

## The renewable energy potential and locations with the criteria in the Simo municipality

30.5.2025



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*Pictures on the cover page: Lapin materiaalipankki and Digipolis.*

## 1. INTRODUCTION

This study is part of Invest in Veitsiluoto project. The aim of the project is to attract new industrial activities to Kemi, Keminmaa and Simo areas and to support new project operators. The industrial cluster in Meri-Lappi (Sea Lapland), located near Finland's northernmost port, offers ready infrastructure and diverse areas for industrial activities in the region.

This study maps the potential large-scale industrial locations in the municipality of Simo, examines suitable industrial technologies for these areas, and creates an overview of the potential of the identified areas for industrial operations and energy production. The study provides an expert view of the suitability and limitations of the identified areas for industrial operations. This study includes an overview of the current zoning situation and an examination of the suitability of zoning designations for different technologies. The final output includes site descriptions of the potential areas and a roadmap for the next stages of further planning for the industrial development of the area. The key method in the study is spatial data analysis.

## 2. CURRENT STATE AND PREMISES

The aim of this study is to provide information on the potential and locations for renewable energy. The examination of the potential of renewable energy is based on the protection zones of significant sites and areas as well as the placement criteria that was defined in this work. During the study, the location of the Nordic Hydrogen route in the municipality of Simo, has also been taken into account.

As the output of the study, thematic maps and other material has been created based on spatial data analyses regarding various factors that limit renewable energy (including residential areas, nature reserves, landscape areas, groundwater areas, etc.) and enabling factors (electricity transmission, proximity to water resources, secondary land use areas, etc.).

**The following factors have been considered in the study as factors preventing or limiting the locations of renewable energy:**

- residential areas and secondary homes / zoning plans
- nature reserves / valuable bird areas
- Natura2000 areas
- nationally, regionally and locally significant landscape areas
- nationally, regionally and locally significant built cultural environments
- groundwater areas

**The following factors have been considered as enabling/supporting factors for locations of renewable energy:**

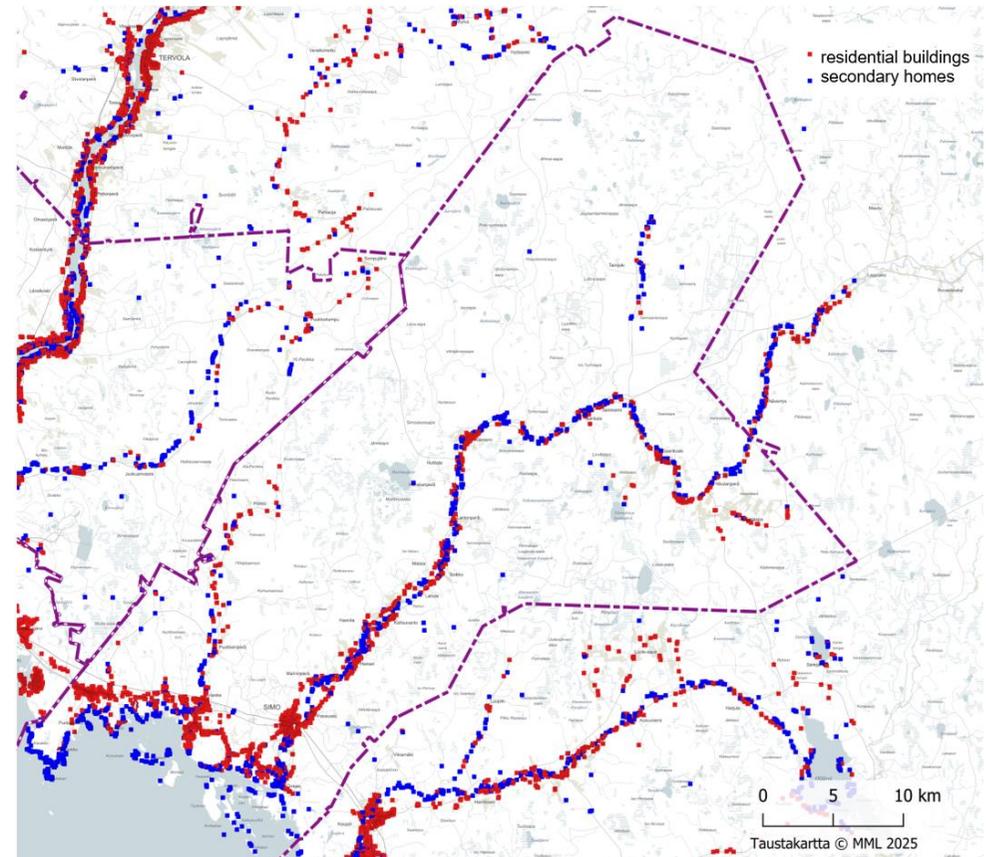
- electricity transmission and distribution network
- grid development plan 2024–2033 (Fingrid)
- proximity to the railway network
- proximity to the road network
- proximity to water resources
- secondary land use areas; former peat production areas, wastelands
- planning situation, projects in neighbouring municipalities

The current state and premises are described below by theme.

**Residential areas**

Most of the habitation of the municipality of Simo is in the southwestern part of the municipality, near the town center and on the coast of the Bay of Bothnia.

There are settlements along the Simojoki river on both sides of the river, as well as along the Viantienjoki and Tainijoki rivers. Large areas, except for the riversides, in the northern and eastern parts of the municipality are completely uninhabited.



*Residential areas in Simo.*

## Nature and environment

Martimoaapa (FI1301602 Martimoaapa - Lumiaapa - Penikat SAC/SPA), located in the municipality of Simo, is a particularly valuable natural area and is one of the most important peatland nature conservation sites in Northern Finland.

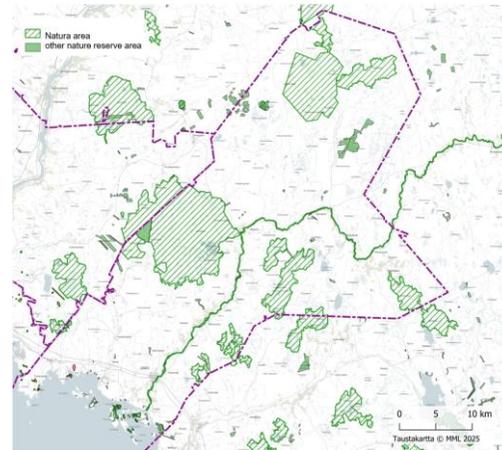
Also, the following Natura areas are located (at least partially) in the municipality of Simo:

- FI1301613 Simojoki SAC
- FI1301603 Veittiaapa SAC/SPA
- FI1301604 Iso-Saarisuo-Hoikkasuo-Musta-aapa SAC/SPA
- FI1301605 Nikkilänaapa SAC
- FI1300302 Perämeren saaret SAC/SPA
- FI1301606 Käärmeaapa SAC/SPA
- FI1301601 Runkaus SAC
- FI1301611 Kuivasjärvi SAC/SPA
- FI1300507 Musta-aapa SAC

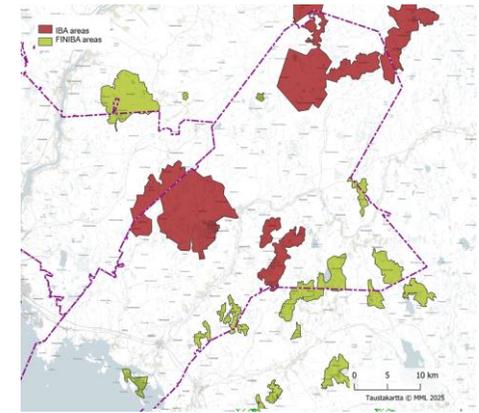
There are also other nature reserves and nature conservation program areas in the municipality. The municipality has several groundwater areas, seven of which are important for water supply. In the Ylikoski (12273176) groundwater area, located in Puutteenperä, the surface water and terrestrial ecosystem is directly dependent on its groundwater.

There are three important bird areas (IBA) in the municipality:

- Martimoaapa-Lumiaapa-Penikat
- Veittiaapa-Ristiaapa
- Runkaus-Saariaapa-Tainijärvet.



*Natura areas and other nature protection areas in Simo.*



*IBA and FINIBA areas in Simo.*

Also, there are three FINIBA (nationally important bird areas) areas in the municipality:

- Kuivasjärvi
- Simon-Kuivaniemen suokeskittymä
- Simon sisäsaaristo.

In Simo there also are cultural environments of national and regional value. The municipality has one nationally valuable landscape area (Simojoen suun kulttuurimaisema).

## Electricity transmission and hydrogen pipeline

Electricity transmission consists of the national grid maintained by Fingrid and the distribution network maintained by the electricity grid companies. In Simo, the local grid company is Rantakairan sähkö Oy.

Key power line connections located in the municipality:

- Keminmaa-Pikkarala (400 kV)
- Simojoki-Pyhänselkä (400 kV)
- Viitajärvi-Simojoki (400 kV)
- Petäjäsoski-Isokangas (400 kV)
- Taivalkoski-Simojoki (110 kV)
- Isohaara-Simojoki (110 kV)
- Simojoki-Raasakka (110 kV)
- Simojoki-Hoikkasuo (110 kV)
- Simojoki-Halmekangas (110 kV)

The existing substations in the area are located in Hirvima (2), Halmekangas, Varesharju (2), Patokoski (1) and Sarvisuo. The Fingrid Simojoki substation located in Hirvima is 400 kV, while other stations in the municipality area are 110 kV.

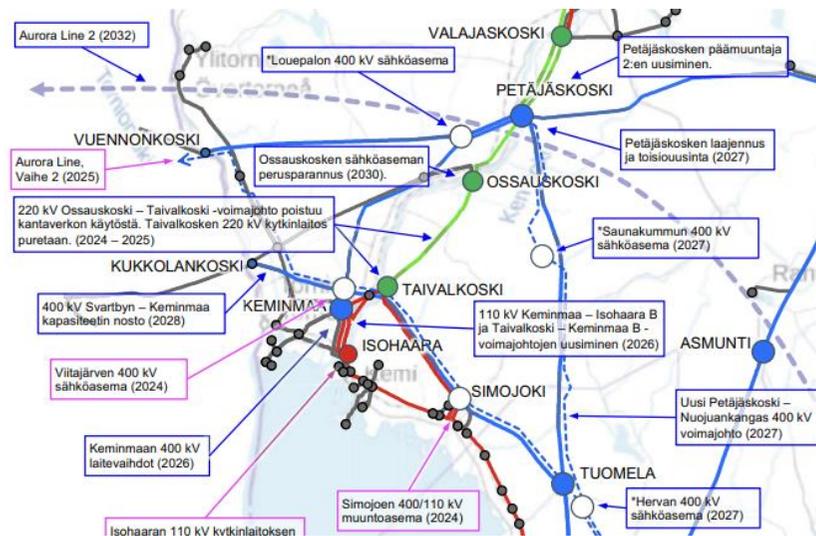


*Electric grid in the Simo area. 400 kV power lines in blue and 110 kV power lines in red.*



*Fingrid's Hirvima substation (picture: Leena Pehkonen).*

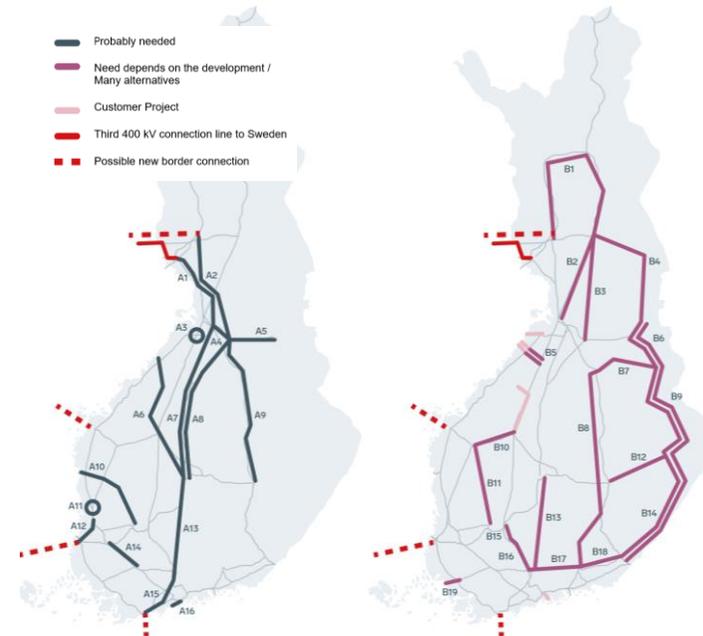
The development plan for the national grid 2024–2033 (Fingrid) includes expanding the Simojoki 110 kV electric station to a 400/110 kV substation by 2024. The expansion included the addition of a 400 kV switchgear and two transformers, converting the substation into a transformer station. The expansion was completed in December 2024.



*Excerpt from the National Grid Development Plan 2024–2033 (Fingrid).*

A new cross-border transmission line, the Aurora Line, is under construction between Finland and Sweden, increasing the electricity transmission capacity between the two countries. On the Finnish side, Aurora Line will run from the Pyhänselkä substation in Muhos through the Simojoki substation to the Viitajärvi substation in Keminmaa, and then to the border via Ylitornio. Provisions have been made for increasing capacity

with Aurora Line 2, which is scheduled for implementation in Fingrid’s development plan for 2032.



*Excerpt from Fingrid's grid vision. Overview of identified network reinforcement needs for the year 2035. The line routes illustrate the need for electricity transmission between substations and may not necessarily correspond to actual transmission routes.*

The national hydrogen network is being developed by Gasgrid Finland. In the national hydrogen pipeline network plan, the hydrogen pipeline route (Nordic Hydrogen Route) runs along the west coast. According to the preliminary plan the hydrogen pipeline runs parallel to the coast in the western part of the municipality of Simo.

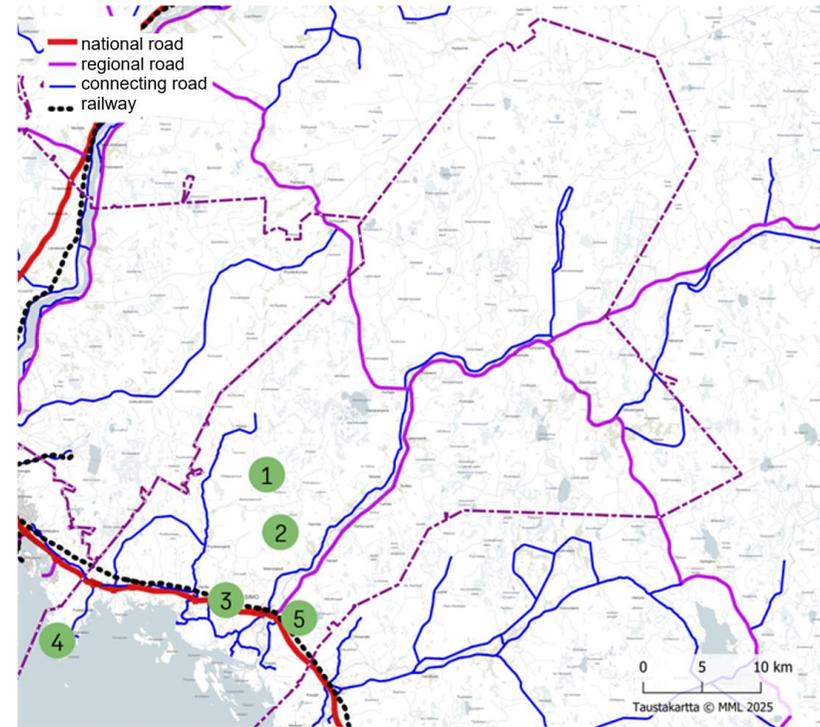
### Traffic and transportation

The municipality of Simo has good transport connections. National road 4, which is also part of the European TEN-T road network, passes through the municipality. North of Kemi, national road 4 continues towards Rovaniemi, and national road 29 continues towards Tornio, which connects further to Sweden and to north towards Kilpisjärvi and all the way to Tromsø in Norway via national road 21 and European Road E8.

Other road connections serving local traffic in the municipality include regional road 924 running along the Simojoki river from Simo to Ranua, regional road 923 from Alaniemi to Tervola, and regional road 849 from Tainiemi via Oijärvi and Yli-li to Kiiminki.

A main railway line runs through the municipality. North of Kemi, the railway branches off heading north towards Rovaniemi and west towards Tornio, from where there is a connection onward to Sweden as well as north along the Tornio river to Kolari.

Kemi-Tornio Airport is located in Kemi, near the municipality of Simo. The port of Kemi is located approximately 30 km by road from the center of Simo.



*Transportation network in Simo. Potential areas are marked with green dots.*

### 3. CURRENT SITUATION

#### Status of renewable energy production

In Simo, there are two permitted solar power areas, one in Jokikylä and the other in the Leipiö wind power area. The planned combined capacity of the solar power parks is 83 MW. Additionally, two potential projects are located in Hiilineva and Ruonasuo.

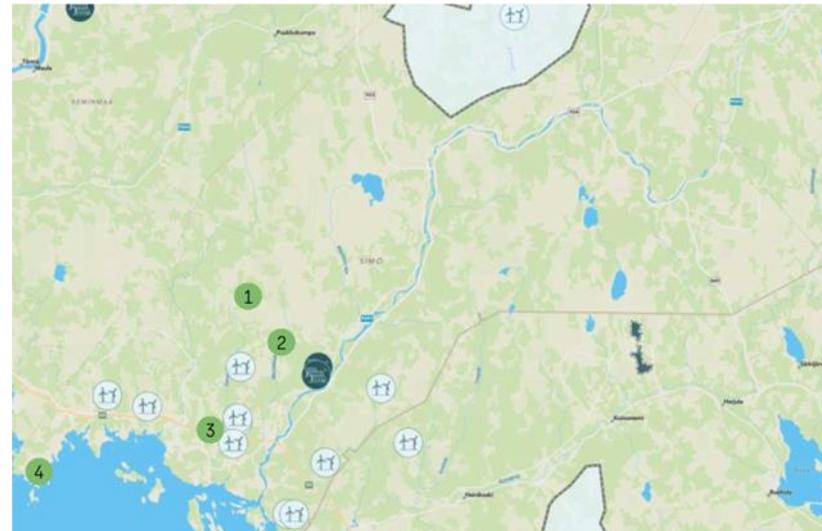
There are seven completed wind farms in the Simo municipality. They are mainly located in the western parts of the municipality.

- Leipiö, 4 turbines, 18 MW
- Leipiö II, 13 turbines, 45 MW
- Leipiö III, 27 turbines, 150 MW
- Putaankangas, 3 turbines, 9 MW
- Onkalonperä, 3 turbines, 9 MW
- Onkalo 2, 3 turbines, 10 MW
- Halmekangas, 11 turbines, 38 MW

Also Tikkala-Seipimäki (27 turbines, 200 MW) wind farm is permitted.

Four projects are ongoing:

- Lakkasuo, 15 turbines, 120 MW
- Leilisuo, 14 turbines, 101 MW
- Lypäkki, 42 turbines, 420 MW.
- Pooki, 185 turbines, 2600 MW.



*The status of renewable energy production in the municipality of Simo as of March 2025. Potential areas are marked with green dots.*

#### Planning situation

##### General plans and local plans

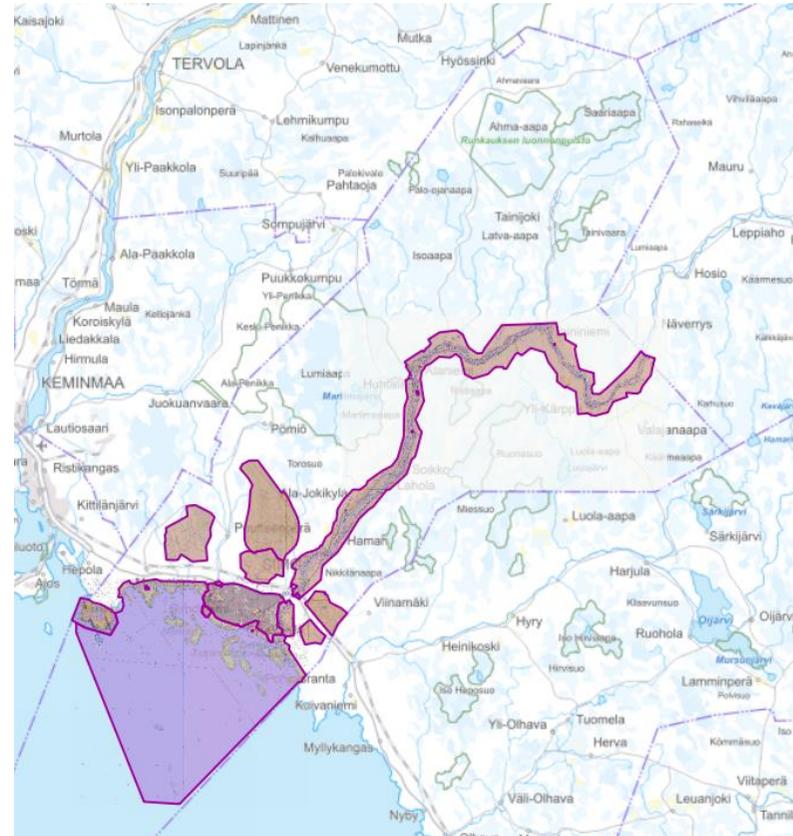
In Simo, there are zoned areas with detailed plans in the town center, Maksniemi area, and Leuannokka.

The general plans valid in the municipality of Simo are:

- Maksniemi component master plan, approved in 1979, without legal effect.
- Station area component master plan, approved in 1983, without legal effect.

- Simoniemi – Viantie component master plan, approved 1987, without legal effect.
- Coastal master plan, confirmed in 1998, legally effective
- Change of the coastal master plan for the Kantolanharju area, approved 17.12.2001.
- Simojoki master plan, approved 24.7.2000, legally effective.
- Simoniemi-Simonkylä master plan, approved 27.1.2003, legally effective.
- Change of the coastal master plan at Ykskuusi area, approved 16.6.2014.
- Wind power master plans, Leipiö, Halmekangas and Onkalo, approved 6.10.2014.
- Component master plan for the expansion of the Leipiö wind farm, approved 26.2.2018.
- Seipimäki and Tikkala wind power component master plans, approved 06.02.2017.
- Karsikkoniemi component master plan, approved 1.10.2018 § 43.
- Change and extension of the Simoniemi component master plan, approved 10.12.2018, § 74.
- Change to Simojoki master plan, into force 28.3.2022.

Ongoing plans are Leilisuo wind power component master plan, Lyyppäkki wind power master plan, Lapinkoski master plan, Harjusranta master plan, Ruonasuo wind power component master plan and Lakkasuo wind power component master plan.

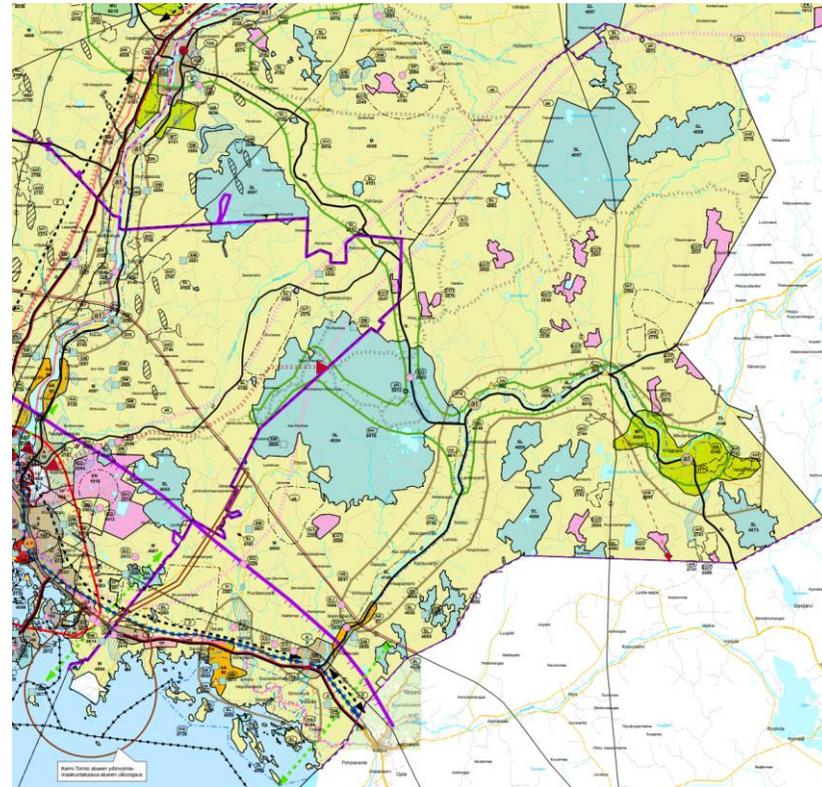


*Areas with valid master plans in the municipality of Simo.*

## Regional plans

The regional plan for Western Lapland, the regional plan for wind power in the marine and coastal area of Lapland, and the partially repealed regional plan for nuclear power in the Kemi-Tornio area are valid in the municipality of Simo.

- **Western Lapland Regional Plan** (The Council of the Lapland Region approved the regional plan on 26.11.2012, the Ministry of the Environment confirmed the regional plan on 19.2.2014, and the plan entered into force on 11.9.20215)
- **Lapland's marine and coastal wind power regional plan** (approved by the Council of the Region of Lapland on 19.11.2004, the Ministry of the Environment confirmed the regional plan on 16.6.2005, and the plan entered into force on 16.7.2005)
- **Partially repealed Kemi-Tornio nuclear power regional plan** (the Council of the the of Lapland Region approved the regional plan on 24.11.2014, the Ministry of the Environment confirmed the regional plan on 10.5.2016, and the regional plan entered into force on 16.2.2017).



*Excerpt from the Western Lapland regional plan.*

In addition, the Lapland safety and traffic phase regional plan 2050 is ongoing. The regional plan has been initiated on 24.1.2025. The phase regional plan deals specifically with issues related to the transport system and safety, but also indicates key areas for large industrial or warehouse buildings.

## 4. RENEWABLE ENERGY POTENTIAL AND THE FACTORS TO BE CONSIDERED IN PLACING

The following describes the forms of renewable energy considered in this study and examines the factors related to their placement.

### Solar power

There are relatively few specific restrictions on the placement of solar power. From a land use and sustainable development perspective, it is good to place solar power in secondary land use areas, as well as in abandoned land areas or existing open terrain. It is good if the removal of existing trees is as minimal as possible.

Areas that are generally suitable for industrial-scale solar power plants include, for example, the following:

Description of the area	Definition
Areas outside intensive land use or areas that have ceased to be intensively used	Road and railway side areas, road and aircraft noise zones, disused agricultural areas, disused peat production areas, disused gravel extraction areas, contaminated land areas, landfill and filling areas, covered dump sites (gas tightness requirement to be considered)

So-called brown field areas	Disused industrial areas
Existing building stock	By placing solar panels in connection with the building stock or in existing areas, improving the use of the built environment and saving natural areas.
Water areas created by human activity	Dam basins, artificial lakes and other water areas created by human activity. Solar energy production area with floating foundation structure.
Power line routes	Construction on power line routes is limited, but possible. In principle, a structure placed on a power line route can be a maximum of 2 meters high and must be located outside the building restriction area, taking into account the safety distances to power line poles and maintenance routes.
Wind power areas	Wind and solar energy complement each other. The area has an existing service road network and electricity connection. Ice falling from platforms and shading from turbines affect the placement of panels.
Areas with high energy consumption	Areas with large industries or areas close to them. The proximity of energy consumption contributes to the profitability of solar panel investment.

Accessibility	Areas that are easily accessible (near roads) and have no obstacles to cable trenches
Connection to the electricity grid	Regionally significant solar energy production plants are in principle connected to the 110 kV grid, at a maximum distance of approximately 15 km (the technically and economically reasonable distance depends on the capacity of the production plant). Other decentralized energy production in the area (wind power, solar energy) may affect the possibilities of grid connection. In principle, wind and solar power can be combined.
Locality	Areas where the generated electricity can be utilized to the maximum extent (industrial plants and commercial areas) or property networks where electricity can be transferred via internal electricity transmission within a property or group of properties.

Source: EMMI project (Council of Northern Ostrobothnia).

In the Lapland Solar and Wind Power Study 2023-2024 conducted by the Council of Lapland two potential solar power areas were identified in Simo. One is a 196-hectare area east of the center of Simo, between the railway and the power line. The other is 266 hectares in size and is located northeast of

the center of Simo, in the Hirvimaa area, west of the Simojoki river.

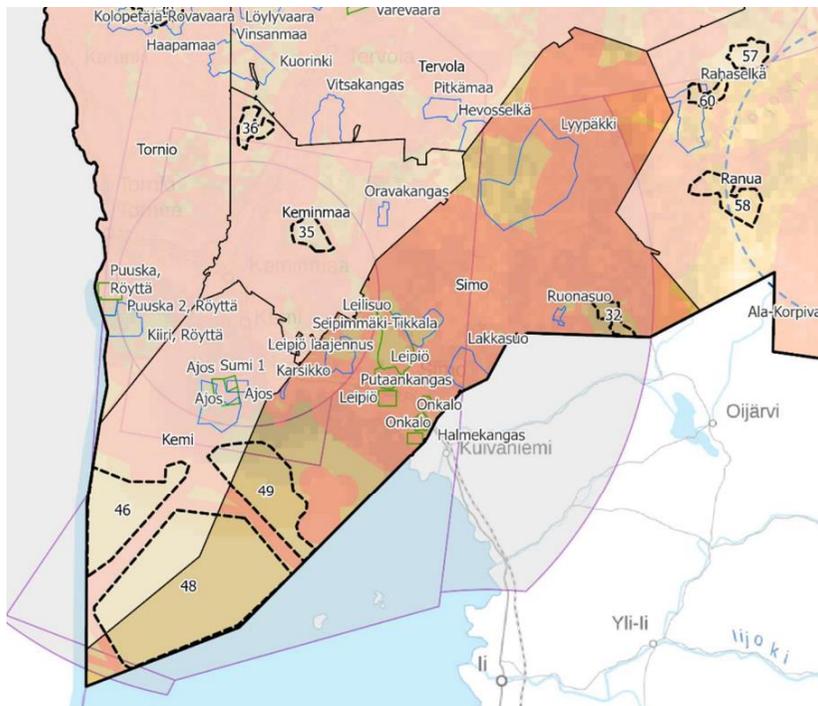
### Wind power

The location of wind power generation is limited by residential buildings and secondary homes (due to noise impacts, among other things), valuable nature and landscape areas, and the location and capacity of the electricity transmission network. In reindeer herding areas, the requirements of reindeer herding must be taken into account when planning land use.

In the Simo municipality, there are already a relatively large number of operational wind power areas, and few wind power areas are in various stages of development. The regional plan of Western Lapland has designated wind power areas, which indicate the areas most suitable for the utilization of wind power referred to in the national land use objectives and areas suitable for the planning of wind power production. Areas suitable for planning are located in the eastern part of the municipality, east of Sompujärvi on the border with Tervola, east of Tainiemi on the border with Ranua, and in the western part of the municipality around the wind power areas in Leipiö. In addition, the areas of Leilisuo and Tikkala-Seipimäki north of Maksniemi have been designated as wind power areas in the regional plan.

In the Lapland Solar and Wind Power Study 2023-2024 conducted by the Council of Lapland, three additional potential regional-scale wind power areas have been identified in the municipality of Simo, in addition to the areas designated in the

regional plan. One of the potential areas is an onshore wind power area, located in the eastern part of the municipality in the Luola-aapa area near the border of Ii. The other two are offshore wind power areas in the maritime area off the coast of Simo. The identified areas in the study could accommodate a total of 15-20 onshore wind turbines and 70-100 offshore wind turbines.



*Potential wind power areas identified in the municipality of Simo in the Lapland solar and wind power study.*

## Green hydrogen

In the green hydrogen production process, water is split into oxygen and hydrogen molecules using electricity. The electricity used in green hydrogen production is generated from renewable energy sources, such as solar or wind power. Another way to produce ecologically sustainable hydrogen is to use bi-methane from biogas in an electrolysis process.

The placement of hydrogen facilities requires proximity to electricity generated from renewable energy sources, an electricity transmission network, water resources, and a gas pipeline or transportation network (road or rail) for hydrogen or its derivatives. To utilize waste heat, it would be beneficial to have a district heating network or other operations that can make use of the waste heat nearby.

## 5. POTENTIAL AREAS

Mapping of key areas for industrial activity and renewable energy began by determining areas where such activities cannot be placed. By taking these areas into account, significant environmental impacts can be minimized. Based on spatial data analysis, “no-go” areas were mapped. These are areas where the placement of renewable energy on an industrial scale is primarily not possible.

In the analysis, the absolute no-go areas are primarily:

- The immediate proximity of residential areas and secondary homes (approx. 500 m)
- Nature conservation areas, Natura2000 areas
- Nationally significant built cultural environments (RKY)
- Valuable landscape areas
- Valuable bird areas

Also factors that do not prevent industrial operations but need to be considered in project planning were mapped. These factors include groundwater areas, soil conditions, existing zoning conditions (regional, master, and detailed plans), land ownership, restrictions imposed by air traffic, and terrain topography.

The study also examined factors whose proximity would benefit several industrial technologies. Such factors include proximity to fresh water, proximity to the national and lower-level electricity transmission network and transformers, considering known future network visions, good logistical accessibility,

existing industrial areas, other brownfield areas, air traffic, ports, railway network and existing municipal infrastructure. Regarding the electrical grid, available capacity must also be considered, although it has not been examined in detail in this study.

### Location review of potential areas

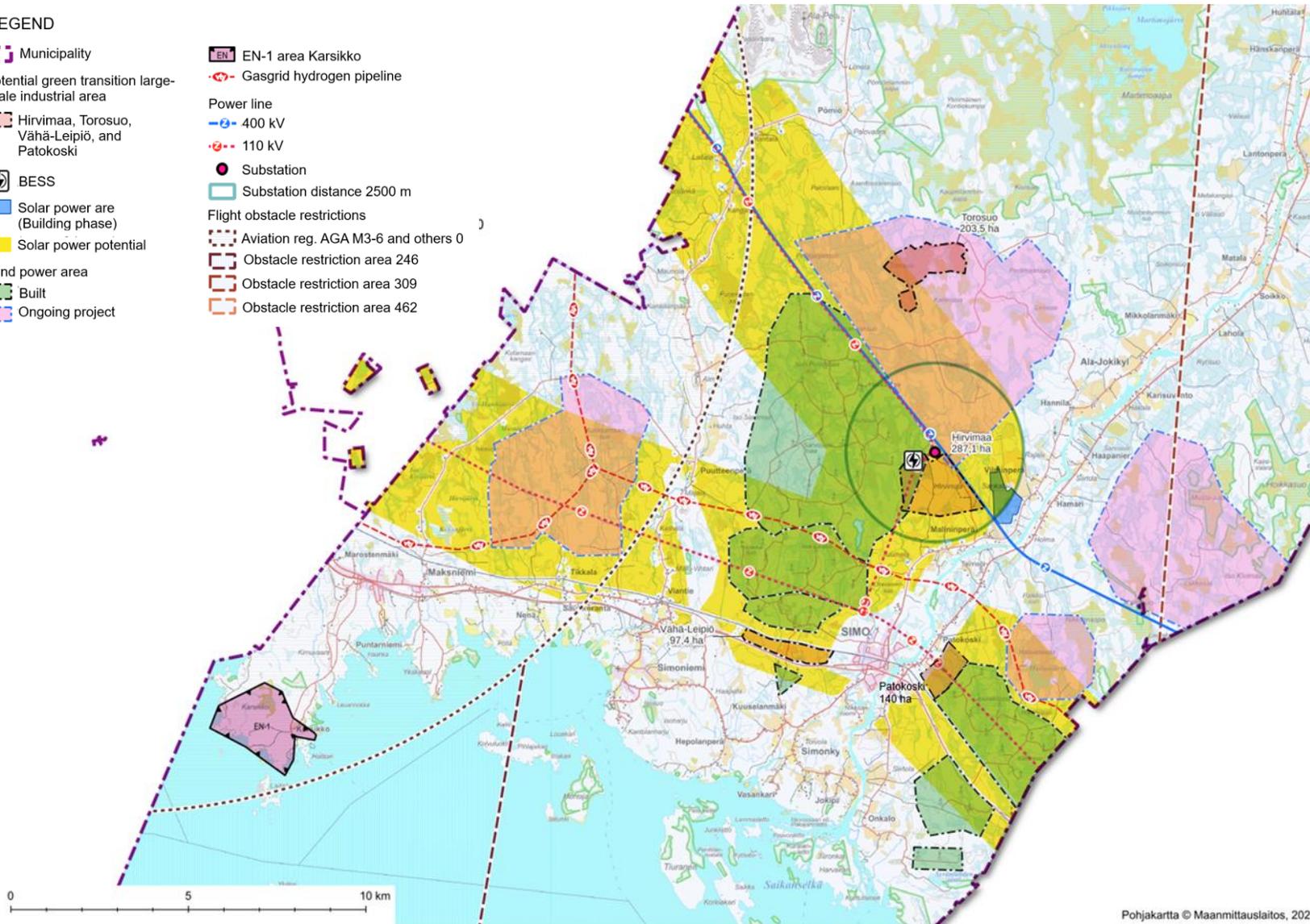
Following the “no go” area analysis, potential areas for renewable energy were mapped. The starting point was the location of existing power lines and transmission lines. Potential locations were specifically sought within a maximum distance of approximately five kilometers from the Simojoki substation. The analysis highlighted Torosuo peat production area, Hirvimaa area near the Simojoki substation, and Vähä-Leipiö and Patokoski areas next to the center of Simo. Vähä-Leipiö and Patokoski are located more than five kilometers away from the Simojoki substation, but due to their accessibility and nearby infrastructure, these areas were included. Additionally, Karsikko area on the western border of the municipality is included in the study. Although it does not meet the actual distance criteria, it is easily utilizable due to its already existing zoning plans.

### Solar power location review

Possible locations for solar power were assessed within a 2.5 kilometer radius from substations and 110 kV power lines. While there are suitable sites for solar power located farther from power lines, the cost of constructing transmission lines often becomes a threshold factor in these cases. Therefore, the maps only show the most potential areas near substations and power lines.

**LEGEND**

-  Municipality
- Potential green transition large-scale industrial area
  -  Hirvima, Torosuo, Vähä-Leipiö, and Patokoski
  -  BESS
  -  Solar power are (Building phase)
  -  Solar power potential
- Wind power area
  -  Built
  -  Ongoing project
- EN-1 area Karsikko
- Gasgrid hydrogen pipeline
- Power line
  -  400 kV
  -  110 kV
  -  Substation
  -  Substation distance 2500 m
- Flight obstacle restrictions
  -  Aviation reg. AGA M3-6 and others 0
  -  Obstacle restriction area 246
  -  Obstacle restriction area 309
  -  Obstacle restriction area 462



The wind and solar power areas currently located in Simo, the location of potential solar power areas, the location of large-scale industry for the green transition, power lines, and the planned hydrogen pipeline.

## Torosuo

The area is located in the central part of the municipality of Simo, 10 kilometers from the center of Simo and just under five kilometers north of the Simojoki substation. The size of the area is 203 hectares. Martimoaapa nature reserve is located north of Torosuo.

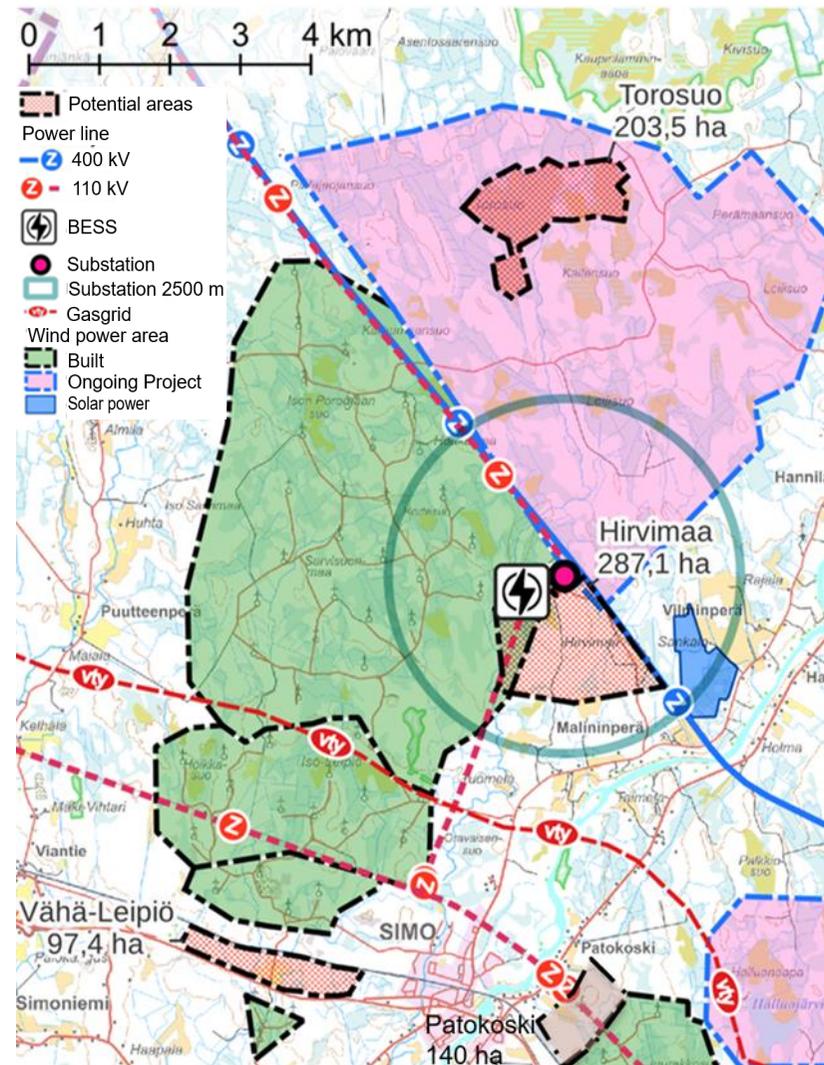
### Location and accessibility

The area is mainly a peat production area. The area is accessible via a road branching off the Pohjoispuolentie (connecting road 9241) leading to the peat production area. The area is located relatively far from the main roads (National road 4/E75, Kemi-Oulu railway) and the distance to the centre of Simo is approximately 17 kilometres by road.

There are no residential areas in the proximity of the area. The nearest settlement is approximately 3.5 kilometres northwest in the Pömiö area and 4.5 kilometres southeast along the Simojoki River.

### Planning situation

There is no valid master plan or local plan for the area. To the west and southwest of the Torosuo area, there is a master plan for the wind power area. In the current Western Lapland regional plan, the area is designated as a peat extraction area (EOT). When planning the after-use of the peat production area in the reindeer herding areas, efforts should be made to secure the conditions for reindeer herding. The area is located within the area of one property.



*The location of the areas of Torosuo, Hirvima, Vähä-Leipiö, and Patokoski in relation to other examined areas, power lines, and the planned route of the hydrogen pipeline.*

The very large and wilderness-like Natura area Martimoaapa-Lumi-aapa-Penikat is located at closest 600 meters north of the area. The protected area also has recreational trails and sites. The closest trails and sites are located at a distance of five kilometers. There are no relics in the area, although there are a few sites located in the vicinity of the area.

**Availability of network-based utilities**

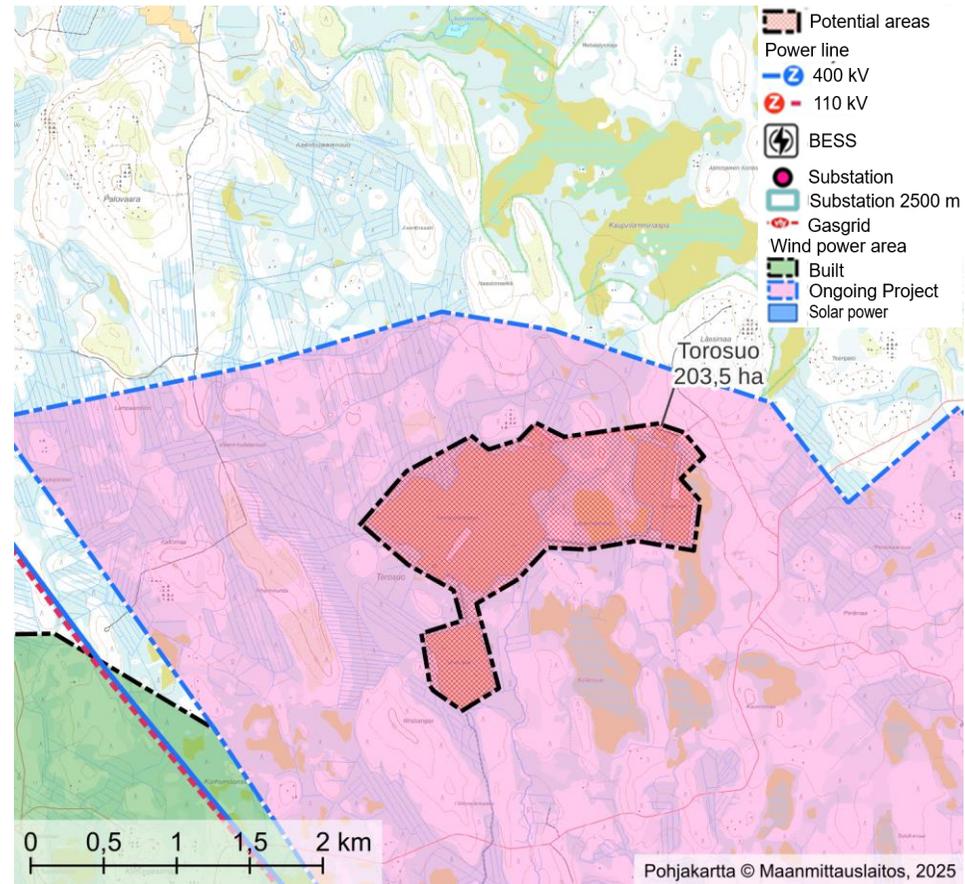
Fingrid's 400 kV substation (Simojoki) is located in Hirvima, less than a kilometer south of Torosuo. The closest Fingrid 400 kV and 110 kV power lines run approximately 1.5 kilometers to the southwest. Gasgrid's preliminary hydrogen pipeline route runs approximately 10 kilometers from the area.

**Recommended actions and the suitability of the area**

When peat production ends, the area is well suited for solar power generation, for example. The currently open area means that no existing forest needs to be cleared for energy production. Power lines run close to the area and there may be synergy benefits with the nearby wind power area in Leipiö. The placement of solar power does not require a master plan or a local plan.

The Natura area Martimoaapa-Lumi-aapa-Penikat is located at closest 600 meters from the area. The Martimoaapa area is very large (140 km<sup>2</sup>). It is the largest continuous and wilderness-like natural area in the area, which should be considered in the surrounding land use and planning of the area. Noise and landscape impacts extending to the protected area must be taken into account. Solar power,

which has low impacts on the noise and distant landscape, is best suited for the area.



*A closer examination of the Torosuo area.*

## Hirvimaa

The area is located approximately four kilometers north of the center of Simo, south of Fingrid's Simojoki substation. The area is 287 hectares.

### Location and accessibility

Hirvimaa is located approximately five kilometers from the main traffic routes (National road 4/E75, Kemi-Oulu railway). The area is accessible from the north (connecting road 9241) along a road leading to the substation. The area is moderately accessible via the current road network.

The area is currently mainly forest and swamp in commercial use. There are no residential buildings or secondary homes within the area. The nearest residential buildings along the Simojoki River are located approximately 700 meters from the area. Several power lines run through the area, and a substation is located in the immediate proximity of the area. Battery storage facilities have been built and are being constructed near the substation.

### Planning situation

The area is mostly unzoned. The westernmost part of the area is located in the master plan area of the Leipiö wind farm, where it is marked as an agricultural and forestry-dominated area. In the master plan, near the eastern boundary of the planned area, there are areas that are important for biodiversity, which include sites referred in the Forest Act 10 §.

The Simojoki master plan is in force to the south of the Hirvimaa area. There is a shooting range, a ski resort and a plant nursery

about half a kilometer southeast of the area. South of the area, between the centre of Simo and the Malini ski centre, there are a fitness track, a ski trail and a mountain bike trail. The area spans over 11 different properties. The nearest Simojoki Natura area is located approximately one kilometer from the area.

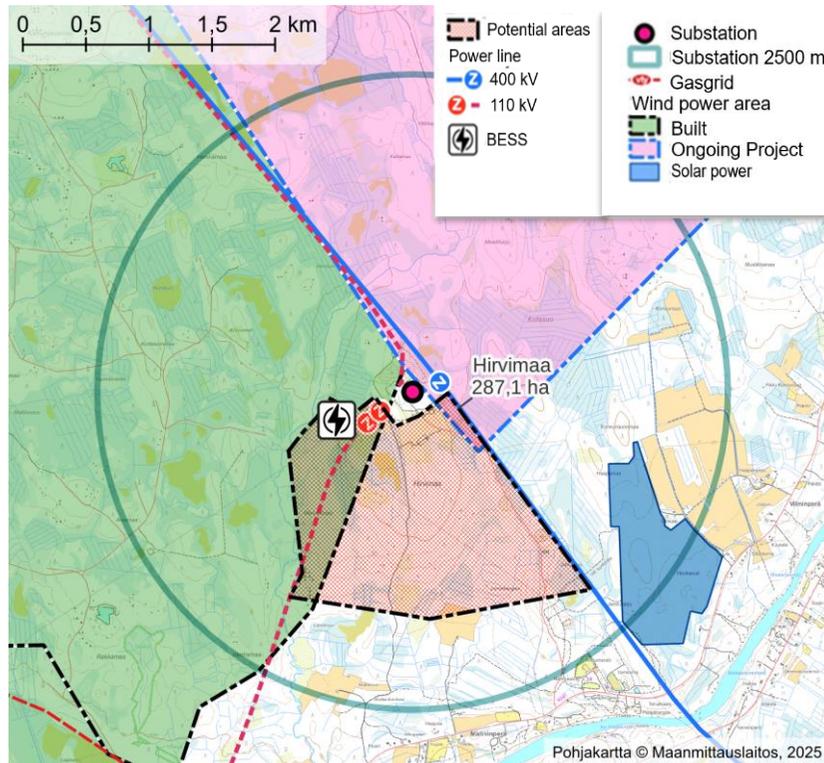
### Availability of network-based utilities

The area is ideally located in relation to the current electricity grid. Fingrid's Simojoki substation is located in the northern part of the area in its immediate proximity. The 400 kV main grid power lines run along the eastern edge of the area, and 110 kV power lines from both Fingrid and other operators run through the area. The planned Gasgrid hydrogen pipeline route runs less than five kilometers from the area.

### Recommended actions and the suitability of the area

The area can accommodate activities that require a significant amount of energy. Power lines running through the area should be taken into account in detailed planning. Part of the area is open-cut forest with little natural value. The relatively close settlement should be taken into account, for example, when locating activities causing noise.

Depending on the activity to be located, a master plan or local plan can be prepared for the area, especially if the area will be industrial and have several different activities. Zoning is not required solely for solar power or battery storage.



A closer examination of the Hirvima area.

## Vähä-Leipiö

The area is located approximately one kilometer west of the center of Simo, between Kemintie road (National road 4 /E75) and the Kemi-Oulu railway. The area is 97 hectares.

### Location and accessibility

The area is currently mainly used for forestry. In its central part, there is a small, cultivated field. There are no residential buildings or secondary homes in the area. The nearest residential area is located about a kilometer away in the center of Simo. The accessibility of the area is excellent, as the area is located between the main transport routes (National road 4/E75 and the Kemi-Oulu railway).

### Planning situation

There is no valid master plan or local plan for the area. The area is located between two master plan areas: to the south is the Simoniemi-Simonkylä component master plan and to the north of the area is the Leipiö wind farm component master plan. In the general plans surrounding the area, nearby land areas have been designated as agricultural and forestry areas. The area borders the central Simo local plan area to the east. The closest areas in the local plan are designated as industrial areas. The local plan for the Hittikka industrial area was completed in the spring of 2025 and the area is currently still unbuilt.

In the Western Lapland regional plan, the railway running along the northern edge of the area is designated as a railway development corridor/connection need, where detailed planning should take into account improvements in rail service levels and related land reservation needs. The area is partly located in a target area for rural

development, in which rural livelihoods, services, settlements and the cultural environment must be preserved and developed in a diverse manner.

The groundwater area is located approximately one kilometer to the west of the area. The nearest nature reserves are located a couple of kilometers away. The nationally valuable cultural landscape of Simo coast, including the village settlements of Simonkylä and Simoniemi and the areas and sites of the nationally valuable built cultural environment of the Ostrobothnia coastal road, are located at closest just over a kilometer away. The area spans over 21 different properties.

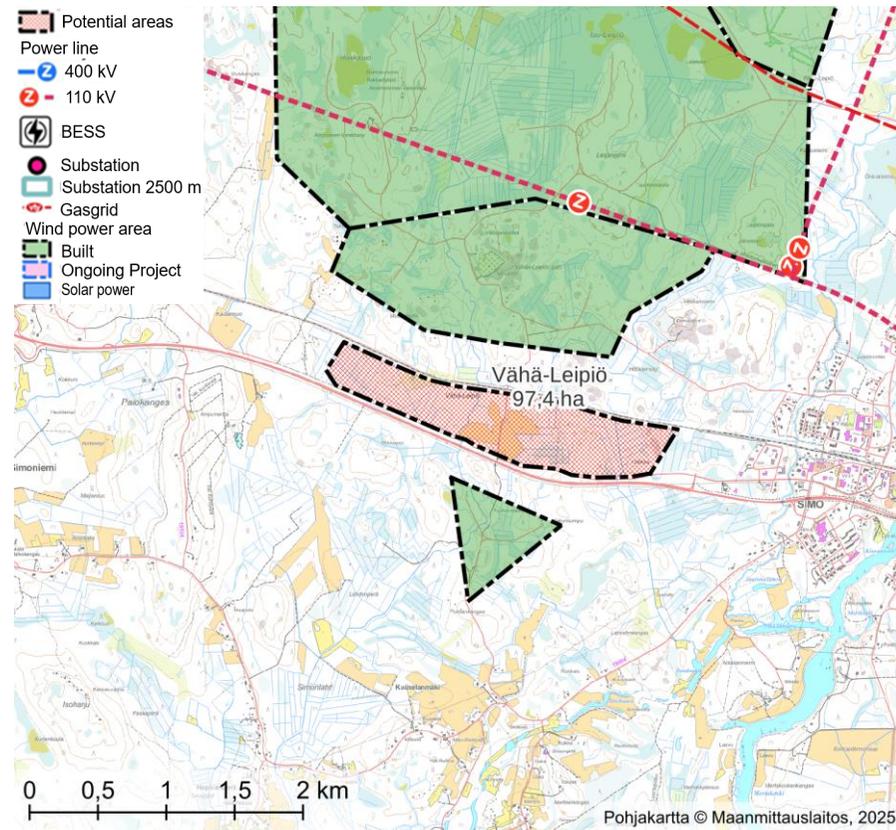
### Availability of network-based utilities

The area is located over five kilometers from Fingrid's Simojoki substation. Less than two kilometers north of the area is the Leipiö wind power area's substation. Fingrid's 110 kV Isohaara-Simojoki power line runs through the area. According to Gasgrid's preliminary plans, the hydrogen pipeline route runs just under three kilometers north of the area. The district heating network in the center of Simo is within a reasonable distance from the area, so that waste heat from industry can be utilized as district heating, for example.

### Recommended actions and the suitability of the area

The area can accommodate activities that require a significant amount of energy. The excellent location, quite close to electricity transmission and transport routes, is particularly suitable for industrial needs. Synergy benefits can be obtained with the nearby Hitikka industrial area, and its operations can also be expanded to the Vähä-Leipiö area. Residential area is located quite close to the area, although the main road and railway currently cause noise in the

surrounding area. The area is recommended to be zoned for industrial needs. Alternatively, the area could also be utilized for solar power production, as the noise from the main road limits other uses of the area.



A closer examination of the Vähä-Leipiö area.

## Patokoski

The area is located approximately one kilometer east of Simo center, near Ouluntie (National road 4 /E75) and Ranuantie (regional road 924), bordering the Kemi-Oulu railway in southwest. Fingrid's Simo 110 kV electrical substation is in the immediate vicinity of the area. The total area is 140 hectares.

### Location and accessibility

The area is currently mainly forest and drained swamp in commercial use. There is a small, cultivated field in the southwestern part. There are no residential buildings or secondary homes in the site. The nearest residential area is located a few hundred meters away, on the southern shore of Simojoki. Accessibility to the area is excellent, as it is near major transport routes (National road 4/E75, regional road 924, and the Kemi-Oulu railway).

### Planning situation

The area does not have an existing detailed plan, and the area is mostly unzoned. It is situated between two master plan areas: the Simojoki master plan to the northwest and the Halmekangas wind farm component master plan to the southeast. In the Simojoki master plan, the nearest land areas are designated for agricultural and forestry use, with an industrial area located slightly further away around the electrical substation. In the Halmekangas component master plan, nearby areas are designated for agricultural and forestry use, including areas allocated for wind turbines.

In the Western Lapland regional plan, the railway running along the southern edge of the area is designated as a railway development

corridor/connection need, where detailed planning should take into account improvements in rail service levels and related land reservation needs. Additionally, a public transport development corridor parallel to National road 4 is indicated near the area.

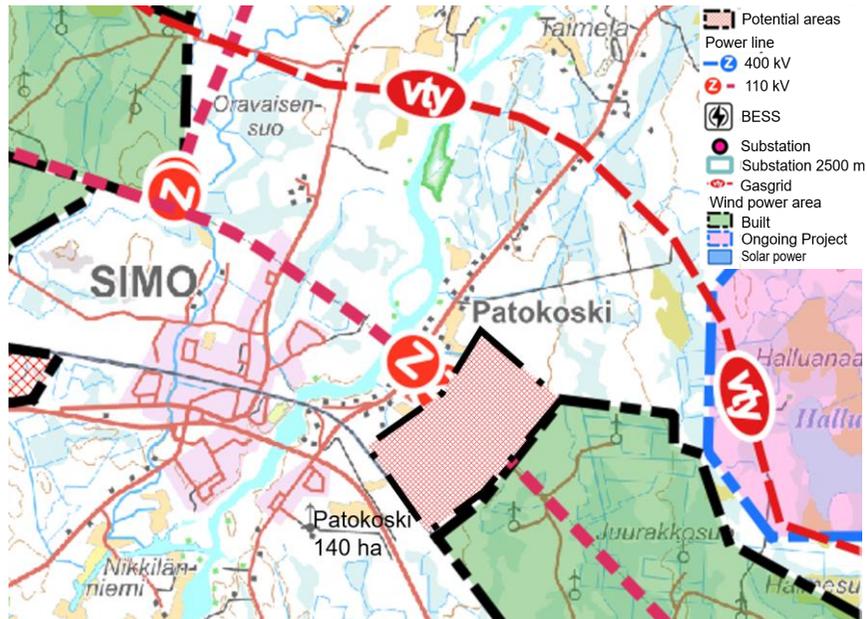
A groundwater area is located approximately one kilometer to the northeast of the site. The nearest nature conservation areas are situated one kilometer away to the north. The Simojoki River is part of the Natura 2000 network. The area spans over 17 different properties.

### Availability of network-based utilities

The area is located over five kilometers from Fingrid's 400 kV Simojoki substation. In the immediate vicinity, there is Fingrid's 110 kV Simo substation, and the Halmekangas wind farm substation to the southeast. A 110 kV power line runs through the area. According to Gasgrid's preliminary plans, a hydrogen pipeline route runs approximately two kilometers north of the area. District heating network of Simo center is at a reasonable distance from the area, allowing the potential use of industrial waste heat for district heating.

### Recommended actions and the suitability of the area

The location near the 110 kV power transmission and transport routes is particularly suitable for industrial needs. Some operations may require 400 kV power transmission though. Residential areas are relatively close to the site, though the main road and railway currently causes noise in the environment. The area is recommended to be zoned for industrial use. Alternatively, the area can be utilized for solar power production, as the noise from the main road limits other uses. The Simojoki Natura area must be taken into consideration.



A closer examination of the Patokoski area.

## Karsikko

In addition to the areas identified in the analysis, the investigation also includes the Karsikko area on the municipality's western border. The area is located far from substations and has no power lines, but thanks to its zoning situation, the area has readiness for industrial and energy supply operations.

### Location and accessibility

A well-maintained road leads to the area from Maksniemi off National road 4, ending at the site. The distance from center of Simo and port of Kemi is approximately 20 kilometers, and around five kilometers from Maksniemi.

### Planning situation

The area is designated as an energy supply zone (EN-1) in the regional plan. It is reserved for facilities, buildings, or structures serving energy production, as well as buildings and structures necessary for the research and development of energy production. Additionally, the area is permitted to accommodate residential units and facilities related to water treatment.

In 2018, the Karsikkoniemi component master plan was approved for the area, designating most of it as an area for industrial activities with significant environmental impacts (TT-1). The area is intended for detailed planning. The TT-1 area covers approximately 100 hectares. The detailed planning

process for the area began in autumn 2023. In the local plan a T/kem area will be designated to Karsikko, which allows placing facilities handling or storing dangerous chemicals in the area.

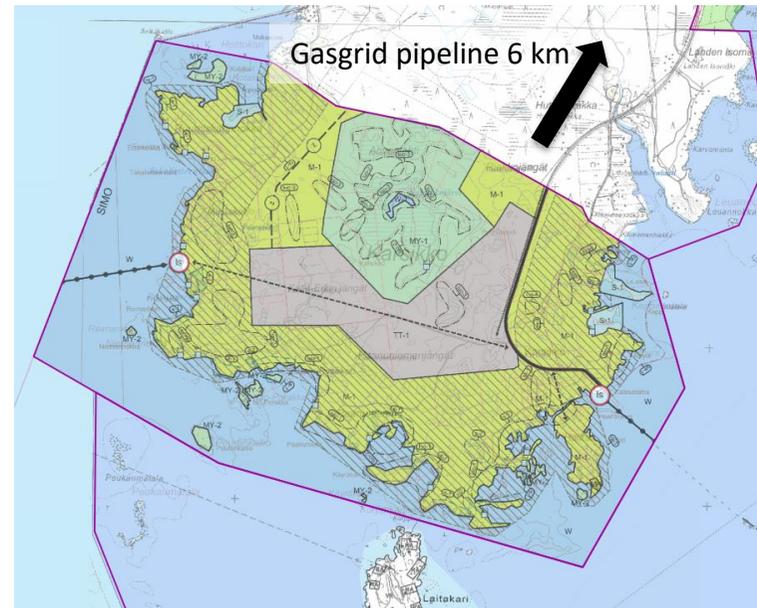
The coastal areas of Karsikkoniemi are almost entirely occupied by secondary homes. However, in the general plan, the coastal zone is designated as an M-1 area, where the primary use is agriculture and forestry. Individual nature conservation areas are located on the shores of Karsikkoniemi and to the north of the area, within a few hundred meters. The nearest groundwater area is two kilometers north of the area. The area is located in 11 different properties.

**Availability of network-based utilities**

Currently, there are no power lines in the area, but a power line can be constructed if needed. A power line connection from the Simojoki 400 kV substation to Karsikko is planned to follow a route partially along the existing 110 kV power line. The preliminary alignment of Gasgrid's hydrogen pipeline runs approximately six kilometers away.

**Recommended actions and the suitability of the area**

The area is well-suited for industrial activities. The current general plan allows industrial operations, and the detailed plan for the area is in progress. Establishing industrial activities will require the construction of a new power line to the area.



*Excerpt from the Karsikkoniemi component master plan. The planned route for Gasgrid's hydrogen pipeline is approximately 6 km from the Karsikko area.*



*The Karsikko area in an aerial photo (photo: Digipolis).*

## **6. CONCLUSION AND RECOMMENDATIONS FOR NEXT STEPS**

Promoting projects in the Simo municipality requires detailed planning and adequate studies. The planning of projects that require zoning is carried out in accordance with the Land Use Act. To promote clean transition projects, the municipality can prepare master plans and local plans, thereby increasing the zoning reserves that facilitate industrial-scale activities within the municipality.

All the areas presented are sufficiently large for large-scale industrial activities and energy production. When planning these areas in greater detail, there may be needs to consider the natural environments, which can likely be preserved due to the size of the areas studied here. Utilization of the areas mainly requires a new or updated master plan, as the current master plans do not permit industrial activities.

Areas containing natural values or those nearby (including groundwater areas) should be given special consideration and designated only for activities that do not endanger these natural values. Particularly, in the Torosuo area, impacts on the nearby Martimoaapa area must be taken into account.

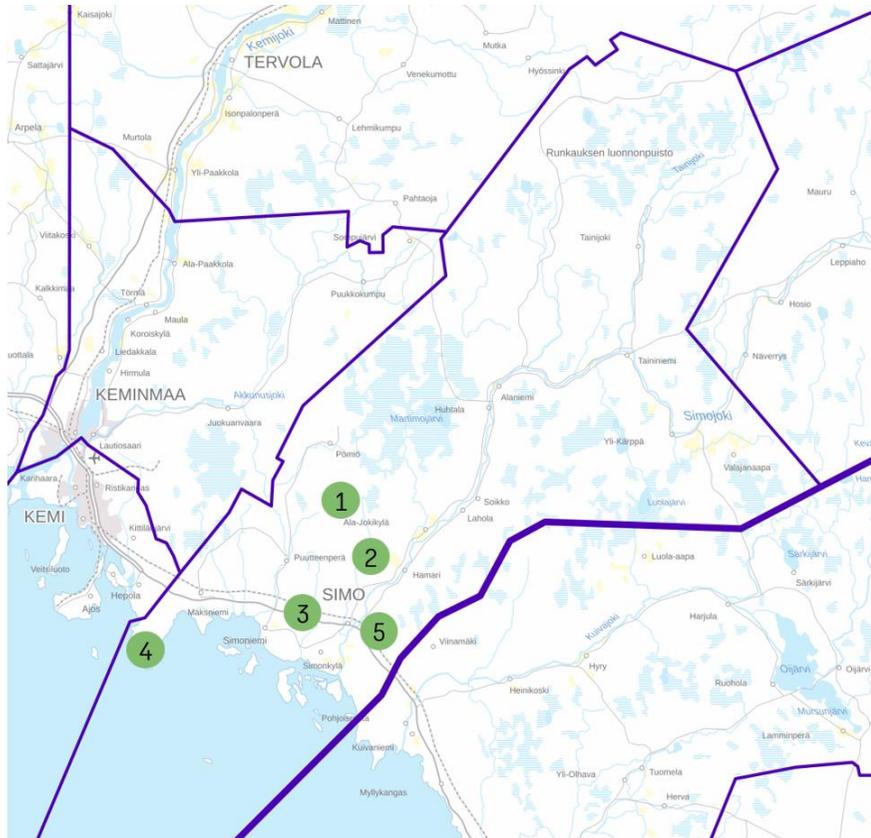
Areas close to residential areas are beneficial for industrial purposes (workplace areas) within the community structure, but the proximity to housing must be considered when placing industrial activities (e.g., noise, landscape impacts, and risks for

accidents). When planning these areas, future land reservations and other needs for residential and recreational areas should also be considered. As Simo is a reindeer herding area, planning must also consider reindeer herding, its need for land and the impacts on it. Legislation has permanently secured free grazing rights for reindeer herding. Construction and land use changes affect grazing areas, so it is advisable to negotiate and discuss with the local reindeer herding cooperative. When planning solar power areas, it is advisable to prepare for fencing the areas because of the reindeer.

Accessibility plays a significant role when planning extensive industrial zones. The Vähä-Leipiö ja Patokoski areas are the most accessible of the areas examined. Hirvimaa is moderately accessible and Torosuo is somewhat less accessible. It depends on traffic and accessibility issues, which activities are reasonable to locate in each area. It is therefore most sensible to concentrate large-scale industry in the Vähä-Leipiö, Patokoski and/or Hirvimaa areas. Karsikko currently has the best zoning readiness, although the area will require the construction of a new power line for its utilization.

The importance of electricity transmission networks must be taken into consideration, but new power lines can also be built if the facilities require that. The capacity of electricity networks needs to be examined in more detail. According to early 2025 data, Fingrid's Simojoki 400 kV substation has production connection capacity of 880 MW and the 110 kV substation has 30 MW. Correspondingly, the consumption connection capacity is

500 MW at the 400 kV substation and 200 MW at the 110 kV substation.



1. Torosuo 203 ha
2. Hirvimaa 287 ha
3. Vähä-Leipiö 97 ha
4. Karsikko 100 ha
5. Patokoski 140 ha