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National Report on the state electricity and gas markets in Finland to the European Union Agency for the Cooperation of Energy Regulators and to the European Commission

Year 2023

Finland

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Foreword

Energy crisis started in autumn 2021 calmed down in 2023. Increased wind power generation capacity and the new Olkiluoto 3 nuclear power plant commissioned in April 2023 have improved electricity self-sufficiency in Finland, and in 2023 Finland was for the first time even a net exporter of electricity on a weekly basis. At the same time the energy market situation has improved in whole Europe due rather high filling levels in gas storages. In Nordics also filling levels of hydro reservoirs were in 2023 higher than in 2022.

Due to the improved market situation average electricity and gas prices turned down during spring 2023. However, retail electricity price levels have remained still at a bit higher level than before the crisis and the price volatility has even increased. Volatility has been exacerbated by individual price spikes, the background of which was not only the weather but also simultaneous breakdowns in power plants or transmission connections. The increased share of intermittent power generation from wind and solar on the other hand has 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 in October 2023. During the repairing period until late April 2024, the Finnish gas system was resting on import through LNG terminals.

For the Energy Authority, year 2023 was characterized especially by the ongoing implementation of European network codes and guidelines, preparation of the methodologies for economic regulation of electricity and gas system operators for 2024-2031 and retroactive reimbursement to consumers for high electricity costs.

The Energy Authority has prepared this 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.

The focus in the report has been in the period from January to December in 2023 and data presented reflects this period as far as possible. In some points also the recent developments in 2024 are mentioned.

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Director General
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Main developments in electricity and gas markets

2.1 Electricity market development

Electricity consumption in Finland decreased in 2023 by 2 per cent and was 80 TWh. Consumption was decreased mainly during winter and late spring-summer months – especially in January-February and April-September. On the other hand, in November and December 2023 consumption was increased by 9 per cent compared to the respective period in 2022.

Electricity consumption in industry sector decreased by 6 per cent. Industry sector covered 42 per cent of electricity consumption in Finland in 2023. Household and agriculture covered 30 per cent of electricity consumption. The rest were used by services and construction (24 per cent) and losses (4 per cent).

The state administration launched in October 2022 a nationwide campaign[1] to encourage citizens and enterprises to save energy. The short-term goal for the campaign has been to get over 95 per cent of Finnish households to save energy and cut down on their consumption by 5 per cent during peak hours. The long-term goal is to permanently lower energy consumption and reduce electricity consumption peaks. In winter 2022–2023, the campaign aimed to help Finns start saving energy quickly and effectively through concrete measures. The aim was to reduce energy consumption throughout society: in homes and housing companies, companies, municipalities, organisations and educational institutions.

Net import of electricity decreased remarkably from 2022. The share of net import covered only 2.2 per cent of consumption (in 2022 the share was 15.3 per cent). The decrease was mainly due to suspended electricity import from Russia since May 2022 and increased domestic power generation after commissioning of Olkiluoto 3 nuclear power plant in April 2023. The net import from other Nordic countries (mainly from Sweden) decreased by 45 per cent. The net export to Estonia increased by 3 per cent.

Domestic power generation increased by 13 per cent in 2023 and was 78 TWh (69 TWh in 2022). Nuclear power production increased by 35 per cent and its share was 42 per cent of power production in Finland.

About 52 percent of electricity was produced from renewable energy sources in Finland. Wind power generation increased by 25 per cent and covered about 19 per cent of power generation. Hydro power increased by 13 per cent compared to 2022. In 2023 share of hydro was 19 per cent. Share of biomass was 13 per cent.

Share of fossil fuels in power generation has been decreasing. Share of gas in power production in 2023 was only about 0.8 per cent and share of coal was 2.6 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 2023 the total available generation capacity in the market during the peak load situation in winter period 2023 - 2024 as about 12,800 MW. The highest hourly load in 2023 was 13,200 MWh/h. 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. However, due to increased domestic generation in 2023 Finland had more often in 2022 the same wholesale electricity day ahead price as in Sweden. Last year Finnish bidding zone (FI) and all Swedish bidding zones (SE1-SE4) had the same day-ahead price in 48 per cent

[1] https://www.astettaalemmas.fi/en

of hours (21 per cent in 2022). With the Swedish bidding zones SE1 and SE3 Finland had the same day-ahead price in 66 per cent (with SE1) and 76 per cent of hours (with SE3). Finland and Estonia had same price in day ahead market in 46 per cent of hours (62 per cent in 2022).

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 2023 that there is, however, no need acquire strategic reserve capacity to meet the national reliability standard during period of November 2023 – October 2024.

In 2023, the supplier switching rate was a bit lower than in 2022. About 14.2 per cent of electricity customers in Finland switched their electricity supplier in 2023 (16.3 per cent in 2022). However, these numbers include also switches which were caused by merging of supply companies.

2.2 Gas market development

In 2023 gas deliveries from gas transmission grid to end users directly connected to the transmission grid and to distribution grids increased by 12 per cent and was 13.3 TWh (in 2022 11.7 TWh)[2]. The increase was mainly due to increased use of gas in heat and power generation which increased in 2023 by 57 per cent. High gas prices and uncertainties with security of supplied had decreased gas consumption remarkably in 2022 and especially gas consumption in heat and power generation decreased in 2022 by 76 per cent. In other sectors gas consumption increased in 2023 moderately: among industrial customers connected to the transmission grid increase was 4 per cent and gas deliveries from the transmission grid to distribution grids increased by 5 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 18.4 TWh in 2023 (12.3 TWh in 2022). About 19 per cent was imported from the Baltic states via Balticconnector pipeline (in 2022 about 59 per cent). The remarkable decrease was due to commissioning of the LNG terminal in Inkoo in January 2023 which has enabled another large-scale import route for gas and 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. Total 78 per cent of gas entry into the Finnish gas system (14.3 TWh) was injected from the LNG terminal in Inkoo. About 4 per cent of injected gas was imported via LNG terminal in Hamina which was commissioned in October 2022. Gas import from Russia through Imatra interconnection point has been suspended since May 2022. In 2023, Finland exported 5.1 TWh of gas to Estonia via Balticconnector (0.6 TWh in 2022).

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[3] establishing a process for the future regional gas market integration of their respective countries. The objective is to establish

[2] 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).

[3] 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

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 in 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 December 2020, the Government adopted amendments to the regulation which facilitates establishment of local energy communities and groups of active customers. The regulation allows netting of electricity input and output through the same meter to the distribution grid within imbalance settlement period. This includes also dividing feed-in from the generation to the members of the community or group in the balance settlement. These amendments facilitate eg. establishing local energy communities within housing cooperatives where a cooperative invests in joint solar panels in the rooftop and the electricity from the panels will be shared among the members of the cooperative. Amendments have come into force 1 January 2021. Netting for local energy communities and groups of active customers has been done at the Datahub from 1 January 2023. Before that, DSOs were able to decide by themselves if they are willing to provide the netting service to their customers.

Amendments to the national energy market legislation to implement the provisions of the Electricity Market Directive (944/2019) was adopted by the Finnish Parliament in February 2023 and came into force on June 1, 2023. The legislation package included also new provisions to implement recommendations from the Smart Grid Task Force to complement the customers' opportunities for active participation at the electricity markets and to promote security of electricity supply. The package included also measures to prevent inappropriate contractual and marketing practices in the electricity retail market. The package consists of amendments to the Electricity Market Act and to the Act of Supervision on Electricity and Gas Markets and, also separate new acts on the Comparison Tool of Electricity Supply Contracts and on the Energy Market Dispute Board. The Energy Market Dispute Board started its operation on 1 September 2023, and it is an out-of-court disputes resolution body for disputes on electricity market issues between energy companies and non-household end users.

To help electricity customers suffering from the heavily increased electricity prices during the energy crisis, the Government introduced late 2022 and early 2023 several measures. VAT on electricity sales was temporarily reduced from 24 per cent to 10 per cent, excluding network-related charges during period from December 1, 2022 until April 30, 2023. Also, the Government decided that payers of very high electricity costs during January – April 2023 may apply a tax credit from the Tax Authority. In addition, if customer's taxes for the year are low, so the tax credit for electricity would not be useful, the customer can instead apply to Kela for temporary electricity assistance. The Parliament also adopted in February 2023 a temporary law on retroactive reimbursement for electricity supply costs during November 2022 – January 2023 for consumers. Finally, the Parliament also adopted in February 2023 also a temporary law for extended payment periods of electricity bill.

Instead of capping market revenues from inframarginal generation as mentioned in the Council Regulation (EU) 2022/1854, Finland decided to set a temporary profit tax in the electricity sector for 2023. The profit tax was payable by companies engaged in electricity production or electricity supply.

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 (2023 figures preliminary)

Indicators	2020	2021	2022	2023*
Number of TSOs	1	1	1	1
Number of high-voltage DSOs[4]	9	9	9	9
Number of DSOs	77	77	77	77
Length of electricity grid (km)				
• 400 kV (km)	5,500	5,500	5,700	5,700
• 220 kV (km)	1,300	1,400	1,000	1,000
• 110 kV (km)	16,500	16,600	16,300	16,300
• 1-70 kV (km)	154,200	154,700	154,900	155,200
• 0.4 kV (km)	254,300	256,400	258,500	259,400

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 2023, 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 2023. 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

[4] 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.

Totally, 37 DSOs were in 2023 over the threshold value. In addition, some other DSOs have voluntarily legally unbundled network activities. At the end of 2023, 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 2023 these requirements were applied to 20 DSOs in Finland.

Since June 1, 2023 the Electricity Market Act requires 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 2023, Fingrid continued to develop the internal transmission system significantly to increase the capacity of the main transmission corridor 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. 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 322.0 million of which investments to the grid were EUR 303.8 million. Investments to the grid were increased by EUR 57.8 million from year 2022. Fingrid currently has about EUR 4 billion investment programme under way for the next ten years. [5]

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[6].

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 2024.

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 13.3 billion.

[5] https://www.fingrid.fi/en/news/news/2024/fingrids-financial-statements-bulletin-januarydecember-2023-clean-and-high-quality-electricity-system-and-largest-ever-grid-investments-created-conditions-for-electricity-consumption-growth/

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

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[7].

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.

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 of tariffs or prices of 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 8 percent. Transmission and distribution system operators shall notice their customers about the changes in network charges at least one month prior to entering force.

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 the four-year regulatory period, the Energy Authority confirms the earnings of each network operator for the regulatory period and the amount that exceeds or falls short of the reasonable earnings level for the 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 can 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.

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

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, 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 actually 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). Most of the WACC parameters are fixed for the methodology period (two regulatory periods) except the risk-free rate which is updated annually and the risk premium of debt which is currently updated for each regulatory period. The methodology for calculating the risk-free rate was amended in 2021 in a way that takes a shorter-term view of the risk-free rate rather than averaging over a 10-year period.

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 efficiency frontier will be estimated in 2024 for the sixth regulation period.

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.

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 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.

New regulation methodology period of network tariffs and charges from 2024

Year 2023 was the last year for the fifth regulatory period and the last year for the period for which the regulatory methods were set in 2015. In December 2023, the Energy Authority confirmed with its decisions new 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.

The key change in methodology was that the unit prices of network components, which are used to determine the net present value of the network, will no longer be updated for the old investments to avoid taking inflation into account twice in the calculation of reasonable return due the nominal WACC% is in use. So the valuation in the new methods describes better historical costs when the investments are valued with investment year specific frozen unit prices.

Also, 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. Process is ongoing.

Evolution of network tariffs and levies

The average distribution network charges rose slightly in 2023. In January 2024, the average distribution network charges (including taxes) for a typical household customer (consumption 5,000 kWh per year) were 3,8 percent higher than in January 2023.

Figure 1 below illustrates development of average electricity distribution network charges for three typical end users in 2021 – 2023.

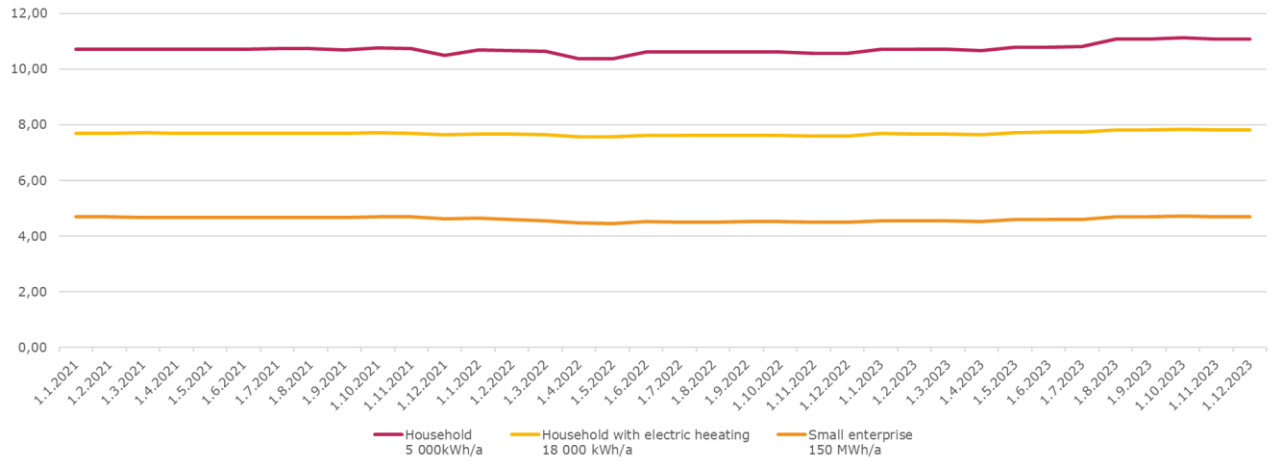

Figure 1. Development of distribution network charges (cnt/kWh). Prices include VAT and other taxes.

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 have to meet the demands by the end of 2028 had to meet the demands for 75 per cent of all customers 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

Based on information submitted by power plant operators to the Energy Authority, total installed power generation capacity in Finland was about 23,700 MW at the end of 2023. However, the entire capacity is not available during the peak load periods.

The Energy Authority has estimated in autumn 2023, that 12,800 MW of Finnish electricity generation capacity will be available during the consumption peaks in winter 2023–2024. The Energy Authority estimated also that peak load will be 14,300 MW for the same period. The peak load however reached 15,000 MW during the first week of January 2024. The domestic electricity production capacity is not sufficient to cover the consumption during peak load periods, and thus electricity imports from neighbouring countries is needed.

The highest hourly load of the year 2023, 13,300 MWh/h, was reached in November. During the peak load hour Finland exported electricity, which is exceptional. Exporting electricity was however possible because of relatively low peak consumption and high wind power production. Domestic electricity production was around 14,000 MWh/h at that hour.

Investments in power generation capacity

In 2023, the most significant new generation unit was the commissioning of nuclear power plant Olkiluoto 3, which started the regular power production in April 2023. Building of this 1,600 MW unit was delayed for several years. Originally, the unit should have been commissioned by the end of 2009.

Wind power capacity increased over 1,900 MW, reaching 6,700 MW by the end of the year 2023. All new wind power projects are being developed commercially without any public support.

At the end of 2023, around 1,000 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 50 MW is from solar power plants with capacity above 1 MVA. Annual increase of solar power capacity was more than 300 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 will also be more and more based on heat pumps and electricity boilers, which will increase electricity consumption. During the year 2023, the net change of CHP-electricity capacity was around –200 MW.

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). Commercially this interconnector is, however, treated as a part of transmission between Finland and SE1.

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.

No new investments in interconnection capacity have been made since commissioning of the Estlink 2 sea 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.

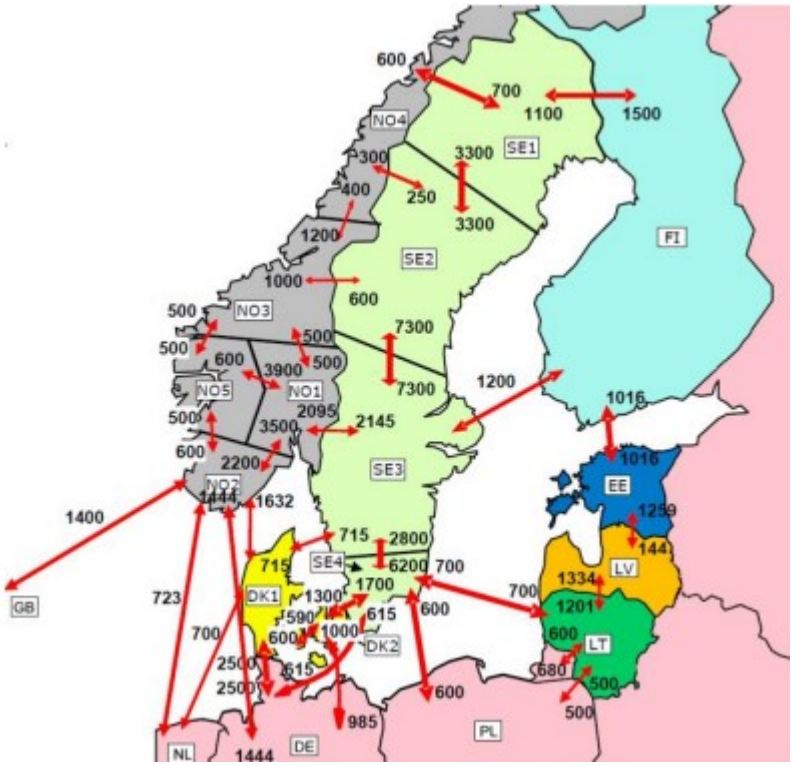

Figure 2. Interconnector capacities between bidding zones in Nordics and Baltics. (Source: Nordic and Baltic Sea Winter Power Balance 2022-2023)

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. The reason for that is that after 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.

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 2023. The updated plan was submitted to the Commission and to the Electricity Coordination Group in January 2023.

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, ÅI-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. In the present system transfer capacity provided to the market is Net Transfer Capacity (NTC) which is Total Transfer Capacity (TTC) subtracted with Transmission Reliability Margin (TRM). TRM is 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 will be used as capacity calculation method for day-ahead and intraday markets. In October 2020, all regulatory Authorities of CCR Nordic agreed to approve the amended day-ahead/intraday capacity calculation methodology. [8]

The flow-based method has not been implemented yet, as there have been issues with the operational implementation of the flow-based 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. Nordic TSOs have now started the external parallel runs, and the expected go-live of the flow-based capacity calculation methodology is in October 2024.

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.

At the interconnector between Finland ND 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.

Table 2 below shows the average availability of interconnection capacities for the market compared to maximum capacities in 2020 - 2023.

[8] 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)

Table 2. Availability of interconnection capacities, %[9] (Source: Fingrid).

	2020	2021	2022	2023
Interconnector FI-SE1				
• Import SE1 -> FI	97.2 %	92.5 %	95.1 %	90.7 %
• Export FI -> SE1	97.1 %	94.4 %	93.5 %	88.0 %
Interconnector FI-SE3				
• Import SE3 -> FI	99.0 %	96.6 %	98.5 %	93.4 %
• Export FI -> SE3	85.6 %	31.2 %	15.2 %	23.5 %
Interconnector FI-EE				
• Import EE -> FI	94.7 %	97.3 %	92.7 %	96.0 %
• Export FI -> EE	98.3 %	99.0 %	97.2 %	97.2 %

Costs of countertrade and congestion 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.

Table 3 shows the costs of the countertrade paid by Fingrid and congestion income to Fingrid during the years 2012 - 2023.

Table 3. Net costs of countertrade and congestion income (Source: Fingrid).

	2020	2021	2022	2023
Net costs of countertrade, MEUR	**0.7**	**2.5**	**7.3**	**0.9**
• Countertrade between Finland and Sweden, MEUR	0.1	0.3	3.8	0.1
• Countertrade between Finland and Estonia, MEUR	0.2	0.2	1.7	0.7
• Countertrade inside Finland, MEUR	0.4	2.0	1.8	0.1
Congestion management income to Fingrid, MEUR	**146.7**	**283.8**	**943.0**	**260.1**
• From interconnectors between Finland and Sweden, MEUR	122.7	221.1	775,6	115.0
• From interconnectors between Finland and Estonia, MEUR	24.1	62.8	167.4	145.1

In 2023 congestion management income for the Fingrid totalled EUR 260 million (EUR 943 million in 2022). Fingrid uses congestion income to investments that aim to relieve the congestions.

Fingrid used EUR 285 million of congestion incomes in 2023. A part of congestion income was used for financing transmission grid investments, and majority was added to the company's turnover to the benefit of customers. After approval of the Energy Authority, Fingrid used in 2023 part of congestion income to compensate for not charging grid service fees from customers for six months in 2023. At the end of the year 2023, Fingrid had EUR 975.7 million of unused

[9] 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.

congestion income, which 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)

In 2023, the Energy Authority 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. The 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.

In 2021 The 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 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.

Capacity Allocation & Congestion Management Guideline (CACM GL)

The Energy Authority discussed with other NRAs on the CACM GL cost reporting and continued its national cost decision processes throughout year 2022 and actively participated other CACM processes discussed and handled in the CACM TF.

The capacity calculation methodology in Nordic Capacity Calculation region (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 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 expected go-live of flow-based capacity calculation is in October 2024.

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 EB GL requires that by 18 December 2020 all TSOs shall apply the imbalance settlement period 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. The implementation of measurements at a resolution of 15 minutes is a prerequisite for the national parallel implementation of 15 ISP in Finland. This also allows for a mandatory change, imbalance settlement resolution of 15 minutes in the Nordic imbalance settlement unit eSett.

In spring 2023 Finnish DSOs implemented 15 minutes energy metering and on 22 May 2023, 15 minutes imbalance settlement was implemented in the Nordic electricity markets.

Overall, in 2023 the planned timelines of the NBM project were extended and the Energy Authority issued decisions for Fingrid regarding Finnish balancing markets national terms and conditions.

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

In 2023, 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. Only a small portion of the DSOs have done research or pilot projects to develop these alternative solutions. In the 2024 distribution network development plans the DSOs must describe in more detail how they are going to utilize alternative resources in their distribution network. 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[10].

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 and Energy Authority will classify the projects to Smart Grid projects during the second half of the year 2024.

[10] 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).

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 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 4).

Table 4. Indicators for electricity wholesale market

Electricity wholesale market indicators	2020	2021	2022	2023
Electricity Production (TWh)	**66.1**	**69.0**	**69.1**	**78.0**
• Hydro power	15.6	15.4	13.3	15.0
• Wind power	8.0	8.1	11.6	14.5
• Solar power	0.3	0.3	0.4	0.6
• Nuclear Power	22.4	22.6	24.2	32.7
• CHP district heating	9.6	10.3	8.9	6.3
• CHP industry	8.1	9.0	7.8	7.1
• Conventional thermal power	2.2	3.1	2.9	1.7
Total annual electricity demand (TWh)	**81.1**	**86.8**	**81.7**	**79.7**
• Maximum hourly demand (GWh/h)	12.4	14.3	13.8	13.2
Net import (TWh)	**14.9**	**17.8**	**12.5**	**1.8**
• Imports	21.6	24.5	19.4	9.6
• Exports	6.7	6.7	6.9	7.8
Traded volume in the spot electricity market (TWh)				
• Day-ahead buy volume (FI)	59.0	62.8	59.6	56.5
• Day-ahead sell volume (FI)	45.2	52.3	48.3	53.6
• Intraday buy volume (FI)	1.0	1.1	1.3	2.1
• Intraday sell volume (FI)	1.0	1.1	1.4	2
Generation fuel mix by source (GW)				
• Coal	1.4	1.4	1.4	1.1
• Gas	1.8	1.8	1.8	1.7
• Petroleum	1.3	1.3	1.3	1.3
• Nuclear	2.8	2.8	2.8	4.4
• Peat	1.5	1.3	1.3	1.2
• Biofuels	2.7	2.6	2.6	2.8
• Waste	0.2	0.2	0.2	0.2
• Hydro	3.2	3.2	3.2	3.2
• Wind	2.4	3.2	4.8	6.7
• Solar	0.3	0.4	0.6	1.0
Total installed generation capacity (GW)	**17.6**	**18.2**	**20.0**	**23.6**
• Maximum hourly generation (GWh/h)	10.6	11.4	12.5	14.2

Market opening

In the Nordic and Baltic electricity market electricity trading takes the form of bilateral trade – i.e. direct trading among the market actors – and trading via the power exchange.

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. Energy Authority re-designated EMCO for indefinite period in December 2019 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 to EPEX SPOT SE 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 79 per cent of the Finnish physical consumption in 2023.

In addition, Nasdaq OMX has been providing services for trading with financial products in an organized marketplace.

Prices

The basis of the price formation in the Nordic power market is the day-ahead spot market. Trade is organised as an implicit auction. The prices are determined by summarising all purchases into a purchase curve and all sales into a sales curve. Bids in the electricity spot market are given in the same way regardless of the player, and accordingly, bids for the following day shall be given before noon every day indicating the amounts one wishes to purchase or sell at the relevant hour at different price levels. When the price has been determined for each operating hour, the sales and purchases of individual players are determined. In case there are no grid restrictions between the Nordic countries or internally in one of countries, the spot price is the common price for the entire Nordic market area.

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).[11]

In 2023, the average system price was 58 per cent lower than in 2022. The average system price in 2023 was EUR 56.44/MWh.

The average Finnish area price in 2023 was EUR 56.47/MWh, showing a decrease of 63 per cent year-on-year. The highest hourly day-ahead price EUR 777.18 /MWh in Finnish bidding zone was reached on Tuesday November 21, 2023. The lowest hourly day-ahead price EUR -500 /MWh at the Finnish bidding zone was reached during same week on Friday November 24, 2023. Day ahead prices at the Finnish bidding zone reached during ten consecutive hours of that day the technical minimum price of the day ahead market when one market actor had submitted on 23 November an erroneous sales bid of average size 5.8 GW for the whole day of 24 November. The erroneous bid passed through to the European single day-ahead market coupling (SDAC) calculation process causing the extremely low day ahead electricity prices at the Finnish bidding zone for November 24, 2023.

Figure 3 presents weekly average Nordic system market prices and day-ahead prices in the Finnish bidding zone in 2022.

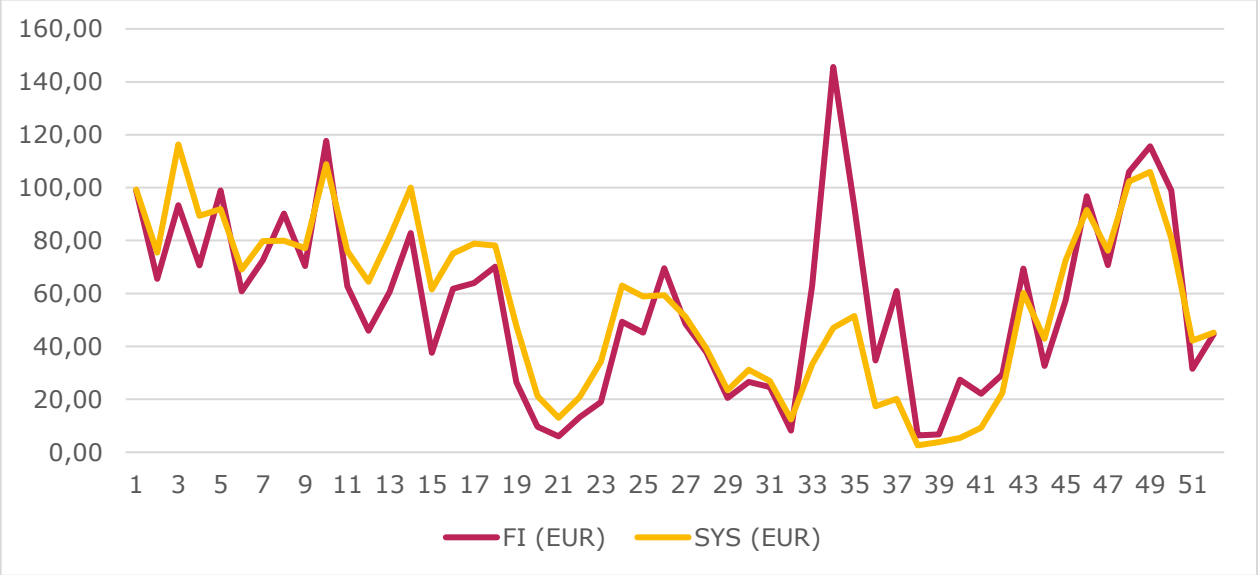

Figure 3. Weekly average day-ahead market system prices and prices at the Finnish bidding zone in 2023 (EUR/MWh). (Source NordPool)

Volatility of wholesale energy prices was remarkably high in 2023. Number of hours when the day-ahead market price was negative in the Finnish bidding zone was 467 hours (27 hours in 2022). Number of negative price hours was the biggest in whole Europe. Wholesale price volatility[12] was 100 per cent in 2023 (86 per cent in 2022) being also the highest in Europe. Table 5 below shows average wholesale electricity prices and price volatility at the Finnish bidding zone in 2020 - 2023.

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

[12] 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 5. Wholesale electricity prices and price volatility at the Finnish bidding zone.

	2020	2021	2022	2023
Average day ahead market electricity price (EUR/MWh)	28.02	72.34	154.04	56.47
• Highest hourly day ahead market price (EUR/MWh)	254.44	1,000.10	861.10	777.18
• Lowest hourly day ahead market price (EUR/MWh)	-1.73	-1.41	-2.08	-500,00
Number of negative hourly prices at the day ahead market	9	5	27	467
Volatility of day ahead market hourly prices, %	75 %	91 %	86 %	100 %

In 2023, Finland had more often than in 2022 same wholesale electricity day ahead prices as in Swedish bidding zones. During 62 per cent (in 2022: 25 per cent) of hours Finland and Northern- and Central Sweden (SE1-SE3 bidding zones) had the equal day-ahead price.

With Estonia Finland had equal day-ahead price 46 per cent (in 2022 62 per cent) of time in 2023.

Figure 4 below presents the percentage of hours in 2023 when an equal day-ahead price existed. In this picture the bidding zones of each country are grouped for clarity.

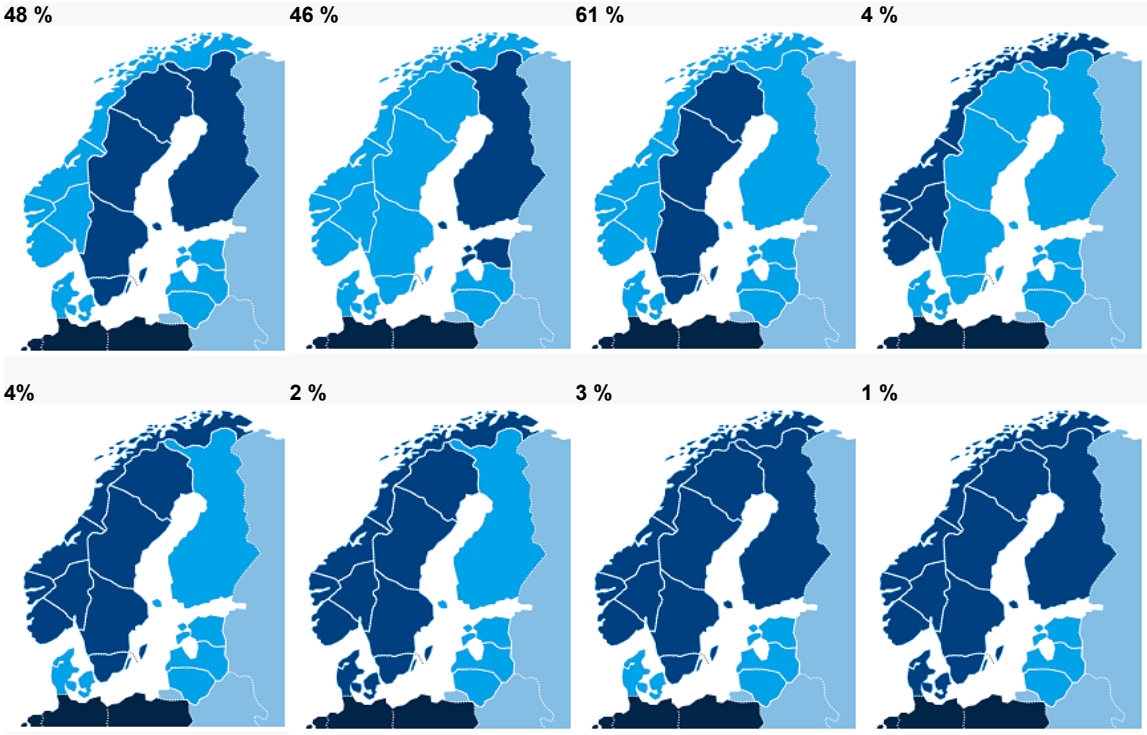

Figure 4. Percentage of hours during which different bidding zones have had equal day-ahead market prices in 2023.

Table 6 below shows on how many hours there has been a price difference between the bidding zones in 2020 - 2023.

Table 6. Number of hours when there has been a price difference between bidding zones[13] (Source: Fingrid).

	2020	2021	2022	2023
Between bidding zones FI and SE1	5,518	5,225	6,422	2,968
• During import SE1 -> FI	5,518	5,225	6,422	2,773
• During export FI -> SE1	0	0	0	195
Between bidding zones FI and SE3	3,908	2,498	3,750	2,136
• During import SE3 -> FI	3,907	2,210	2,926	1,434
• During export FI -> SE3	1	288	824	702
Between bidding zones FI and EE	2,889	3,526	3,345	4,698
• During import EE -> FI	14	9	0	2
• During export FI -> EE	2,875	3,517	3,345	4,696

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 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

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

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 2023, Energy Authority did not receive any notification from the power plant operators on planned maintenance outages during winter period of 2023 - 2024.

3.2.2 Retail market

Some key indicators for illustrating the development electricity retail market are shown in the following table (Table 7).

Table 7. Indicators for electricity retail market.

Electricity retail market indicators	2020	2021	2022	2023
Number of electricity customers (1000)	**3,585**	**3,600**	**3,590**	**3,853**
• Household customers (1000)	3,085	3,197	3,170	3,258
• Other customers (1000)	500	403	417	489
Number of electricity suppliers	63	58	53	52
Market share of the three largest suppliers by metering points, %	45 %	41 %	48 %	48 %
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, %[14]	**15.5%**	**16.2%**	**16.3%**	**14.2%**
• Households, %	15.6%	16.2%	16.6%	15.1%
• Other customers, %	14.7%	17.1%	14.7%	11.6%
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, %	52%	54%	50%	45%
• Open-ended contract, %	40%	37%	36%	24%
• Dynamic price contract, %	8%	9%	14%	31%
HHI in terms of sold energy	875-900	825-850	800-825	825-850
• Households	875-900	725-750	925-950	950-975
• Other customers	975-1000	800-825	750-775	750-775

[14] Switching rates might include also switches which are due to mergers of supply companies and treated as supplier switches in data exchange. Thus, the actual supplier switching rate might be a bit lower

HHI in terms of metering points • Households • Other customers	925-950 950-975 825-850	800-825 875-900 775-800	1000-1050 1050-1100 875-900	1000-1025 1025-1050 850-875
Evolution of the price of electricity for a typical household consumer[15], 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
Number of final household consumers with a network service contract for partial self-generation	29,900	37,100	61,200	91,600
Installed capacity of small-scale power generation[16], MW	**200.9**	**363.4**	**715.5**	**1012.0**
• Photovoltaic, MW	119.7	288.3	626.9	922.0
• Wind, MW	14.3	11.8	17.8	18.5
• Bio, MW	12.9	11.7	13.8	13.2
• Hydro, MW	30.8	28.0	32.6	30.7
• Diesel, MW	20.9	22.2	23.4	26.5
• Other, MW	2.4	1.4	1.0	1.2

Market opening and competition

There have been no notable changes to barriers of entry or the overall competitive situation on the market in 2023. 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 2023, there were 52 retail suppliers supplying electricity for households and other small-scale end-users.

In 2023, none of the electricity retail suppliers went bankrupt and therefore had to exit from the market. In 2023 two retail suppliers with around 30,000 and 10,000 customers announced that they would voluntarily exit from the electricity retail market as part of their business strategy and to focus on other areas of the business, such as electricity distribution and generation from renewable energy sources. Both companies had agreed to sell their retail supply business and transfer all their supply contracts to other companies. Therefore, their exit from the market didn't require any separate action from their customers and the Energy Authority did not have to make any decisions in relation to their exits from the market.

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 2023. 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 48 per cent.

[15] 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

[16] Only generator units with nominal capacity max 1 MVA. Connected to the network

The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) in terms of energy volumes to measure market concentration in retail market is 836. HHI based on metering points is 1004. Both numbers indicate a competitive market.

Since 2022, all electricity retail companies in Finland are obliged to register themselves to the centralised data exchange system, Datahub, which is operated by Fingrid Datahub a subsidiary of the Finnish transmission system operator Fingrid. Datahub[17] is a centralised data exchange system for the electricity retail market, storing information on around 3.8 million electricity points of use. Distribution system operators (DSOs) and electricity suppliers are obliged to use the Datahub in their information exchange. The system provides secure, fair and up-to-date access to data for all authorised parties. Also, customers have access to the Datahub and may check measured consumption data for own electricity usage points via the Datahub customer portal.

Retail companies and DSOs are required to report to the 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 on their rooftops. In 2023, number of customers having an agreement with the DSO on partial self-generation increased by 49.7 per cent. At the end of 2023 almost 100,000 customers had a contract for partial self-generation.

Small scale generation[18] 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 50 MW, but it is estimated to increase remarkably during next few years.

Figure 5 below illustrates development of small-scale power generation capacity.

[17] https://www.fingrid.fi/en/electricity-market/datahub/
[18] Generator units with nominal capacity max 1 MVA

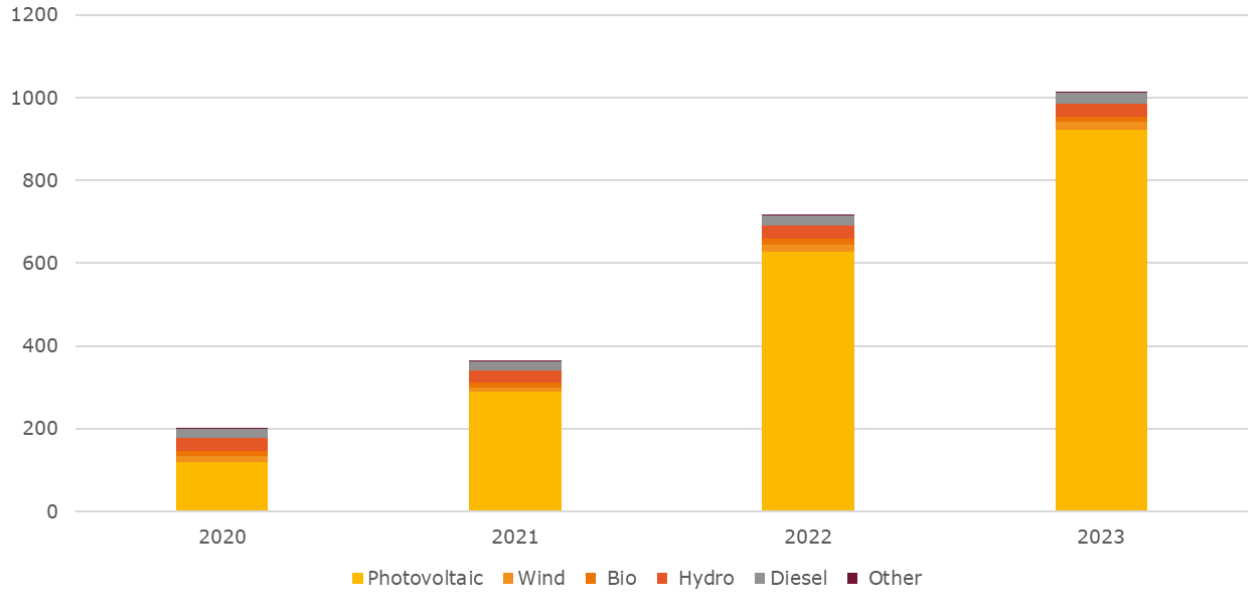

Figure 5. Installed small-scale power generation capacity with connection to the distribution grids (MW).

Price comparison tools

On 1 June 2023 came into force an Act on the Price Comparison Tool for Electricity Supply Contracts[19] 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[20] since 2006 to promote effective competition at the electricity retail market. In November 2019, the Energy Authority took into use the renewed service with aim to better fulfil customers' needs. The system has been developed to inform customers about the origin of the electricity they purchase and about the suppliers willing to buy their customers' self-generated surplus electricity.

In 2023 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.

[19] Laki sähköntoimitussopimusten vertailuvälineestä (498/2023)
[20] www.sahkonhinta.fi

Prices

Electricity suppliers may decide retail prices by themselves in Finland. For retail supply, there are no regulated tariffs which should be approved by the Energy Authority or any other authorities before taking into use.

Retail prices were still high during spring 2023 following the energy crisis in autumn 2022. The prices however quickly began decrease and stabilised during the year. However, the price levels are remaining significantly above pre-crisis levels in 2020-2021. The evolution of price of new supply products during 2022-2023 is shown in following figure (Figure 6). This figure uses data of prices reported in the comparison tool provided by Energy Authority (sähkönhinta.fi).

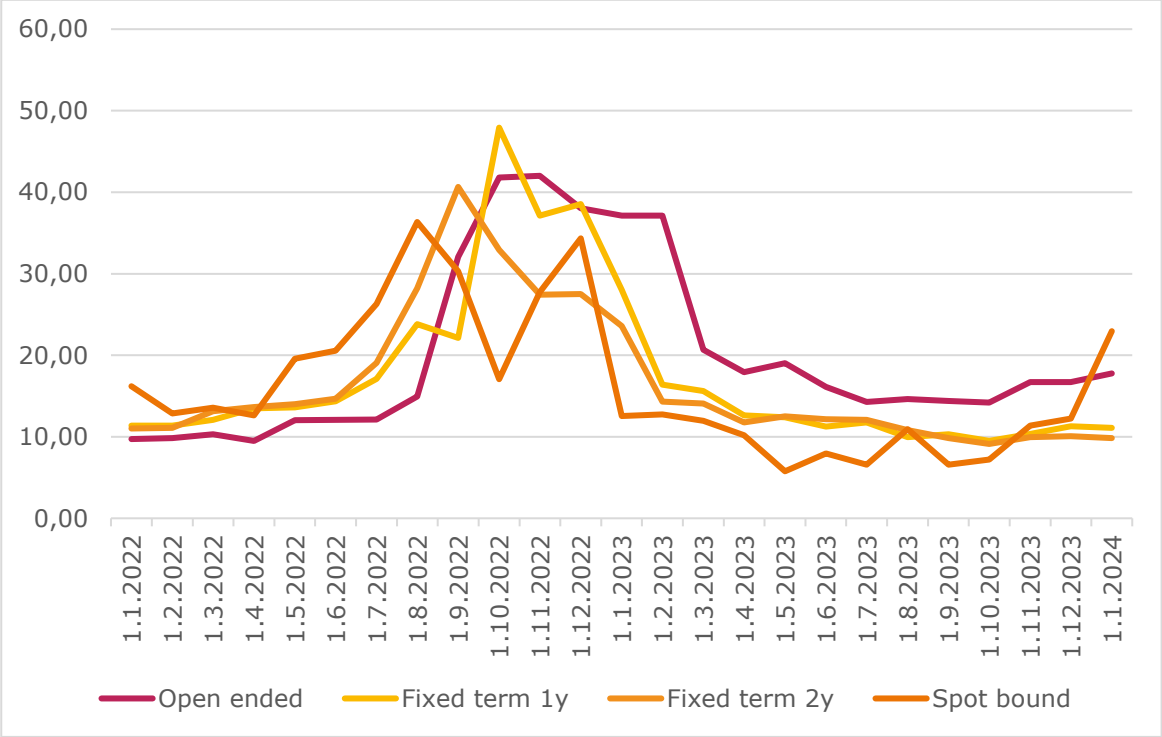

Figure 6. Price of offered new electricity supply contracts for a household customer (annual consumption 5,000 kWh) in different contract types in 2023 (cent/kWh, incl. VAT, excl. grid charges and electricity taxes).

Based on statistics by Statistics Finland, for a customer with 5,000 kWh annual consumption, the average price paid for electricity excluding taxes and network costs has fallen 37 per cent between December 2022 and 2023. Price of electricity distribution grid services including taxes showed a one per cent decrease for all household consumers.

The supply related VAT was temporarily decreased for a five-month period December 2022 – April 2023 from 24% to 10%. The goal was to alleviate the increased electricity costs of households due to high wholesale prices. VAT rate for grid charges remained at 24 %.

Consumption of electricity is subject to the electricity excise tax, strategic stockpile fee and general VAT (24 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.

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

Since the roll-out of smart meters and using hourly measured consumption in balance settlement many retailers have also started to offer even for household customers dynamic electricity price supply contracts 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 2023, about 31 per cent of retail customers had a dynamic electricity price supply contract. Share of dynamic priced contracts continued to increase also in 2023. This was partly due to the high and volatile wholesale prices in fall which drove late 2022 most suppliers to offer only spot bound contracts to new customers in order to minimize their own risks.

The most popular supply contract type among Finnish end users has been a fixed-term contract during last few years. At the end of 2023 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 24 per cent of retail customers had open-ended supply contract which customer may terminate with two weeks' notice. The share of such contracts decreased compared to 2022.

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.

In 2023 electricity retailers started to offer consumers also fixed-term and open-ended contracts which include in addition to the fixed energy price term an energy price element which varies based on timing of consumer's energy use compared variation of wholesale day-ahead prices. Aim of these contracts is to facilitate consumers move their consumption to times when wholesale prices are lower.

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 is metered either with granularity of one hour or 15 minutes and balance settlement is done in 15 minutes periods, including also households in Finland.

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 2023 the number of end users switching electricity supplier slightly decreased compared to 2022. In 2023, the switching rate was 14.2 per cent of all electricity end users (16.3 per cent in 2022). This corresponds about 547,000 end users which have switched the supplier during 2023.

For household customers switching rate was 15.1 percent (16.6 per cent in 2022).

However, these figures might include also supplier switches which are only due to merger and bankrupt of existing suppliers as they might have been treated as supplier switches in the data exchange and thus cannot be not excluded from data. Thus, actual supplier switching rates might be lower.

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 2023. 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[21] to amend national legislation to facilitate so-called combined billing of energy and grid charges to foster competition in retail market. The proposal 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. The Ministry has not yet put the proposal forward.

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

[21] 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)

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 2023, the Energy Authority received 9 new requests for investigation from household customers and opened on its own initiative one new investigation related to electricity distribution system operators and suppliers.

In 2023, the Energy Authority made decision in 3 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 the energy companies' 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 2023, the Energy Authority gave one decision on compensation to the distribution system operator for the cost of supplying electricity. In the decision, 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 2023, 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 how to terminate very expensive

fixed-term fixed-price contracts concluded at the time when prices were at their highest due to the energy crisis.

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.

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 include specific provisions for a situation when electricity supply to an end user is going to interrupt due to reasons attributable to his/her retailer like due to bankrupt of a retailer.

In such a situation, 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 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 June 1, 2023, further requires that, if the end user is a household consumer, the DSO shall continue supply until the Energy Authority has transferred the end user with its decision to retailer having the obligation to supply within that area.

In 2023, there were no situations when supply of electricity to end users was going to interrupt due to reasons attributable to retailers.

In such situation 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 with is decision the amount of the compensation. In 2023 the Energy Authority made one decision related to the amount of the compensation to a DSO when the DSO had the responsibility to continue electricity supply to end users due to a supplier's bankrupt 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. Normally those panels are of size that they do not create surplus which could be injected to the network.

Also, some housing companies have been interested to invest own PV generation. However, unclear rules on sharing surplus of self-generated energy between the members of the housing company have partly been delaying these investments.

In 2020, the Ministry of Economic Affairs and Employment prepared legislative amendments which would 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 shall be offered by the Datahub. Prior to this, and as regards the calculation of compensation until the June 30, 2023, the provisions allowed DSOs voluntarily to provide these services in their distribution network for members of the local energy communities or the group of active customers.

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 8).

Table 8. Indicators for gas grids

Indicators	2020	2021	2022	2023
Maximum gas daily consumption TWh/d[22]	0.110	0.179	0.114	0,078
Transmission pipeline entry capacity TWh/y HCV[23]	109	109	82	51
Transmission pipeline exit capacity (exports) TWh/y HCV[24]	29	29	29	29
LNG Gas Storage Capacity nm3[25]	80,000	80,000	258,806	261 000
Number of TSOs	1	1	1	1
Number of DSOs	18	17	17	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.

[22] energy volumes are expressed by using higher calorific value.
[23] Technical capacity without limitations (caused for example by compressor station delays)
[24] Technical capacity without limitations
[25] 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 Agency to Gasum Oy. The Energy Agency 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 Community-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.

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.[26]

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 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.

[26] 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 .

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.

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. Especially, heat and power plants and industrial end users reduced their gas use. Some remarkable end users also 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.

Some indicators on gas wholesale market are presented in the following table (Table 9).

Table 9. Natural gas wholesale market indicators (2023 numbers preliminary).

Natural gas wholesale market indicators	2020	2021	2022	2023*
Total gas demand TWh[27]	25.4	25.1	12.2	13.4
• Imports volume (by pipeline) TWh	25.3	25.1	12.3	3.3
• Imports LNG volume TWh[28]	n/a	n/a	0.3	15.1
• Exports volume (by pipeline) TWh	0	0.1	0.6	5.1
• Biogas injected into the transmission grid TWh	0.1	0.1	0.2	0.1
Number of active wholesale companies	34	39	49	56
Number of traders active in the wholesale market	16	19	19	19
Gas delivery from transmission grid to customers (mcm/y)	2,256	2,235	1,069	1,159
• Heat and power plants	742	708	170	258
• Industrial customers	966	1,000	648	647
• DSO grids	503	513	240	244
• Other customers	46	13	11	10

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. Large industrial end users and heat and power plants covered approximately 78 percent of the total gas consumption in 2023.

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

Prices

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

The following figure (Figure 7) illustrates the daily prices of fulfilled trades for Finland in GetBaltic in 2023.

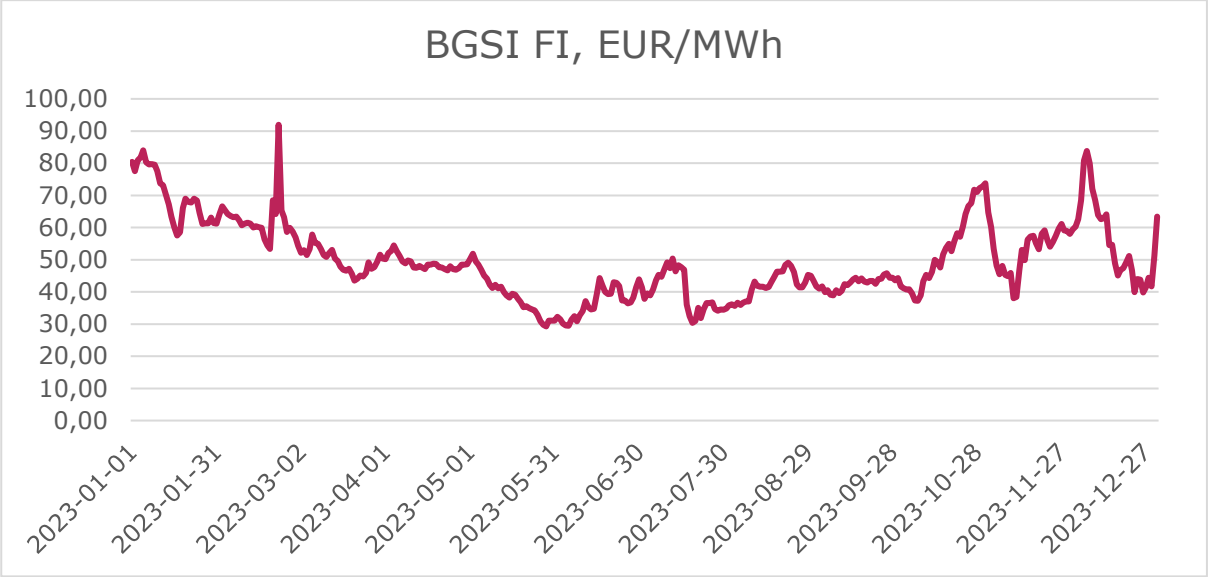

Figure 7. Price of fulfilled trades for Finland on a daily market in GetBaltic in 2023. (Source: GetBaltic)

illustrates how the natural gas price developed during year 2023 within different gas consumption groups of transmission network customers. The prices decreased from the 2022 level. In Figure 9 can be seen that the price of natural gas increased also in power production during year 2023.

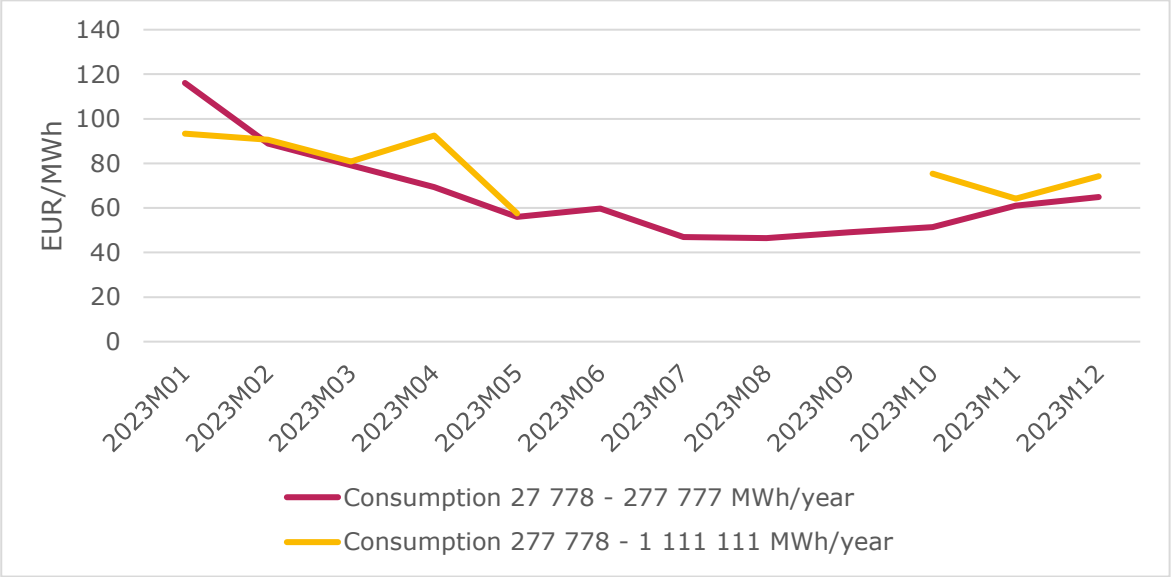

Figure 8. Price of natural gas to transmission network customers in 2022 (excl. taxes). (Source: Statistics Finland)

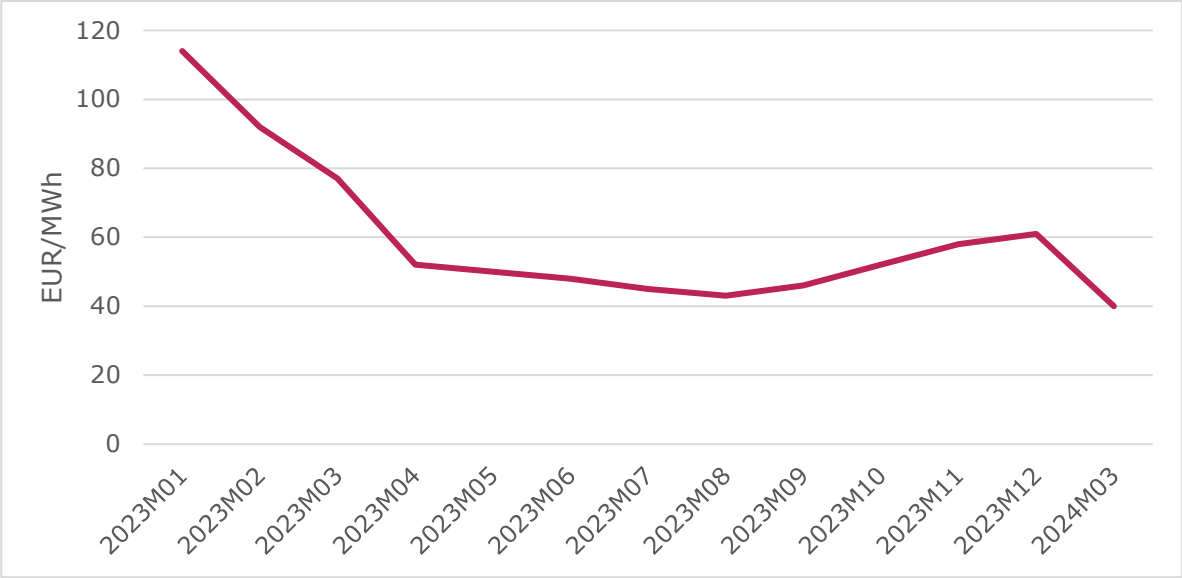

Figure 9. Price of natural gas in power production (EUR/MWh). (Source: Statistics Finland)

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 10).

Table 10. Natural gas retail market indicators (2023 preliminary).

Natural gas retail market indicators	2020	2021	2022	2023*
Number of DSO customers	**28,014**	**26,485**	**23,937**	**22,841**
• Small houses and customers using only for cooking	28,809	23,797	21,590	20,732
• Housing buildings	1,065	679	574	419
• Commercial and public buildings	1,219	1,130	983	923
• Local district heating	104	99	83	125
• Greenhouses	23	16	14	14
• Industrial customers	597	555	483	468
• Power plants	9	9	10	9
• Gas filling stations	141	140	139	137
• Other users	47	60	61	14
Amount of gas delivered to end users at the distribution grids, mcm	910.93	893.69	401.28	523.55
• Small houses and customers using only for cooking	9.27	10.79	5.67	3.37
• Housing buildings	14.88	16.71	12.03	6.60
• Commercial and public buildings	26.12	32.83	24.94	15.69
• Local district heating	50.11	76.17	25.40	52.02
• Greenhouses	1.62	1.32	0.52	0.42
• Industrial customers	575.36	532.51	255.09	362.78
• Power plants	211.54	202.74	59.99	77.28
• Gas filling stations	2.29	3.57	2.88	2.18
• Other users	19.73	17.04	14.74	3.20
Evolution of the retail price of gas for reference customer categories[29], EUR/MWh, yearly average				
• Consumption <278 MWh/y	na	75.61	176.92	96.85
• Consumption 278 - 2 777 MWh/y	na	53.26	149.40	75.13
• Consumption 2 778 - 27 777 MWh/y	na	46.41	134.00	83.44
• Consumption 27 778 – 277 777 MWh/y	na	49.25	113.58	74.43

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

[29] 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.

grid. There are only about 23,000 gas end-users in the natural gas market and the number of gas end users is gradually decreasing.

The largest gas end user segment, (20,732 customers, about 90 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 3,37 mcm (about 0.3 per cent of total gas consumption). In Finland, only a few thousand customers are using gas for heating their houses.

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.

Prices

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.

Figure 10 below illustrates gas retail price development for certain reference customer categories in 2022 - 2023.

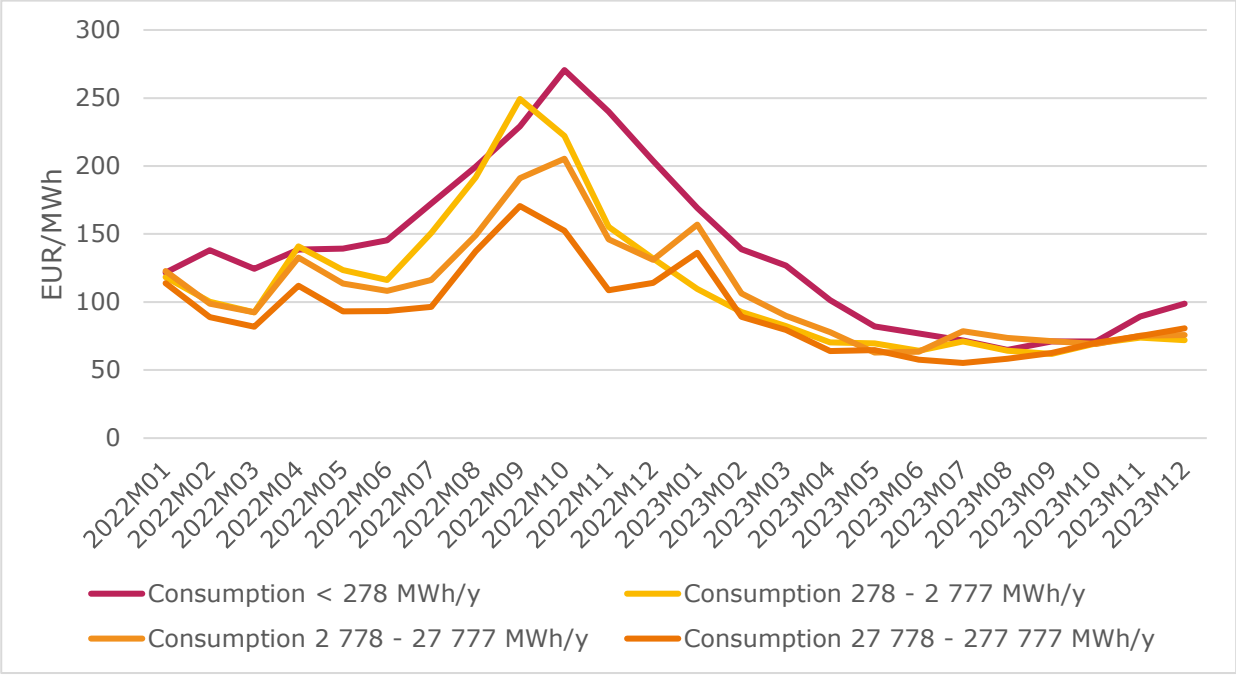

Figure 10. Price of natural gas to distribution network customers (excl. taxes). (Source: Statistics Finland)

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

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.

In 2022, the Energy Authority received a request for investigation regarding the notification procedures for changes in natural gas prices to the end users and the pricing of natural gas within the obligation to supply. The Energy Authority decided to handle these issues separately, as dealing with them simultaneously would have caused unnecessary delay. In the previous year, the Energy Authority gave decision regarding the notification procedures. The Energy Authority has not yet made a decision on the pricing of natural gas within the obligation to supply.

Furthermore, 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 2023, 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

Regarding the compliance with the natural gas market legislation, as stated above, an inquiry was submitted to the Energy Authority in February 2022, regarding the notification procedures for changes in natural gas prices to the end users and the pricing of natural gas within the obligation to supply. The Energy Authority has decided to handle these issues separately, as dealing with them simultaneously would cause unnecessary delay. In the previous year, the Energy Authority gave decision regarding the notification procedures.

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 2023, 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 11 below illustrates gas entry and exit at the connection points of the Finnish gas transmission system and net consumption in Finland in 2020 – 2023 as monthly numbers.

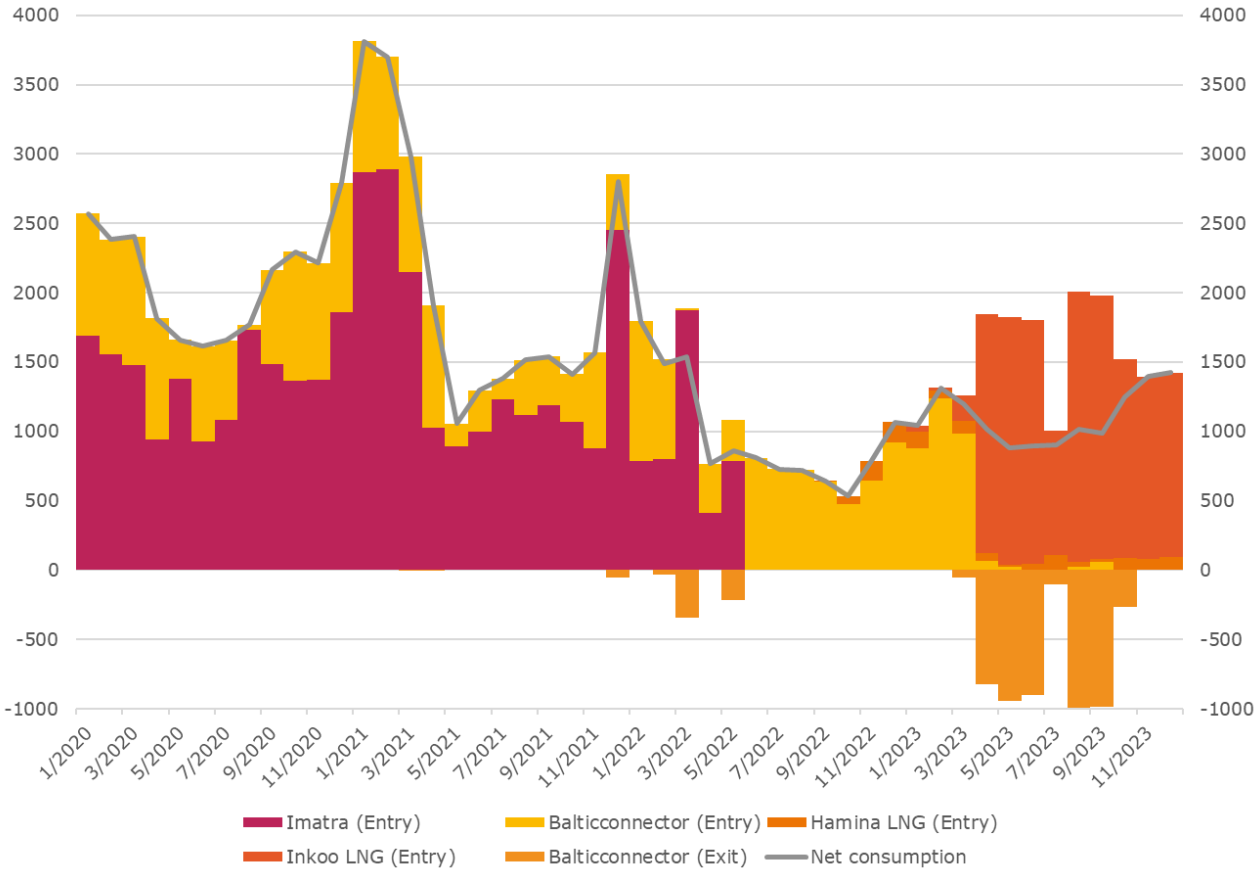

Figure 11. Gas entry and exit at the connection points of the Finnish gas transmission system and net consumption in 2020 – 2023 (GWh/month). (Source: ENTSOG Transparency platform)

A technical import capacity from Estonia to Finland varied between 0 and 78 GWh/day during 2023.

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.