Electric grid finland

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Finland's electricity network consists of a main grid, high-voltage distribution networks and distribution networks. High-voltage distribution networks distribute electricity at the regional level. Distribution networks can use the main grid through the high-voltage distribution network or they can connect directly to the main grid.

The main grid is used in long-distance transmission connections and high transmission voltages. In order to minimise transmission losses, the voltage of the main grid is high: 400 kilovolts, 220 kilovolts or 110 kilovolts. At its maximum, this is 2,000 times higher than the voltage available in the power socket of residential properties.

The main grid is continued by high-voltage distribution networks that distribute electricity at the regional level. The distribution networks can use the main grid through the high-voltage transmission network or they can connect directly to the main grid. The high-voltage transmission networks operate on a voltage of 110 kilovolts, the distribution networks on 20, 10, 1 or 0.4 kilovolts. The lowest voltages of up to 1 kilovolt are called low voltage, the higher voltages are medium voltage (1-70 kilovolts) or high voltage (110-400 kilovolts).

The electricity network includes numerous substations and distribution substations. Substations are junctions of the network where power lines of different voltages are connected. The substations can transform, distribute and centralise electricity transmission. Distribution substations convert the high transmission voltages into low voltage suitable for the electricity users. Distribution substations can be installed on poles, in separate distribution substation structures, and, e.g., in the basements of apartment buildings.

Homes receive their electricity from the distribution networks, whereas industry, commerce, services and agriculture receive it from either the distribution network, high-voltage transmission network or the main grid. Electricity-generating power plants can also join any of the three networks. Large wind farms are connected to the grid or to the high-voltage distribution network. More and more generation plants, especially solar power, are also being connected to the distribution networks.

Energy in Finland describes energy and electricity production, consumption and import in Finland. Energy policy of Finland describes the politics of Finland related to energy. Electricity sector in Finland is the main article regarding electricity in Finland.

Finland lacks domestic sources of fossil energy and must import substantial amounts of petroleum, natural gas, and other energy resources, including uranium for nuclear power.

In 2021, Finland"s Total Energy Supply (TES) comprised bioenergy and waste (33.6%), oil (20.8%), nuclear

(18.5%), coal (6.3%), natural gas (6.4%), electricity imports (4.6%), hydro (4.1%), peat (2.7%), wind (2.2%), and heat (0.6%). Regarding Total Final Consumption (TFC) by sector, the industrial sector accounted for 53%, buildings for 31%, and transport for 16%.[1][2]

Final consumption of energy - i.e. after losses through transformation and transmission - was 1 102 petajoules, which equals 202 gigajoules per capita in 2013. Of this, 46% is consumed by industry, 16% in transportation and 25% in heating.[6]

Energy consumption per capita in Finland is the highest in EU. Reasons for this include energy-intensive industry, a high standard of living, a cold climate and long distances. Rise of energy consumption stopped in the 21st century, mainly due to changes of industry. There is now less heavy industry and the energy efficiency has improved. New energy consuming business is the data centres of international enterprises.[7]

Energy consumption increased 44 percent in electricity and 30 percent in the total energy use from 1990 to 2006. The increase in electricity consumption 15,000 GWh from 1995 to 2005 was more than the total hydropower capacity. The electricity consumption increased almost equally in all sectors (industry, homes, and services).

Energy consumption for heating has increased, as population and average size of homes has grown. As of 2019, 2.8 million Finns and half a million Helsinki residents rely on district heating for their homes.[8]In 2017, 66% of the new homes were connected to district heating and usage kept expanding among old buildings as well.[9]

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