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National Report on the State of Electricity and Gas Markets in Finland

Year 2024

CONTENT

Foreword

Finland has rapidly decreased the use of fossil fuels in energy generation. In 2024, about 94 per cent of domestic power generation was covered by non-fossil fuels - nuclear and renewables. Wind power passed hydro and was the second largest form in power production behind nuclear.

Increased wind power generation capacity and the new Olkiluoto 3 nuclear power plant commissioned in April 2023 have improved electricity self-sufficiency in Finland. During several weeks of time in 2024 Finland has been a net exporter of electricity. Estlink 2 subsea cable between Finland and Estonia was unavailable large part of year 2024 due to failures which decreased electricity net export to Estonia. Despite of decreased import from other Nordic countries, net import of electricity was a bit higher than in 2023.

Market situation has been good also due to improved filling levels of hydro reservoirs which were in 2024 above long-time average level. The improved market situation has also stabilized prices for forward contracts.

Due to the improved market situation, average wholesale electricity prices were in 2024 at the same level as before the energy crisis and COVID. Despite of lowered average electricity prices, volatility in hourly electricity prices has increased during the last few years. The background of which was not only the increased share weather dependant power production but also breakdowns in power plants or transmission interconnectors and colder periods of time which have led to short-term price peaks. The increased share of intermittent power generation from wind and solar has also increased the number of negative hourly prices.

A new large-scale LNG terminal commissioned in January 2023 in Inkoo showed its vital role in ensuring gas supplies to Finland when the Balticconnector pipeline connecting the Finnish and Estonian gas grids was damaged from October 2023 until late April 2024. During the winter period 2023-2024, the Finnish gas system was relaying on import through LNG terminals.

For the Energy Authority, year 2024 was characterized especially by the ongoing implementation and enforcement of European network codes and guidelines, court processes related to the methodologies for economic regulation of electricity and gas system operators and retroactive reimbursement to consumers for high electricity costs during the energy crises.

The Energy Authority has prepared this national report on the state of the Finnish electricity and natural gas markets to the European Union Agency for the Cooperation of Energy Regulators and to the European Commission pursuant to the Article 59(1)(i) of the Directive for the Internal Market in Electricity (2019/944/EC) and Article 41(1)(e) of the Directive for the Internal Market in Natural Gas (2009/73/EC).

The report covers the main steps the Energy Authority has taken, and the results obtained as regards the tasks listed in Article 59 of the Electricity Market Directive and Article 41 of Natural Gas Market Directive. It contains a description of the powers and tasks of the Energy Authority as a national regulatory authority, an overview of the regulation and performance of electricity and natural gas sectors in Finland in 2024.

The focus in the report has been in the period from January to December in 2024 and data presented reflects this period as far as possible. In some points also the recent developments in 2025 are mentioned.

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Main developments in electricity and gas markets

2.1 Electricity market development

Gross electricity consumption in Finland increased in 2024 by 3.4 per cent and was 83 TWh. Compared to year 2023 consumption increased every month except in March and in later autumn in October-December. Especially in January-February 2024 gross consumption of electricity increased due to cold weather by more than 15 percent compared to the same period previous year.

Electricity consumption in industry sector remained stable. Industry sector covered 41 per cent of gross electricity consumption in Finland in 2024. The other sectors increased their annual electricity consumption by 5.9 percent. In 2024, household and agriculture covered 30 per cent of total electricity consumption. The rest were used by services and construction (25 per cent) and grid losses (4 per cent).

Net import of electricity increased from 2023. The share of net import covered only 3.8 per cent of gross electricity consumption (in 2023 the share was only 2.2 per cent). The increase in net import was mainly due to decreased electricity export to Estonia due to failures in Estlink 2 subsea cables in February-September and damage at same cable from late December 2024. The net import from other Nordic countries (mainly from Sweden) decreased by 22 per cent. The net export to Estonia decreased by 48 per cent.

Domestic power generation increased by 1.6 per cent in 2024 and was 79.6 TWh (78.3 TWh in 2023). Nuclear power production decreased by 5 per cent and its share was 39 per cent of power production in Finland.

About 56 percent of electricity (52 percent in 2023) was produced from renewable energy sources in Finland. Wind power generation increased by 37 per cent and covered about 25 per cent of power generation being for the first time the second biggest form in Finnish power production. Hydro power decreased by 6 per cent compared to 2023. In 2024 share of hydro was 18 per cent. Share of biomass was 12 per cent. Share of solar power in Finnish power generation was 1.4 per cent.

Share of fossil fuels in power generation has been decreasing. Share of gas in power production in 2024 was only about 0.8 per cent and share of coal was 1.6 per cent.

During the peak load situations, the available domestic generation capacity is not enough to cover the demand in Finland. The Energy Authority has estimated in the Security of Supply Outlook in November 2024 the total domestic power generation capacity available in the market during the peak load situation in winter period 2024 - 2025 as about 11,700 MW excluding disturbance reserves and Meri-Pori condensed coal power plant (560 MW) which has been reserved for a period of 1 April 2024 until 31 December 2026 by the National Emergency Supply Agency for emergency supply purposes.

The highest hourly load in 2024 was 14,246 MWh/h which is also the highest hourly load ever in Finland. The Energy Authority has also estimated that the interconnector capacity between Finland and neighbouring countries is high enough to cover the deficit in own generation capacity during the peak load situations.

Available electricity transmission capacity between Finland and neighbouring countries has not always been enough for to cover market needs which has lead price differences between the bidding zones. In 2024, Finnish bidding zone (FI) and all Swedish bidding zones (SE1-SE4) had the same day-ahead price in 32 per cent of hours (48 per cent in 2023). With the Swedish bidding zones SE1 and SE3 Finland had the same day-ahead price in 51 per cent (with SE1) and 51 per cent of hours (with SE3). Finland and Estonia had same price in day ahead market in 32 per cent of hours (46 per cent in 2023).

Based on the Capacity Reserve Act the Energy Authority has responsibility to estimate amount of and procure strategic capacity reserves needed to ensure the balance between supply and demand. The Finnish Government adopted in March 2022 based on the proposal from the Energy Authority the national reliability standard which is 2.1 hour per year as a lost-of-load-estimation (LOLE). The Energy Authority decided based on national resource adequacy assessment (NRAA) in April 2024 that there is, however, no need acquire strategic reserve capacity to meet the national reliability standard during period of November 2024 – October 2025.

At the Nordic Capacity Calculation Region (CCR) flow-based capacity calculation methodology in day ahead market timeframe was implemented on 29 October 2024, (the first trading day for delivery on 30 October 2024).

The first step towards the 15-minute market time unit (MTU) was taken in May 2023 when the balance settlement and a large part of energy measurements in Finland were changed to 15 minutes resolution. Intraday trading between Finnish and Estonian bidding zones moved to 15-minute MTU on 23 January 2025 and on the Nordic internal and external borders on 18 March 2025. The final stage of the 15 minutes MTU transition is the implementation of 15-minute trading on entire European electricity day-ahead market which is planned to go-live in late October 2025. For all energy measurements, the transition period to a 15-minute measurement resolution will last until the end of 2028.

Volatility in wholesale electricity prices has been increasing during past few years due to increased share of intermittent weather dependant energy sources in power production. In 2024, during total of 725 hours (467 hours in 2023) wholesale day-ahead market price in Finnish bidding zone were negative. On 181 days in 2024 (on 204 days in 2023) price difference between the highest and the lowest hourly price was more than EUR 50/MWh which shows the extent of intra-day price volatility and can indicate challenges in balancing supply and demand, as well as the value of flexible assets like demand-side response. Average daily difference between the maximum and minimum hourly wholesale electricity prices over all days in the year 2024 was EUR 80.62/MWh (75.29/MWh in 2023).

In 2024, the supplier switching rate was a bit higher than in 2023. About 14.8 per cent of electricity customers in Finland switched their electricity supplier in 2023 (14.2 per cent in 2023). However, these numbers include also switches which were caused by merging of supply companies.

Share of dynamic priced electricity supply contracts has steadily increased. At the end of 2024, about one third of all supply contracts were dynamic priced. Still, fixed-term contracts are the most common supply contracts among Finnish end users. Its share was about 45 per cent.

2.2 Gas market development

In 2024 gas deliveries from gas transmission grid to end users directly connected to the transmission grid and to distribution grids increased by 4.5 per cent and was 14.0 TWh (in 2023 13.4 TWh)[1]. Gas consumption in Finland has slightly recovered from the deep decrease in 2022 caused by high gas prices and suspended gas import from Russia. However, gas consumption in Finland is still 44 per cent lower than in 2022.

The increase in gas consumption was mainly due to increased use of gas in heat and power generation which was increased in 2024 by 11 per cent. In other sectors changes in gas consumption in 2024 were moderate: among industrial customers connected to the transmission

[1] Excluding offgrid use of gas eg offgrid biogas or gas delivered through offgrid LNG terminals to end users. Total gas consumption, incl. offgird use in 2022 was 15.7 TWh (Source: Statistics Finland).

grid consumption decreased by 2 per cent and gas deliveries from the transmission grid to distribution grids increased by 3 per cent. Gas deliveries to distribution grids covered 21 per cent of all gas deliveries from transmission grid.

Total entry of gas into Finnish gas transmission system was 20.8 TWh in 2024 (18.4 TWh in 2023). The damage at the Balticconnector pipeline on 8 October 2023, which prevented the use of Balticconnector pipeline for the gas transmission until late April 2024, decreased pipeline import and export of gas. About 6 per cent of all imported gas was imported from the Baltic states via Balticconnector pipeline (in 2023 about 19 per cent). LNG terminals and especially terminal in Inkoo played a vital role to ensure gas deliveries in Finland during Balticconnector's failure. LNG import covered 94 per cent of gas import in 2024 and of which import through Inkoo LNG terminal was 93 per cent. Gas was exported to Baltic states through Baltic connector after it was repaired in April 2024. Amount of exported gas was 6.8 TWh (5.1 TWh in 2023). These numbers do not include import to off-grid LNG terminals in Pori and Tornio.

Finland is no longer importing natural gas nor LNG from Russia. Pipeline gas import from Russia through Imatra interconnection point has been suspended since May 2022. Terms and conditions for Inkoo LNG terminal prohibits importing LNG originating in Russia. Since the came into force on 26 July 2024 of the 14th sanctions package against Russia approved by the Council of the European Union on 24 June 2024 prohibiting purchase or import liquified natural gas originating from Russia through European Union terminals that are not connected to the EU gas network, also import and purchases of Russian LNG to Finnish off-grid LNG terminals have been ceased.

Finland together with Baltic states has several years been developing a regional gas market. In 2019 a separate inter-TSO compensation agreement was signed between the Finnish, Estonian and Latvian TSOs and a common tariff area has been established since the beginning of 2020 between Finland, Estonia and Latvia. In the common tariff area entry tariffs are unified and the tariffs at interconnection points between Finland, Estonia and Latvia have been removed since the beginning of 2020.

In April 2020, energy ministries, regulators and transmission system operators from Estonia, Finland, Latvia and Lithuania gave their agreement to a roadmap[2] establishing a process for the future regional gas market integration of their respective countries. The objective is to establish a merged, regional gas market in Estonia, Finland, Latvia and Lithuania, encompassing all four Member States, with the objective to improve market liquidity, integration and competition, ensuring affordable gas prices and high quality of service - thus being attractive for existing and new market participants. However, because of the geopolitical situation since 2022 which has caused significant changes in the fundamentals of the region's gas market, merging of regional gas markets and the development of updated ITC mechanism between TSOs have been postponed until market will be more stabilised.

2.3 National electricity and gas market regulation development

In 2024, any new amendments to the national electricity or gas market regulation did not came into force. However, some proposals to amend existing legislation was prepared and/or proposed by the Government in 2024.

[2] https://ec.europa.eu/info/news/baltic-regional-gas-market-roadmap-will-mark-first-cross-border-gas-market-merger-between-4-eu-countries-2020-apr-20_en

Government proposal to amend the Electricity Market Act and the Act on the Comparison Tool for Electricity Supply Contracts

In November 2024, the Government submitted to Finnish Parliament a government proposal to amend the Electricity Market Act and the Act on the Comparison Tool for Electricity Supply Contracts. The Parliament approved the proposed amendments in May 2025 and these amendments have come into force on 1 July 2025, except the provisions on market-based end-user load control which will enter into force on 1 September 2026. However, while approving the government proposal, the Parliament rejected proposed new provisions related to combined billing for electricity supply and distribution charges.

The main objective of these amendments is to implement measures whereby a smart electricity system provides customers opportunities to actively participate in the electricity market and to promote the maintenance of security of supply. The amendments will harmonise the structures of transmission charges, which would improve the understandability of electricity transmission pricing. In addition, the amendments will promote power-based pricing of electricity distribution. It would increase the customer's ability to influence the amount of their charges and incentivise customers to avoid consumption peaks. The customer's position will also be strengthened by limiting the effective date of a new electricity sales contract concluded through distance selling, and by implementing the provision of the Electricity Market Directive that regulates termination fees for fixed-term fixed-price electricity supply contracts.

Regarding connecting consumption and generation facilities to the grid, the requirement for a reasonable connection time under the Electricity Market Act is clarified, whereby the upper limit of a reasonable connection time for consumer customers would generally be six months from the conclusion of the connection agreement. In addition, the obligations imposed on the distribution system operator required by the Electricity Market Directive to regularly publish information on available capacity and the status of requests for connection to the grid would be implemented.

By clarifying the definition of a connection line, energy storage systems located in connection with power plants could utilize the connection line of a power plant or a common connection line of several power plants. This will enable the feasibility of energy storage systems located in connection with power plants and promote investments in energy storage systems built in connection with wind and solar power plants.

In addition, the amendments implement the provisions of the RED II Directive on compensation for electricity produced from renewable energy sources fed into the grid.

The amendments include also new rules for end-user market-based load control which would improve power shortage management and give customers the opportunity to choose a demand response service that suits their needs, allowing the loads connected to their smart meters to be controlled based on the price of electricity. The change would bring customers within reach of demand response in a cost-effective manner and would give customers the tools to reduce their electricity bills through automation. At the same time, increasing demand response would improve the security of electricity supply. The change would also increase opportunities to develop new demand response services.

Report from the High Voltage Grid Working Group

In December 2024, the High Voltage Grid Working Group appointed by the Ministry of Employment and the Economy published in its report[3] proposed ways to integrate growing electricity production and consumption into high-voltage grids. The main objective of the proposal was to

[3] Press release and the report (in Finnish): https://tem.fi/-/tyoryhmalta-ehdotukset-kasvavan-sahkontuotannon-ja-kulutuksen-integroimiseksi-suurjanniteverkkoihin

reform the Electricity Market Act in order to integrate increasing electricity production and growing consumption loads into the main grid and the high voltage distribution network more smoothly and cost-effectively.

The background for these proposals is the estimated strong growth in electricity production and demand by 2040 due to clean transition projects, increasing hydrogen production and, for example, green steel production. At the same time, electricity consumption and production are becoming increasingly differentiated across Finland. Electricity production capacity is increasing with the growth of onshore and offshore wind power, especially in the Ostrobothnian provinces. At the same time, electricity consumption is increasing further as urban areas electrify their heat production, transport becomes electrified, and consumption is increasingly concentrated in Southern Finland.

According to the Working Group's report, the responsibility for developing a national unified electricity grid would continue to lie with the transmission system operator, Fingrid. Transmission system operator's responsibility to develop electricity grid would in future be limited to the development of a national unified electricity transmission grid and cross-border interconnection lines. Fingrid's area of responsibility would include the entire country, excluding the Åland Islands, and the Finnish exclusive economic zone. Åland Islands has its own electricity market legislation and the electricity supply in the region is organised differently than in mainland Finland.

Local and regional distribution system operators would be more clearly responsible than before for the development of high-voltage networks in their own area of operation. According to the proposal, network lines above 110 kilovolts would no longer automatically be considered a transmission system based on their voltage level, but such a line could also be a high-voltage distribution network if it is a local or regional network in nature. Distribution system operators will be enabled to build and operate a robust regional or local 400 kV network as a high-voltage distribution system operator.

Based on these proposals the Government submitted to the Parliament in May 2025 the Government proposal to amend the Electricity and Natural Gas Market Acts. The Parliament has not yet approved the proposal.

Temporary restriction of imports of natural gas and liquefied natural gas from Russia and Belarus

The Ministry of Employment and the Economy has prepared in 2024 the draft government proposal for a law on the temporary restriction of imports of natural gas and liquefied natural gas from Russia and Belarus.

The proposed temporary law would restrict the supply of natural gas and liquefied natural gas to the Finnish natural gas network through connecting pipelines or liquefied natural gas processing facilities if the natural gas or liquefied natural gas comes from Russia or Belarus.

At the same time, the Natural Gas Market Act would be amended so that the connecting pipeline between Finland and a third country connected to the Finnish natural gas network could be closed for a fixed period of time to prevent a threat to the gas network.

The proposed temporary law aims to protect Finland's core security interests by limiting the tax revenues Russia and Belarus receive from the trade in natural gas and liquefied natural gas for the Finnish market and thus their ability to finance the maintenance and expansion of their military capabilities and warfare. In addition, the government proposal would seek to protect Finland from Russian hybrid influence and to achieve greater security of energy supply.

The Ministry of Employment and the Economy organised a public hearing on the draft proposal early 2025. However, the final government proposal has not yet been submitted to the Parliament for approval.

Fossil-Free Flexibility

The Ministry of Employment and the Economy set up in August 2024 the Fossil-Free Flexibility Working Group to assess flexible demand and supply of electricity and various energy storage systems are needed to meet the challenges of rapidly fluctuating electricity production resulting from increasing renewable energy production.

The Working Group published its final report[4] in May 2025.

[4] Report and the press release (in Finnish): https://tem.fi/-/fossiilittoman-jouston-tyoryhma-pohti-mallia-sahkomarkkinoiden-toimitusvarmuuden-ja-jouston-edistamiseksi

Electricity market

3.1 Network regulation

Some key indicators for illustrating the development electricity network in Finland are shown in the following table (Table 1).

Table 1. Indicators for electricity network (2024 figures preliminary)

Indicators	2021	2022	2023	2024*
Number of TSOs	1	1	1	1
Number of high-voltage DSOs[5]	9	9	9	9
Number of DSOs	77	77	77	77
Length of electricity grid (km)				
• 400 kV (km)	5,500	5,700	5,500	6,000
• 220 kV (km)	1,400	1,000	1,000	1,000
• 110 kV (km)	16,600	16,300	16,300	17,600
• 1-70 kV (km)	154,700	154,900	155,200	156,400
• 0.4 kV (km)	256,400	258,500	260,100	261,400

3.1.1 Unbundling

TSO unbundling and certification of TSO

Finland has chosen ownership unbundling model for unbundling of electricity transmission system operators (TSO). Before an undertaking is approved and designated as a transmission system operator, it shall be certified to have complied with the ownership unbundling requirements set in the Article 43 of the Electricity Directive. According to the national legislation, transmission system operator shall own transmission network it operates.

In 2024, there were no changes in the ownership of Finnish TSO, Fingrid Oyj. Majority (53.14 percent) of shares of Fingrid is owned by the State of Finland and the National Emergency Supply Agency, while the rest is owned by Finnish financing and insurance institutions. Duties related to the state-ownership steering of Fingrid are within the Ministry of Finance to fulfil ownership unbundling requirements of Fingrid.

The Energy Authority has made the decision on the certification of Fingrid on March 14, 2014.

DSO unbundling

Number of electricity distribution system operators have remained unchanged some years. Total number of distribution system operators (DSOs) having lower than 110 kV voltage level network was 77 at the end of 2024. Further, there are 9 high-voltage distribution system operators having only high-voltage 110 kV network.

The Electricity Market Act requires, that electricity network operations must be legally unbundled from electricity trade operations and electricity generation if the annual quantity of electricity

[5] Distribution system operators having only 110 kV or above grid

transmitted to the customers through the network operator's 0.4 kV distribution network has been 200 GWh or more during three consecutive calendar years.

In total, 36 DSOs were over the threshold value in 2024. In addition, some other DSOs have voluntarily legally unbundled network activities. At the end of 2024, a total of 54 DSOs were legally unbundled.

The requirement for separate management for the electricity network company and requirements for professional interests and compliance programmes are applied in Finland only to legally unbundled system operators having 50,000 customers or more. At the end of 2024 these requirements were applied to 20 DSOs in Finland.

Since June 2023 the Electricity Market Act has required DSOs to apply permit from the Energy Authority for an exemption to operate other businesses than electricity network operations. Electricity trade operations or electricity generation, for which the requirements to unbundle still apply, do not require said permission. The change in Electricity Market Act also prohibits DSOs to engage in electric vehicle charging service business.

3.1.2 Network extension and optimization

Investments plans

In 2024, Fingrid continued to develop the internal transmission system significantly to increase the transmission capacity in North to South direction to accommodate rapidly increasing renewable energy. Increasing market integration and intermittent generation demands flexibility not only from generation but also from the transmission system. Renewable electricity generation in Finland is concentrated in the northern and western part of Finland, while in the South Finland electricity generation is decreasing and consumption is increasing. Also, old East to West connections in Southern Finland at the end of technical lifespan are being replaced with more modern ones.

In 2023, Fingrid invested by EUR 520.9 million of which investments to the grid were EUR 491.8 million. Investments to the grid were increased by EUR 188 million from year 2024.[6]

Fingrid estimates that the gross capital expenditure in 2025–2028 will amount to roughly EUR 1.7 billion.[7]

In December 2016, Fingrid and Swedish TSO, Svenska Kraftnät announced their agreement to build up a new AC-interconnector between the two countries by 2025. This project – Aurora-line – is included in the 4th list of Projects of Common Interest published by European Commission in October 2019[8].

According to the Finnish Electricity Market Act, all DSOs shall submit updated network development plans (NDP) to the Energy Authority bi-annually. The NDPs should include actions which demonstrate that each DSO will improve and maintain security of supply requirements set in the legislation. In summer 2021 amendments to the Finnish Electricity Market Act were made and in addition to the earlier security of supply requirements, legislation now includes requirements for DSOs to do investments in cost-effective ways and to consider possibilities of using flexibility services instead of grid investments. The next NDPs are delivered to the Energy Authority by 30th of June 2026.

[6] Fingrid's annual report 2024: https://www.fingrid.fi/globalassets/dokumentit/en/annual-report/2024/fingrid_oyj_annual_report_2024.pdf

[7] https://www.fingrid.fi/en/news/news/2025/fingrid-oyjs-financial-statements-bulletin-januarydecember-2024-the-need-for-electricity-transmission-and-grid-connection-continued-to-grow-rapidly--fingrids-grid-investments-increased-to-a-reco/

[8] https://ec.europa.eu/energy/sites/ener/files/c_2019_7772_1_annex.pdf

The Energy Authority has powers to request DSOs to make amendments to their NDPs if deemed necessary. According to the submitted NDPs, DSOs have planned to make replacement investments to the electricity distribution grids during period of 2014 - 2036 worth about EUR 13.4 billion.

Smart grid development

In September 2016, the Ministry of Economic Affairs and Employment established the Smart Grid Working Group to explore smart grids´ potential for the electricity market. Its goal was to explore and propose concrete measures through which smart grids can facilitate the ability of customers to actively participate in the electricity market and generally promote the maintenance of security of supply. The final report with recommendations was published in October 2018[9].

The amendments to the Electricity Market Act, which came into force on June 1, 2023, include provisions to implement some of these recommendations - among other things, the provisions related to market-based demand side flexibility, the operation of independent flexibility service providers in the electricity market and the use of energy storages as a competitive activity in the market.

In December 2024, Energy Authority gave an updated order regarding electricity system operators data collection. Updates included requirements for new indicators on monitoring smart grid status, although some of the indicators chosen are already included in the earlier order. Data for these new indicators are submitted to the Energy Authority first time in 2026.

In Finland, following smart grid indicators were selected to be collected from distribution system operators: Total number and theoretical maximum power of demand response agreements made for the network needs and how many of these were activated during the year and maximum activated power. Energy storages connected to a network are divided to eight sub (8) categories, ranging from solid battery storages to hydrogen storages, from each category number of storages, total capacity and total power are asked to be submitted. Energy storages are also divided between storages for network needs and other's needs. Number of energy communities and customers of energy communities are to be collected as well. Total energy losses are also chosen to be monitored for smart grid development purposes. Small scale production (less than 1 MW nominal power unit) has already been collected.

For transmission system operator, following new TSO specific indicators are chosen: Dynamic line rating, including length of lines that use dynamic line rating, total average static thermal load capacity with DLR and total average dynamic thermal load capacity with DLR. Installed capacitive and inductive compensation capacity divided between series and shunt compensation.

3.1.3 Network tariffs

Regulation of network tariffs and charges

Transmission and distribution system operators set the actual network tariffs and charges by themselves. There is no ex-ante approval nor fixing of tariffs or prices of electricity network services by the Energy Authority nor any other authorities.

However, according to the electricity market legislation the allowed maximum price increase of distribution and transmission network charges within a rolling twelve-month period is limited to

[9] Final report is available from https://tem.fi/en/working-group-to-explore-smart-grids-potential-for-the-electricity-market

8 per cent. In individual cases, Energy Authority may allow by its decision transmission or distribution system operator a higher increase if the increase is deemed necessary to fulfil requirements set in the system operation license or to fulfil the legal obligations set for the system operator.

Transmission and distribution system operators shall notice their customers about the changes in network charges at least one month prior to entering force.

Instead of approving or fixing tariffs or prices for grid services, the Energy Authority confirms ex-ante the methodology to be used in setting both transmission and distribution network tariffs and connection charges. The Energy Authority shall also approve ex-ante the terms and conditions of transmission and connection services before the network operators apply them.

The methodology of setting transmission and distribution network tariffs is confirmed by the Energy Authority prior to each regulatory period. The length of regulatory periods is four years, though the methodology is set for two consecutive regulatory periods.

In December 2023, the Energy Authority confirmed with its decisions the methods concerning the rate of return in electricity network operation to be followed during the sixth and seventh regulatory periods in 2024 – 2027 and 2028 - 2031.

After the end of each four-year regulatory period, the Energy Authority confirms by its supervision decisions the earnings of each network operator for the whole regulatory period and the amount that exceeds or falls short of the reasonable earnings level for the whole regulatory period. Where necessary, the supervision decisions include obligations to return any surplus profit from the completed regulatory period to customers through lower network charges during the new regulatory period. Conversely, the supervision decisions also confirm the cases where the network operator may increase earnings via higher network charges during the new regulatory period, equal to the amount by which the actual earnings from the previous regulatory period fell below the reasonable earnings level.

In the regulation model, all investments in the network are updated into the regulated asset base annually, which is then used to determine the reasonable rate of return. Thus, the confirmed methodology allows necessary network investments to be carried out to in a manner which ensures the viability of the networks as required by the Article 59(7)(a).

The network is valued with unit prices in net present value instead of book value in the regulated asset base. Ever since the first regulatory period in 2005-2007, the Energy Authority has incentivised system operators to make investments in the electricity network at economically sensible pace, taking into account the technical lifetime of the assets. Unit prices are used in the calculation of the adjustments of electricity network assets to ensure that the objectives laid down in the legislation on the regulation of reasonable pricing and the cost-effectiveness of investments can be achieved as well as possible. The objectives set in legislation require a principle that promotes cost-efficiency, which can be used to take a stand on the extent to which a system operator could have achieved a reasonable level of cost in the investments on average. This objective can be achieved with an adjustment made through unit prices.

A reasonable rate of return (WACC %) is determined as a nominal value, i.e. the impact of inflation is not removed from it. To avoid taking inflation into account twice in the calculation of reasonable return, the value of network assets may not be revalued. This refers to an adjustment that resembles a historical valuation in accordance with accounting in principle, in which separate frozen unit prices reflecting the average acquisition value must be determined for each investment year and used only for the adjustment of investments in that year.

The unit prices will be determined in the end of the regulatory period and applied to investments made in that period. During the period, unit prices are always adjusted and frozen for each year of investment using the consumer price index. However, for the valuation of the investments made before 2024, the unit prices are not indexed, and they are based mainly on the 2021-2022 cost level that describes the valid cost level during the previous regulatory period. Older unit

prices cannot be used because they have been found to be too inaccurate. This is used to ensure cost-reflective and equitable network valuation.

Approved rate of return on capital is determined using a WACC-model (Weighted Average Cost of Capital). The WACC parameters are updated annually, biennially or for each 4-year regulatory period depending on the parameter.

The network operators have also been encouraged to increase the efficiency of their operations and to maintain a high security of electricity supply. The Energy Authority has set both the general efficiency target and the company-specific efficiency target for the DSOs. The company-specific efficiency targets are estimated on the benchmarking of DSOs by using semi - nonparametric StoNED-method (*Stochastic Nonsmooth Envelopment of Data*).

The Energy Authority has also developed details of the methodology with a view to achieve a regulatory model which incentivizes innovation, flexibility options and investments in the networks in order to ensure viability of the networks.

Also, some other changes were made. For example, how depreciation difference and stocks are handled in the methodology.

TSO and number of DSOs have appealed to the Market Court about the new regulation methods. The appealing process is still ongoing.

The Electricity Market Act has detailed provisions related to network charges collected from electricity generation. The connection fees for small-scale electricity generation (maximum 2 MVA) may not include the costs caused by strengthening the existing electricity network but only include the direct costs of connection.

The Finnish regulation also sets the maximum level of the network charges for the electricity generation connected to the distribution network. The annual network charges collected from an electricity generator may not exceed 0.07 cent/kWh.

According to the Electricity Market Act, at the request of the customer (either generator or load), the transmission and distribution system operators shall provide a comprehensive and sufficiently detailed estimate on the costs of a new connection.

Evolution of network tariffs and levies

The average distribution network charges rose slightly in 2024. In January 2025, the average distribution network charges (including taxes) for a typical household customer (consumption 5,000 kWh per year) were 3.5 percent higher than in January 2024, 2.3 per cent higher excluding the increase in VAT[10].

Figure 1 below illustrates development of average electricity distribution network charges for two typical end users from beginning of 2020 to beginning of 2025.

[10] The general VAT increased from 24 % to 25,5 % in September 2024.

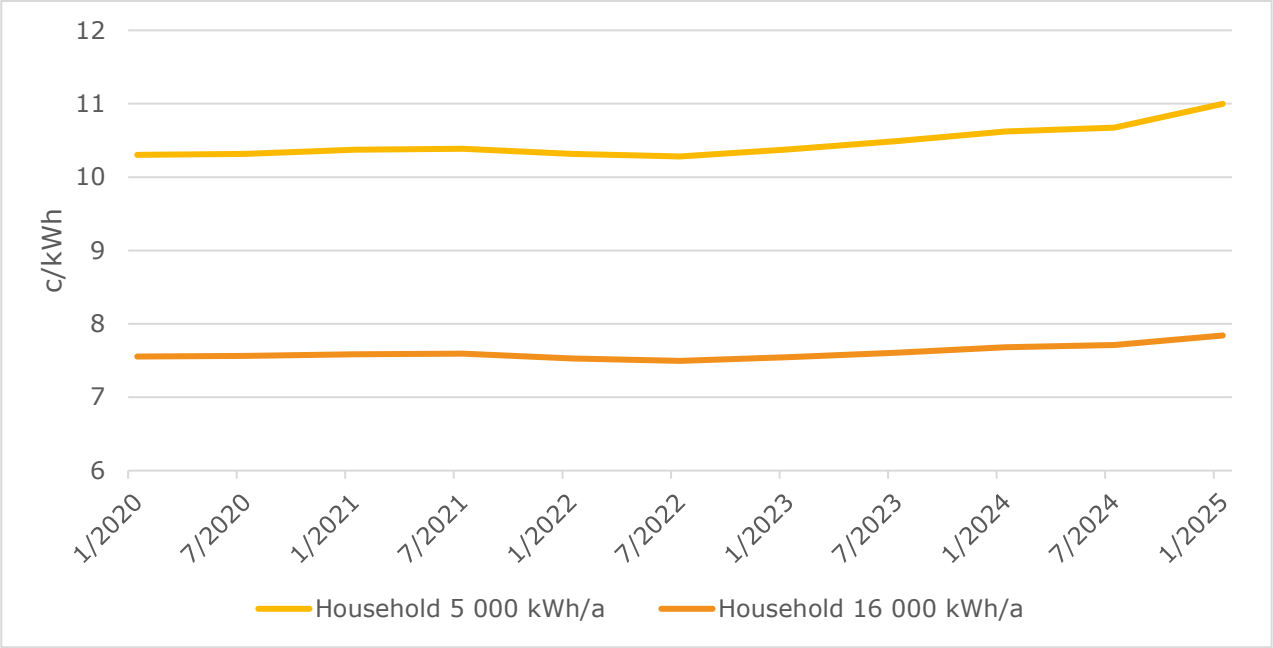

Figure 1. Development of distribution network charges (c/kWh). Prices include VAT and other taxes.

3.1.4 Security and reliability regulation

Network security and reliability rules

Since September 2013, the national legislation has included obligations for DSOs to plan and develop their network that weather related (like storms or snow) interruptions shall not be longer than 6 hours in zoned areas and 36 hours outside zoned areas.

These demands are coming into force gradually by the end of 2028 and by the end of 2019 half of all customers electricity supply should have met the demands. According to the amendments made in 2021 to the Electricity Market Act, all DSOs operating mainly outside of zoned areas and doing significant investments in the network in the 2020's to fulfil the obligations, are automatically granted time to fulfil the requirements until end of 2036.

DSOs that shall meet the demands by the end of 2028 should have met the demands for 75 per cent of all customers by the end of 2023. Based on network development plans submitted to the Energy Authority in 2024, all these companies have met the 75 per cent target by the end of 2023.

Each DSO shall prepare a network development plan to meet these requirements and send an updated plan to the Energy Authority for a review bi-annually. Energy Authority has been monitoring DSO’s progress in this task bi-annually since 2014 through DSO’s network development plans.

3.1.5 Monitoring balance of supply and demand

Balance of supply and demand

As a national energy regulatory authority, Energy Authority has task to monitor investments made to power generation capacity and its impact on security of supply in Finland. The next table (Table 2) shows installed power generation capacity at the end of 2021-2024 and annual maximum hourly generation on Finland.

Table 2. Installed power generation capacity

Generation capacity	2021	2022	2023	2024
Generation capacity by fuel mix (GW)				
• Coal	1.4	1.4	1.1	1.0
• Gas	1.8	1.8	1.7	1.7
• Petroleum	1.3	1.3	1.3	1.3
• Nuclear	2.8	2.8	4.4	4.4
• Peat	1.3	1.3	1.2	1.2
• Biofuels	2.6	2.6	2.8	2.7
• Waste	0.2	0.2	0.2	0.2
• Hydro	3.2	3.2	3.2	3.2
• Wind	3.2	4.8	6.7	8.0
• Solar	0.4	0.6	1.0	1.2
Total installed generation capacity (GW)	**18.2**	**20.0**	**23.6**	**25.0**
• Maximum hourly generation (GWh/h)	11.4	12.5	14.2	14.2

Based on information submitted by power plant operators to the Energy Authority, total installed power generation capacity in Finland was about 25 GW at the end of 2024. However, the entire installed capacity is not available during the peak load periods.

The Energy Authority has estimated in November 2024, that 11.8 GW of Finnish electricity generation capacity will be available at the market in low wind conditions in winter 2024–2025. The Energy Authority estimated also that peak load could reach 15 GW during the same period.[11]

Thus, domestic electricity production capacity is not sufficient to cover the consumption during peak load periods and electricity imports from neighbouring countries are needed. Energy Authority estimated that transmission capacity of interconnectors to neighbouring countries (total 3,400 MW) is sufficient to cover the estimated deficit in electricity demand. The challenges would be during cold and windless periods if there are simultaneous disruptions in significant production facilities and transmission connections.

Damage in Estlink 2 cable on December 25, 2024 made the security of supply situation a bit more challenging as its capacity of 658 MW was no longer available. Fingrid published early January 2025 an updated winter adequacy estimation for winter period 2024-2025[12]. According to the updated estimate, the failure of the EstLink 2 transmission link between Estonia and Finland has weakened the adequacy of electricity on very cold and windless winter days. In the event of scarcity situations, demand response was anticipated to safeguard the adequacy of electricity, and a shortage of electricity was not expected when domestic power plants and cross-border connections are operating normally. On a normal winter day, the failure has a smaller impact on the availability of electricity, and Fingrid estimated that Finland will have sufficient supply of electricity. In the updated estimate, estimated consumption on a very cold and calm winter day was reduced to 14,550 MW as the availability of electricity would limit the maximum power consumption.

[11] Press release and report (in Finnish): https://energiavirasto.fi/-/sahko-riittaa-suomessa-tulevana-talvena-hinta-ohjaa-kulutusta-niukkuustilanteissa

[12] Fingrid press release on 9 January 2025: https://www.fingrid.fi/en/news/news/2025/fingrid-has-updated-its-winter-electricity-adequacy-estimate-the-damage-to-the-estlink-2-connection-weakens-the-adequacy-of-electricity-on-very-cold-and-calm-winter-days/

Winter 2024-2025 was mild and during the winter period 2024-2025 the realised peak load was 13,314 MW in February 2025. Thus, there were no adequacy challenges in the Finnish electricity system.

The highest hourly load of the year 2024, 14,993 MWh/h, was reached in the first week of January. During that week temperature in Finland was lower than normal in many days which increased electricity consumption. Consumption-weighted temperature in Finland was -24 °C during the peak load hour.

During that week also some power plants were unavailable and therefore the electricity power situation was tighter and very sensitive to unexpected failures in the electricity system and therefore the situation could have changed quickly. In day-ahead market the maximum hourly price was EUR 1900 /MWh on 5 January which incentivised customers to activate demand flexibility worth several hundred megawatts. Also, Fingrid and authorities encouraged customers for activating demand flexibility when possible.

Investments in power generation capacity

In 2024, wind power capacity increased more than 1,300 MW, reaching 8,000 MW by the end of the year. All new wind power projects are being developed commercially without any public support.

At the end of 2024, over 1,200 MW of solar power capacity was connected to the grid. This consists mainly of small-scale solar panels (capacity less than 1 MVA) - only total capacity of 100 MW is from solar power plants with capacity above 1 MVA. Annual increase of solar power capacity was more than 200 MW.

During the year 2024, the CHP-electricity capacity decreased by around –200 MW. A part of old CHP capacity has been decommissioned and replaced by heat-only production. Due to low profitability of electricity production, these kinds of investments may become more common in the coming years. Heat production is also more and more based on heat pumps and electric boilers, which increase electricity consumption.

In April 2024, the last coal-fired condensed power plant in Meri-Pori (capacity 560 MW) was transferred into emergency reserve organised by the National Emergency Supply Agency until end of 2026. The power plant is no longer available for the market, and it would be activated only when emergency situations are declared in Finland.

On 1 April 2019 came into force a new Act which forbids the use of coal in electricity and heat production from 1 May 2029. However, use of coal will be allowed after 1 May 2029 to ensure security of supply in heat production subject to the Energy Authority’s approval. Furthermore, the Government may allow use of coal for an interim period under crisis. However, use of coal in energy production has already been decreasing also because of economic reasons.

Interconnector capacity

Total installed interconnection capacity between Finland and Sweden is 2,700 MW. In normal situation, commercial interconnection capacity between Finland ja Northern Sweden (bidding zone SE1) is 1,100 for export and 1,500 MW for import. However, when Olkiluoto 3 nuclear power plant is operating with capacity of above 1,000 MW, Fingrid reduces available import capacity from the Northern Sweden (SE1) to Finland by 300 MW. Installed capacity between Finland and Central Sweden (SE3) is 1,200 MW for both export and import.

In normal situation interconnection capacity between Finland and Estonia is 1,016 MW for both directions.

Finland has also an interconnector to Norway (bidding zone NO4) with capacity of 80 MW.

In addition, there is a cable with capacity of 100 MW between Åland island and mainland of Finland, which serves as a backup connection for Åland's needs. Åland island has also connection to SE3 and commercially Äland island belongs to the bidding zone SE3.

Import from Russia through AC links in Vyborg (import capacity 1,400 MW) has been suspended since May 2022.

Any new investments in interconnection capacity have not been made since commissioning of the Estlink 2 subsea cable between Finland and Estonia in 2014.

Third AC connection between Finland and Sweden, Aurora Line, is under construction and scheduled to be in operation in late 2025. It will increase interconnection capacity from Finland to Sweden (SE1) with 900 MW and from Sweden to Finland with 800 MW. European Union has granted EUR 127 million in support for the Aurora line.

Fingrid and Svenska Kraftnät have also agreed in 2021 to continue operation of Fennoskan 1 HVDC-connector between Finland and Sweden until 2040.

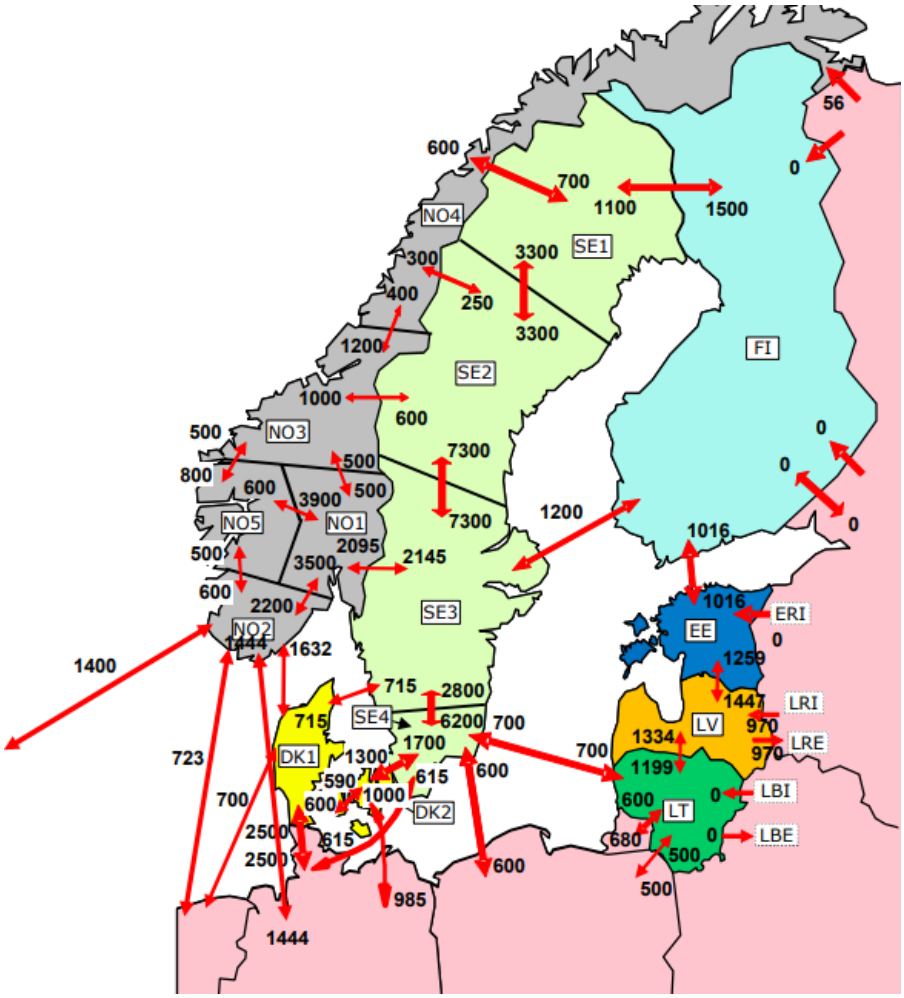

Figure 2. Interconnector capacities between bidding zones in Nordics and Baltics 1st January 2024. (Source: Nord Pool)

Strategic reserves

To ensure the balance between supply and demand during scarcity hours, Finland has a capacity mechanism – strategic reserves. The Energy Authority is responsible for evaluating and deciding the required size of the strategic reserve capacity and arranging the tendering process to procure the capacity.

During the winter period, from December to end of February, units participating in the strategic reserve system are in 12 hours' readiness to start power production. At other times, the units are in one-month readiness. The units shall be able to increase power output with 1 MW within 1 minutes after request and be ready for 200 hours continuous power production with full capacity during the winter period.

Since July 2022, there hasn't been any capacity in strategic reserve system. Since the commissioning of Olkiluoto 3 -nuclear power plant National Resource Adequacy Assessments haven't shown any resource adequacy concerns which would prevent reaching the national reliability standard (LOLE=2.1 hours/year) adopted by the Government in March 2022.

The system has been in place since 2007, and the activation of strategic reserve capacity has been very rare. The last time strategic reserves were activated in Finland was in January 2010.

Risk-preparedness for crisis in electricity sector

Being designated as the competent national authority defined in the Risk-preparedness Regulation (2019/941) in September 2020, the Energy Authority together with relevant stakeholders updated national crisis scenarios in electricity sector and the national Risk Preparedness Plan in 2024.

The updated plan was submitted to the Commission and to the Electricity Coordination Group in January 2025.

3.1.6 Cross-border issues

Capacity allocation and congestion management

Congestions in interconnectors between Finland and Sweden, Finland and Norway and Finland and Estonia are managed by implicit auctions in the day-ahead market.

Capacity of submarine cable between Åland Island and mainland of Finland, Ål-Link, is not provided to the market. This cable is built to ensure security of supply in Åland islands which have an AC-submarine cable connection to Sweden.

The day-ahead interconnector capacities for the next day are announced before noon and the intraday capacities in the afternoon. The principles for determining the transfer capacities in the Nordic power market and margins are described in the System Operation Agreement between the Nordic TSOs which is a part of the Nordic Grid Code. Until go-live of flow-based capacity calculation methodology in Nordic capacity calculation region (Nordic CCR) in October 2024, transfer capacity provided to the day-ahead market was the Net Transfer Capacity (NTC) which is Total Transfer Capacity (TTC) subtracted with Transmission Reliability Margin (TRM). TRM was 100 MW in AC interconnectors between FI and SE1 bidding zones and zero in Fennoskan HVDC links between FI and SE3 bidding zones.

In July 2018, all regulatory Authorities of CCR Nordic approved TSOs' Proposal for a Capacity Calculation Methodology in accordance with Article 20(2) of the CACM Guideline. According to the proposal, flow-based (FB) method would be used as capacity calculation method for day-

ahead and intraday markets. In October 2020, all regulatory Authorities of Nordic CCR agreed to approve the amended day-ahead/intraday capacity calculation methodology. [13]

The flow-based capacity calculation methodology was taken into use in the Nordic CCR in late October 2024. This new methodology has been functioning well, and there have not been any significant technical issues in capacity calculation after the adoption. Having said that, the change in how the capacities have been calculated has resulted in less intra-day capacities, which has been demanding for the market participants. The Nordic regulatory authorities are assessing the situation, looking at solutions to ensure that there are no so-called lock-in -situations, where we would have zero capacities for trade in the intraday markets, as well as making sure the markets function as intended after the adoption of flow-based.

Availability of interconnection capacities

In 2023, the average interconnection capacity between bidding zone Finland (FI) and Northern Sweden (SE1) available for day ahead market was 916 MW for export and 1,196 MW for import. Data from year 2024 is not available.

At the interconnector between Finland and Central Sweden (SE3) the average capacity available for day ahead market was 282 MW for export and 1,121 MW for import. Export capacity at the interconnector FI-SE3 has been reduced remarkably since 2021 by the Swedish TSO due to challenges in the transmission management at the Swedish internal transmission grid.

Between Finland and Estonia (EE) the average interconnector capacity available for day ahead market in 2023 was 977 MW for export and 975 MW for import. Available interconnector capacity between Finland and Estonia was reduced large part of year 2024 due to failures in Estlink 2 subsea cable (658 MW) on January 26 – September 4, 2024 and from December 25, 2024.

In other interconnectors available capacity has been limited shorter period of time due to failures and maintenance in transmission system.

Table 3 below shows the average availability of interconnection capacities for the market compared to maximum capacities in 2021 - 2024.

Table 3. Availability of interconnection capacities, %[14] (Source: Fingrid).

	2021	2022	2023	2024
Interconnector FI-SE1				
• Import SE1 -> FI	92.5 %	95.1 %	90.7 %	na
• Export FI -> SE1	94.4 %	93.5 %	88.0 %	na
Interconnector FI-SE3				
• Import SE3 -> FI	96.6 %	98.5 %	93.4 %	na
• Export FI -> SE3	31.2 %	15.2 %	23.5 %	na
Interconnector FI-EE				
• Import EE -> FI	97.3 %	92.7 %	96.0 %	na
• Export FI -> EE	99.0 %	97.2 %	97.2 %	na

[13] https://energiavirasto.fi/documents/11120570/12872579/P%C3%A4%C3%A4t%C3%B6s+Nordic+kapasiteetin+laskenta-alueen+kapasiteetin+laskentamenetelm%C3%A4n+muuttamisesta.pdf/ea9b8c31-ef41-4d32-b902-571e43fad02c/P%C3%A4%C3%A4t%C3%B6s+Nordic+kapasiteetin+laskenta-alueen+kapasiteetin+laskentamenetelm%C3%A4n+muuttamisesta.pdf?t=1603785321857 (in Finnish)

[14] Availability of interconnection capacity is calculated by comparing transmission capacity available for the market during the year to the maximum transmission capacity of the interconnector. Data from 2024 is not available.

Costs of countertrade and congestion management income

Finland is considered as a single bidding zone and congestions within Finland and after day-ahead market closure are managed by countertrade.

Countertrade is used to relieve both national and inter-regional congestions during the daily network operation. Costs of countertrade are paid by the TSO.

Congestion management income arises when the transmission capacity between bidding zones is too low to even out the difference between supply and demand in the market areas. The congestion management income is obtained by multiplying the amount of electricity to be transmitted between the bidding zones by the price difference:

> Congestion management income [€/hr] = Transmission between bidding zones in the day-ahead market [MW] * Price difference between bidding zones [€/MWh]

The congestion management income is divided evenly between the transmission system operators whose cross-border lines caused the income to accrue.

Table 4 shows the costs of the countertrade paid by Fingrid and congestion management income to Fingrid during the years 2021 - 2024.

Table 4. Net costs of countertrade and congestion income (Source: Fingrid).

	2021	2022	2023	2024
Net costs of countertrade, MEUR	**2.5**	**7.3**	**0.9**	**7.1**
• Countertrade between Finland and Sweden, MEUR	0.3	3.8	0.1	0.9
• Countertrade between Finland and Estonia, MEUR	0.2	1.7	0.7	5.2
• Countertrade inside Finland, MEUR	2.0	1.8	0.1	1.0
Congestion management income to Fingrid, MEUR[15]	**283.8**	**943.0**	**260.1**	**265.2**
• From interconnectors between Finland and Sweden, MEUR	221.1	775,6	115.0	164.5
• From interconnectors between Finland and Estonia, MEUR	62.8	167.4	145.1	100.7
Income to Fingrid from issuing long-term transmission rights, MEUR	**-**	**-**	**57.0**	**62.3**
• On interconnectors between Finland and Estonia, MEUR[16]	-	-	57.0	62.3
Congestion income credited to the holders of corresponding transmission rights, MEUR	**-**	**-**	**96.2**	**85.5**
• On interconnectors between Finland and Estonia, MEUR	-	-	96.2	85.5

In 2024 congestion management income for the Fingrid totalled EUR 265.3 million (EUR 260.1 million in 2023). In addition, Fingrid earned income EUR 62.3 million (EUR 57.0 million in 2023)

[15] Congestion management income in 2023 and 2024 does not include incomes from issued long-term transmission rights at FI-EE border

[16] Fingrid and Elering started issuing financial long-term transmission rights on Finnish-Estonian border in December 2022.

from issuing the financial long-term transmission rights (FTR) issued on the Finland–Estonia border.

Fingrid used EUR 461.5 million of congestion management incomes in 2024. A total of EUR 301.0 (284.7 in 2023) million in congestion income was recognised in turnover to cover the waiving of grid service fees and increased operating expenses, and EUR 130.1 (118.0 in 2023) million in other operating income to cover financial transmission rights and cross-border capacity costs and EUR 30.4 (2.3 in 2023) million in investments to improve cross-border transmission capacity. After approval of the Energy Authority, Fingrid used part of congestion income to compensate for not charging grid service fees from customers for three months in 2024.

At the end of 2024, the accrued congestion income on Fingrid's balance sheet amounted to EUR 841.8 million (EUR 975.7 million at the end of 2023). The accrued congestion income could be used for financing investments to improve the market functioning.

Technical cooperation between Union and third country transmission system operators

The electricity trading with Russia has been suspended since May 2022.

There was 1,300 MW of transmission capacity from Russia to Finland available to the electricity market. Additionally, Fingrid had reserved a volume of 100 MW to be used as a power system reserve. The maximum trading capacity from Finland to Russia was 320 MW.

3.1.7 Implementation of Network Codes and guidelines

System Operation Guideline (SO GL)

Energy Authority has continued to co-operate with Nordic TSOs and NRAs to meet System operation guideline (2017/1485) requirements on Nordic and national levels. Before approval of some proposals, there have been preparatory actions on ramping restrictions and FRR exchange and sharing limits between SAs. The Energy Authority have taken coordinated actions to meet Guideline requirements and to ensure that Guideline objectives can be met.

In 2023, the Energy Authority and other Nordic NRAs received the following two methodologies for regulatory approval.

- Limits on the amount of exchange of FRR between synchronous areas defined in accordance with Article 176(1) and limits on the amount of sharing of FRR between synchronous areas defined in accordance with Article 177(1).
- Ramping restrictions, in accordance with SO GL Articles 137(3) and (4)

The TSOs withdrew the methodology proposal in accordance with Articles 176(1) and 177(1) on 28 September 2023, before the NRA deadline for a decision. As the proposal was submitted voluntarily by the TSOs, all NRAs stopped processing of the proposal after receiving an official letter from their respective TSO.

The NRAs approved the methodology in accordance with Articles 137(3) and (4) on 30 January 2024 and made the corresponding national decisions by the deadline 4 February 2024.

Forward Capacity Allocation Guideline (FCA GL)

The assessment in line with Article 30(4) of the FCA guideline in 2021 revealed that the hedging opportunities in the Estonian bidding zone were no longer insufficient. This was largely due to the fact that previously the Estonian market participants had used the Helsinki EPAD as their main hedging tool due to the low liquidity of the Tallinn EPAD. The changes in the markets resulted in decreased correlation between the Finnish and Estonian bidding zones, making it impossible for the Estonian market participants to acquire a sufficient hedge using the Helsinki EPAD. Finnish and Estonian NRAs came to the conclusion in 2021 that the hedging opportunities were insufficient and agreed to request the Finnish and Estonian TSOs to issue transmission rights on the FI-EE -border. Finnish and Estonian TSOs, Fingrid and Elering have issued long-term financial transmission rights (FTR) on FI-EE border since 1 December 2022.

In 2021, Energy Authority assessed the hedging opportunities in cooperation with the Swedish national regulatory authority, Energimarknadsinspektion, concerning the FI-SE -borders and concluded that there are not sufficient hedging opportunities available in the electricity forward markets. However, the Finnish and Swedish NRAs were unable to agree on the decision in line with article 30 of the FCA Guideline. Due to this, ACER adopted a decision under Article 30(5)(b) of the FCA Guideline concerning the FI-SE1 and FI-SE3 bidding zone borders in September 2022. Fingrid appealed against ACER´s decision to the ACER Board of Appeal. ACER's Board of Appeal issued its decision on Fingrid's appeal on 24 October 2023, upholding ACER's original decision in the case. Fingrid sent the proposal to the Energy Authority in line with ACER´s original decision and Article 30(6) of the FCA Guideline concerning how to improve the hedging opportunities in the Finnish bidding zone in December 2023. The proposal was approved by the Energy Authority in June 2024.

Due to the requirement to assess the cross-border hedging opportunities at least every four years in line with article 30 of the FCA Guideline, Energy Authority began the preparation for the upcoming new decision in late 2024. The decision will be given in 2025.

Capacity Allocation & Congestion Management Guideline (CACM GL)

The capacity calculation methodology in Nordic Capacity Calculation Region (Nordic CCR) in line with article 20 of CACM (CCM -methodology) was already approved in July 2018. The Nordic NRAs, however had agreed to request for an amendment from Nordic TSOs to clarify some parts of the methodology by requesting changes to the methodology in December 2018. The Nordic TSOs thus sent a proposal for amendments on the capacity calculation method in June 2019. Amendments to the capacity calculation method were approved by the NRAs of the Nordic CCR October 2019.

In April 2020 the Nordic CCR TSOs sent a new proposal for amendment of the CCM, following ACER´s decision on the long-term capacity calculation methodology for the same region. The Nordic CCR NRAs considered the proposal to be for the most part in line with the regulation but found need to specify the implementation plan more precisely in order to ensure proper parallel runs and sufficient functionality before starting to use the new flow-based calculation. Energy Authority and the other Nordic CCR NRAs approved the methodology with some additions on in October 2020. At the same time, the NRAs also agreed to add a checkpoint to the implementation process 6 months after the start of parallel runs. During this checkpoint, the relevant NRAs would assess the functionality of the methodology of the operational implementation of the flow-based capacity calculation method based on the TSOs' report which builds on experience from the parallel runs. After the checkpoint and provided that the TSOs are operating at a sufficient level, the TSOs shall run the parallel runs for another 6 months before go-live. The Nordic TSOs plan to begin the parallel runs in accordance with the approved methodology and art. 20(8) of the CACM Guideline in early 2022. As the approved methodology requires a minimum of 12 months of parallel runs, flow-based capacity calculation could be taken into use in the Nordic CCR earliest in spring 2023. During 2022, the TSOs faced several issues regarding the setup of parallel runs,

resulting delay in planned timeline stated above. Towards the end of 2022, the TSOs started the runs in parallel and were continuously reporting the relevant development of the runs to the NRAs. At this point, runs were not part of the official 12-month parallel run but preparative actions for that.

The Nordic CCR TSOs had issues with the operational implementation of the flow-based day-ahead calculation method as well as the ATC-extraction approach that will be also taken into use for the intra-day markets until the intra-day algorithms are able to implement flow-based. The official parallel runs were however started in 2023 after tackling these issues.

The flow-based capacity calculation methodology in day ahead market and the capacity calculation methodology of Available Transfer Capacity (ATCE) in the intraday market were taken into use in the Nordic CCR in late October 2024. This new methodology has been functioning well, and there have not been any significant technical issues in capacity calculation after the adoption, but the reduction of capacities in ID has been somewhat demanding among the market participants.

Nordic NRAs have requested Nordic TSOs to deliver a report 6 months after go-live of flow-based capacity calculation methodology in the day-ahead market and ATCE in the intraday market covering 6 months of data, starting from the day of go-live, 29 October 2024. Nordic TSOs have submitted the report has been to the Nordic NRAs on 27 June 2025.

Electricity Balancing Guideline (EB GL)

In 2023, the Energy Authority have participated together with other European NRAs and ACER in the common European decision-making processes to approve methodologies pursuant to the EB GL. Also, the Energy Authority has followed Nordic TSOs co-operation project NBM (Nordic balancing model) which is closely related to EB GL implementation. The Energy Authority have taken coordinated actions to meet Guideline requirements and to ensure that Guideline objectives can be met.

In March 2018, all Nordic TSOs signed a Cooperation Agreement on an initiative of the Nordic Balancing Model (NBM) to update and adapt the balancing market design, develop methods and operational processes as well as related IT systems to ensure an efficient and secure balancing scheme compliant with the European network codes. The NBM initiative will be based on the introduction of modernized Area Control Error (mACE) in the Nordic LFC Block where instantaneous power imbalance will be set to zero for each sub region (bidding zone) separately instead of present system where imbalance will be set for whole Nordic synchronous area.

The NBM project covers almost the entire area of electric balancing market development in the Nordic region. Some of the development projects also extend to the area of system operation or are national development projects. The project includes several steps aiming at Nordic TSOs' connection to European mFRR market platform (MARI) and European aFRR market platform (PICASSO).

In 2022 the Energy Authority granted derogations for Fingrid to join MARI and PICASSO platforms by July 2024. In May 2023 Fingrid submitted a proposal on Finnish national terms and conditions concerning Fingrid's PICASSO platform integration and establishment of an aFRR energy market in Finland by July 2024. During 2023 all Nordic TSOs informed all Nordic NRAs of their delay regarding joining MARI platform by the granted derogation deadlines.

The deadline for the adoption of European MARI and PICASSO platforms for Fingrid and other TSOs at the Nordic CCR was in July 2024. None of the Nordic CCR TSOs had implemented and made the European MARI and PICASSO platforms operational in 2024. The Nordic CCR regulatory authorities have coordinated in order to ensure TSO cooperation in fulfilment of this requirement. The EB GL requires that by 18 December 2020 all TSOs shall apply the imbalance settlement period (ISP) of 15 minutes in all scheduling areas while ensuring that all boundaries

of market time unit shall coincide with boundaries of the imbalance settlement period. The regulation allows that the national regulatory authority may, at the request of the TSO or at its own initiative, grant the relevant TSOs a derogation from this obligation until 1 January 2025.

In March 2019 Nordic TSOs announced that they have identified risk of delay in the implementation of 15 min imbalance settlement period in the Nordics by December 2020. Fingrid submitted to the Energy Authority in June 2020 a request to approve derogation from the implementation of 15 minutes imbalance settlement until 22 May 2023. In March 2021, the Energy Authority approved the derogation request after coordination with other Nordic NRAs.

In August 2021, the Finnish Government adopted updated metering regulation (767/2021), which requires Finnish DSOs to implement 15 minutes energy meter resolution within transition periods. According to the regulation energy meters should be capable for metering in 15 minutes resolution by the end of 2028. Currently, about half of the energy meters in Finland are already metering with 15 minutes resolution. Measurements at a resolution of 15 minutes is a prerequisite for the national parallel implementation of 15 minutes ISP in Finland. This also allows for a mandatory change, imbalance settlement resolution of 15 minutes in the Nordic imbalance settlement unit eSett.

On 22 May 2023, 15 minutes imbalance settlement was implemented in the Nordic electricity markets.

In October 2024, Energy Authority together with other Nordic NRAs approved several methodologies related to mFRR and aFRR capacity market:

- methodology on the common and harmonised rules and processes for the exchange and procurement of mFRR balancing capacity,
- methodology on the common and harmonised rules and processes for the exchange and procurement of aFRR balancing capacity,
- methodology on the application of the Nordic CCR market-based allocation process of cross-zonal capacity for the exchange of manual frequency restoration reserve capacity (mFRR) for the bidding zones of Denmark, Finland and Sweden,
- amendment to the methodology on the application of the Nordic CCR market-based allocation process of cross-zonal capacity for the exchange of aFRR balancing capacity for the Nordic LFC Block.

In addition, Energy Authority approved in May 2024 terms and conditions for mFFR capacity providers. These terms and conditions were linked to Finnish, Swedish and Danish TSOs' plan to establish a common mFRR capacity market among these three countries. National mFRR capacity market was expanded from national capacity markets to Nordic capacity market of three Nordic countries in November 2024.

Connection Codes (DCC NC. RfG NC and HVDC NC)

In 2024, Energy Authority did not issue any decision related to the implementation of connection codes in Finland.

3.1.8 Monitoring and assessing the development of a smart grid

According to the legislation, Energy Authority shall monitor and assess the development of smart grid and how the actions improve energy efficiency and the integration of energy from renewable

sources. Also, Energy Authority shall assess the network development, investments to the network and are the DSOs using demand response, energy efficiency, energy storage facilities or other resources as an alternative to system expansion.

Since August 2021, the national legislation has included obligations for DSOs to include in the distribution network development plans a plan for using demand response, energy efficiency, energy storage facilities or other resources as an alternative to system expansion. Distribution network development plans including the new obligation were delivered to the Energy Authority first time in June 2022.

Based on distribution network development plans the DSOs have invested over EUR 4.6 billion in 2014-2021 because of the security of supply obligations. The network development and investments to distribution network because of these obligations will continue to the end of 2036. Demand response and other resources as an alternative to system expansion are still quite new solutions for the DSOs based on the NDPs.

Based on the 2024 distribution network development plans, most of the DSOs have done research or pilot projects to develop these alternative solutions, but there has not been other major developments than pilot projects. The Energy Authority also encourages the DSOs to research and pilot new potential alternatives to system expansion and because of that for the new regulatory period started in January 2024 the Energy Authority included a separate incentive for flexibility as a part of the regulatory methodology.

In addition to the obligation of monitoring and assessing the development of smart grid, Energy Authority also strongly incentives DSOs and TSO to innovate self-imposed. DSOs and TSO have a possibility to include a cost equalling 1 per cent of their yearly network business related turnover to a specific innovation incentive as a part of Energy Authority's regulatory methodology. Since DSOs and TSO are required to publish the results of their finished innovative projects, it creates Energy Authority a possibility to consider number of published Smart Grid projects as an output suitable for also Smart Grid Indicators[17].

To be considered as a Smart Grid project according to Energy Authority the project must address at least one of the following categories:

- smart metering
- demand flexibility
- flexibility solutions
- batteries, storages, EVs

Therefore, Energy Authority reported the number of published Smart Grid projects as a part of National Report 2022. During year 2022 DSOs and TSO reported total of 17 innovative projects which Energy Authority classified as Smart Grid projects. Two of the total 17 projects were carried out by the TSO and the rest were projects by DSOs. A few projects are collaborative projects between several DSOs, but Energy Authority has calculated projects if they were individual projects since every DSO must bear their own project costs. For year 2023 about a same number of innovative projects were reported for Energy Authority.

As stated above, January 2024 marked the beginning for the new regulatory period and a separate incentive for flexibility is included in the new regulatory method. Up to beginning of the new regulatory period network operators were able to report different flexibility solutions as a

[17] The Expert Workshop on Defining Common Smart Grid Indicators (i.e. Smart Grid KPIs) has concluded that Smart Grid Indicators should include a limited sets of output indicators, supported by inputs indicators. The workshop was co-organised by DG ENER, CEER and ACER, Organised virtually on 25th May, 2022, including national regulators, network operators (ENTSO-E and EU.DSO, and energy stakeholders (T&D Europe, SmartEn).

part of innovative incentive. However, the Energy Authority expects the amount of flexibility solutions to increase due to the new incentive for flexibility.

3.2 Competition and market functioning

3.2.1 Wholesale markets

Some key indicators for illustrating the development wholesale market are shown in the following table (Table 5).

Table 5. Indicators for electricity wholesale market

Electricity wholesale market indicators	2021	2022	2023	2024
Electricity Production (TWh)	**69.0**	**69.1**	**78.0**	**79.5**
• Hydro power	15.4	13.3	15.0	14.1
• Wind power	8.1	11.6	14.5	19.9
• Solar power	0.3	0.4	0.6	1.2
• Nuclear Power	22.6	24.2	32.7	31.1
• CHP district heating	10.3	8.9	6.3	5.3
• CHP industry	9.0	7.8	7.1	6.5
• Conventional thermal power	3.1	2.9	1.7	1.4
Total annual electricity demand (TWh)	**86.8**	**81.7**	**79.7**	**82.7**
• Maximum hourly demand (GWh/h)	14.3	13.8	13.2	15.0
Net import (TWh)	**17.8**	**12.5**	**1.8**	**3.2**
• Imports	24.5	19.4	9.6	8.7
• Exports	6.7	6.9	7.8	5.5
Traded volume in the spot electricity market (TWh)				
• Day-ahead buy volume (FI)	62.8	59.6	56.5	56.7
• Day-ahead sell volume (FI)	52.3	48.3	53.6	52.5
• Intraday buy volume (FI)	1.1	1.3	2.1	3.3
• Intraday sell volume (FI)	1.1	1.4	2.0	3.2

Market opening

The Energy Authority has designated in December 2015 for four years period Nord Pool AS to perform day-ahead and intraday coupling in Finland as a nominated electricity market operator (NEMO). European Market Coupling Operator ASA (EMCO/former Nord Pool) applied in 2019 for re-designation of their nominated market coupling operator status in accordance with article 4 of CACM. In December 2029, Energy Authority re-designated EMCO for indefinite period with obligations to inform relevant changes to Energy Authority.

In January 2016, EPEX SPOT SE announced to the Energy Authority its willingness to offer day-ahead and intraday trading services with delivery in Finland by using so-called passport method. The Energy Authority decided in February 2016 that EPEX SPOT SE has right to offer day-ahead and intraday trading services with delivery in Finland. EPEX SPOT SE announced in November 2023 to the Energy Authority that the French NRA has granted EPEX SPOT SE the renewal of the French NEMO license until the 9th November 2027. In February 2024, Energy Authority confirmed that EPEX SPOT SE may continue to offer day-ahead and intraday trading services with delivery in Finland as a passporting NEMO based on the renewed NEMO designation decision from the French NRA.

In April 2017, the Energy Authority approved in cooperation with other Nordic regulatory authorities a plan for multi-NEMO arrangements (MNA) proposed by Fingrid. This enables multiple NEMOs to offer day-ahead and intraday trading services in Finland.

EPEX SPOT SE launched in Finland their intraday continuous trading and clearing services on 25 May 2020 and started offering day-ahead trading services on 3 June 2020.

Finland has been part of the European Cross-Border Intraday (XBID) solution since the 1st wave of XBID go-live in June 2018. XBID allows for orders entered by market participants for continuous matching in one bidding zone to be matched by orders similarly submitted by market participants in any other bidding zone within the XBID solution's reach, as long as transmission capacity is available.

The share of electricity bought from the power exchange in relation to the Finnish electricity consumption has increased considerably since Finland joined the Nordic power market area in June 1998. The share of electricity procured from Nord Pool and EPEX SPOT power exchanges covered 73 per cent of the Finnish physical consumption in 2024 (79 per cent in 2023).

Nasdaq OMX has been providing services for trading with financial products in Nordic region. In addition, European Energy Exchange (EEX) started in March 2024 offering trading with own financial products in Nordic power futures market.

In August 2024, Euronext and Nord Pool announced their plan to launch a Nordic and Baltic power futures market. In January 2025, Euronext and Nasdaq announced the signing of a binding agreement under which Euronext will acquire Nasdaq's Nordic power futures business, subject to receipt of applicable regulatory approvals.

Prices

The basis of the price formation in the wholesale power market is the day-ahead spot market. Trading day ahead market is organised as an implicit auction. Finland is a part of pan-European single day-ahead market coupling (SDAC). In SDAC buyers and sellers shall submit bids to the power exchanges for the following day before 12.00 CET every day indicating the amounts one market actor wishes to buy or sell in each bidding zone at the relevant hour at different price levels. The prices for individual bidding zones are calculated by using a common Euphemia algorithm. In the calculation all buy and sell bids from each power exchange are summarised into buy and sale curves and the price and traded volume are set where the buy and sell curves are crossing. The calculation takes also into account transmission capacity available between bidding zones and bids set in other bidding zones When the price has been determined for each operating hour, volumes of sales and buys of individual market actors are also determined. In case there are no grid restrictions between the bidding zones, the spot price is the same price for these bidding zones.

In Nordic area Nord Pool calculates also so-called system price which is an unconstrained market clearing reference price for the Nordic region. It is calculated without any congestion restrictions by setting capacities to infinity. The system price is calculated locally by Nord Pool after area prices are calculated for all bidding areas. Flows between the Nordics and the Netherlands, Germany, Poland and the Baltics from the area price calculation are taken into account in system price calculation. These flows are used when calculating the System price either as import/sales or as export/purchase orders. In system price calculation area bidding areas in Norway, Denmark, Sweden and Finland constitute one common bidding area (capacities between these are set to infinity).[18]

[18] https://www.nordpoolgroup.com/trading/Day-ahead-trading/Price-calculation/

In 2024, the average system price was 36 per cent lower than in 2023. The average system price in 2024 was EUR 36.06/MWh (EUR 56.44/MWh in 2023).

The average day ahead market price in Finnish bidding zone in 2024 was EUR 45.57/MWh, showing a decrease of 19 per cent year-on-year (EUR 56.47/MWh in 2023). The highest hourly day-ahead price EUR 1896.00/MWh in Finnish bidding zone was reached on Friday January 5, 2024. The lowest hourly day-ahead price EUR -20.01 /MWh at the Finnish bidding zone was reached on Thursday August 8, 2024.

Figure 3 presents daily average day-ahead market prices at the Finnish bidding zone in 2022-2024.

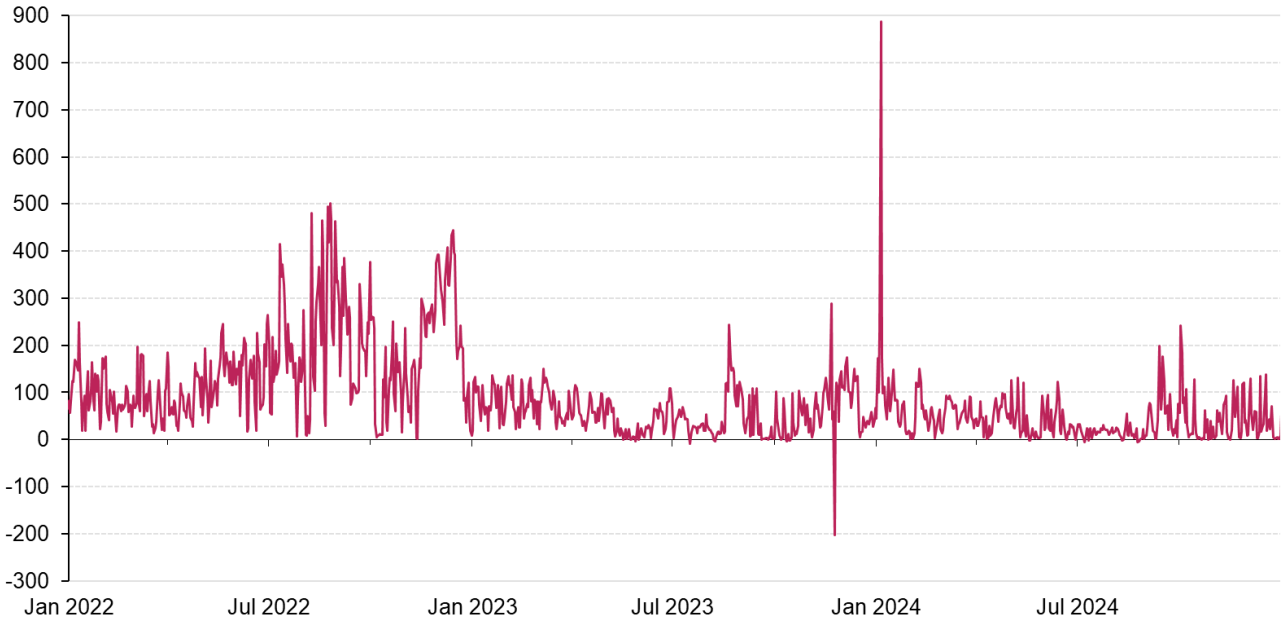

Figure 3. Daily average day-ahead market prices at the Finnish bidding zone in 2022-2024 (EUR/MWh). (Source NordPool)

Volatility of wholesale energy prices was remarkably high in 2024. Number of hours when the day-ahead market price was negative in the Finnish bidding zone was 725 hours (467 hours in 2023). Wholesale price volatility[19] was 163 per cent in 2024 (100 per cent in 2023). Number of days when price swing between the highest and lowest hourly prices is higher than EUR 50/MWh has decreased since the energy crises, but still covered almost half of the days in 2024.

Table 6 below shows average wholesale electricity prices and price volatility at the Finnish bidding zone in 2021 - 2024.

[19] Price volatility at the day ahead market is measured here as: (standard deviation of hourly prices) / (average of hourly prices) over all hours during the year.

Table 6. Wholesale electricity prices and price volatility at the Finnish bidding zone (Source: calculations from NordPool data).

	2021	2022	2023	2024
Average day ahead market electricity price at the Finnish bidding zone (EUR/MWh)	72.34	154.04	56.47	45.57
• Highest hourly day ahead market price (EUR/MWh)	1,000.07	861.14	777.18	1,896.00
• Lowest hourly day ahead market price (EUR/MWh)	-1.41	-2.08	-500,00	-20.01
Average day ahead market Nordic system price (EUR/MWh)	62.31	135.86	56.44	36.06
Number of negative hourly prices at day ahead market (Finnish bidding zone)	5	27	467	725
Volatility of day ahead market hourly prices, % (Finnish bidding zone)[19]	91 %	86 %	100 %	163 %
Number of days with price swing >50 EUR/MWh at day ahead market (Finnish bidding zone)[20]	223	334	204	181
Average daily swing at day ahead market (EUR/MWh) (Finnish bidding zone)[21]	80.28	201.18	75.29	80.62

Uniformity of day ahead market prices between Finnish and neighbouring bidding zones decreased in 2024.

In 2024, Finland had less time than in 2022 same wholesale electricity day ahead prices as in Swedish bidding zones. During 45 per cent (in 2023: 62 per cent) of hours Finland and Northern- and Central Sweden (SE1-SE3 bidding zones) had the equal day-ahead price.

Finland had with Estonia equal day-ahead price in 32 per cent (in 2023 46 per cent) of time in 2024.

Figure 4 below presents the percentage of hours in 2024 when an equal day-ahead price existed. In this picture the bidding zones of each country are grouped for clarity.

[20] Refers to the number of days in a year during which the difference between the highest and lowest hourly electricity prices exceeded €50/MWh.
[21] Refers to the average difference between the maximum and minimum hourly wholesale electricity prices over all days in the year.

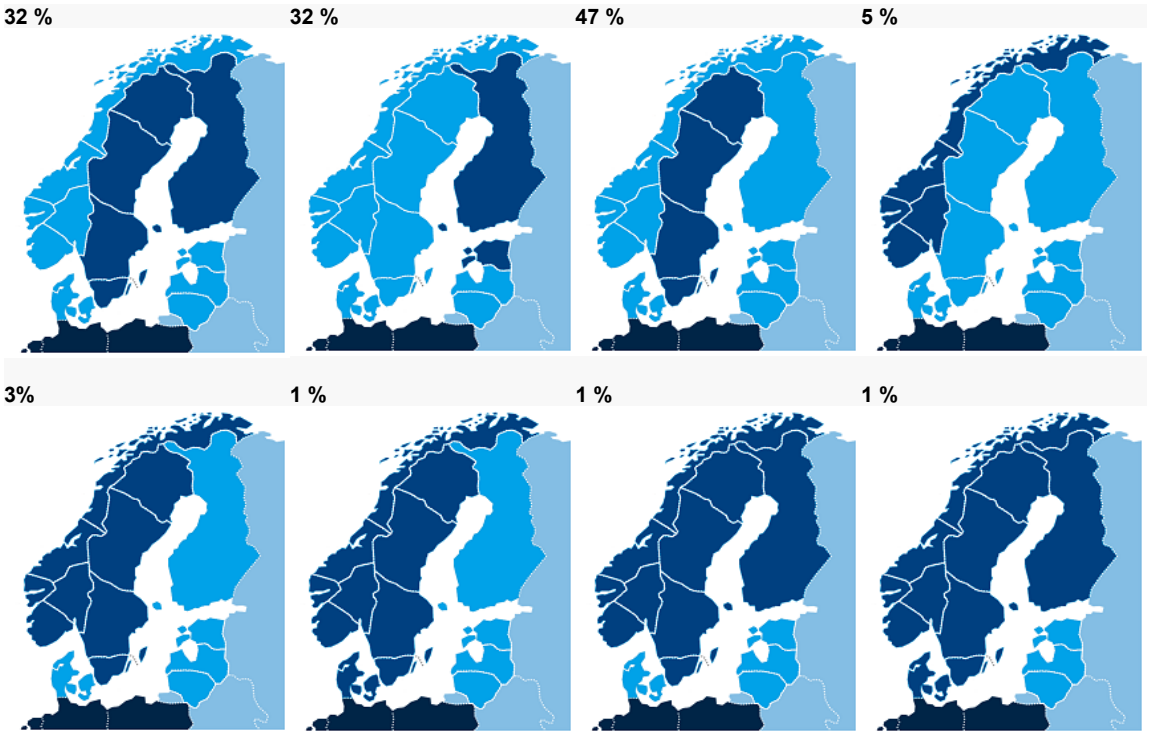

Figure 4. Percentage of hours during which different bidding zones have had equal day-ahead market prices in 2024.

Table 7 below shows on how many hours there has been a price difference between the bidding zones in 2021 - 2024.

Table 7. Number of hours when there has been a price difference between bidding zones[22] (Source: Fingrid, ENTSO-E Transparency Platform).

	2021	2022	2023	2024
Between bidding zones FI and SE1	5,225	6,422	2,968	4,338
• During hours with import SE1 -> FI	5,225	6,422	2,773	3,686
• During hours with export FI -> SE1	0	0	195	393
Between bidding zones FI and SE3	2,498	3,750	2,136	4,307
• During hours with import SE3 -> FI	2,210	2,926	1,434	2,675
• During hours with export FI -> SE3	288	824	702	1,023
Between bidding zones FI and EE	3,526	3,345	4,698	5,970
• During hours with import EE -> FI	9	0	2	622
• During hours with export FI -> EE	3,517	3,345	4,696	5,268

Transparency

In 2013 came into force transparency regulation (543/2013) which is directly applicable legislation also in Finland. In addition to this, also REMIT regulation (1227/2011) includes obligations for market participants to publish inside information, which if it were made public, would likely

[22] Hour is nominated as import hour if there has been import to the Finnish bidding zone based on the day ahead market results.

to significantly affect the prices of wholesale energy products. In addition to publication of inside information REMIT regulation also sets other obligations to improve energy market transparency.

According to REMIT regulation it is prohibited to trade on an inside information. This includes, inter alia, acquisition of a wholesale energy market product when market participant holds inside information related to that product, disclosure of inside information to a third party and recommending another person to acquire wholesale energy product based on such inside information. Energy Authority monitors markets and potentially investigates and sanctions market participants when they detect potential breach of REMIT obligations to publish inside information or prohibition of insider trading.

According to REMIT regulation market participants shall register with the national regulatory authority in the Member State in which they are established or resident of. Energy Authority maintains the national registry of market participants and approves/disapproves new participants, or any changes done to the existing one. Market participants are also obliged to report their wholesale energy market transactions and orders to trade to ACER which in turn discloses the received information on transactions and orders to trade made by Finnish market actors to Energy Authority. Energy Authority monitors markets in relation to the registry of market participants and reported transactions and orders to trade in order to detect whether all relevant parties are within the scope of REMIT.

According to the regulations, power producers, electricity users and transmission system operators have an obligation to disclosure information on events, which might have a relevant effect on price formation at the wholesale markets. They shall disclosure for example information on any plans or changes of plans for maintenances or limitations of their production units or interconnectors as well as unplanned outages and failures.

Furthermore, in Finland there are some national rules on disclosing information related to electricity power plants. According to the Electricity Market Act a power plant operator shall notify the Energy Authority of a plan for constructing a power plant, of commissioning of a power plant and of long-term or permanent decommissioning of a power plant. Further provisions on the contents of the notification obligation and notification procedure are given by Government degree.

Pursuant to the Electricity Market Act, the power plant operators are also obliged to notify the Energy Authority planned maintenance outages of their power plants practicing separate electricity generation, with an output of 100 MVA, which would take place between the 1st of December and the 28th of February. The notification shall be made at least six months before the planned starting date of the maintenance outage. The Energy Authority may order that the date of a maintenance outage of a power plant be rescheduled outside the period of the 1st of December and the 28th of February if deemed necessary to maintain the security of supply.

In 2024, Energy Authority did not receive any notification from the power plant operators on planned maintenance outages during winter period of 2024 - 2025.

3.2.2 Retail market

Some key indicators for illustrating the development electricity retail market are shown in the following table (Table 8).

Table 8. Indicators for electricity retail market (2024 numbers are preliminary).

Electricity retail market indicators	2021	2022	2023	2024*
Number of electricity customers (1000)	**3,600**	**3,590**	**3,718**	**3,753**
• Household customers (1000)	3,197	3,170	3,291	3,328
• Other customers (1000)	403	417	427	425
Number of electricity suppliers	60	54	53	49
Market share of the three largest suppliers by metering points, %	41 %	48 %	48 %	46 %
Number of retailers with market shares >5%	6	6	6	6
Number of retailers with customer shares > 5%	6	6	6	6
External switching rate, %[23]	**16.2%**	**16.3%**	**14.2%**	**14.8%**
• Households, %	16.2%	16.6%	15.1%	15.1%
• Other customers, %	17.1%	14.7%	11.6%	12.7%
Share of customers having a smart meter, %	>99%	>99%	>99%	>99%
Share of customers having different type of electricity supply contracts (as of 31 December)				
• Fixed-term contract, %	54%	50%	45%	45%
• Open-ended contract, %	37%	36%	24%	22%
• Dynamic price contract, %	9%	14%	31%	33%
Market concentration				
HHI in terms of sold energy	825-850	800-825	825-850	925-950
• Households	725-750	925-950	950-975	975-1000
• Other customers	800-825	750-775	750-775	925-950
HHI in terms of metering points	925-950	800-825	1000-1050	1000-1025
• Households	950-975	875-900	1050-1100	1025-1050
• Other customers	825-850	775-800	875-900	925-950
Evolution of the price of electricity for a typical household consumer[24], cent/kWh	**18.64**	**19.97**	**26.57**	**20.75**
• Network charges (excl. taxes)	6.38	6.20	6.26	6,68
• Energy costs and supply margin (excl. taxes)	6.40	7.65	14.56	7,80
• Taxes	5.86	6.11	5.75	6,27
Prosumers and energy communities				
Number of customers with a network service contract for partial self-generation (as of 31 December)	41,800	69.400	101,900	113,700
• of which households	37,000	61,200	91,800	101,600
Number of energy communities in distribution grids (as of 31 December)	..	..	..	280

[23] Switching rates also include switches which are due to mergers of supply companies and treated as supplier switches in data exchange.

[24] Household annual consumption 5000 kWh/year. For 2022 and 2023 the energy cost is an estimate based on SCF data. Situation as of 31.12

Electricity retail market indicators	2021	2022	2023	2024*
Number of consumption places in energy communities (as of 31 December)	..	..	..	3,300
Installed capacity of small-scale power generation[25], MW	**474.5**	**723.3**	**1018.2**	**1207.4**
• Photovoltaic, MW	390.4	637.1	926.9	1097.2
• Wind, MW	17.8	17.8	18.5	19.1
• Bio, MW	13.0	13.8	14.2	14.4
• Hydro, MW	28.1	30.2	31.0	30.5
• Diesel, MW	24.0	23.4	26.5	34.1
• Other, MW	1.2	1.0	1.2	9.3

Market opening and competition

There have been no notable changes to barriers of entry or the overall competitive situation on the market in 2024. Electricity retail supply does not require any license or registration from the Energy Authority.

The number of retail suppliers has gradually decreased during the last few years. At the end of 2024, there were 49 retail suppliers supplying electricity for households and other small-scale end-users. Five companies exited the retail market in 2024, all by selling their retail supply business and transferring their ongoing supply contracts to another company. Energy Authority gave no decisions related to these exits from the market. One new company has entered the retail market in 2024.

Only a few of the electricity retailers in Finland are fully ownership unbundled from electricity network activities. Though legally unbundled, most of the electricity retailers still belong to a same group of companies as a local distribution system operator or they are owned by one or several distribution system operators.

Six electricity retailers had a larger than five per cent share of retail market based on energy volume at the end of 2024. The same six retailers also hold more than five per cent share of metering points. The market share of the three largest companies in the retail market for small and medium-sized customers is 46 per cent.

The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) in terms of energy volumes to measure market concentration in retail market is 937. HHI based on metering points is 1008. Both numbers indicate a competitive market.

Since 2022, retail companies and DSOs are required to report to a centralised Datahub information on each metering point they service. The reported customer and consumption data is available to all entitled parties, which simplifies for example the process of switching from one retail company to another.

Self-generation and small-scale power generation

Number of customers having electricity self-generation has been increasing rapidly. This increase is mainly due to decreased costs of solar panels and high electricity prices during the energy crisis which have attracted households and small and medium enterprises to install solar panels

[25] Only generator units with nominal capacity max 1 MVA. Connected to the network at the end of December.

on their rooftops. In 2024, number of customers having an agreement with the DSO on partial self-generation increased by 11.6 per cent. At the end of 2024 over 113,000 customers had a contract for partial self-generation of which 102,000 were households.

Small scale generation[26] capacity connected to the distribution grids increased by 41 per cent in 2023.

Increase was mainly due to increase of photovoltaic capacity which increased by 47 per cent and was 922 MW at the end of 2023. According to the Energy Agency's estimate, new solar power systems were installed in nearly 30,000 small houses in Finland in 2023.

In addition, Energy Authority has estimated that there are about 23 MW of PV capacity without any grid connection. These installations are mainly in summer houses. Industrial size PV capacity was about 100 MW, but it is estimated to increase remarkably during next few years.

Figure 5 below illustrates development of small-scale power generation capacity connected into distribution grids.

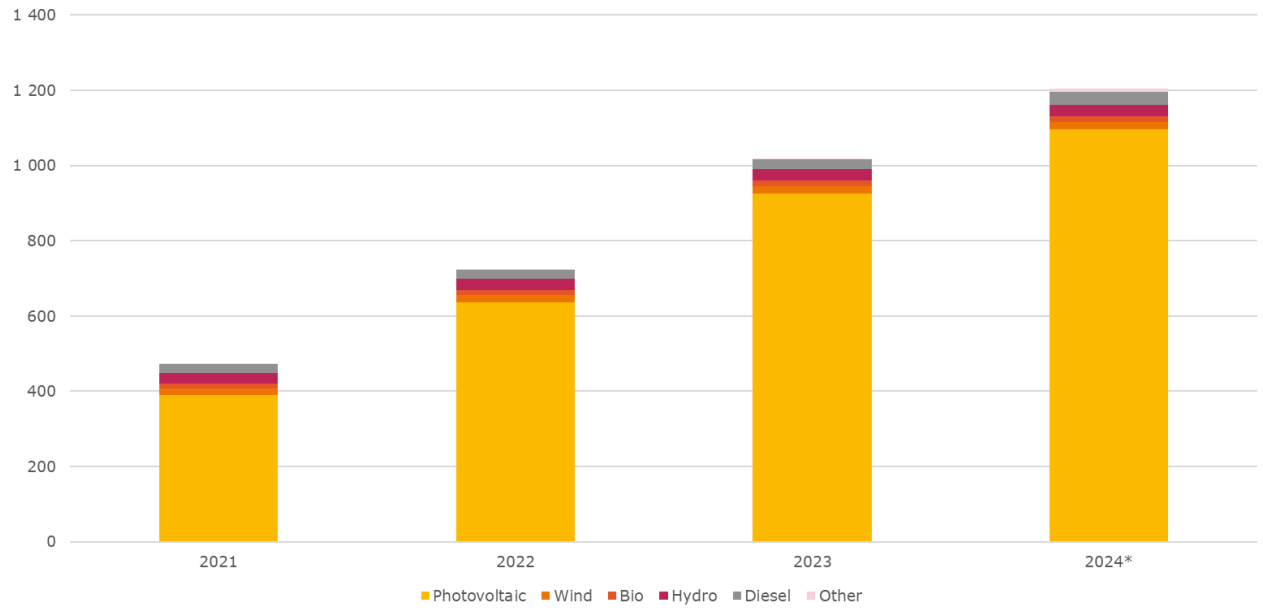

Figure 5. Installed small-scale power generation capacity with connection to the distribution grids (MW).

Price comparison tools

On 1 June 2023 came into force an Act on the Price Comparison Tool for Electricity Supply Contracts[27] which obliges the Energy Authority to maintain a price comparison tool which meets requirements set out in the Article 14 of the Electricity Market Directive (EU) 2019/944. Energy Authority has already voluntarily administrated such a tool[28] since 2006 to promote effective competition at the electricity retail market.

In 2024 new types of products started to become prevalent in the market, namely the so-called *consumption-effect* contracts. Consumption-effect contracts include a fixed price element and a variable price element dependant on when electricity is used. At the end of 2024 the price comparison tool was updated to create a new category for these products which allows users to

[26] Generator units with nominal capacity max 1 MVA
[27] Laki sähköntoimitussopimusten vertailuvälineestä (498/2023)
[28] www.sahkonhinta.fi

compare these products against each other. At the same time new categories for fixed-term contracts were introduced, allowing for a larger variety of contract lengths to be reported.

In 2024 the Energy Authority has provided a lot of advice to end-users and suppliers about the procedures and functionalities of the comparison tool. It has also addressed issues concerning different forms of abuse of the price comparison website by suppliers aiming to appear as one of the suppliers with the cheapest products.

In addition to the legal-based price comparison tool administrated by the Energy Authority, there are some other privately run comparison tools in Finland. As Energy Authority provides a comparison tool that meets the requirements set out in Art 14(1) of the Directive, Finland has chosen not to provide for the issuance of trust marks to other comparison tools.

According to the legislation, electricity suppliers offering electricity to end users in Finland who wish to publish prices in the Energy Authority's price comparison tool, shall provide the Energy Authority information on prices which are applied when supplier is offering electricity in general to the consumers and other end users, whose annual consumption is below 100,000 kWh. In addition, the legislation requires that electricity retailer with SOLR (supplier of last resort) status shall provide information to the Energy Authority on prices, which are applied when supplier is offering electricity in general to the consumers and other end users, whose annual consumption is below 100,000 kWh.

Prices

In Finland, electricity suppliers can decide retail prices freely. For retail supply, there are no regulated tariffs which should be approved by the Energy Authority or any other authorities before taking into use.

The evolution of prices of new supply products during 2022-2024 is shown in the following figure (Figure 6). This figure uses data of prices reported in the comparison tool provided by Energy Authority (sähkönhinta.fi).

The start of 2024 saw an increase in spot-prices, which reflected noticeably on the open-ended fixed price contracts offered on the market. Prices of futures were not as affected, so the prices of fixed-term contracts remained stable throughout the year. As spot-prices decreased during summer, also the open-ended contract prices started to decrease. Overall, the retail market prices have stabilized to a normal level after the energy crisis of 2022. Increased price volatility on the spot-market has however made especially open-ended fixed price contracts more expensive than before the energy crisis.

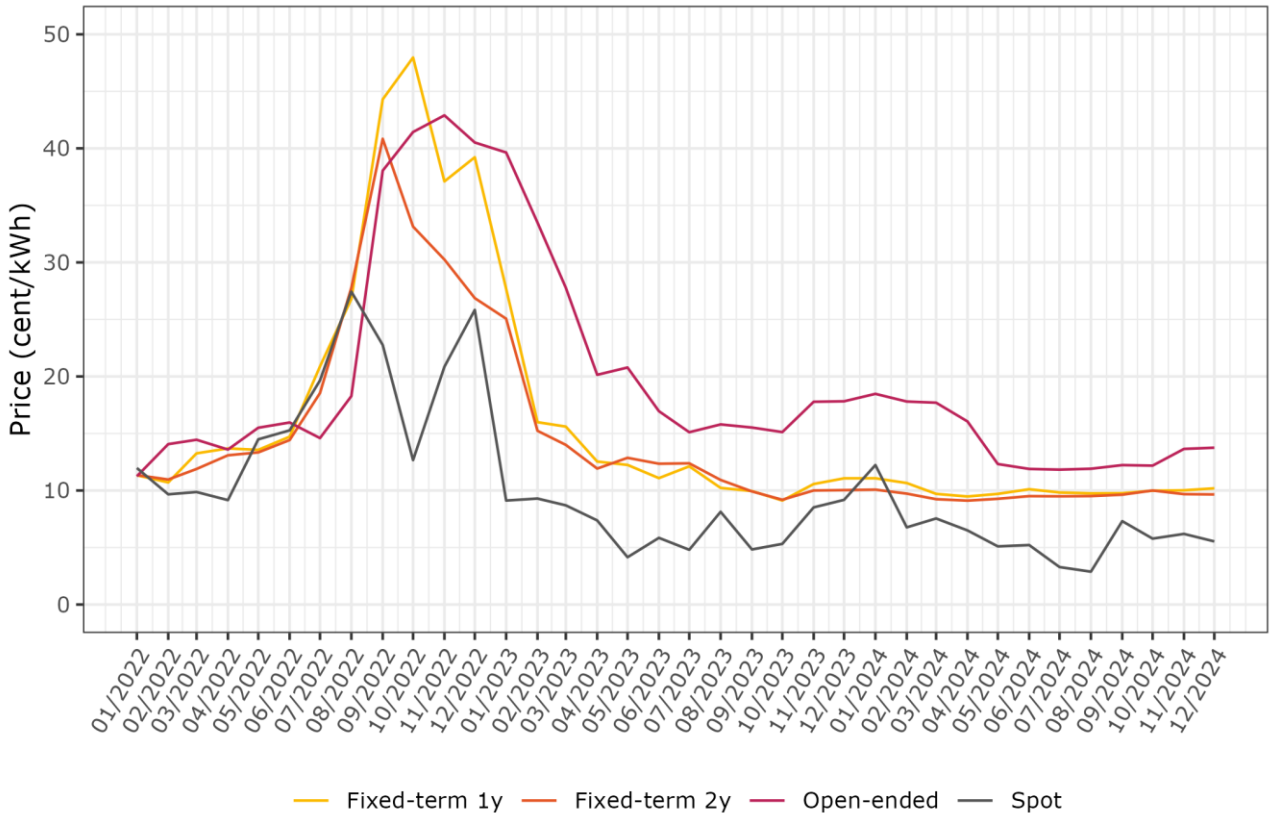

Figure 6. Price of offered new electricity supply contracts for a household customer (annual consumption 5,000 kWh) in different contract types (cent/kWh, incl. VAT, excl. grid charges and electricity taxes).

Based on information from Statistics Finland, for a customer with 5,000 kWh annual consumption, the average price paid for electricity excluding taxes and network costs has fallen in 2024. The average price paid in December 2024 was 24 per cent lower than in December 2023. Price of electricity distribution grid services excluding taxes has not changed on average between 2023 and 2024.

Finland saw a general VAT increase in September 2024. The VAT rate was changed from 24 per cent to 25,5 per cent, and this applied also to electricity. The market-based price decreases have been larger than the VAT increase, resulting in an overall decrease in prices despite the increase in VAT.

Consumption of electricity is subject to the electricity excise tax, strategic stockpile fee and general VAT (25,5 per cent). Strategic stockpile fee (0.013 cent/kWh) is paid by all end users. Strategic stockpile fee and electricity excise tax are collected by the DSOs and TSO based on amount of electricity delivered to end-use. Electricity excise tax has two categories:

- in category I tax is 2.253 cent/kWh and it is paid by households, public sector, agriculture and services;
- in category II tax is 0.063 cent/kWh and it is paid by industry, mining, greenhouses and data centres.

At the end of 2024, about 33 per cent of retail customers had a dynamic electricity price supply contract. Share of dynamic priced contracts increased by 2 percentage points from 2023. The most popular supply contract type among Finnish end users has been a fixed-term contract during last few years. At the end of 2024 about 45 per cent of retail customers in Finland had a fixed-term supply contract. Most commonly, fixed-term contracts are made for one or two years.

About 22 per cent of retail customers had an open-ended supply contract which customer may terminate with two weeks' notice. The share of such contracts decreased by 2 percentage points compared to 2023.

Prepayment systems

In Finland, prepayment meters are not in use. Since almost all customers have a smart meter in Finland, suppliers and distribution system operators commonly offers their customers a choice for billing based on their actual electricity consumption.

However, suppliers and distribution system operators are allowed to offer prepayment systems in order to invoice end users in advance based on the estimation. If they offer these kinds of systems to household customers, the system shall adequately reflect likely annual electricity consumption.

Dynamic price contracts

On 1 June 2023 came into force amendment to the Electricity Market Act which requires that all retailers supplying electricity to more than 200,000 customers have to offer dynamic priced contracts provided that the customer is connected into distribution network and has a meter capable for metering with required accuracy. There is a similar requirement also for all retailers having the SOLR (supplier of last resort) status. However, retailers having the SOLR status may not offer dynamic priced contracts only.

Currently all electricity retail companies operating nationwide in Finland offer their customers a dynamic electricity price contract, where electricity price varies every hour and is bound to day-ahead spot prices added with the supplier's fixed margin.

At the end of 2024, about 33 per cent of retail customers had a dynamic electricity price supply contract. Share of dynamic priced contracts increased by 2 percentage points from 2023.

There was great price volatility in the day-ahead spot market during 2024, with January having much higher than usual prices whereas July and August saw very low prices. These fluctuations also have a direct impact on those consumers' bills who are on a dynamic price contract. Using average consumption data from the Finnish TSO for a consumer with a small house with electric heating and an annual consumption of 11,000 kWh, the average monthly cent/kWh price for a customer on a dynamic price contract varied in 2024 between 1–12 cents/kWh. The most expensive month was January, with the price reaching 12 cents/kWh. For all the other months of the year the price was below 6 cents/kWh, with the cheapest month, August, reaching 1,2 cent/kWh. The average price of a dynamic priced contract was lower than all other types of products for every month excluding January.

In 2024 contract types that mix a fixed price element with a variable price element dependant on spot-prices became more common on the market. These products are aimed at providing customers a chance to benefit from switching their consumption to a cheaper time while providing security from the full variance of the day-ahead spot market. These types of contracts see much smaller price fluctuations than regular dynamically priced contracts.

Smart meter use

More than 99 per cent of consumption places in Finland had already a smart meter. The Finnish national legislation requires that each DSO should have hourly registering smart meters installed

in at least 80 per cent of consumption places by the end of 2013. In August 2021, the Government adopted updated regulation for balance settlement and metering which also defines technical requirements for the 2nd generation of smart meters.

Since May 2023 consumption and production are metered either with granularity of one hour or 15 minutes and balance settlement is done in 15 minutes periods, including also households in Finland. All hourly meters should be capable for metering with 15 minutes resolution by the end of 2028. Currently, about half of the energy meters are already metering consumption with 15 minutes resolution. Metering with 15 minutes resolution is necessary for customers to gain full benefit after day-ahead market will move to 15 minutes market time unit.

Regarding roll-out of 2nd generation of smart meters, the national regulation requires that the network operator may until June 30, 2025, in individual cases, install hourly metering equipment at the electricity usage location, if the electricity usage location's metering equipment is damaged and the network operator has not yet started replacing the electricity metering equipment with new remote metering equipment. In addition, DSOs must replace the hourly metering smart meters used to measure the point of electricity use and small-scale electricity production with new remote metering equipment by July 4, 2031 at the latest.

Switching rates

In 2024 the number of end users switching electricity supplier slightly increased compared to 2023. In 2024, the switching rate was 14.8 per cent of all electricity end users (14.2 per cent in 2023). This corresponds to approximately 555,000 end users.

For household customers the switching rate was 15.1 percent in 2024, the same as 2023. For other customers, the switching rate increased to 12.7 percent from 11.6 percent in 2023.

These figures include also supplier switches which are only due to mergers of existing suppliers.

Distortion or restriction of competition

The Competition and Consumer Authority protects sound and effective economic competition by intervening, where necessary, in restrictive practices, such as cartels and abuse of dominant position.

The Energy Authority may report relevant information to the Competition and Consumer Authority, but such cases have not occurred in 2024. The Energy Authority, on its own behalf, supervises the compliance with the Electricity Market Act containing also some prohibitions to use terms and conditions limiting competition within the electricity sales.

In 2019, Energy Authority established a Smart Grid Forum to support national implementation of smart grid provisions of the Clean Energy Package and proposals from Smart Grid Working Group which was set by the Ministry of Economic Affairs and Employment and submitted its final report in Autumn 2018. The Smart Grid Forum consisted of representatives from the Ministry, the Competition and Consumer Authority and relevant stakeholder organisations representing consumers and electricity companies.

Based on discussions at the Smart Grid Forum, the Energy Authority prepared and submitted in July 2021 to the Ministry a proposal[29] to amend national legislation to facilitate so-called combined billing of energy and grid charges to foster competition in retail market. The proposal

[29] https://energiavirasto.fi/documents/11120570/120184679/Energiavirasto+esitys+s%C3%A4hk%C3%B6n+myynnin+ja+jakelun+maksujen+yhteislaskutus+1548-403-2021.pdf/4311167c-b361-d387-11a8-0851d8d30f01/Energiavirasto+esitys+s%C3%A4hk%C3%B6n+myynnin+ja+jakelun+maksujen+yhteislaskutus+1548-403-2021.pdf?t=1652265595978 (in finnish)

includes suggestions for necessary practical processes and arrangements to enable voluntary combined billing in which supplier and customer may agree on that the customer will receive from the supplier only one electricity bill which includes both energy and grid payments. Amendments into provisions at the Electricity Market legislation to facilitate combined billing were included in the Government proposal which was submitted to the Parliament in November 2024. However, during the approval process the Parliament rejected these provisions.

3.2.3 Consumer protection and dispute settlement

The consumer authorities are in general responsible for consumer protection in Finland. The Finnish Competition and Consumer Authority ensures that the practices companies use in marketing and their customer relations are appropriate and the contract terms applied by them are reasonable. The Consumer Ombudsman supervises that the Consumer Protection Act and other laws passed to protect consumers are observed.

The Energy Authority monitors the transmission system operators', distribution system operators' and suppliers' overall compliance with the electricity and natural gas market legislation. In particular, the provisions in the legislation concerning electricity and natural gas contracts are aimed at ensuring the minimum protection for household consumers.

Monitoring the retail electricity market is an ongoing process and the Energy Authority follows the market closely in order to ensure that illegal practices are met with due investigations and sanctions. The scope of issues is under constant review and possible courses of action are explored continuously. The Energy Authority has powers to impose necessary and proportionate measures to promote effective competition and to ensure the proper functioning of the electricity market.

Complaints by household customers

In 2024, the Energy Authority received 17 complaints from household customers related to electricity distribution system operators and suppliers. The Energy Authority opened two new investigations related to electricity distribution system operators and suppliers in 2024.

In 2024, the Energy Authority made decision in three cases related to electricity distribution system operators and suppliers. Some of these cases were already received in previous years.

These statistics do not include the phone calls or other written inquiries from customers or other market participants received during the year. The requests for investigation and other inquiries fell into the following categories: connection charges, network tariffs, quality of supply, metering, contractual issues, invoicing, disconnections, reasonableness of electricity prices under the obligation of supply and compensation to the distribution system operator for the costs of supplying electricity.

Disconnection rates

The Energy Authority does not collect data on disconnections due to non-payment or for other customer-related reasons.

Restrictive contractual practices

Under section 102 § of the Finnish Electricity Market Act, DSOs are obligated to ensure electricity supply for consumers whose supplier stops supplying electricity for at least for a 3-week period.

The consumer must compensate to the DSOs the reasonable costs of supplying the electricity. If the consumer and the distribution system operator cannot agree on the compensation, the Energy Authority determines the amount of compensation. In 2022, due to the exit of some electricity companies from the market, some customers had to rely on their DSOs for electricity. The Energy Authority received several requests for investigation concerning the compensation of electricity supply costs to the distribution system operator.

In 2024, the Energy Authority gave three decisions on compensation to the distribution system operator for the cost of supplying electricity. In these decisions, the Energy Authority assessed whether the prices charged by the DSO were reasonable. The Energy Authority didn't set any specific price or price range that would be considered reasonable.

During 2024, the Energy Authority was also handling several advice requests from customers. The Energy Authority received a large number of consumer complaints and advice requests especially regarding prices of their electricity supply contracts and obligations for retailers to inform their customers on changes in contract prices.

As the Energy Authority does not have jurisdiction to investigate the basis for the contractual changes, some of these consumer complaints and requests for advice were redirected to the Finnish Competition and Consumer Authority instead, thus using the resources of both Authorities.

Protection of energy poor and vulnerable household customers

Energy poverty or vulnerable customers are not defined in the national energy legislation. The definition of a vulnerable consumer is considered to be included in Article 19 of the Finnish Constitution, from which the right to social security is derived. The definition is complemented by the Social Assistance Act. In addition, the Electricity Market Act does contain some restrictions to disconnection due to non-payment to protect household customers in specific circumstances. If the non-payment is caused by the end user's financial difficulties due to serious illness, unemployment or some other special cause, principally through no fault of their own, the disconnection may take place at the earliest two months after the due date of the payment. Furthermore, the disconnection due to non-payment is not allowed between the beginning of October and the end of April in an electrically heated building or in a part of a building that is used as a permanent residence, until four months have elapsed since the due date of the outstanding payment.

According to the Electricity Market Act an electricity retailer with a significant market power or the highest market share within the area of responsibility of a distribution system operator has so-called obligation to supply. The obligation means that the retailer shall supply electricity at reasonable prices to consumers and other users of electricity whose place of use is equipped with main fuses of 3x63 amperes at maximum or whose site of electricity use receives annually no more than 100,000 kWh of electricity. Terms and conditions regarding this obligation shall not include any unreasonable provisions or limitations that would restrict competition within electricity trade. The Energy Authority may order the retailer referred to here to sell electricity to the customers within the obligation to supply.

The prices of electricity within the obligation to supply system do not have to be approved by the regulator before the supplier takes them into use. By virtue of the Electricity Market Act the Energy Authority may investigate either on the basis of a complaint or at its own initiative the pricing of electricity within the obligation to supply. In 2022, the Energy Authority received several complaints regarding the pricing of electricity within the obligation to supply and opened investigations regarding 17 different companies. Several of these cases were still ongoing in 2024.

In 2023 the Energy Authority gave its first decision regarding the pricing of electricity within the obligation to supply. In the decision, the Energy Authority assessed whether the pricing for contracts under obligation to deliver were reasonable. In its decision the Energy Authority didn't define any specific allowed maximum price or an exact price range that would be considered reasonable. Instead, Energy Authority assessed the issue by comparing development of prices of offered retail price contracts in general to the development of wholesale day-ahead market prices and forward contract prices. In addition, Energy Authority compared individual company's prices to the respective offered competitive contracts offered in the retail market. Energy Authority considered in its decision that, while retail supply under obligation to supply is competing with other supply offers, there is no reason to doubt unreasonable pricing as long as movements in retail prices in general reflect the development of wholesale prices and individual company's prices are below offered respective supply contracts under competition.

Safeguard measures against interruptions in electricity supplies

The Electricity Market Act includes specific provisions for situations when electricity supply to an end user would be to be interrupted due to reasons attributable to the retailer like in the case of a bankruptcy.

In such situations, before the DSO may interrupt the electricity supply, the DSO shall notify the affected end users of the interruption and the reasons behind it. In addition, the DSO has the responsibility to continue supplying electricity for those customers for at least three weeks since the DSO has notified them about the interruption and since the retailer has ended its supplies.

The amendment to the Electricity Market Act, which came into force on June 1, 2023, further requires that, if the end user is a household consumer, the DSO shall continue the supply until the Energy Authority transfers the end user to a retailer which has the obligation to supply within that area.

In 2024, there were no situations where supply of electricity to end users was going to be interrupted due to reasons attributable to retailers.

In such situations the end user shall compensate the DSO for the reasonable costs incurred for the supply of electricity. If the end user and the DSO do not agree on the compensation, the Energy Authority determines the amount of compensation.

In 2024 the Energy Authority made three decisions related to the amount of compensation to a DSO. These cases were related to situations where the DSO had the responsibility to continue electricity supply to end users due to a supplier's bankruptcy in 2022.

Obstacles to and restrictions of consumption of self-generated electricity and citizen energy communities

Electricity customers may install own small-scale power generation facilities like PV panels to the roof-top of their apartment by notifying the DSO and use this self-generated energy in the same facilities. In case they have surplus of generated energy, they may conclude a contract with party who is willing to buy the surplus. The regulation does not include provisions concerning pricing of this surplus energy and usually the price reflects current wholesale prices.

Increasing number of customers have installed PV panels to cover part of their electricity consumption with a self-generated energy. Also, some housing companies have been interested to invest own PV generation and to share surplus of self-generated energy between the members of the housing company.

In 2020, the Ministry of Economic Affairs and Employment prepared legislative amendments to improve local energy communities' possibilities to consume and share self-generated energy within a local energy community. These amendments into the Government Decree entered into force in January 2021. New provisions facilitate to distribute self-generated electricity among the community or the group of active customers on the same property or group of properties. The regulation also applies, under defined prerequisites, to individual end-users and thus improves their opportunities to utilize self-generated electricity as well. The decree stipulates the rules for netting of consumption and production in the balance settlement and calculating the compensation of jointly produced electricity for each consumption point. The transitional period of the decree ended on January 1, 2023, and since then the netting and calculation of compensation inside the imbalance settlement period has been done by the Datahub.

At end of 2024, there was 280 local energy communities at the distribution grids. These energy communities consisted of 3,300 consumption points.

Dispute settlement

The Energy Authority does not have powers for dispute settlements between energy users and energy companies in individual contractual disputes.

In Finland, the disputes between household consumers and energy companies in individual cases may be solved in the Consumer Disputes Board which is a neutral and independent expert body whose members represent consumers and business in a balanced way. The Boards gives solution recommendations for legal disputes between consumers and energy companies. A dispute handled by the Board can always be taken to a court of law. Furthermore, the Consumer Advisory Service is a national service that provides information on consumer rights, and mediation assistance in disputes between household consumers and energy companies.

The Consumer Ombudsman may assist a household consumer in an individual dispute in the court if the issue carries significant impact or the entrepreneur is not compliant with the decision of the Consumer Disputes Board. The Consumer Ombudsman may also bring group complaints to the Consumer Disputes Board or initiate class actions, for instance, against a network operator or supplier and act as the representative of the plaintiffs in a general court of law.

Individual disputes between non-household customers and energy companies are solved in a general court of law or in an arbitral tribunal if agreed so. The Parliament adopted in February 2023 a new law on dispute settlement between business customers and energy companies as required by the Directive (EU) 2019/944. Legislation regarding an independent Energy Market Disputes Board to specifically solve contractual disputes between energy companies and business customers entered into force on 1 September 2023.

National measures in response to high prices during the energy crisis

At the end of the 2022 and in 2023 the government designed and introduced a series of measures to help consumers affected by the high electricity prices caused by the energy crisis.

In autumn 2022, the Finnish Parliament approved a temporary law to reduce VAT on electricity sales from 24 per cent to 10 per cent, excluding network-related charges. The VAT reduction was valid from 1 December 2022 to 30 April 2023 and was intended to mitigate the impact of electricity price increases on households and to improve households' purchasing power in times of high inflation.

Starting from January 2023, taxpayers with high electricity costs could apply a tax credit from the Tax Authority. The deduction could be claimed for costs incurred between January and April 2023. If the total cost of electricity for a four-month period exceeded EUR 2,000, the customer

was entitled to a tax credit. The amount of the credit was 60 per cent of the amount exceeding EUR 2,000. The maximum credit was EUR 2,400 per permanent residence. The electricity tax credit was not available for summer cottages, holiday homes, etc. The tax credit applied only to the cost of supplying electricity. The deadline for applying for the tax credit was spring 2024.

Alternatively, if the household's income was too low to apply a tax credit, they could apply to Kela for temporary electricity assistance instead. The customer could receive assistance with electricity costs from Kela for electricity costs incurred in a permanent dwelling for the period from 1 January to 30 April 2023. The assistance was available for the electricity costs of one dwelling only, and this dwelling had to locate in Finland. The amount of the assistance was 60 per cent of the amount of the electricity bill, excluding the cost of electricity transmission and the own liability of EUR 400. The maximum amount of assistance was EUR 660 per month. The application period for the electricity subsidy ended on December 31, 2023. Kela paid a total of EUR 620,000 in temporary electricity assistance to applicants.

In March 2023, temporary acts on retroactive reimbursement for electricity costs and extended payment periods of electricity bills came into force.

According to the law on extended payment periods of electricity bill retail customers were entitled by request for an extended payment periods of electricity bill related to energy consumption during period 1 January 2023 – 30 April 2023. The maximum extension was for non-commercial end users 120 days and for commercial customers 60 days.

The temporary law on retroactive reimbursement for electricity supply costs for consumers was for realised supply costs during November 2022 – January 2023. The amount of the reimbursement was 50 per cent of the amount of the electricity bill, excluding the cost of electricity transmission and the own liability of EUR 90 per month. The maximum amount of reimbursement was EUR 700 per month. The reimbursement for costs in January 2023 was paid double. In addition, for being eligible for the reimbursement the average monthly supply price should have been more than 10 cent/kWh unless the consumer has had a dynamic priced supply contract who were always eligible if their monthly electricity bill exceeded the own liability of EUR 90 per month.

The reimbursement was paid automatically to the consumers entitled to it as a deduction to their electricity bill made by the electricity company. Electricity companies paid the reimbursement in two instalments: in the electricity bill due in April 2023, or the first electricity bill after that and in the following electricity bill. Under certain conditions, electricity companies could apply to the Energy Authority for permission to derogate from the payment schedule if they had difficulties to upgrade their IT system. Twelve electricity retailers applied for a derogation from the payment schedule, and the Energy Agency granted an extension to all of them.

In cases where the end user and retail seller disagreed on the reimbursement to be paid, the end users had the right to refer the matter to Energy Authority. The Energy Authority received and resolved 868 applications related to disagreement on the reimbursement to be paid to the end user. Most of these cases concerned the question of whether end users who had signed their electricity contract with a business ID were entitled to reimbursement.

In addition, retailers and end users had the right to make a rectification request concerning a decision made by the Energy Authority. The Energy Authority received and resolved 42 rectification requests concerning decisions made by them regarding reimbursements for supply costs.

Reimbursements were paid a total of EUR 223 million, of which the Energy Authority obligated companies to pay a total of EUR 357,568.

Gas market

4.1 Network regulation

The Finnish natural gas market was opened for competition on January 1, 2020. In the initial phases of competitive market, the approval decisions on terms and conditions for capacity allocation and transmission services were given only for a term of one year to gain practical experience from open gas markets. The approval decisions made in 2021 on terms and conditions for capacity allocation and transmission services for 2022 onwards was made until further notice because gained experience of the open gas market has showed that the terms and conditions are sufficient to support efficient and transparent functioning of the open gas market.

Some key indicators on gas networks are presented in the following table (Table 9).

Table 9. Indicators for gas grids

Indicators	2021	2022	2023	2024
Maximum gas daily consumption TWh/d[30]	0.179	0.114	0.078	0.130
Transmission pipeline entry capacity TWh/y HCV[31]	109	82	51	na
Transmission pipeline exit capacity (exports) TWh/y HCV[32]	29	29	29	na
LNG Gas Storage Capacity nm3[33]	80,000	258,806	261,000	261,000
LNG Regasification Capacity GWh/day	-	6	146	146
Number of TSOs	1	1	1	1
Number of DSOs	17	17	16	16

4.1.1 Unbundling

Unbundling of TSO

Prior to 2020, there was neither legal nor operational requirements in place for unbundling of natural gas transmission network operation. The only wholesale supplier of natural gas – Gasum Oy – was also the sole importer and operator of the transmission system until end of 2019. TSO activities were unbundled only in accounts.

Due to the Natural Gas Market legislation, gas transmission system operations were ownership unbundled from electricity and gas generation and supply by the 1 January 2020. A new gas TSO Gasgrid Finland Oy was unbundled through a partial demerger from Gasum Oy that entered into force on 1 January 2020. Furthermore, duties related to the ownership steering of Gasgrid Finland Oy was transferred to the Ministry of Finance on 1 January 2020 to fulfil ownership unbundling requirements of Gasgrid Finland Oy as the duties related to the state ownership steering of Gasum Oy as well as other state-owned energy generation and supply companies remained within the Prime Minister's Office.

[30] energy volumes are expressed by using higher calorific value.
[31] Technical capacity without limitations (caused for example by compressor station delays)
[32] Technical capacity without limitations
[33] Storage capacity in off-grid LNG terminals is 80 000 nm3. Numbers since 2022 include also storage capacity located in LNG terminals in Hamina and Inkoo. In Finland there are no other gas storages.

Gasgrid Finland Oy submitted its application for the certification of the TSO to the Energy Authority in January 2020. Final certification decision was given on 19 August 2020. Gasgrid Finland Oy is fully owned by the State of Finland.

The Energy Authority has had a process with Gasum Oy first in the Market Court and continuing in the Supreme Administrative Court concerning accounting unbundling and cross subsidization in financial statements 2017 - 2020. In its decision on March 28, 2024, the Supreme Administrative Court has with minor exceptions ratified the cross-subsidy decisions issued by the Energy Authority to Gasum Oy. The Energy Authority is continuing the process in the Market Court regarding the penalty payment proposal for Gasum Oy.

Unbundling of DSO

Legal and operative unbundling requirements are not required from distribution network operators in Finland as Member States may decide that the unbundling provisions are not applied to network operators with less than 100,000 customers. All Finnish natural gas distribution system operators fall below the limit set by the Directive.

The accounting unbundling requirement applies to all distribution system operators. The accounting unbundling is also required in the companies, which have other activities besides natural gas network business if these activities are not relatively small. As a relatively small activity has been considered such business activities, whose annual revenue is less than 10 per cent of total revenue of the company's natural gas supply operations.

4.1.2 Network extension

According to Finnish national legislation, gas transmission system operator does not have obligation to prepare and submit to the Energy Authority national network development plans for review. Thus, Energy Authority does not have power to monitor national network investment plans and assess the consistency with Union-wide ten-year network development plans (TYNDP).

4.1.3 Network and LNG tariffs for connection and access

Regulation of gas network tariffs and charges

According to the Natural Gas Market Act, the gas transmission and distribution system operators (TSO and DSOs) may set the actual network tariffs and charges by themselves. There is no ex-ante approval of tariffs or prices of network services by authorities.

However, the Energy Authority confirms ex-ante the methodology to be used in revenue cap regulation applied in setting transmission and distribution network tariffs and methodology for connection charges. The Energy Authority shall approve ex-ante also the terms and conditions of network and connection services before the network operators are able to implement them.

The methodology for revenue cap regulation of gas transmission and distribution network tariffs is confirmed by the Energy Authority prior to each regulatory period. After end of the regulatory period, the Energy Authority will validate the earnings of each network operator in its supervision decisions for the whole regulatory period and will confirm the amount of any accrued earnings that exceed or fall short of reasonable earnings for the regulatory period. Where necessary, the supervision decisions will include an obligation to return to the customers any excess profit for the completed regulatory period through pricing for the new regulatory period. The supervision decisions will correspondingly confirm that the network operator may allow in its pricing for the

new regulatory period, for the amount by which the earnings accruing to the network operator from the previous regulatory period fell below the reasonable earnings level.

The length of regulatory periods is four years. In November 2023, the Energy Authority confirmed with its decisions the methodology to be followed in natural gas system operation during the fifth and sixth regulatory periods in 2024 – 2027 and 2028 - 2031.

Based on Article 26 of Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonized transmission tariff structures for gas (TAR NC) Gasgrid Finland Oy started hearing of the tariff methodology in early 2020. In October 2020, Energy Authority approved the reference tariff methodology in line with tariff network code (2017/460, TAR NC). TSO shall use the reference tariff methodology in setting tariffs from 1 January 2021.

After end of derogation in the beginning of 2020, Gasgrid Finland Oy started hearing of the tariff methodology in early 2020. In October 2020, Energy Authority approved the reference tariff methodology in line with tariff network code (2017/460, TAR NC). TSO should use the reference tariff methodology in setting tariffs from 1 January 2021.

In accordance with Article 28 of TAR NC the Energy Authority conducted a consultation with the national regulatory authorities of all directly connected Member States and the relevant stakeholders on the following:

- the level of multipliers;
- if applicable, the level of seasonal factors and the calculations set out in Article 15; and
- the levels of discounts set out in Article 9(3) and 16.

The latest consultation on the matter was open from 15th until 29th November 2022. The Energy Authority gave in November 2023 a motivated decision on the level of multipliers, seasonal factors and discounts.

Regulation of LNG tariffs and access

As all off-grid LNG terminal projects in Finland have received state-aid, European Commission has requested that the regulation concerning the 3rd party access and ex-ante approval of terminal tariffs shall be applied to those LNG terminals. This concerns also off-grid terminals. Tariffs are in force for a maximum time span of two years at once.

In December 2023, the Energy Authority approved tariffs for the LNG terminal in Pori and in March 2023 the Energy Authority approved tariffs for the LNG terminal in Tornio. LNG terminals in Pori and Tornio are off-grid terminals serving local industrial customers.

In September 2023, the Energy Authority approved tariffs for the Hamina LNG terminal. The third LNG terminal in Hamina opened for commercial operation on 16 September 2022. The Hamina terminal is the first on-grid LNG terminal in Finland. Its storage capacity is 30,000 nm3 and injection capacity is 6,000 MWh/d. The Hamina LNG terminal is connected to both the low-pressure DSO network and high-pressure TSO network.

In December 2022 floating LNG terminal vessel Exemplar (FSRU) anchored in the harbour at Inkoo, Finland. Its maximum storage capacity is 148,806 nm3 and the injection capacity is 140 GWh/d. The Inkoo LNG terminal is connected to both the high-pressure TSO network.

In November 2022, the Energy Authority approved tariffs for LNG terminal in Inkoo. On November 30, 2022, the Energy Authority granted the terminal operator, Floating LNG Terminal Finland Oy, the right to limit the use of the floating LNG terminal ship for ten years. The decision makes it possible that liquefied natural gas of Russian origin will not be handled on the terminal.

In April 2023, the Energy Authority approved terms and conditions and tariffs for the use of LNG terminal in Inkoo for the period of 1 October 2023 – 1 October 2024. However, due to damage in Balticconnector pipeline on 8 October 2023, it became necessary to make some amendments to the terms and conditions to ensure smooth operation of Inkoo LNG terminal, which were approved by the Energy Authority on 18 October 2023 for the period of 19 October 2023 – 15 April 2024. The Energy Authority approved on 23 October 2023 further amendments to the rules of using Inkoo LNG terminal for the period of 20 October 2023 – 1 October 2024. In addition, further amendments to the terms and conditions from 14 February 2024 were approved by the Energy Authority in February 2024. In April 2024, the Energy Authority approved terms and conditions for ther LNG terminal in Inkoo for the period on 1 October 2024 – 31 December 2024.

In July 2024, the Energy Authority approved terms and conditions and tariffs for the use of LNG terminal in Inkoo and the terminal rules for the period on 1 January 2025 – 1 January 2026.

4.1.4 Balancing

Energy Authority approves the terms and conditions for the gas market under the Act on the Regulation of the Electricity and Gas Markets (590/2013), including the main principles of the balancing in Finland. The rules approved in 2020 are still applicable and no changes to the balancing rules are made after the year 2020. These approved terms and conditions also include the methodology used to calculate the provision of balancing services.[34]

Finnish Transmission System Operator (TSO) with system responsibility, Gasgrid Finland, is responsible for balancing in the Finnish gas system. Gasgrid Finland is also responsible for the for the physical balance of the Finnish gas system and for organizing both balancing and balance settlement. Gasgrid takes care of the physical balancing by optimizing the level of pressure.

The balancing period is the gas day, which commences at 7:00 am and ends at 7:00 am on the following day. A shipper's or trader's injections and withdrawals of gas energy must be of equal quantity over the period in question, that is, participants are responsible for their own commercial balance in the market.

A shipper or trader may act as a balance responsible party by itself or outsource balance responsibility to another shipper or trader. The market model enables multiple ways of achieving balance as, in addition to forming and merging balance groups, participants may buy/sell gas over the counter between each other or on a gas exchange or, alternatively, export gas via the Balticconnector.

4.1.5 Cross-border issues

The Balticconnector pipeline, a link between the Finnish and Baltic gas networks, was commissioned in December 2019. The commercial operations of the link started on January 1, 2020. Prior to that there were no other interconnections except for the Imatra entry point for gas importing from Russia. Gas flow from Russia was suspended on May 20, 2022.

According to national regulation, TSO has obligation to submit their capacity allocation and congestion management rules to NRA for confirmation. In November 2021, the Energy Authority approved capacity allocation methodology applicable in the Balticconnector interconnection point for an indefinite period. The decision was coordinated with the Estonian national regulatory authority. In the approved methodology auctioning at Balticconnector is not applied, but instead

[34] Unofficial English translation of the Terms and Conditions of Balancing can be found here: https://gasgrid.fi/wp-content/uploads/Terms-and-conditions-of-balance-management-2.0-unofficial-english-translation.pdf .

capacity is allocated implicitly (CAM NC 30 article). However, Energy Authority takes the changing market situations into account and, if reasonable, will re-assess the approved methodology.

Regarding the designing of provisional/final transmission and distribution tariffs or methodologies, see chapter 4.1.3.

The Energy Authority is appointed to resolve conflicts against TSO, DSO and LNG operators, in relation to that operator's obligations under the directive.

Since 2017, Finland and the Baltic states have been working actively towards the achievement of the gas market integration of the four countries. Established for this purpose, the Regional Gas Market Coordination Group (RGMCG) meets around four times a year. Participating in the work of RGMCG are the countries' ministries for energy, transmission system operators and authorities supervising the energy market.

During 2021-2022 the Finnish and Baltic transmission system operators have been working on the proposal for 4-country single entry tariff zone, without internal cross-border entry and exit fees. In November 2021, the national regulatory authorities of Finland, Estonia, Latvia, and Lithuania received an application from the TSOs for a coordinated opinion on gas transmission entry tariff and inter-transmission system operator compensation mechanism among Finnish, Estonian, Latvian and Lithuanian gas TSOs. The objective was that the 4-country single entry tariff zone should enter into force from the beginning of gas year 2023. However, on 12 October 2022 FinBalt NRAs chairs agreed to postpone FinEstLat and Lithuanian gas market merger determining that merger could happen no sooner than in October 2024. This decision was taken because the geopolitical situation in 2022 has caused significant changes in the fundamentals of the region's gas market. Consequently, the ITC mechanism, which was developed based on other assumptions about the functioning of the market, no longer corresponds to the current situation and may not provide benefits to all parties involved.

On January 20, 2023, TSOs proposed to postpone the submission of updated or new ITC application of four country ITC mechanism until the new region's gas supply model is stabilised and the role of the region's gas infrastructure in supply of gas beyond the borders of the region has become clear. Consequently, the market merger was postponed once more and did not materialise in 2024 either.

Energy Authority does not have the competence to monitor investment plans and assessment of consistency with Union-wide network development plan, PCIs and national development plans.

4.1.6 Implementation of Network Codes and guidelines

Finland decided to end the derogation from applying certain provisions from the European natural gas market regulation, e.g. network codes from January 1, 2020. Since then, the network codes have been applicable in Finland.

4.2 Competition and market functioning

4.2.1 Wholesale markets

Effectiveness of competition

Until end of 2019, the Finnish natural gas market was isolated with a pipeline connection only to Russia. There was also only one gas wholesale supplier. Commissioning of Balticconnector pipeline in December 2019 connected the Finnish gas market to Baltic gas markets and enabled gas market opening for competition from 1 January 2020.

Gas import through the Imatra entry point was suspended on 21 May 2022 due to currency-related matter with Gazprom. Since then, gas has been imported into the Finnish gas system through Balticconnector. In addition to the import through Balticconnector, it is now possible also to inject gas from new LNG terminals. A new on-grid LNG terminal in Hamina was commissioned in October 2022.

Commissioning of LNG terminal vessel in Inkoo in January 2023 ensured security of supply in Finland and added another significant source in to Finnish energy mix.

Finland has only small amount of domestic biogas production of which only a small part is injected into gas grids.

In 2022, high gas prices and uncertainties with security of supply influenced remarkably on gas consumption. As a result, gas consumption was decreased by 52 per cent. Since then, consumption of natural gas has recovered slightly, but it is still 44 per cent lower than in 2022. Especially, heat and power plants and industrial end users have reduced their gas use. Some remarkable end users also have decided to use alternative fuels instead of gas.

Balticconnector pipeline between Finland and Estonia was damaged in the early hours of October 8, 2023, when an anchor of a vessel had hit the pipe. Damages in the pipe section were severe and gas pipeline transmission between Finland and Estonia was interrupted during the repair works until late April 2024.

Despite of the damage the situation of the Finnish gas system was, however, stable during winter period 2023 - 2024, and the gas supplies to Finland were secured by LNG cargoes arranged by market actors through LNG terminals in Inkoo and Hamina. The LNG terminals had the capacity and ability to deliver gas Finland needed even though gas consumption is typically higher in winter seasons. Market players were instructed to ensure their gas supply by ordering it to the Inkoo or Hamina LNG terminals, ensuring the continuity of gas supply for the coming winter season.

Additionally, to better respond to the exceptional situation where Finland's whole gas demand was met by gas supplied from LNG terminals, the Inkoo LNG terminal operator Floating LNG Terminal Finland Oy and the transmission system operator Gasgrid Finland Oy requested the Energy Authority to promptly approve changes to the terms of use for the Inkoo LNG terminal and to the gas market regulation manual maintained by Gasgrid Finland Oy. The Energy Authority approved the requested changes in decisions issued on October 18, 2023, and October 23, 2023. In addition, Energy Authority approved amendment to the Inkko LNG terminal rules on 12 February 2024. On 18 April, the Energy Authority approved unchanged terms and conditions for the Inkoo LNG terminal for the period on 1 October 2024 -31 December 2024.

As part of the normal process, on 1 July 2024, the Energy Authority confirmed the terms, conditions, and tariffs of Floating LNG Terminal Finland Oy for the year 2025–2026. However, the terms became applicable already from the moment terminal users were able to start booking capacity for the period from 1 January 2025 to 1 January 2026.

Some indicators on gas wholesale market are presented in the following table (Table 10).

Table 10. Natural gas wholesale market indicators (2024 numbers preliminary).

Natural gas wholesale market indicators	2021	2022	2023	2024*
Total gas demand TWh[35]	**25.1**	**12.2**	**13.4**	**14.0**
• Imports volume (by pipeline) TWh	25.1	12.3	3.3	1.3
• Imports LNG volume TWh[36]	n/a	0.3	15.1	19.6
• Exports volume (by pipeline) TWh	0.1	0.6	5.1	6.8
• Biogas injected into the transmission grid TWh	0.1	0.2	0.1	na
Maximum daily gas consumption GWh	178.7	114.2	78.1	130.5
Number of active wholesale companies	39	49	56	na
Number of traders active in the gas wholesale market	19	19	19	na
Gas delivery from transmission grid to customers (mcm/y)	2,235	1,069	1,159	1,182
• Heat and power plants	708	170	258	286
• Industrial customers	1,000	648	647	634
• DSO grids	513	240	244	252
• Other customers	13	11	10	10

Unavailability of Balticconnector pipeline from early October 2023 until late April 2024 decreased import volume through pipelines. On the other hand, during this incident gas supply in Finland was ensured by LNG import and therefore LNG import increased in 2024 by 30 per cent.

Finnish wholesale gas market is characterized by large share of gas used by end-users connected directly to the transmission grid. Only about 21 per cent of gas is used by customers connected to the distribution grids. In 2024, total 79 large industrial gas end users and heat and power plants covered approximately 78 percent of the total gas consumption in Finland.

Annual gas consumption in Finland is characterized by strong variation throughout the year (Figure 7). Large share of gas consumption in heat and power production increases gas consumption in winter periods October-April while during summer period there is no need for heat and gas consumption is lower and more stable. However, during winter period there are remarkable variation in gas consumption related fluctuations in outside temperature. In 2024, the highest gas consumption was in early January, when Finland had longer cold period.

[35] Source: ENTSOG Transparency platform
[36] Injected gas from LNG terminals to the gas grid. Imports through off-grid LNG terminals excluded.

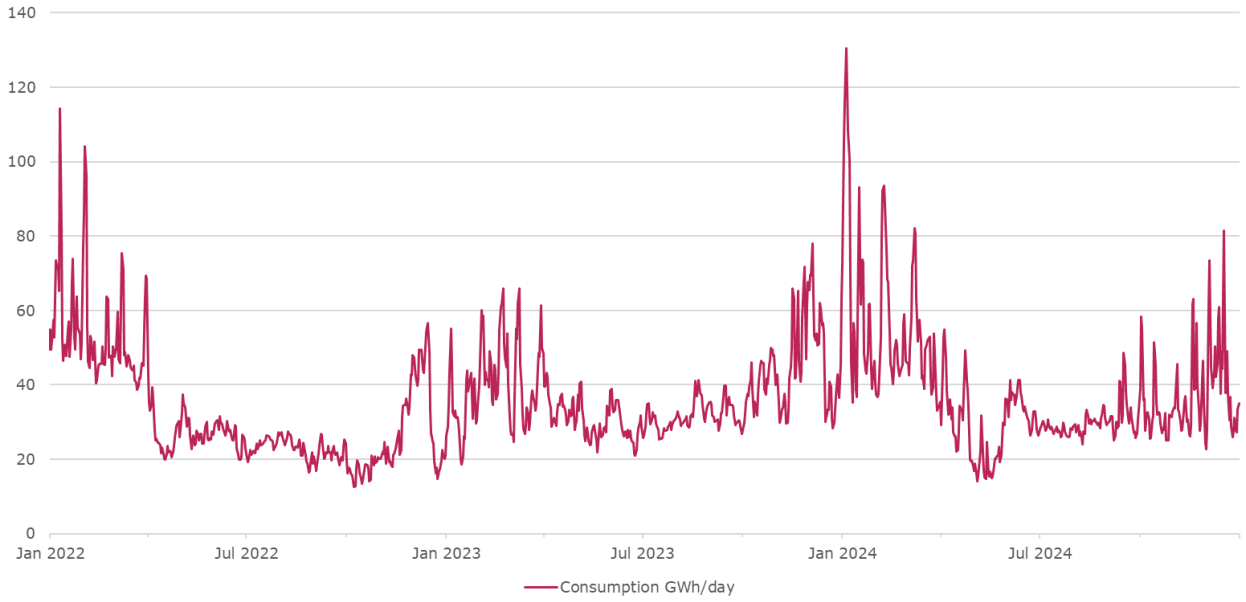

Figure 7. Daily gas consumption in Finland GWh/d (Source: Gasgrid Finland)

Prices

Since the beginning of 2020 gas trading services has been provided by GetBaltic, the common Finnish-Baltic gas exchange.

The following figure (Figure 8) illustrates the daily prices of fulfilled trades for Finland in GetBaltic in 2024. Prices were volatile when the Balticconnector -pipeline between Finland and Estonia was unavailable and gas supply in Finland was only based on importing LNG cargoes in October 2023 – April 2024. During the second half of 2024 prices were rising steadily towards the end of year reflecting gas price development in other parts of Europe.

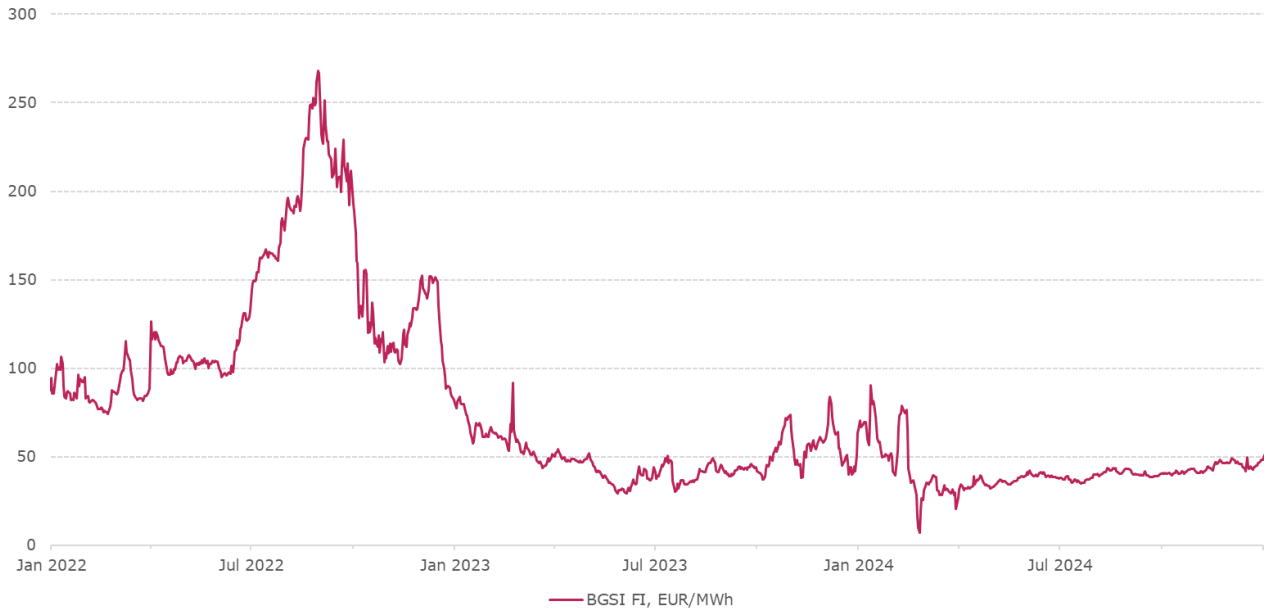

Figure 8. Price of fulfilled trades for Finland on a daily market in GetBaltic in 2024 (EUR/MWh). (Source: GetBaltic)

Figure 9 below presents development of natural gas prices for transmission network customers between different customer groups in 2022-2024. Prices from April 2024 onwards are based on preliminary data.

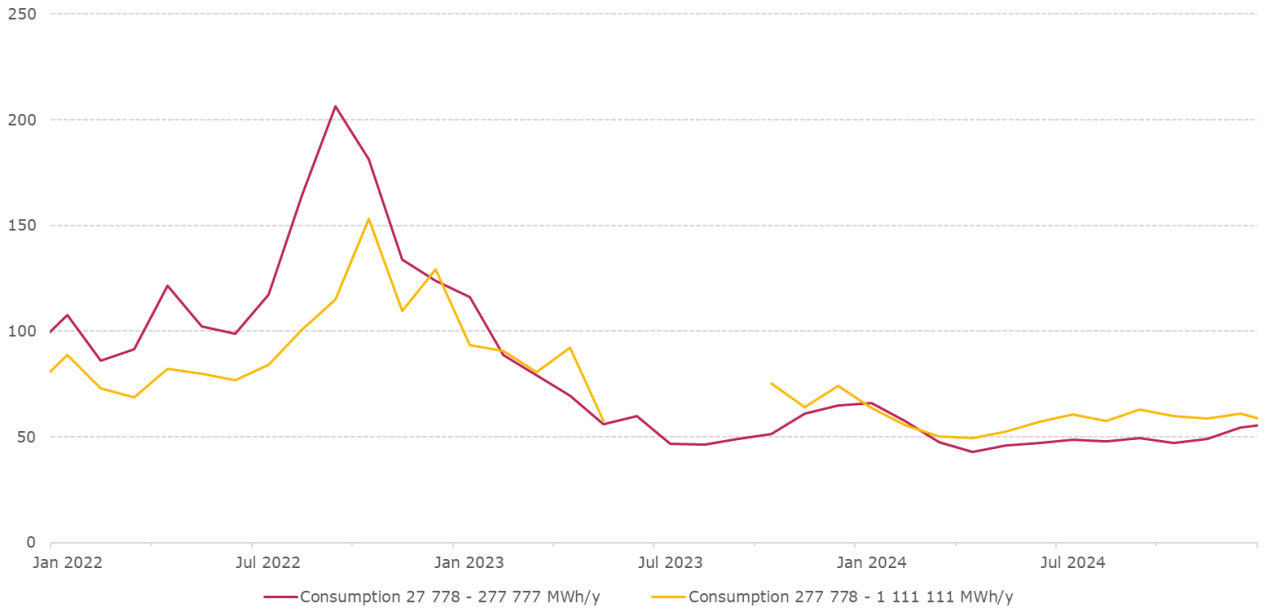

Figure 9. Price of natural gas to transmission network customers in 2022-2024 (excl. taxes). (Source: Statistics Finland)

In Figure 10 can be seen that the price of natural gas in power production remained below EUR 60/MWh through the year 2024. Price development reflects the development of the daily prices of fulfilled trades for Finland in GetBaltic gas exchange in 2024 (see Figure 8), However, prices from April onwards are still based on preliminary data.

Figure 10. Price of natural gas in power production (EUR/MWh). (Source: Statistics Finland)

Transparency

The REMIT regulation also applies to gas markets. Market participants operating in wholesale gas markets are obliged to register to their national regulatory authority and to report their

wholesale energy market transactions to ACER. They are also obliged to publish inside information and are prohibited to do insider trading or market manipulation.

Energy Authority performs similar monitoring and investigatory activities on gas markets as on electricity markets.

4.2.2 Retail market

Some indicators on gas retail market are presented in the following table (Table 11).

Table 11. Natural gas retail market indicators (2024 preliminary).

Natural gas retail market indicators	2021	2022	2023	2024*
Number of DSO customers	**26,485**	**23,937**	**22,844**	**21,843**
• Small houses and customers using only for cooking	23,797	21,590	20,732	19,839
• Housing buildings	679	574	419	331
• Commercial and public buildings	1,130	983	923	928
• Local district heating	99	83	128	120
• Greenhouses	16	14	14	14
• Industrial customers	555	483	468	438
• Power plants	9	10	9	7
• Gas filling stations	140	139	137	138
• Other users	60	61	14	28
Amount of gas delivered to end users at the distribution grids, mcm	**893.69**	**401.28**	**523.55**	**538.12**
• Small houses and customers using only for cooking	10.79	5.67	3.37	3.16
• Housing buildings	16.71	12.03	6.60	4.03
• Commercial and public buildings	32.83	24.94	15.69	13.13
• Local district heating	76.17	25.40	52.02	46.23
• Greenhouses	1.32	0.52	0.42	0.44
• Industrial customers	532.51	255.09	362.78	371.67
• Power plants	202.74	59.99	77.28	94.15
• Gas filling stations	3.57	2.88	2.18	1.84
• Other users	17.04	14.74	3.20	3.46
Average retail gas prices of gas for reference customer categories connected into gas distribution grids[37], EUR/MWh				
• Consumption <278 MWh/y	75.61	176.92	94.90	67.98
• Consumption 278 - 2 777 MWh/y	49.25	149.40	75.13	63.90
• Consumption 2 778 - 27 777 MWh/y	53.26	134.00	83.44	61.37
• Consumption 27 778 – 277 777 MWh/y	46.41	113.58	74.43	60.43

[37] Excluding taxes. Data before 1 January 2021 is not available. Yearly average is calculated as an average of the monthly averages reported by Statistics Finland. Source Statistics Finland.

Market opening and competition

Most of the natural gas used in Finland is used by heat and power plants and industrial end users connected to the gas transmission grid. The retail market for gas in Finland is thus relatively small. About 21 per cent of the natural gas used in Finland is transmitted through the distribution grid. There are only about 22,000 gas end-users in the natural gas market and the number of gas end users has been gradually decreasing.

The largest gas end user segment, (19,839 customers, about 91 per cent of all gas end-users) consists of households and customers who buy natural gas only for cooking at home. However, the total natural gas consumption of this segment amounts to only 3.16 mcm which means less than 0.3 per cent of gas delivered to end users through transmission and distribution grids. Average annual gas consumption in this segment is only 159 m3/customer. In Finland, only a few thousand customers are using gas for heating their houses and their number is decreasing.

About 44 per cent of gas transferred in distribution grids were transferred to the energy company's own use in heat or power plants. Only 56 per cent were sold to external gas users and of which the largest segment is industrial gas end users.

There are 18 companies registered as retailers and 16 distribution network operators. The customer segments vary among suppliers, some of gas suppliers serve mostly households while others have only industrial customers.

Since 1 January 2020, gas retail market has been opened for competition and all gas customers have been able to choose their supplier. However, to switch a gas supplier, the customer must have a remotely readable gas meter.

Monitoring the level of prices, the level of transparency, the level and effectiveness of market opening and competition

In retail level, many retailers have only a few customers which are also different in their gas consumption profile. According to the Natural Gas Market Act the retailer in a dominant market position in a natural gas distribution network shall supply natural gas at reasonable price upon the request of an end-user using gas mainly for heating apartment or other end-users whose connection capacity is maximum 250 kW (obligation to supply).

The retailer with obligation to supply shall have public terms, prices and criteria for determining them for the end-users in question. However, before publishing above mentioned information, the retailer with obligation to supply, shall provide the Energy Authority information on prices.

As regards the supervision of natural gas retail pricing under obligation to supply, the powers of the Energy Authority are ex post by their nature. As stated above, in retailers with obligation to supply shall inform Energy Authority regarding the prices before publishing them.

Figure 11 illustrates gas retail price development for certain reference customer categories connected to distribution grid in 2022-2024.

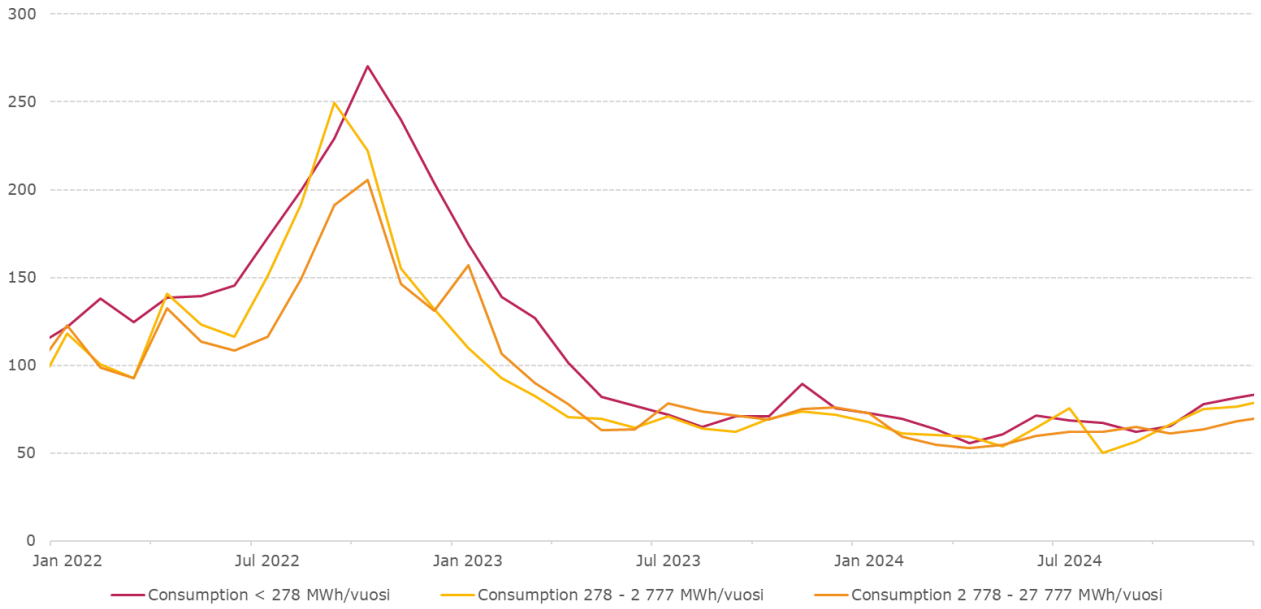

Figure 11. Monthly average price of natural gas to distribution network customers (excl. taxes). (Source: Statistics Finland)

Gas retail customers have been able to switch the gas supplier only from the beginning of 2020. The Energy Authority has not yet collected data on switching rates.

4.2.3 Consumer protection and dispute settlement

Ensuring access to consumption data

According to Natural Gas Market Act end users have a right to receive the metering data on their own consumption free of charge. Likewise, they have a right to give any other party access to that data. The metering data must be given in the format that corresponds to general procedures followed by the industry and the network system operator. In 2024, the Energy Authority did not have any investigations regarding the access to consumption data.

Consumer protection

The consumer authorities are in general responsible for consumer protection in Finland. The Finnish Competition and Consumer Authority ensures that the practices companies use in marketing and their customer relations are appropriate and the contract terms applied by them are reasonable. The Consumer Ombudsman supervises that the Consumer Protection Act and other laws passed to protect consumers are observed.

The Energy Authority monitors the transmission system operators', distribution system operators' and suppliers' overall compliance with the electricity and natural gas market legislation. In particular, the provisions in the legislation concerning electricity and natural gas contracts are aimed at ensuring the minimum protection for household consumers. The requirements set out in the Directive 2009/73/EC and its Annex 1 have been implemented in the national legislation.

Complaints by household customers

No new inquiries or complaints were received from household customers in 2024.

Dispute settlement

The Energy Authority does not have powers for dispute settlements between consumers and energy companies in individual contractual disputes.

The disputes between household consumers and energy companies in individual cases may be solved in the Consumer Disputes Board which is a neutral and independent expert body whose members represent consumers and business in a balanced way. The Boards gives solution recommendations for legal disputes between consumers and energy companies. A dispute handled by the Board can always be taken to a court of law.

Furthermore, the Consumer Advisory Service is a national service that provides information on consumer rights, and mediation assistance in disputes between household consumers and energy companies.

The Consumer Ombudsman may assist a household consumer in an individual dispute in the court if the issue carries significant impact or the energy company is not compliant with the decision of the Consumer Disputes Board. The Consumer Ombudsman may also bring group complaints to the Consumer Disputes Board or initiate class actions, for instance, against a network operator or supplier and act as the representative of the plaintiffs in a general court of law.

Individual disputes between non-household customers and energy companies are solved in a general court of law or in an arbitral tribunal if agreed so.

Safeguard measures against interruptions in gas supplies

The Natural Gas Market Act include specific provision for situations when supply of gas to end users is going to interrupt due to reasons attributable for the gas supplier like due to bankrupt of a supplier.

In such a situation, before they may interrupt the supply the gas DSO shall notify affected end users. In addition, the DSO has responsibility to continue supplying gas at least three weeks since the DSO has notified the customers. Further, if the end user belongs to the obligation to supply scheme – end user is using gas mainly for heating houses or demand in the end user's connection point is max 250 kW – the DSOs shall continue supply until the Energy Authority has nominated a new supplier for the end user.

In 2024, there were no situations when supply of gas to end users was going to interrupt due to reasons attributable for the gas suppliers.

In such situation the end user shall compensate the DSO for the reasonable costs incurred for the supply of gas. If the end user and the DSO do not agree on the compensation, the Energy Authority determines with is decision the amount of the compensation.

4.3 Security of supply

4.3.1 Monitoring balance of supply and demand

The role of the Energy Authority in security of supply issues is to monitor the balance between supply and demand in natural gas, the quality and maintenance of networks and measures to cover the peak demand and avoid the supply shortages. The Energy Authority publishes annually a report on gas security of supply situation.

The Finnish gas system has faced since 2019 several fundamental changes. Until end of 2019 all gas was imported from Russia through the interconnection point in Imatra. Commissioning of Balticconnector pipeline between Finland and Estonia in December 2019 opened additional source for importing gas. Balticconnector has also enabled export of gas to Baltic states. Gas import from Russia to Finland suspended in May 2022. After that, the only source of pipeline gas was the Balticconnector between Estonia and Finland until commissioning of LNG terminals in Hamina in October 2022 and Inkoo in January 2023.

LNG terminals in Inkoo and Hamina together with the pipeline connection to Estonia has enabled for market participants using of Inčukalns underground gas storage (Inčukalns UGS) in Latvia as a seasonal storage of gas: during summer period market participants could import LNG and inject it to the gas storage for using it during winter period.

The Balticconnector pipeline was damaged on October 8, 2023. The pipeline was out of use more than six months until late April 2024. During that time, Finnish gas system did not have any pipeline connection to any other member state and the floating LNG terminal in Inkoo was the primary source of natural gas in Finland.

Figure 12 illustrates amount of gas entry and exit at the connection points of the Finnish gas transmission system and net consumption in Finland in 2020 – 2024 as monthly values.

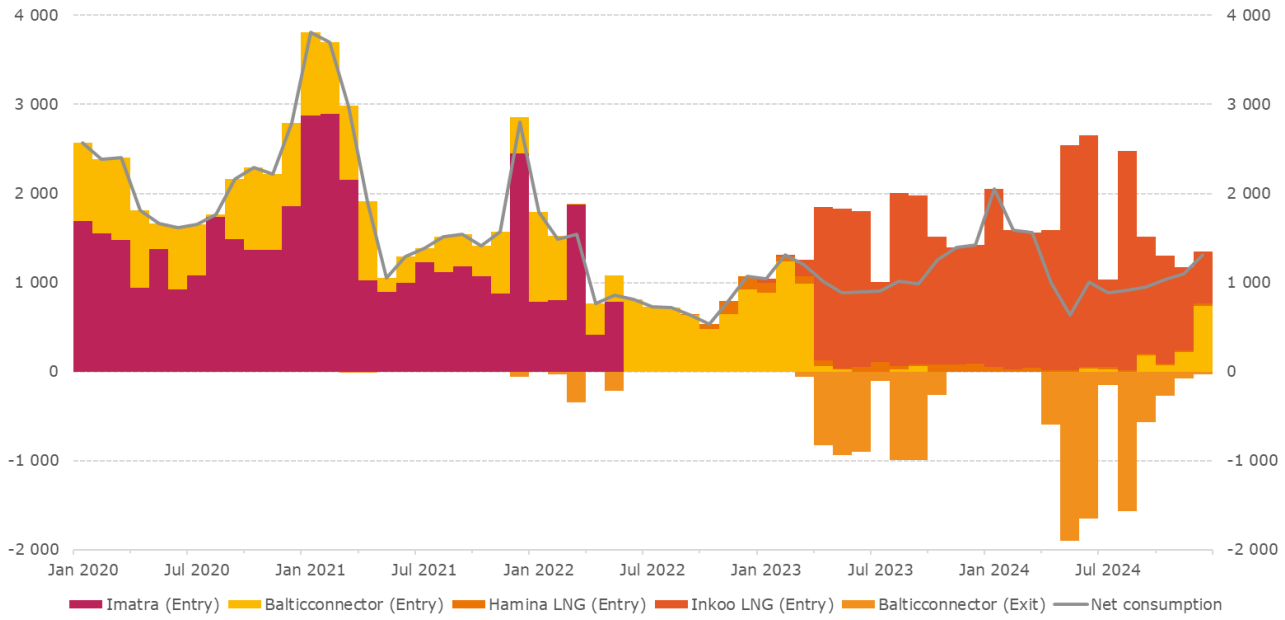

Figure 12. Amount of gas entry and exit at the connection points of the Finnish gas transmission system and net gas consumption in 2020 – 2024 (GWh/month). (Source: ENTSOG Transparency platform)

A technical import capacity from Estonia to Finland varied between 0 and 76 GWh/day during 2024.

To improve the security of supply situation, Finnish gas TSO has leased a floating LNG-terminal vessel which is located in Inkoo and has a vaporizing capacity of 140 GWh/d and maximum storage capacity 151,072 m3.

Smaller LNG terminal in Hamina has storage capacity of 30,000 m3 and maximum injection capacity of 6,000 MWh/d. It is connected to the Finnish national gas transmission grid as well as to the local gas distribution network.

There's no natural gas production in Finland. Small-scale biogas is produced and injected into the gas transmission and distribution network in six different locations. There are also two off-grid LNG-terminals in Pori and Tornio serving mainly local industry.

4.3.2 Measures to cover peak demand and shortfalls of suppliers

Natural gas users, excluding consumer customers, are primarily responsible for their own contingency planning, condition of possible backup fuel systems, backup fuel buffer stock and fuel transportation.

In case of a gas shortage situation LNG can be feed into gas network. Finnish system operator Gasgrid Finland uses mobile LNG-vaporizers and have prepared feed-in-points for LNG.

During system malfunction almost in all cases natural gas can be quickly switched to other fuels or natural gas driven generation capacity can be replaced by other generation capacity using other fuel than gas. Light and heavy fuel oil are the primary backup fuels for natural gas. In specific cases air-propane mixture and liquefied petroleum gas can be used as backup fuels too. Biogas can be used as a backup fuel as well.

If the natural gas supply is prevented over an extended period, the obligatory storages can be used too. The National Emergency Supply Agency controls for use of obligatory storages in Finland. Total volume of stockpile fuels and obligatory storages must be at least equal to cover normal consumption of imported fuels for five months.