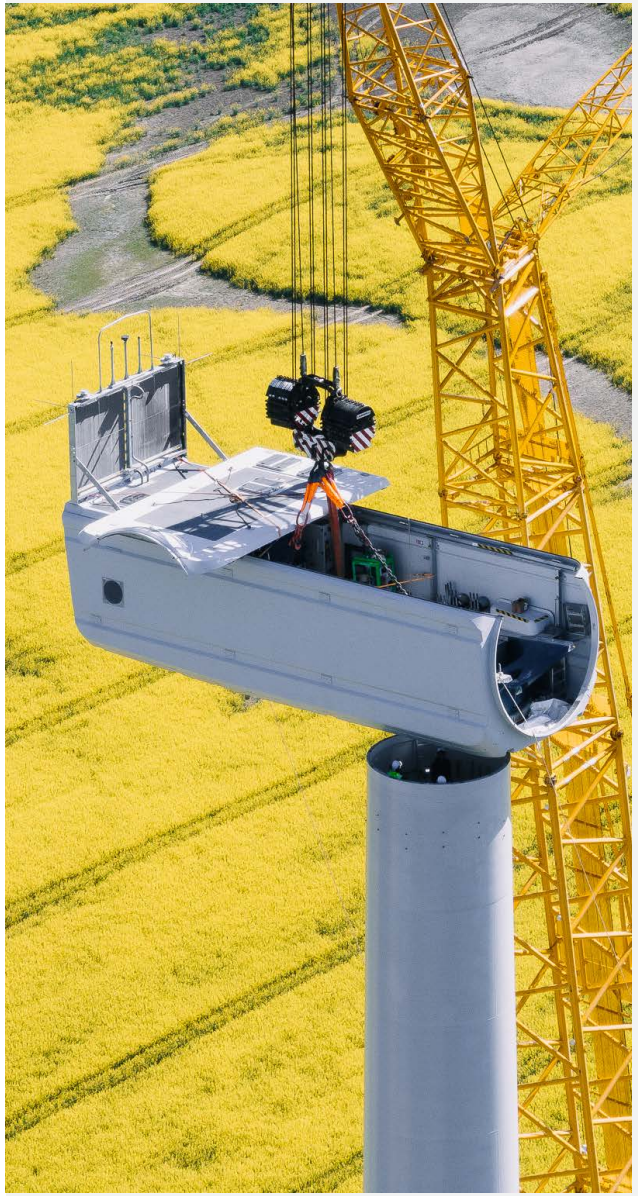
5.10 Traffic and transport

It is planned to use existing local roads for access to the wind park, which will be strengthened and renovated if needed.

Mitigation measures

- The roads will be strengthened and renovated if needed.

If it becomes clear during the performed activity that the impact on the environment is greater than was assessed during the EIA procedure, the operator will be obliged to immediately apply additional measures to reduce the environmental impact or reduce the scope of the activity/terminate the activity.



6. Glossary

BAST	Special Areas of Conservation are designated areas that are protected under the European Union's Habitats Directive. These areas are established to conserve natural habitats and species of wild fauna and flora that are considered to be of European importance.
EIA	Environmental Impact Assessment.
EPA	Environmental Protection Agency under the Ministry of Environment of the Republic of Lithuania.
General Plan	General Plan of the Kelmė District Municipality territory, approved by the decision of the Kelmė District Municipality Council on March 29, 2013, Decision No. T-94.
Natura 2000	A coherent network of special areas of conservation of habitats which is composed of sites hosting the natural habitat types of community interest and habitats of the species of community interest, and which enables the natural habitat types and the species' habitats to be maintained and, where appropriate, restored to a favourable conservation status in their natural range. The Natura 2000 network includes special areas of conservation of birds.
PAST	Special Protection Areas are designated areas under the European Union's Birds Directive. These areas are established to protect and manage habitats for rare and vulnerable birds, as well as for regularly occurring migratory bird species.
Protected area	A land and/or water area which has clearly defined boundaries, an acknowledged scientific, ecological, cultural and other value and for which a special protection and use regime/procedure has been established by legal acts.
Reserve	A protected area established for the preservation of the natural and/or cultural sites valuable from a scientific or cultural point of view, the territorial complexes and objects/properties of natural and cultural heritage located therein, the landscape, biological diversity, and gene pool. Preservation of the properties located in these areas shall be ensured without terminating economic activities therein.
Restoration site	A protected area intended for the protection, restoration, enhancement and limited use of natural resources, formerly impoverished by human activities.
Sanctuary	A protected area set up in order to preserve and conduct research of the natural or cultural territorial complexes of particular scientific value, ensure the unaffected course of natural processes or maintenance of authenticity of cultural properties, and promote protection of the territorial complexes of natural and cultural heritage. The principal designation of land use shall be established as conservational in these areas, with termination of economic activities therein.
State (national and regional) park	A large protected area which is complex from the natural, cultural and recreational points of view and is particularly valuable, and whose protection and management is related to the designation of the area's functional and landscape management zones.
VENBIS	Map of Wind Energy Development and Areas Important for Biodiversity.
WTG	Wind turbine generator.

7. Contacts

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