

# Mäli wind farm

Non-Technical Summary



## Document details

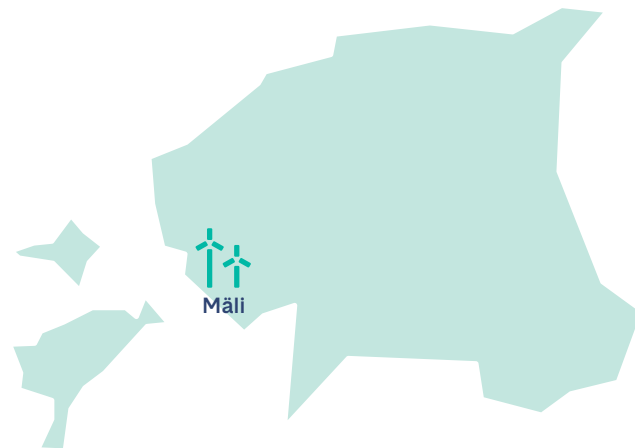
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## 1. Short description of the project

The Mäli Wind Park project aims to construct a 12 MW wind farm in Varbla municipality, Pärnu County, Estonia. The wind park will consist of four WinWind-3 WTGs, each with a capacity of 3 MW, along with necessary infrastructure including access roads, assembly sites, and cable lines. The total area governed by the spatial plan is approximately 70.7 hectares, where the land use remains unchanged.

## 2. Legal basis and background

The project adheres to the Environmental Impact Assessment and Environmental Management System Act, which mandates a strategic environmental assessment (SEA) to ensure environmental considerations are integrated into strategic planning documents. The SEA for the Mäli Wind Farm was initiated on 22 February 2007 by Varbla municipal government decision no. 8. The SEA process included public discussions and received approvals from relevant authorities, ensuring compliance with environmental regulations and sustainable development principles.

## 3. Site location and description

The Mäli Wind Park is located in the Helmküla and Mäliküla villages within Varbla municipality, Pärnu County, Estonia. The site lies approximately 2.5 kilometers east of the Gulf of Riga's coastline. The area governed by the spatial plan is approximately 70.7 hectares, encompassing several cadastral units, including Lankuse II, Põlde II, Andruse III, Olevi I, Tuule, Kalda I, Metsandi I, Moringi IV, Põllumetsa II, and Põllumetsa III.

The project site is characterized by its position on the Great Varbla Drumlin, which rises to 28 meters above sea level. This drumlin-like ridge is surrounded by a mix of arable lands, pastures, and young mixed forests, predominantly pine. The site's boundaries include the Helmküla-Kapuse sand and gravel road to the north, the Audru-Tõstamaa-Nurmsi national secondary road (19101) to the east, the Metsandi-Abromänniku gravel road to the south, and agricultural land and forests to the west.

The land within the project area has been historically used for agriculture, with no significant land improvement systems in place. The northern part of the area features medium voltage overhead lines, and there are no natural water bodies or significant ditches within the immediate vicinity. The closest built environment is Helmküla village, characterized by dispersed, low-density single-family homes and farm buildings.

## 4. Description of the planned activity

The Mäli Wind Park project involves the construction of a wind farm with a total installed capacity of 12 MW. The project includes the following key components: wind turbines, access roads and assembly sites, cable lines, land use, environmental considerations.

Four WinWind-3 type electric wind turbines, each with a capacity of 3 MW, will be installed. These turbines have a hub height approximately of 100 meters and a rotor diameter approximately of 100 meters. The total area occupied by the turbines will be around 2000 square meters (500 square meters per turbine). New access roads will be constructed, and existing roads will be upgraded to facilitate the transport of turbine components and maintenance activities. Specific road sections, such as the Metsandi-Abromänniku road, will be repaired and expanded. Culverts will also be built to ensure proper drainage. Assembly

sites will be established for the construction and maintenance of the wind turbines. Underground cable lines will be laid to connect the wind turbines to the Lõpe substation, approximately 21 kilometers away. These cables will follow existing buffer corridors of overhead lines to minimize environmental disruption.

The project has taken into account various environmental factors, including potential impacts on local flora and fauna, noise and shading effects, and the preservation of the natural landscape. Construction activities will be timed to avoid sensitive periods, such as the bird nesting season, and best practices will be followed to mitigate any adverse impacts. The Mäli Wind Park project aims to harness wind energy in an environmentally responsible manner, contributing to Estonia's renewable energy goals while maintaining the existing agricultural use of the land and ensuring minimal disruption to the local community and environment.

## 5. Summary of the impacts and mitigation measures

### 5.1 Landscape and visual

The WTGs are planned in an undeveloped agricultural and forest landscape, with the main viewpoint being the Audru-Tõstamaa-Nurmsi highway, which borders the wind generator area in a straight section of about 2 km in a southeast-northwest direction. The background of the wind turbines is a tall forest, and the rest of the road is winding with forests that hide the view of the wind farm. The turbines are constantly visible to Helmküla village residents, while views from other villages are mostly obscured by forests.

The landscape includes alternating forests, fields, rock fences, juniper shrubs, drumlin-like ridges (Varbla (28 m) and Tammiste-Koeri (42 m)), marshy areas, and an articulated seashore with small islands. The nearest valuable landscapes are the Paatsalu-Varbla islets and the cultural and environmental landscape in Varbla. The Mäli wind farm's construction (the construction of facilities takes a relatively small area of the existing land parcel) is acceptable and will not generally harm the existing landscape, though it will add dominant structures to the traditional coastal village landscape. The impact is considered neutral or weakly negative.

### Mitigation measures

- To mitigate the negative visual impact, it is possible to paint the wind turbines with a matte color, and different colors have also been used to reduce the effect of scale.
- An information board with brief information about the wind farm could be installed at the border of the area governed by the spatial plan.

## 5.2 Soil pollution and erosion

For the construction of wind generators, roads and assembly sites must be built in the area governed by the spatial plan, and the necessary building materials and parts must be stored. Part of the soil is removed to build and renovate roads, so the vegetation that grew there will also disappear. The forest growing in the western part of the area governed by the spatial plan will remain, it is also important because it is a buffer zone between the green corridor K-8 and the land parcel.

### Mitigation measures

- In order to mitigate the negative impact of construction activities, the time of the activity must be chosen such that the spring snowmelt period is over and the autumn rains have not yet started.
- It is necessary to ensure the availability of pollution control means that can quickly stop the spread of pollution and collect smaller pollution (sawdust, absorbent, shovels, collection container, etc.).

## 5.3 Hydrology and Hydrogeology

The area governed by the spatial plan is located approximately 2.5 km from the Gulf of Riga. There are no natural water bodies or ditches in the area or in the immediate vicinity. The nearest lake is Lake Lõpe, located approximately 2.3 km to the southwest. The nearest stream is the branch of the Kūti stream that has been channelled into the ditches in the eastern direction, approximately 500 m from the area.

There are no public water networks and wells in the area governed by the spatial plan. The planned activity does not involve water consumption or a threat to groundwater. Therefore, the

planned activity will not have a negative impact on groundwater or other water users in the region.

### Mitigation measures

- During construction period excavation works are recommended to be carried out during periods of low rainfall, preferred in summer.
- The machines and mechanisms used for construction work must have passed a technical inspection.
- In case of possible fuel and oil pollution, pollution control equipment should be stocked up so that, if necessary, the spread of pollution can be quickly stopped, and smaller pollution centres can be eliminated by the polluter themselves until help arrives. Pollution control means are sawdust, absorbent, shovels, container, etc.

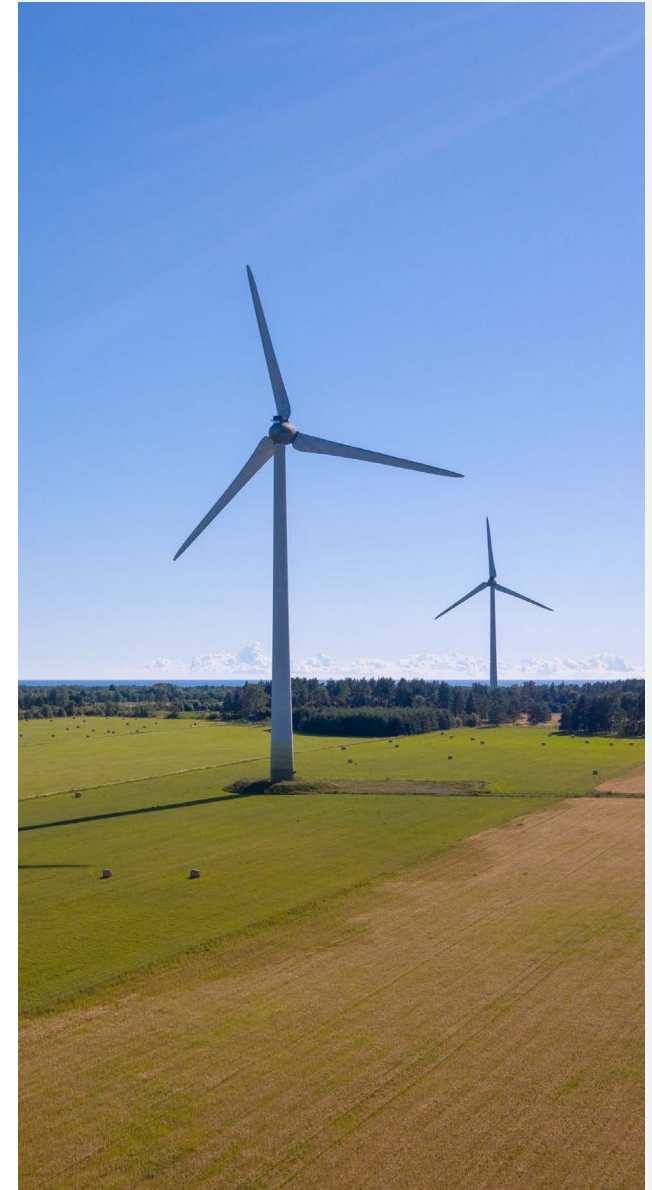
## 5.4 Protected areas and areas of high ecological value

The Māli wind farm will not have significant adverse effects on nearby protected areas, including Natura 2000 sites such as the Varbla islets landscape conservation area, the Väinamere limited conservation area, and the Varbla limited conservation area. The closest protected areas are about 900 m (the Vana-Varbla manor park) away from the planned Māli wind farm site, Natura 2000 areas more than 1 km away from the planned Māli wind farm site, such as the landscape conservation area of the Varbla islets, the Väinamere limited conservation area, the Varbla limited conservation area.

The planned activity will not directly impact the habitat types and protected plant and animal species located in protected, nature and limited conservation areas: the areas of protected areas will remain unchanged, and the number of protected species will probably not decrease. Visual impact on the protected landscapes is considered neutral to weakly negative due to the distance.

## 5.5 Biodiversity

The planned wind farm construction area lacks nesting sites for protected bird species and does not contain special protection areas of European Union importance. The construction and operation will minimally impact local biodiversity, which mainly consists of agricultural land and young mixed forests, with no significant habitats for protected plant and animal species.



Woodlarks, a species of conservation concern, are present, but the impact on them is minor, provided construction avoids the nesting season from April 15 to July 15.

No protected fauna or bat habitats have been identified in the area. The presence of green network corridors K-8 and K-9 nearby allows animal species accustomed to cultural landscapes to inhabit the fields and groves. The wind farm construction will not significantly alter bird habitats in surrounding forests and pastures. Bird monitoring identified 12 bird species, including the woodlark, Eurasian skylark, and yellowhammer, indicating possible nesting behaviors. Wind turbine No. 4's proximity should not disturb woodlark nesting conditions.

Common feeding guests in the area include the white stork, common buzzard, and barn swallow. Construction's short-term impact on breeding birds can be mitigated by avoiding the nesting period. The newer wind turbines' design should cause less disturbance to birds. Animals and birds adaptable to human proximity will likely adjust to the wind farm, suggesting no significant impact on them.

#### Mitigation measures

- Schedule construction activities outside the bird nesting season (April 15 to July 15) to minimize disturbance to breeding birds.
- Construction is not recommended during the bird nesting season.
- Continuous bird monitoring, especially for woodlarks, which is included in Annex I of the European Union Birds Directive, is recommended during the implementation of the wind farm plan.

#### 5.6 Cultural heritage and protected areas

The planned economic activity will not have a negative impact on cultural heritage. The planned area does not contain protected cultural monuments. Varbla Urbanus church and the boundary wall of Varbla church, historical monuments Varbla church garden and WWII mass grave (the aforementioned have a common buffer zone), archaeological monument sacrificial site Hiiepanga Hill, architectural monument Veski farm windmill and archaeological monument sacrificial stone Holy Stone (the last two with a common buffer zone) are almost 1000 m away.

Based on the information the planned activity will not have a significant impact on the archaeological and cultural monuments or holy places in the area.

#### Mitigation measures

- Recommendations regarding land use, construction activities and maintenance (A23 The valuable landscape of Varbla): to keep Varbla church and churchyard, Varbla cemetery and Uue-Varbla manor park in order. To maintain open agricultural land. To organize and mark individual objects of conservation value and accesses to them. To prepare maintenance recommendations for landscaping.
- Recommendations regarding land use, construction activities and maintenance (A24 Paatsalu- Valuable landscape of the Varbla islets): To preserve cultural heritage landscapes through mowing and grazing, to try to restore coastal and wooded meadows that are currently out of use. To clean up Paatsalu and Illuste manors and manor parks. To organize and mark individual objects of conservation value and accesses to them. When constructing new buildings on the beach or shore, preparation of detailed spatial plan is recommended. To prepare maintenance recommendations for landscaping. The area is suitable for the development of nature recreation.

#### 5.7 Public health

No significant adverse impacts on public health are anticipated. The project does not involve hazardous substances or high-risk activities. Planned activity will comply with the requirements that are compatible with a healthy environment.

#### 5.8 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 under the most unfavorable conditions (headwind of 8 m/s in all directions), which maximizes noise spread. In reality, actual noise levels will be lower, especially when the wind blows towards the turbines. The noise generated by the wind turbines is expected to comply with the regulatory standards, ensuring it does not exceed 40 dB at residential areas. The area has been mapped to show noise levels,

ensuring that noise-sensitive areas, such as residential buildings, are not adversely affected.

The movement of shadows caused by rotor blades can be visually disturbing, especially on sunny days when the sun's rays are "cut" by the blades. An assessment of shadow flicker associated with the proposed development has been undertaken using the WindPRO software. Shading impacts have been evaluated using a shade map, considering average sunshine distribution and wind direction. Shading duration depends on weather conditions, wind direction, and the sun's position. Shadows are longest in the morning and evening and shortest at noon. The shading impact is significant within 1000 meters from the turbines, beyond which the effect diminishes due to the optical properties of the atmosphere. Existing buildings will not remain in areas where shading exceeds 30 hours per year. No buildings will experience significant shading impacts (exceeding 10 hours per year).

#### Mitigation measures

- The placement of turbines has been planned such that no residential buildings fall within the 40 dB noise zone, ensuring good acoustic conditions in the vicinity.
- WTGs nacelles shielded and grounded.
- Existing buildings will not remain in areas where shading exceeds 30 hours per year. No buildings will experience significant shading impacts (exceeding 10 hours per year).
- Recommendations include avoiding new housing developments in areas with significant shading and implementing mitigating measures for new buildings.

#### 5.9 Waste

Waste from packaging, construction, and transport of wind generators is collected, sorted, and disposed of according to the Waste Act by the end of the installation. During the operational period of the wind farm, maintenance waste, which occurs about twice a year, is immediately taken by the maintenance team to a hazardous waste reception point. Waste management, organized by the Varbla municipality, requires sorting different types of waste (e.g., glass, cardboard, paper, plastic). Hazardous waste is specifically handled at a designated reception point in the Varbla centre. The detailed spatial plan does not significantly increase regional waste generation.

### Mitigation measures

- Packaging and construction waste generated during the construction period must be sorted on site and, depending on the material, either recycled or handed over to the waste carrier.
- Hazardous waste generated during construction and subsequent maintenance work must be handed over to the person who has the right to handle it.

### 5.10 Air pollution

The planned activity will not have impact on air quality, no pollutants will be released into the air.

To a small extent, the traffic load increases during the construction of the wind farm (large heavy and slow loads); later maintenance does not significantly affect the traffic frequency in the area.

With a certain increase in traffic frequency, the air quality will probably not become significantly worse, because the predicted traffic frequencies will remain relatively low, and in addition, the semi-open landscape and the roof of the Great Varbla Drumlin continue to have good pollutant dispersion conditions.

### 5.11 Traffic and transport

To a small extent, the traffic load increases during the construction of the wind farm (large heavy and slow loads); later maintenance does not significantly affect the traffic frequency in the area. Doubling the traffic loads is accompanied by an increase in the noise level of approximately 3 dB, a two and a half times increase leads to an increase in the noise level of up to 4 dB. In this case, a speed limit of 90 km/h has been taken into account; with the same traffic load within the settlement (50 km/h), the noise load will be lower by approximately 4 dB.




## 6. Glossary


<b>EIA</b>	Environmental Impact Assessment.
<b>Spatial Plan</b>	Detailed plan of the Măli wind farm was initiated on 22 February 2007 by Varbla municipal government decision no. 8.
<b>Natura 2000</b>	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.
<b>Protected area</b>	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.
<b>SEA</b>	Strategic environmental assessment.
<b>WTG</b>	Wind turbine generator.

## 7. Contacts



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