



14 December 2021

**INSTRUCTIONS FOR TAKING INTO ACCOUNT WIRES IN THE HIGH VOLTAGE
110 kV REGIONAL DISTRIBUTION NETWORK IN OULUN ENERGIA
SÄHKÖVERKKO OY'S AREA**



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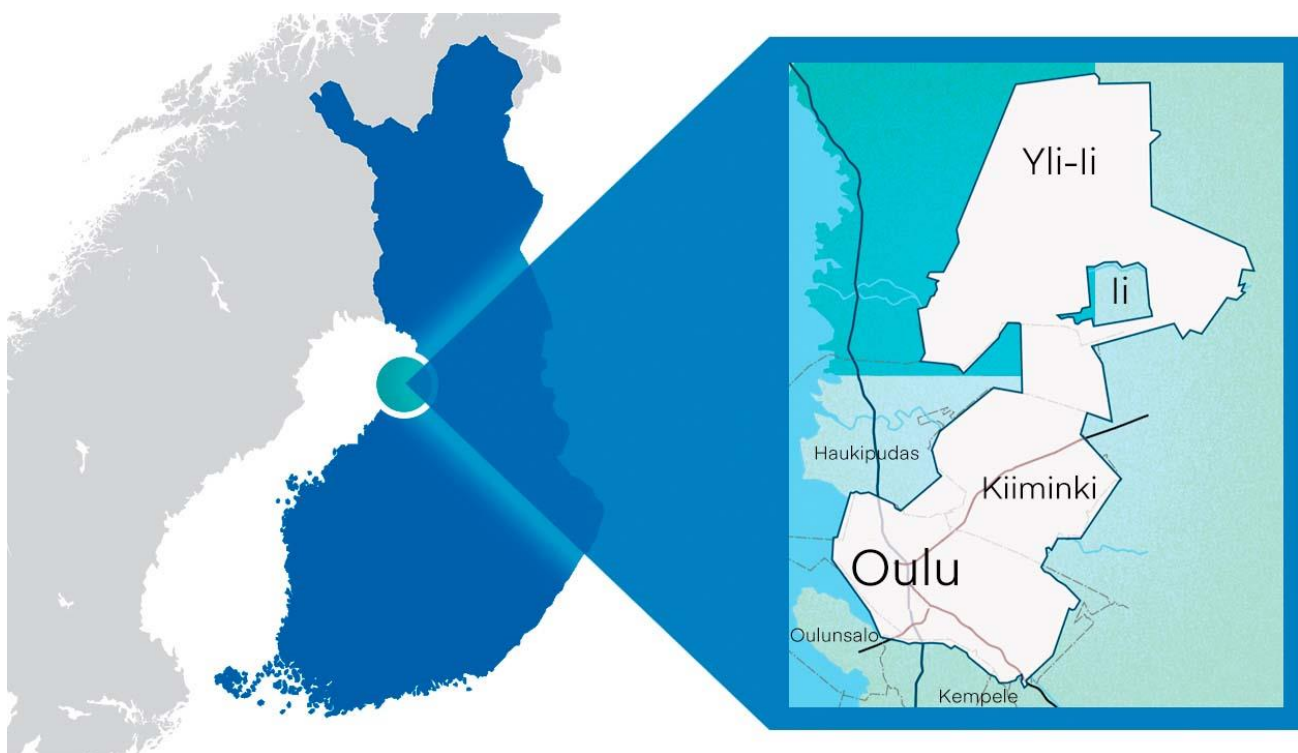
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1. GENERAL

These instructions define the principles to be followed in Oulun Energia Sähköverkko Oy's (hereinafter "OES") high voltage (110 kV) distribution network transmission line areas in the placement of buildings or other infrastructure and growth, as well as operation in the network line areas.

According to the Electricity Market Act, OES operates as a network operator in its distribution area. The OES distribution network is located in the areas of former Oulu, Kiiminki, and Yli-Ii, including (2021) 15 substations, a high-voltage 110 kV distribution network of approx. 50 km, a medium voltage network of 10 and 20 kV of approx. 1080 km, and a low voltage network of 400 V of approx. 3030 km.



The 110 kV distribution network and compliance with the instructions have a significant impact on public safety and electrical safety, as well as on the security of supply of distribution of electricity, which is why guidelines have been defined for the use of transmission line areas.

The distribution area of OES also includes lines owned by main grid network companies Fingrid Oyj, EPV, and Pohjolan Voima (PVO). The instructions and authorisation procedures are always specified by the owner of the line concerned.



2. INTRODUCTION TO THE INSTRUCTIONS

2.1 Electricity Market Act 588/2013

Section 3

Definitions

For the purposes of this Act:

- 1) *electricity network* refers to a set of interconnected electricity lines, substations, and other electrical equipment and electrical installations, systems and software serving the operation of the electricity network and the provision of electricity services, intended for the transmission or distribution of electricity;
- 2) *distribution network* refers to an *electricity network* with a rated voltage of less than 110 kilovolts;
- 3) *high voltage distribution network* refers to a local or regional electricity network or line with a nominal voltage of 110 kilovolts that is not a access line and that does not cross the national border

Section 4

Licensing requirements for electricity network operations

Electricity network operations may be carried out on the electricity network located in Finland only with the permission of the Energy Authority (*electricity network permit*). The electricity network permit cannot be transferred.

Section 6

General requirements for an electricity network permit applicant

The electricity network permit applicant must meet the following general requirements:

- 1) the applicant is an entity or an institution;
- 2) the applicant's organisation corresponds to the scope and nature of its electricity network operation;
- 3) the applicant has sufficient staff, corresponding to the scope and nature of its network operation;
- 4) the applicant has an operation manager and, if the applicant performs electrical work, a manager of electrical work, who meet the eligibility requirements provided for in the Electrical Safety Act (410/1996);
- 5) the applicant has the financial capacity to operate a profitable electricity network;



6) the applicant has the power to decide on the funds necessary for the operation, maintenance and development of the electricity network, as well as the power to make connection contracts and electricity network contracts with the users of the network.



2.2 Electrical Safety Act 410/1996

Section 2

This Act applies to equipment and installations used for the generation, transmission, distribution or use of electricity, the electrical or electromagnetic properties of which may give rise to a risk of damage or interference.

Section 4

For the purposes of this Act and the provisions adopted pursuant thereto, the following definitions shall apply:

- 1) *electrical equipment* refers to any apparatus, machine, appliance or accessory for the generation, transmission, distribution or use of electricity, which requires certain electrical features;
- 2) *electrical installation* refers to a functional unit consisting of electrical equipment and possibly other equipment, accessories and structures

Section 5

Electrical equipment and installations must be so designed, constructed, manufactured, repaired, maintained and operated so that:

- 1) they do not endanger anyone's life, health or property;
- 2) they do not cause unreasonable disturbance electrically or electromagnetically; and
- 3) their operation is not easily disturbed electrically or electromagnetically.

Section 52

Where, following the commencement of construction of an electrical installation or part thereof, a road, a passageway, a railway, an airport, a gas or water supply or any other similar pipeline, or a building or any other structure is or is to be constructed in its vicinity such that the electrical installation needs to be modified in the interest of public safety or to protect the installation, the owner of the electrical installation is obliged to carry out the necessary modifications. However, the costs are borne by the owner of the road, passageway, airport, pipeline, building or structure.



3. DEFINITIONS

The **110 kV high voltage** line comprises, in addition to its technical construction, a transmission line area.

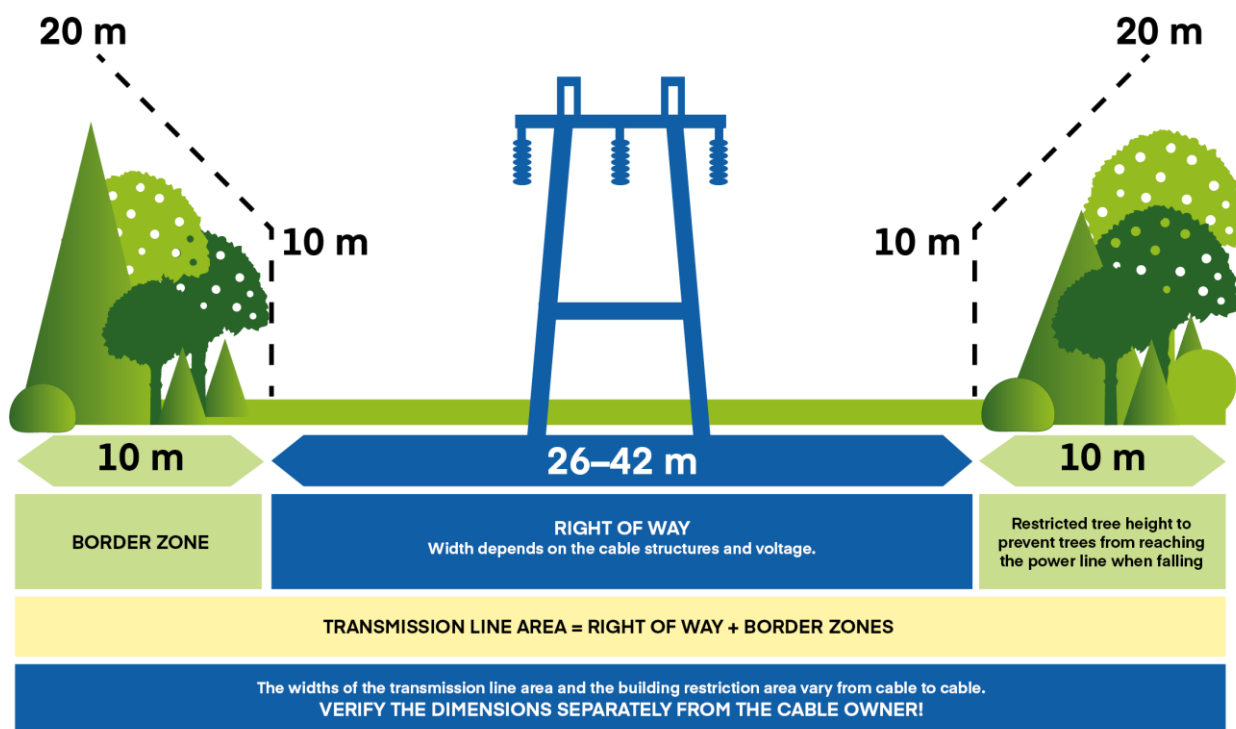
A **transmission line area** is an area for which the network operator has expropriated a limited right of use or for which the City of Oulu has granted a siting licence, in which case the right of use is equal to the expropriated transmission line area. The right of use gives OES the right to keep a transmission line structure in the transmission line area, while at the same time imposing restrictions on the free use of the land by the landowners in the transmission line area.

The transmission line area includes the right of way and the border zones on both sides. The height of trees in the border zones is restricted so that a falling tree does not reach the conductor. The width of the transmission line area varies depending on the structure, as does the width of the building restriction area that limits construction. A building restriction area is an area in which buildings may not be built. In addition, the placement of various structures on the building area and the use of the site for storage, for example for the storage of trees, require the permission of the owner of the transmission line.

The tower area of a transmission line tower extends over a distance of three metres from the overground tower structures.

A **building restriction area** typically consists of a 26-metre wide right of way with a 110 kV line and 10- metres wide border zones on both sides of the right of way, with restricted tree growth.

Figure: Fingrid Oyj's guidelines for taking into account transmission lines in general, and town planning and land use planning <https://www.fingrid.fi/globalassets/dokumentit/fi/julkaisut/voimajohtojen-huomio-ottaminen-yleis--ja-asemakaavoituksessa-seka-maankayton-suunnittelussa.pdf>





4. BUILDINGS, STRUCTURES, PASSAGEWAYS AND TRANSPORT AREAS

A building or an integral part of a building may not be built on a **building restriction area**.

OES's permission is required for the placement and construction of structures higher than 2 metres, but for electrical safety reasons, OES's permission must be requested for all structures planned in the building restriction area. These include columns, parking areas, carports, roads, flagpoles, fences, lamps, trampolines and wires. At intersections, electrical railway lines also require OES's permission after the construction of a transmission line.

The purpose of the building restriction is to ensure that general safety and electrical safety are not compromised. The load caused by snow and ice can stretch the transmission lines significantly, either causing the transmission lines to break, the insulator structures to break, or the snow and ice load to fall off the transmission line. A fire in the structures or cars below the transmission line can cause a significant risk to electrical safety due to the conductivity of smoke, or the heat of the fire can damage the transmission line structures.

The building restriction also applies to underground building for electrical safety reasons. The transmission line's owner is responsible for the electrical safety of the transmission line area, and the safety of underground structures and operation cannot be supervised.

The building restriction also applies to structures designed on top of 110 kV cables, such as buildings, car parks or fences.

4.2. *Passageways and transport areas*

Roads, streets and other passageways may be assigned to a transmission line area, but their implementation requires the permission of OES. In design, the height of the transmission line and the distance requirements to various structures must be taken into account. Measured horizontally from 110 kV transmission lines, the height is limited to a distance of five metres.

The height of street lights is restricted, and they must not be placed directly under the current conductor of a transmission line.

The road and the transmission line can be positioned in the same direction, taking into account the distance requirements. The minimum distance between the embankment or the non-collapsing edge of the ditch and the overground tower and guy structures of the transmission line is at least three metres. In addition, the design must ensure that there is no risk of collapse on the tower foundations.



Interchanges, bridges and street lighting, as well as other structures, are special cases and their placement in a transmission line area requires special clearance.

A transmission line area can be used for snowmobiling, but this requires the permission of OES and the landowner. Snowmobiling in the tower area is forbidden. A snowmobile route must be positioned in such a way that there is no risk of collision with tower structures or guys.

4.3. Parking areas and storage

Parking solutions are investigated on a case-by-case basis. A parking area must not be positioned within three metres of a transmission line tower, and towers and guys must be guarded by railings.

The placement of a parking area in a transmission line area is subject to OES's approval, and if the area is considered suitable for parking, the operator must make an exclusive contract with OES, in which the operator undertakes to comply with OES's instructions. OES is not liable for any additional costs incurred by the parking area's transmission line and is not liable for any damage caused by falling snow or ice from the transmission line, staining of cars or structures caused by birds, or other similar damage.

An underground parking garage is treated as a building, which must be located outside the transmission line building restriction area.

Storage and loading of timber in a transmission line area is forbidden without the permission of OES.

Storage of fuel in a transmission line area is forbidden.

4.4. Soil extraction and crushing

Soil may be extracted from a transmission line area, but it must be authorised by OES. Quarrying and crushing of soil must not be carried out in a transmission line area.

Soil dumping must not be carried out in a transmission line area.

Soil extraction and the activities it causes must not complicate the maintenance of the transmission line area, nor jeopardise electrical safety, for example by spreading dust on transmission line structures.



4.5. Fuel distribution

Petrol stations and fuel storage with large non-portable containers must be designed and located entirely outside a transmission line area. A fuel distribution station must be located outside a transmission line area, because a possible accident, malfunction in the event of a tower collapsing, or line breaking would create a spark hazard.

4.6. Ground source heat and bore wells or similar

The locations of wells and the associated pipelines must be outside the hazardous voltage area of the transmission line.

Ground source heat or other wells and associated pipelines can be placed up to 15 metres horizontally from the centre line of the transmission line. We recommend a minimum distance of 30 metres from tower structures and earthing electrodes. If the structures are placed in the hazardous voltage area, all structures must be made from non-conducting material, and the possible locations of the structure's earthing electrodes must be taken into account. All work, from the installation of the equipment to subsequent maintenance or repair work, requires an adequate safety distance from the transmission line.

4.6.1 Pipelines connected to wells

The surface collection pipes of ground source heat wells or geothermal systems must be made of non-conducting material if they are located in the hazardous voltage range, which is 30 metres horizontally, measured from the transmission line towers of earthing. Earthing diagrams are provided as an attachment to a statement requested from OES Oy (see section 5).

Installation must take into account that heavy machinery can be moved in the transmission line area by the order of the transmission line's owner, and the owner is not responsible for breakage of pipelines or similar structures located in the area.

It is recommended that pipelines connected to ground source heat energy or wells are not built in the hazardous voltage area of the transmission line.



5. CROSSING STATEMENTS

When planning and implementing projects or activities in or near a transmission line area, a crossing statement must be requested from OES Oy. A crossing can be a road, cable, overhead line, water pipe, ditch, trench, outdoor route, soil extraction area, public event, or structure, such as a fence, which is located near the transmission line.

A crossing statement must be requested even if the plan was indicated in a construction plan and OES had commented on it.

A crossing statement sets out in more detail the aspects and safety factors that the project designer must take into account. This includes piping of cables or earthing copper due to hazardous voltages.

The request for a crossing statement must include a brief description of the planned activities in the area, a map of the location of the project, a possible site plan of the placement in relation to the transmission line, the planned timetable for the implementation of the project, and the contact information of the statement's requestor.

Crossing statement requests are sent to Oulun Energia Sähköverkko Oy, risteämälausunnot, PO Box 116, 90101 OULU



6. POSSIBLE TRANSFER OR RAISING OF TRANSMISSION LINE

A high voltage distribution network line limits land use planning, allowing the planner to consider alternative solutions for the location of the existing line.

Changes are time-consuming and involve specific technical solutions. The starting point is that OES is not responsible for the cost of the changes.

Moving the transmission line or towers, or raising the transmission line height, often affects the adjacent towers as well.

Without OES's permission and prior notification to the network operator, the cost of altering the transmission line will always be borne by the contractor in retrospect.

The conditions for the transfer of the transmission line are that the initiator takes care of the new location of the transmission line and takes care of the costs of the transfer in terms of planning and construction, as well.

- A contract is drawn up for the modification of the transmission line route.
- The new transmission line must be ready and commissioned before dismantling the old one
- At 110 kV, cable solutions are not in the same category of overhead power lines in terms of usability and security of supply, because the correction of a possible fault is slower and adaptability to future network development needs is more difficult and expensive.
- The technical service life of the cables is about half as long as the service life of open wires, and the cable route also requires a transmission line area.
- Underground cable connections at high voltage are several times more expensive than overhead lines.
- Underground cables are commonly only used in urban centres.



14 December 2021

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