

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

Year 2021

Finland

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# Foreword

This national report is prepared by the Energy Authority to the Agency for the Cooperation of Energy Regulators and to the European Commission on the state of the Finnish electricity and natural gas markets as required by 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 each of 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 report covers main developments during the period from January to December in 2021 and data presented in the report reflects this period as far as possible. In some points also the developments in 2022 are mentioned.

In 2021, the Energy Authority has continued active participation in the implementation of European network codes and guidelines. In the implementation focus has been in regional – Nordic and Baltic - approval processes. Finnish gas markets were opened for competition on 1 January 2020 and based on the gained experiences market rules and terms and conditions were improved in 2021. Together with Baltic regulatory authorities the Energy Authority has also continued the preparation work towards more integrated Finnish-Baltic gas markets.

The second half of 2021 was characterised by the sharply increased gas prices in whole Europe together with increasing coal and CO<sub>2</sub> prices, increasing electricity demand and relatively low hydro reservoir levels in Nordics which resulted high gas and electricity prices also in Finland. However, due to lower share of using gas in power generation electricity price increase was lower in Finland than in Central-Europe. In 2021, three electricity retailers had to end their supplies to their customers, but only one due to financial difficulties caused by high wholesale electricity prices.

In 2022, Russia's invasion of Ukraine has heightened the energy crisis in Europe. Since May 2022, electricity and gas import from Russia to Finland has been suspended. To improve security of supply situation, Finnish gas TSO has made an agreement to lease a floating LNG-terminal vessel which is planned to be available already for the winter 2022-2023.

The Clean Energy Package adopted in EU in 2019 will bring new tasks for the Energy Authority. However, implementation of the Directive for the Internal Market in Electricity into national legislation has been delayed in Finland. Instead of being just a national regulatory authority of the electricity and gas markets, the Energy Authority has tasks also as the national emissions trading authority and to promote renewable energy and energy-efficiency.

Simo Nurmi  
Director General  
Energy Authority

# Main developments in electricity and gas markets

## 2.1 Electricity and gas market development

### Electricity market development

Electricity consumption in Finland increased in 2021 by 7 per cent. This was partly due to normal temperatures in winter 2020-2021 after milder winter in 2019-2020 and also December 2021 was colder than normal. In addition, also recovery from Covid-19 increased electricity consumption in industry sector.

The share of net import covered 20 per cent of consumption and increased from 2020 (in 2020 share was 18 per cent). Relatively the largest increase (by 200 per cent) in electricity import concerned import from Russia which collapsed in 2020 due to low electricity prices (decreased in 2020 by 63 per cent). The net import from other Nordic countries (mainly from Sweden) decreased by 19 per cent. The net export to Estonia and further to Baltic states decreased by 1 per cent.

Wind power generation increased by 1 per cent and covered about 12 per cent of electricity generation in Finland. Hydro power decreased by 1 per cent compared to 2020. In 2021 share of hydro was 23 per cent. Share of nuclear power was 33 per cent of electricity production in Finland. Share of biomass in electricity production was increased. Share of gas in power production was about 4 per cent and decreased by 1 per cent. Total domestic electricity generation remained stable and was 69 TWh.

In peak load situation the Finnish generation capacity is not enough to cover the demand. The Energy Authority has estimated total available generation capacity in the peak load situation in winter 2021 - 2022 to be about 11,300 MW (incl. strategic reserves 611 MW). The highest hourly load in 2021 was 14,267 MWh/h. The interconnector capacity between Finland and neighbouring countries (5,100 MW) has been enough to cover the deficit in own generation capacity during the peak load situations.

Relatively low hydro situation in Nordics after summer 2021 and sharply increased gas, coal and CO<sub>2</sub> prices together with increased electricity demand increased electricity prices in Finland and other Nordic countries. Available electricity transmission capacity from Sweden to Finland has not always been enough for to cover market needs. In 2021, Swedish TSO Svenska Kraftnät also started to restrict available transmission capacity from Finland to Central Sweden (SE3 bidding zone). However, in 2021 number of hours when the wholesale electricity day ahead prices in Finland were same as in Northern and Central Sweden increased and especially day ahead prices in Finland and Central Sweden (SE3) were similar more often than before. Last year Finland and Northern Sweden (SE1) had same day-ahead price in 40 per cent of hours. With the Central Sweden (SE3) Finland had same day-ahead price in 71 per cent of hours. In 2021, Finland and Estonia had same price in day ahead market in 60 per cent of hours.

Based on the Capacity Reserve Act the Energy Authority has responsibility to estimate and procure capacity reserves needed to ensure the balance between supply and demand (strategic reserve). In December 2019, the Energy Authority decided after public tendering procedure to purchase 611 MW as strategic reserve capacity for the period of July 2020 – June 2022. In 2021, amendments to the Capacity Reserve Act due the EU regulation concerning capacity mechanisms were prepared and the amendments came into force 1 January 2022. The Energy Authority made a proposal to the Ministry for the reliability standard in Finland in June 2021 and an updated proposal in March 2022.

Electricity trade between Finland and Russia has been suspended since May 2022 as the only importer from Russia did not receive payments from electricity exchange any longer due to sanctions.

In 2021, the supplier switching rate was at the all-time highest level. About 16.2 per cent of electricity customers in Finland switched their electricity supplier in 2021. However, this number includes also some switches which were caused by restructuring of some supply companies.

During 2021, three electricity suppliers ended their electricity supplies to customers. Three of them ended electricity supplies in June 2021 due to lack of having a balance responsible party and one of them ended in December 2021 due to financial difficulties caused by high electricity prices.

## **Gas market development**

In 2021 gas consumption in Finland decreased by 1 per cent. Due to lower temperatures, gas consumption in Q1/2020 and in December 2021 was high, but due to surging gas prices gas consumption in autumn 2021 was lower than in previous years. Gas consumption in heat and power generation decreased in 2021 by 4.5 per cent and gas consumption by industrial customers connected to the transmission grid increased by 3.6 per cent. Gas delivery from the transmission grid to distribution grids increased by 1.8 per cent.

In 2021 share of gas imported from Russia increased. About 25 per cent of natural gas used in Finland was imported from Baltic states through the Balticconnector (in 2020 about 33 per cent). The rest was imported from Russia through Imatra interconnection point.

Since May 2022, gas import from Russia to Finland has been suspended. To improve security of supply situation, Finnish gas TSO has made an agreement to lease a floating LNG-terminal vessel which is planned to be available already for the winter 2022-2023. During winter 2022-2023, the vessel will be located either in Inkoo (Finland) or in Paldiski (Estonia) depending on the speed of construction works. The final location will be in Inkoo.

Finland together 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 from internal border points were removed from 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<sup>1</sup> establishing a process for the future regional gas market integration of their respective countries. The objective is to establish a merged, regional gas market in Estonia, Finland, Latvia and Lithuania, encompassing all four Member States, with the objective to improve market liquidity, integration and competition, ensuring affordable gas prices and high quality of service - thus being attractive for existing and new market participants. This common regional gas market will be the first four-country wide cross-border gas market merger in the EU.

## **2.2 National electricity and gas market regulation development**

On 1 February 2019, new provisions to the electricity market legislation which enable implementation of a centralized data exchange (Datahub) in electricity retail markets in Finland came into force. In 2021, the Energy Authority supervised whether all DSOs and retailers have made their preparatory actions for Datahub implementation. Datahub went go-live on 21 February 2022.

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<sup>1</sup> [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](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)

Since 1 September 2021, Energy Authority has been designated as the competent national authority defined in the Risk-preparedness Regulation (2019/941).

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. However, netting for local energy communities and groups of active customers will be done in the Datahub from 1 January 2023. Before that, DSOs may decide by themselves if they are willing to provide the netting service to their customers.

On 1 August 2021, came into force amendments into the Electricity Market Act which strive to restrain increase in electricity distribution prices. Amendments limit maximum increase of electricity transmission and distribution charges into 8 per cent from previous 15 per cent. Further, it includes provisions which gives power to the Energy Authority to monitor cost efficiency in network investments and requires DSOs to assess alternatives for network investments in their network development plans.

Amendments to the Capacity Reserve Act came into force on 1 January 2022. After these amendments the Act are in line with capacity mechanism provisions concerning strategic reserves set in the Regulation on the Internal Market for electricity (2019/943). As the strategic reserve system includes state-aid, it requires an approval from the DG COMP but the final approval is still pending.

In Finland, the Ministry of Economic Affairs and Employment has been responsible for preparing amendments to the national legislation to implement provisions of the Clean Energy Package (CEP). Energy Authority assists the Ministry when needed. Implementation of electricity market directive into Finnish national legislation has, however, been delayed. The Ministry organised a public consultation in November 2021 on draft amendments to national legislation, but final Government proposal has not yet been submitted to the Parliament for approval.

# 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 (2021 figures preliminary)**

Indicators	2018	2019	2020	2021*
Number of TSOs	1	1	1	1
Number of high-voltage DSOs <sup>2</sup>	11	10	9	9
Number of DSOs	77	77	77	77
Length of electricity grid (km)				
• 400 kV (km)	5,500	5,500	5,500	5,500
• 220 kV (km)	1,600	1,300	1,300	1,400
• 110 kV (km)	16,400	16,500	16,500	16,600
• 1-70 kV (km)	151,800	152,900	154,200	154,700
• 0.4 kV (km)	249,200	251,400	254,300	256,400

### 3.1.1 Unbundling

#### **TSO unbundling and certification of TSO**

Finland has chosen ownership unbundling model for unbundling of electricity transmission system operators. 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 2021, there were no changes in the ownership of Finnish TSO, Fingrid. Majority (53.14 per cent) 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.

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

#### **DSO unbundling**

Total number of distribution system operators having lower than 110 kV voltage level network was 77 at the end of 2021. 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 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.

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<sup>2</sup> Distribution system operators having only 110 kV or above grid

Totally, 37 distribution system operators were in 2021 over the threshold value. In addition, some other distribution system operators have voluntarily legally unbundled network activities. At the end of 2021 a total of 54 distribution system operators 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 2021 these requirements were applied to 20 distribution system operators in Finland.

### **3.1.2 Network extension and optimization**

#### **Investments plans**

In 2021, Fingrid continued to develop the internal transmission system significantly to increase the capacity of the main transmission corridor in North to South direction. Increasing market integration and intermittent generation demands flexibility not only from generation but also from the transmission system. Also, old East to West connections of Southern Finland at the end of technical lifespan are being replaced with more modern ones.

In 2021, Fingrid invested by EUR 178,6 million of which investments to the grid were EUR 166.3 million. Investments to the grid were increased by EUR 29 million from year 2020 and Fingrid plans to increase annual grid investments even further up to EUR 300 million by 2023.

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 4<sup>th</sup> list of Projects of Common Interest published by European Commission in October 2019<sup>3</sup>.

According to the Finnish Electricity Market Act, all DSOs shall submit updated grid development plans (GDP) to the Energy Authority bi-annually. The GDPs should include actions which demonstrate that each DSO will improve and maintain quality 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 quality 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 first new type GDPs were delivered to the Energy Authority by 30<sup>th</sup> of June 2022.

The Energy Authority has powers to request DSOs to make amendments to their GDPs if deemed necessary. According to the submitted GDPs, DSOs have planned to make replacement investments to the electricity distribution grids during period of 2014 - 2036 worth about EUR 9.7 billion of which 1/3 will be used to increase quality of supply.

#### **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 proposals was published in October 2018<sup>4</sup>.

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<sup>3</sup> [https://ec.europa.eu/energy/sites/ener/files/c\\_2019\\_7772\\_1\\_annex.pdf](https://ec.europa.eu/energy/sites/ener/files/c_2019_7772_1_annex.pdf)

<sup>4</sup> Final report is available from <https://tem.fi/en/working-group-to-explore-smart-grids-potential-for-the-electricity-market>

Energy Authority established in autumn a Smart Grid Forum to assist and discuss proposals to the Ministry for implementation of smart grid provisions of the Directive and proposals of the Smart Grid Working Group.

### **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. 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 November 2015, the Energy Authority confirmed with its decisions the methods concerning the rate of return in electricity network operation to be followed during the fourth and fifth regulatory periods in 2016 – 2019 and 2020 - 2023.

After the end of the 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.

The network is valued 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. 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 in a manner which ensures the viability of the networks as required by the Article 59(7)(a). Prior to 2016, the unit prices for all components that formed the regulated asset base were updated for each regulatory period. From 2016, the updates were planned to be made every two regulatory periods, however, the prices were most recently updated in 2021, and came into effect in 2022, as part of a wider set of amendments made to the regulatory methodology in 2021

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 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 was estimated in 2019 for the fifth regulation period.

The Energy Authority has also developed details of the methodology with a view to achieve a regulatory model that is incentivizing more innovation and investment 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.

### **Significant amendments to the electricity market legislation in 2021**

As a result of amendments to the Electricity Market Act which came into force on 1 August 2021, the Energy Authority amended the regulation methodology with changes that came into force from the beginning of 2022. There were three key changes:

- the unit prices of network components, which are used to determine the net present value of the network, were updated and as a result a correction was made to the way prices are adjusted for inflation, to align the methodology with the new schedule based on which component prices are updated periodically
- the already described methodology change to the calculation of the risk-free rate in determining the WACC
- removal of the security of the supply incentive from the methodology, to reflect the fact that the security of supply target date was extended by legislation from 2028 to 2036

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 September 2021 to the Ministry recommendations to harmonise structures of network tariffs at electricity distribution grids.<sup>5</sup>

### **Evolution of network tariffs and levies**

The national electricity market legislation was changed in 2017 so that the allowed maximum price increase of network charges within a rolling twelve-month period is limited to 15 percent. This was further amended to 8 percent in 2021 to limit the upward pressure on network charges.

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<sup>5</sup> <https://energiavirasto.fi/-/suositukset-sahkon-verkkopalvelumaksujen-harmonisoinnista> (in finnish)

In terms of the average distribution network charges, the previously witnessed upward price trend was reversed in 2021. The average price fell by 2.3 percent in real terms for a typical household compared to 2020.

### **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.

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 18,200 MW at the end of 2021. However, the entire capacity is not available during the peak load periods. The Energy Authority has estimated in autumn 2021, that 11,300 MW of Finnish electricity generation capacity (incl. peak load reserves) will be available for the consumption peaks in winter 2021–2022. The Energy Authority estimated also that peak load will be 15,100 MW for the same period, which however turned out to be 900 MW smaller. 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 2021, 14,267 MWh/h was reached in February. The electricity import capacity was around 5,100 MW in 2021. During the peak load hour net import was 3,076 MWh/h.

#### **Investments in generation capacity**

In 2021, more than 700 MW of wind power capacity was commissioned. Two industrial CHP-units were decommissioned, leading to 100 MW decrease in power output.

The most significant ongoing power generation investment project in Finland is the construction of nuclear power plant unit Olkiluoto 3. Building of this 1,600 MW unit has been delayed for several years. Originally, the unit should have been commissioned by the end of 2009. According to the latest public information, it will start regular electricity production in December 2022.<sup>6</sup>

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<sup>6</sup> <https://www.tvo.fi/en/index/news/pressreleasesstockexchangereleases/2022/olkiluoto3epr8217stestproductionwillcontinueintheendofjuly.html>

Fennovoima Oy was planning to construct a new Hanhikivi 1 nuclear power plant unit in Pyhäjoki and the project received a decision-in-principle from the Finnish Government and the Parliament in 2014. In early May 2022, Fennovoima announced that it had terminated the contract of plant delivery and later in May 2022 Fennovoima announced that it has withdrawn the Hanhikivi nuclear power plant Construction License Application.<sup>7</sup>

Wind power capacity will continue to increase in the coming years. Seven wind power projects will receive public support, based on the results of technology neutral RES auction organized by the Energy Authority in 2018. However, majority of new wind power projects are being developed without any support. Fingrid has estimated, that 1000 MW of new wind power capacity will be commissioned annually until 2030.

At the end of 2021, about 400 MW of solar power were connected to the grid. This consists mainly of small-scale solar panels (capacity less than 1 MVA); only total capacity of 4.6 MW is from solar power plants with capacity above 1 MVA. Annual increase of solar power capacity was more than 100 MW.

A part of CHP old 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, which will increase electricity consumption.

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**

No new investments in interconnection capacity have been made since the Estlink 2 between Finland and Estonia started operation in 2014.

Third AC connection between Finland and Sweden, Aurora Line, is scheduled to be in operation in 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 agreed in 2021 to continue operation of Fennoskan 1 HVDC-connector between Finland and Sweden until 2040.

### **Strategic reserves**

To ensure the balance between supply and demand during scarcity hours, Finland has a capacity mechanism – strategic reserve. 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.

The current strategic reserve period is from 1<sup>st</sup> of July 2020 to 30<sup>th</sup> of June 2022. During this period the peak-load reserve capacity consists of three power plants, 611 MW in total. The selected power plants made the agreements with Fingrid in late 2019. Fingrid is responsible to pay

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<sup>7</sup> <https://www.fennovoima.fi/en/press-releases/fennovoima-has-withdrawn-hanhikivi-1-construction-license-application-focus-now>

the compensations to the power plants, and they are financed by the fees collected from the Finnish electricity end-users.

During the winter period, from December to end of February, power plants participating in the strategic reserve system are in 12 hours' readiness to start electricity production. At other times, power plants are in one-month readiness. Power plants shall be able to increase power output with 10 MW within 10 minutes after request and be ready for 200 hours continuous power production with full capacity during the winter period. DSR facilities are included in the strategic reserve only during the winter period and they shall be able to decrease load with 10 MW within 10 minutes after request. During the period 2020–2022 DSR facilities are not part of the strategic reserve capacity.

Activation of strategic reserve capacity has been very rare. The last time strategic reserves were activated was during the winter 2009 - 2010.

After the current period, new EU capacity mechanism rules will be complied. The Energy Authority has decided that the amount of capacity needed will be 600 MW, based on the reliability standard (Loss of Load Expected 2,1 hours/year and Expected Energy Not Served 1,100 MWh/year) and adequacy studies. The next strategic reserve period will be from 1<sup>st</sup> of November 2022 to 31<sup>st</sup> of October 2023.

### **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 defined in 2021 national crisis scenarios in electricity sector and prepared the national Risk Preparedness Plan. The plan was submitted to the Commission and to the Electricity Coordination Group in December 2021. The Commission provided its opinion on the Risk Preparedness Plan in June 2022.

### **3.1.6 Cross-border issues**

#### **Technical cooperation between Union and third country transmission system operators**

Fingrid provides 1,300 MW of transmission capacity from Russia to Finland available to the electricity market on its 400 kV connections from Russia. Total capacity of these connection is 1,400 MW and Fingrid has reserved a volume of 100 MW to be used as a power system reserve. The maximum trading capacity from Finland to Russia is 320 MW. The full volume of the confirmed trade schedules is traded on the Single day-ahead and intraday market coupling.

The electricity trading with Russia was suspended in May 2022 until further notice due to RAO Nordic Oy's problems in receiving payments.

#### **Capacity allocation and congestion management**

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

Capacity of submarine cable between Åland Island and mainland of Finland, Ål-Link, is not provided to the market. This cable is built to ensure security of supply in Åland islands which have an AC-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.<sup>8</sup>

The flow-based method has not been implemented yet. Nordic TSOs started the external parallel runs with the flow-based method in day-ahead timeframe in March 2022. As the methodology requires a minimum total of 12 months of parallel runs, this would mean that the flow-based methodology can be used for capacity calculation earliest in spring 2023.

Table 2 shows the costs of the countertrade paid by Fingrid and congestion income to Fingrid during the years 2016 - 2020.

**Table 2. Net costs of countertrade and congestion income.**

	2018	2019	2020	2021
<b>Net costs of countertrade, MEUR</b>	<b>4.1</b>	<b>0.9</b>	<b>0.7</b>	<b>2.5</b>
• Countertrade between Finland and Sweden, MEUR	1.9	0.1	0.1	0.3
• Countertrade between Finland and Estonia, MEUR	0.1	0.5	0.2	0.2
• Countertrade inside Finland, MEUR	2.2	0.3	0.4	2.0
<b>Congestion management income to Fingrid, MEUR</b>	<b>29.6</b>	<b>73.0</b>	<b>146.7</b>	<b>283.8</b>
• From interconnectors between Finland and Sweden, MEUR	28.2	65.5	122.7	221.1
• From interconnectors between Finland and Estonia, MEUR	1.4	7.5	24.1	62.8

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.

In 2021 congestion management income for the Fingrid totalled EUR 283.8 million (EUR 146.7 million in 2020). Fingrid uses congestion income to investments that aim to relieve the congestions. Fingrid used EUR 14.2 million of congestion incomes in 2021 for financing transmission grid investments. At the end of the year 2021, Fingrid had EUR 488.7 million of unused congestion income, which will be used later for financing investments to improve the market functioning.

<sup>8</sup> <https://energiavirasto.fi/documents/11120570/12872579/P%C3%A4%C3%A4t%C3%B6s+Nordic+kapasiteetin+laskenta-alueen+kapasiteetin+laskentamenetelm%C3%A4n+muuttamisesta.pdf/ea9b8c31-cf41-4d32-b902-571e43fad02c/P%C3%A4%C3%A4t%C3%B6s+Nordic+kapasiteetin+laskenta-alueen+kapasiteetin+laskentamenetelm%C3%A4n+muuttamisesta.pdf?t=1603785321857> (in Finnish)

### **3.1.7 Implementation of Network Codes and guidelines**

#### **System Operation Guideline (SO GL)**

In 2021, the Energy Authority continue to co-operate with TSOs and NRAs to meet System operation guideline (2017/1485) requirements on Nordic and national levels. Before approval, some proposals, there have been preparatory actions on next matters ramping restrictions, FRR dimensioning and FCR additional properties. The Energy Authority have taken coordinated actions to meet Guideline requirements and to ensure that Guideline objectives can be met.

In March 2021, the Energy Authority received among all the other Nordic NRAs from Nordic TSOs a proposal on amended ramping methodology in accordance with SO GL art 137 (3)(4). The proposal main content was to include North Sea Link ja Kriegers-Flak HVDC links to the scope of existing proposal. In October 2021 Nordic NRAs submitted a request for amendment concerning most of the minor details but also the major reason was that Nordic TSOs informed Nordic NRAs in September 2021 that proposed ramping restrictions is not possible to implement according to proposed implementation timelines. In December 2021 Nordic TSOs submitted an amended proposal to Nordic NRAs. Content of resubmission was to include partial implementation to methodology where first part of methodology is valid after the national NRAs' decisions and the second part valid when virtual bidding zone (NO2) is technically implemented on intraday trading system. Neither Nordic NRAs' agreement nor national decisions were made by the end of 2021.

During the year 2021, several meetings were held between Nordic TSOs and NRAs to map needs for amending FRR dimensioning methodology. As a result, TSOs concluded the necessary changes to the methodology could be implemented by updating the system operation agreement (SOA). By the end of 2021, any formal proposal wasn't submitted to Nordic NRAs for approval.

In 2021, TSOs developed new technical features as well as dimensioning rules in the FCR methodologies. In June 2021, the Nordic TSOs informed the NRAs about challenges in obtaining the required FCR-D down capacity through market-based measures. TSOs presented a plan to procure more reserve capacity and assured that, despite the challenges, system security will be kept at an acceptable level due to inherent properties of the production units. This subject was closely discussed and followed up in the cooperation group of the TSOs and the NRAs.

#### **Emergency and Restoration Network Code (ER NC)**

By 2021, the Energy Authority has approved all proposals related to the ER NC.

Among the approved proposals was a proposal on the rules for suspension and restoration of market activities in accordance with network code on Emergency and Restoration. According to these rules Fingrid shall not suspend market activities pursuant to the relevant article of the network code as activities listed for possible suspension in the network are either not relevant to be suspended in an emergency situation as suspension would not help handling of the situation or Fingrid has otherwise adequate tools to better cope with situation such as reducing the cross-zonal capacities on the Finnish bidding zone borders if needed for operational security reasons rather than suspending the provision of cross zonal capacity for capacity allocation altogether.

In 2021 Fingrid updated already approved proposals concerning significant grid users and test plan according to (EU) 2017/2196 article 4.2(c and g) and submitted them for approval. These new proposals were approved in the first half of 2022.

## **Forward Capacity Allocation Guideline (FCA GL)**

Currently there are no long-term transmission rights for cross-border trade from Finland to Sweden and from Finland to Norway and from Finland to Estonia or vice versa. For hedging against price differences between bidding-zone prices and the Nordic system price market actors may use EPADs (Electricity Price Area Differentials) or bilateral contracts.

In accordance with Article 30(3) of the FCA Guideline, the Energy Authority assessed the bidding zone borders between Finland and Estonia and Finland and Sweden and decided in April 2017 together with Swedish and Estonian regulatory authorities that existing electricity forward market provided sufficient hedging opportunities in these bidding zone borders. Thus, the Energy Authority decided in 2017 not to request Fingrid to issue long-term transmission rights or to make other cross-zonal hedging products available on the FI-EE, FI-SE1 and FI-SE3 bidding zone borders.

During spring 2021, the subsequent assessment in line with Article 30(4) of the FCA guideline 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 that the hedging opportunities were insufficient and agreed to request the Finnish and Estonian TSOs to issue transmission rights on the FI-EE -border. Energy Authority gave its decision on the matter in June 2021 and the Finnish and Estonian TSOs are now preparing the newly applicable relevant methodologies for regulatory approval in order for transmission rights to be issued on the FI-EE -border.

What comes to the FI-SE1 and FI-SE3 bidding zone borders and the respective decision, Energy Authority has assessed in spring 2021 the FI bidding zone and concluded that there are not sufficient hedging opportunities available in the electricity forward markets. On the other side of the border, concerning bidding zones SE1 and SE3, the Swedish NRA respectively concluded that sufficient hedging opportunities are offered in the Swedish bidding zones. The Finnish and Swedish NRAs were thus unable to agree on the decision in line with article 30 of the FCA Guideline. Due to this, the Finnish and Swedish NRAs agreed in March 2022 to request for ACER to adopt a decision either under Article 30(5)(a) or under Article 30(5)(b) of the FCA Guideline concerning the FI-SE1 and FI-SE3 bidding zone borders. ACER's decision is expected during fall of 2022.

## **Capacity Allocation & Congestion Management Guideline (CACM GL)**

In 2021, the focus has been in amendments to the current CACM regulation and enforcement questions for which the Energy Authority has actively contributed. Energy Authority participated actively to the drafting process for the changes to the CACM regulation tasked by the European Commission in 2020 and discussions relating to the ACER proposal.

The Energy Authority discussed with other NRAs on the CACM GL cost reporting and continued its national cost decision processes throughout year 2021 and actively participated other CACM processes discussed and handled in the CACM TF.

Energy Authority also took part to the enforcement processes relating to the CACM guideline. Based on the request from ACER, Energy Authority also started enforcement process towards Fingrid concerning fulfilment of the ACER decision 29/2020.

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 will 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.

### **Electricity Balancing Guideline (EB GL)**

In 2021, 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, Energy Authority has followed Nordic TSOs co-operation project NBM (Nordic balancing model) which is closely related to EB GL implementation. Before approval, some proposals, there have been preparatory actions on several balancing methodologies. 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 ongoing NBM development projects: 15 minutes imbalance settlement period, Nordic aFRR capacity market, Automated Nordic mFRR, Nordic mFRR capacity market, Intraday 15 minutes, European mFRR market platform (MARI) and European aFRR market platform (PICASSO).

The EBGL 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 October 2018, the Energy Authority published after analysis and consultation with neighbouring Estonian and Nordic NRAs a statement in which the Energy Authority did not find reasons for such derogation in Finland. In December 2018, all Nordic NRAs published a similar joint statement.

However, 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. However, the Energy Authority requested Fingrid to prepare parallel an alternative approach to meet the new implementation date even if there will be any problems with implementation timetable in other Nordic countries. Also, The Energy Authority required Fingrid to submit continuous reports on every six months on national parallel implementation.

In August 2021, the 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 October 2020, Fingrid submitted to Energy Authority a request to receive from NRA an informal guidance regarding BRP terms and conditions. The informal guidance was submitted to Fingrid in November 2020. The previous decision (2018) to BRP terms and conditions was two price systems in which up and down adjustments were made into two separate prices. In a single price system, up and down adjustments together affect price formation, and the result is a converging price for up and down adjustments, imbalance price. Single price model combines price formation.

The single price proposals were submitted to Nordic NRAs in December 2020. The proposals did have different scope on each Nordic country and in Finland proposal was consisting of mFRR, FCR and BRP terms and conditions. Fingrid submitted also separate proposals regarding single price model aFRR in April 2021. The aFRR proposal was divided on two separate sub-proposals regarding firstly single price model and secondly Nordic aFRR market changes.

During the decision-making process, the legality of technical price cap for balancing electricity (EUR 5,000 /MWh) and the even treatment for managing serious disturbances became major issues based on stakeholder statements. The Energy Authority made decision regarding single price model (mFRR, FCR and BRB terms and conditions) in September 2021. Energy Authority considered that the proposed balancing electricity price cap (EUR 5,000 /MWh) did not fulfil existing regulation and thus was removed, and 12 months was given to Fingrid to make technical changes for necessary actions. Also, 12 months was given to resubmit a reformed proposal regarding even treatment in the management of serious disturbances. Fingrid made an appeal on the decision to the Market Court. The court process is still ongoing.

In December 2021 Fingrid submitted a proposal concerning Nordic mFRR EAM. Proposal was consisting of mFRR terms and conditions.

In summary, based on the NBM meetings held in 2021, the planned timelines were stretched and the risk of one major simultaneous market change have increased compared to the previous year.

### **Demand Connection Code (DCC NC)**

Fingrid has prepared requirements for demand connections (KJV2018) based on the DCC NC. Fingrid submitted draft requirements to Energy Authority for approval in September 2018. Energy Authority has approved the requirements after amendments in March 2019.

## **Requirements for Generators (RfG NC)**

Fingrid has prepared requirements for generators (VJV2018) based on the RfG NC. Fingrid submitted draft requirements to Energy Authority for approval in May 2018. Energy Authority has approved the requirements after amendments in December 2018.

## **High Voltage Direct Current Connections (HVDC NC)**

Fingrid has prepared requirements for HVDC connections which will be connected to the Finnish electricity system based the HVDC NC. Fingrid submitted draft requirements to Energy Authority for approval in November 2018. Energy Authority has approved the requirements for HVDC connections in May 2019.

## **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 3).

**Table 3. Indicators for electricity wholesale market**

<b>Electricity wholesale market indicators</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Electricity Production (TWh)</b>	<b>67.5</b>	<b>66.1</b>	<b>66.1</b>	<b>69.0</b>
• Hydro power	13.1	12.3	15.6	15.4
• Wind power	5.9	6.0	8.0	8.1
• Solar power	0.2	0.2	0.3	0.3
• Nuclear Power	21.9	22.9	22.4	22.6
• CHP district heating	11.8	12.4	9.6	10.3
• CHP industry	9.7	9.6	8.1	9.0
• Conventional thermal power	4.9	2.6	2.2	3.1
<b>Total annual electricity demand (TWh)</b>	<b>87.4</b>	<b>86.1</b>	<b>81.1</b>	<b>86.8</b>
• Maximum hourly demand (GWh/h)	14.06	14.54	12.39	14.27
<b>Imports volume (TWh)</b>	<b>22.5</b>	<b>23.9</b>	<b>21.6</b>	<b>24.5</b>
<b>Exports volume (TWh)</b>	<b>2.6</b>	<b>3.9</b>	<b>6.7</b>	<b>6.7</b>
<b>Traded volume in the spot electricity market (TWh)</b>				
• Day-ahead buy volume (FI)	61.6	63.2	59.0	62,8
• Day-ahead sell volume (FI)	48.6	50.1	45.2	52,3
• Intraday buy volume (FI)	1,1	1.0	1.0	1,1
• Intraday sell volume (FI)	1.0	1.0	1.0	1,1
<b>Average day ahead markets electricity price in Finnish bidding zone (EUR/MWh)</b>	<b>46.80</b>	<b>44.04</b>	<b>28.02</b>	<b>72.34</b>
<b>Generation fuel mix by source (GW)</b>				
• Coal	1.9	1.6	1.4	1.4
• Natural gas	1.8	1.8	1.8	1.8
• Petroleum	1.3	1.3	1.3	1.3
• Nuclear	2.8	2.8	2.8	2.8
• Peat	1.8	1.8	1.5	1.3

Electricity wholesale market indicators	2018	2019	2020	2021
• Biofuels	2.3	2.6	2.7	2.6
• Waste	0.2	0.2	0.2	0.2
• Hydro	3.2	3.2	3.2	3.2
• Wind	2.0	2.2	2.4	3.2
• Solar	0.1	0.2	0.3	0.4
<b>Total installed generation capacity (GW)</b>	<b>17.4</b>	<b>17.7</b>	<b>17.6</b>	<b>18.2</b>
• Maximum hourly generation (GWh/h)	11.38	11.20	10.56	11.41

## **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.

In January 2019, after being designated as a NEMO in Sweden, Nasdaq Oslo ASA announced to the Energy Authority its willingness to offer day-ahead trading services with delivery in Finland by using so-called passport method. The Energy Authority decided in March 2019 that Nasdaq Oslo ASA has right to offer day-ahead trading services with delivery in Finland.

In January 2022, after being designated as a NEMO in Sweden, Nasdaq Spot AB announced to the Energy Authority its willingness to offer day-ahead trading services with delivery in Finland by using so-called passport method. The Energy Authority decided in March 2022 that Nasdaq Spot AB has right to offer day-ahead trading services with delivery in Finland.

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. Nasdaq Oslo ASA and Nasdaq Spot AB have not yet started offering day-ahead trading services in Finland.

Finland has been part of the European Cross-Border Intraday (XBID) solution since the 1<sup>st</sup> 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 power exchange covered 67 per cent of the Finnish physical consumption in 2021. Electricity procurement from EPEX SPOT was

considerably lower, and it covered less than 7 per cent of Finnish electricity consumption in 2021.

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 Spot calculates 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 Spot 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).<sup>9</sup>

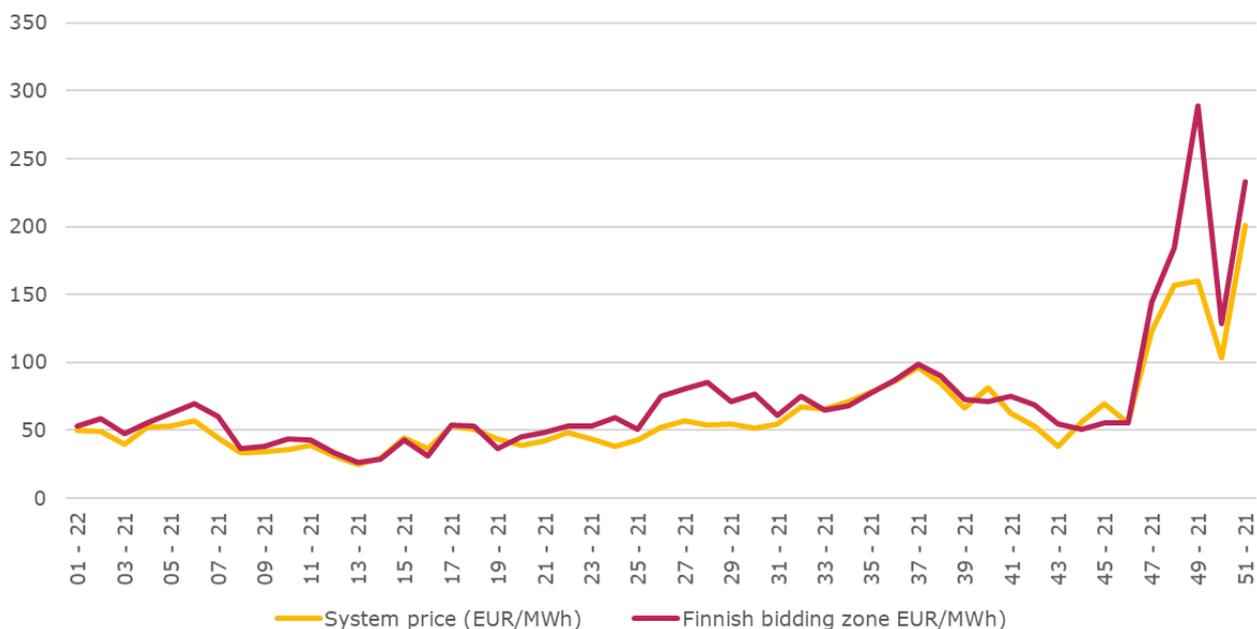
In 2021, the average system market price was 470 per cent higher than in 2020. The average system price in 2021 was EUR 62,31/MWh.

The average Finnish area price in 2021 was EUR 72.34/MWh, showing an increase of 158 per cent year-on-year. The highest hourly day-ahead price EUR 1,000.07 /MWh in Finnish bidding zone was reached on December 7, 2021.

Figure 1 presents weekly average Nordic system market prices and day-ahead prices in the Finnish bidding zone in 2021.

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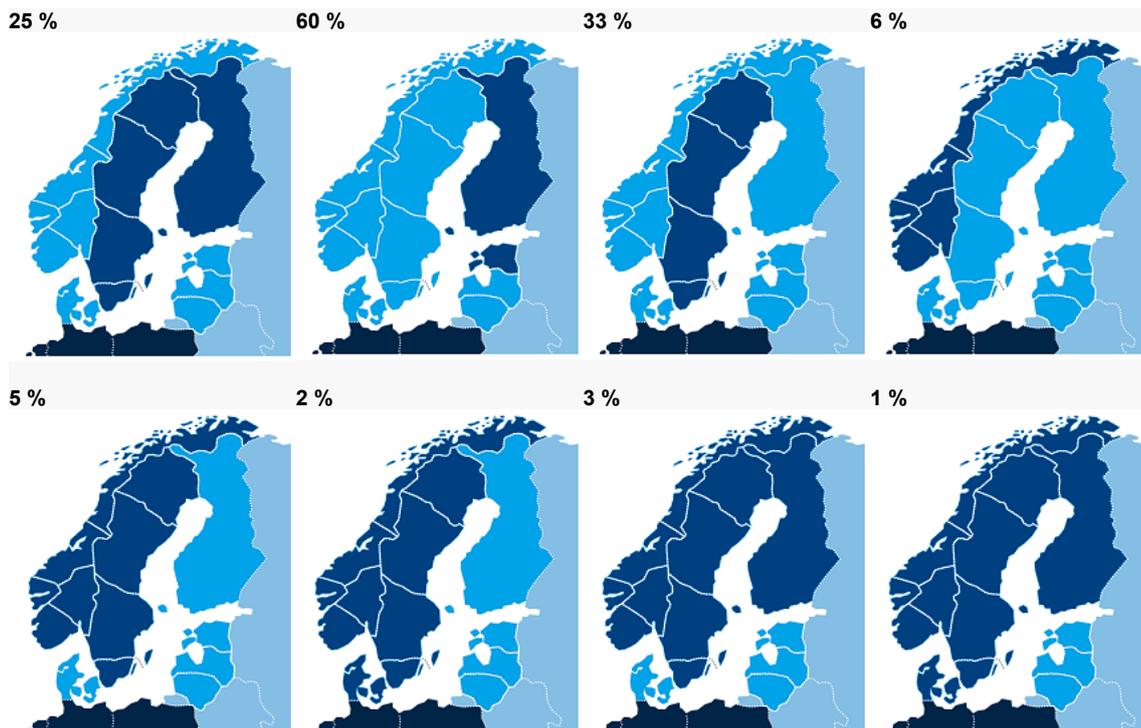
<sup>9</sup> <https://www.nordpoolgroup.com/trading/Day-ahead-trading/Price-calculation/>



**Figure 1. Weekly average day-ahead market system prices and prices in Finnish bidding zone in 2021. (Source NordPool)**

In 2021, about 39 per cent (in 2020: 37 per cent) of the time Finland and Northern- and Central Sweden (SE1-SE3 bidding zones) had equal day-ahead price. Finland had equal day-ahead price with Estonia 60 per cent (in 2020 67 per cent) of time in 2021.

Figure 2 presents the percentage of hours during the year 2021 when equal day-ahead price existed. In this picture the bidding zones of each country are grouped for clarity.



**Figure 2. Percentage of hours during which different bidding zones have had equal day-ahead market prices in 2021**

### **Transparency**

In 2013 came into force transparency regulation (543/2013) which is also followed 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 (1227/2011) 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 (1227/2011) 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 to ACER which in turn discloses these transactions to Energy Authority. Energy Authority monitors markets in relation to the registry of market participants and reported transactions in order to detect whether all relevant parties are within the scope of REMIT.

In Finland, transparency arrangements are based on legislation and authority surveillance. Additionally, there are also voluntary contract-based arrangements between Nord Pool and the market participants trading in Nord Pool.

According to the regulations, producers, consumers and transmission system operators have an obligation to disclosure information on events, which might have a relevant effect to price formation. They shall report 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 disclosure of information related to electricity power plants. According to the Electricity Market Act a power plant operator shall notify the Energy Authority of a plan for constructing a power plant, of commissioning of a power plant and of long-term or permanent decommissioning of a power plant. Further provisions on the contents of the notification obligation and notification procedure are given by Government degree.

Pursuant to the Electricity Market Act, the power plant operator is obliged to notify the Energy Authority of a planned maintenance outage of its power plant 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.

### 3.2.2 Retail market

Some key indicators for illustrating the development electricity retail market are shown in the following table (Table 4).

**Table 4. Indicators for electricity retail market (2021 figures preliminary).**

Electricity retail market indicators	2018	2019	2020	2021*
<b>Number of electricity customers (1000)</b>	<b>3,577</b>	<b>3,614</b>	<b>3,585</b>	<b>3,600</b>
• Household customers (1000)	3,117	3,148	3,085	3,197
• Other customers (1000)	460	467	500	403
Number of electricity suppliers	72	71	63	58
Market share of the three largest suppliers by metering points, %	35-40%	40-45%	45%	41%
Number of retailers with market shares >5%	4	7	6	6
Number of retailers with customer shares > 5%	3	5	6	6
<b>External switching rate, %<sup>10</sup></b>	<b>10.9%</b>	<b>13.9%</b>	<b>15.5%</b>	<b>16.2%</b>
• Households, %	11.1%	14.3%	15.6%	16.2%
• Other customers, %	10.2%	12.3%	14.7%	17.1%
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, %	42%	49%	52%	54%
• Open-ended contract, %	49%	40%	40%	37%
• Dynamic price contract, %	9%	11%	8%	9%
HHI in terms of sold energy	450-475	725-750	875-900	825-850
• Households	575-600	800-825	875-900	725-750
• Other customers	450-475	750-775	975-1000	800-825
HHI in terms of metering points	625-650	850-875	925-950	800-825
• Households	650-675	875-900	950-975	875-900
• Other customers	450-475	800-825	825-850	775-800
<b>Evolution of the price of electricity for a typical household consumer<sup>11</sup>, cent/kWh</b>	<b>17.96</b>	<b>18.62</b>	<b>18.64</b>	<b>19.97</b>
• Network charges (excl. taxes)	5.93	6.18	6.38	6.20
• Energy costs and supply margin (excl. taxes)	6.30	6.58	6.40	7.65
• Taxes	5.73	5.86	5.86	6.11
Number of final household consumers with a network service contract for partial self-generation	13,200	21,400	29,900	37,100

<sup>10</sup> 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

<sup>11</sup> Household annual consumption 5000 kWh/year. Situation as of 31.12

Electricity retail market indicators	2018	2019	2020	2021*
<b>Installed capacity of small-scale power generation<sup>12</sup>, MW</b>	<b>177.0</b>	<b>200.9</b>	<b>363.4</b>	<b>494.8</b>
• Photovoltaic, MW	66.4	119.7	288.3	390.3
• Wind, MW	16.5	14.3	11.8	20.6
• Bio, MW	16.3	12.9	11.7	30.7
• Hydro, MW	36.2	30.8	28.0	28.0
• Diesel, MW	38.2	20.9	22.2	24.0
• Other, MW	3.3	2.4	1.4	1.2

### **Market opening and competition**

Number of retail suppliers has been stable. At the end of 2021, there were round 58 retail suppliers supplying electricity for households and other small-scale end-users. Number of suppliers has been decreased as some electricity retail companies have been merged into bigger ones. In 2021 also three electricity suppliers had to end electricity deliveries to their customers – one of these companies had to end supplying electricity due to financial difficulties caused by high electricity prices and the other two had due to not having a balance responsible party anymore. In addition, there are some suppliers which are supplying electricity only for large end-users.

Still, only a few electricity retailers are ownership unbundled from electricity network activities. Most of the legally unbundled electricity retailers still belong to same group of companies as a distribution system operator or are owned by one or several distribution system operators.

Electricity retail supply does not require any license or registration from the Energy Authority.

Even though the exact market shares of individual retailers are not available, the Energy Authority has estimated that seven electricity retailers have larger than five per cent share of retail market (based on energy volume) and six retailers have more than five per cent of electricity customers. Number of larger retailers have increased since 2018 due to merger of some retailers. The market share of the three largest companies in the retail market for small and medium-sized customers has been estimated to be about 41 per cent. This has also increased a bit during last few years.

The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) in terms of energy volumes to measure market concentration in retail market is about 850 and still showing rather competitive marketplace. However, also this metric has been increasing. Number of new entrants and their market share have been low.

On 1 February 2019, new provisions to the electricity market legislation which enable implementation of a centralized data exchange (Datahub) in electricity retail markets in Finland came into force. According to these provisions the Finnish TSO, Fingrid Oyj has obligation to organise and provide information exchange services necessary for market processes in distribution networks and imbalance settlement in distribution grids. Provisions also set obligation to DSOs and retailers to use these services and to ensure that their IT-systems are compliant with the Datahub.

The new provisions have also given powers to the Energy Authority to monitor and supervise that all DSOs and retailers are well-prepared for the commissioning of the Datahub. In 2021, Energy Authority supervised whether all DSOs and retailers have made their preparatory actions for Datahub implementation. Datahub went successfully go-live on 21 February 2022.

<sup>12</sup> Only generator units with nominal capacity max 1 MVA. Connected to the network

In 2020, the Energy Authority together with other Nordic energy regulators (NordREG) commissioned a study regarding Nordic data hub interoperability. The study<sup>13</sup>, published in March 2021, assessed the potential for reduction of access barriers in the Nordic electricity markets through the introduction of data hub interoperability. The study showed that there are no indications of insufficient competition in the Nordic electricity supply markets. Data hub interoperability will reduce some entry barriers, while other entry barriers will remain unaffected. The report concluded that there are no sizeable socio-economic benefits of data hub interoperability. However, in the longer perspective, sharing data from the national data hubs on a Nordic level could promote new business models related to flexibility services.

## **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.

Electricity suppliers offering electricity to end users in Finland shall provide the Energy Authority information on prices, which are applied when supplier is offering electricity in general to the customers, whose main fuse is max 3x63 amperes or whose annual consumption is below 100,000 kWh.

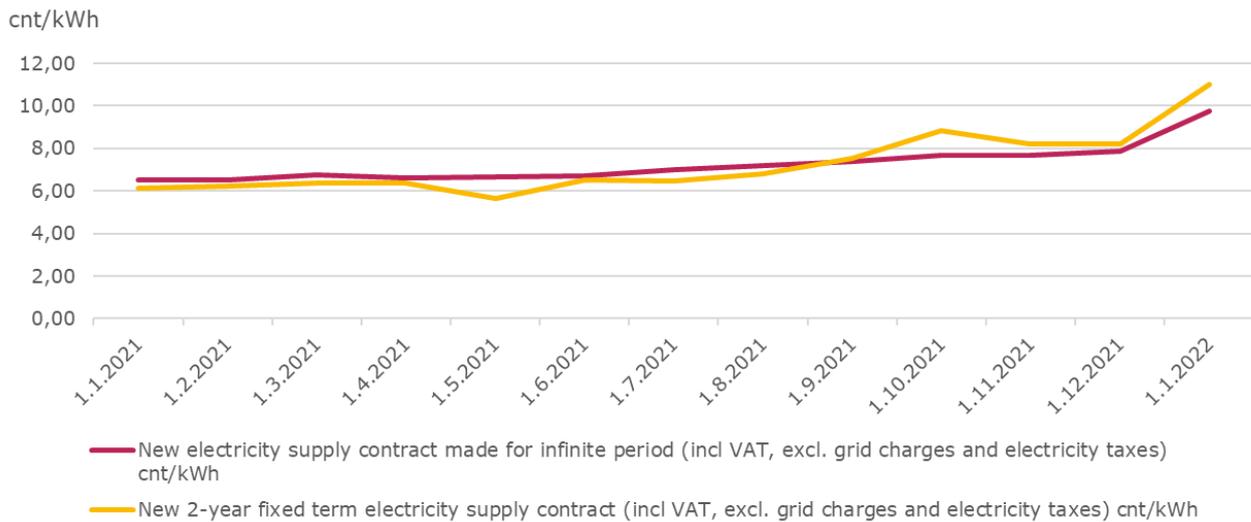
The retail prices increased in the fourth quarter of 2021 following the increase in the wholesale energy prices. In 2021, the prices of the so-called obligation to supply contracts including taxes increased 59.7 per cent for a residential customer with annual 5,000 kWh consumption. For a household with electric heating increase was 72.8 per cent. The percentual changes are calculated using the prices of January 1, 2020 and January 1, 2021.

The average price of offers for an open-ended contract for electrical energy including taxes for a residential customer with annual 5,000 kWh consumption increased by 48.3 per cent. For a small house with electric heating (annual consumption 18,000 kWh) the price increase was 108.5 per cent. The average price of offers for a two years fixed-term contract for a residential customer increased with 77.6 per cent and for a household customer with electric heating decrease was 84 per cent.

Figure 3 presents average prices of new supply contracts for a typical household customer in the beginning of each month in 2021. Prices include VAT but exclude grid charges and electricity taxes.

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<sup>13</sup> Available at: [Implement Consulting Group - Nordic Data Hub Interoperability \(nordicenergyregulators.org\)](https://nordicenergyregulators.org)



**Figure 3. Price of new electricity supply contracts for a household customer (annual consumption 5000 kWh) in different contract types in 2021 (incl. VAT, excl. grid charges and electricity taxes).**

Price of electricity distribution grid services including taxes showed a 0.7 per cent decrease for household consumers. For electrically heated households the decrease was 0.8 per cent in 2021.

In 2021, the electricity bill for apartment house households and households with electrical heating increased in total by 25.1 and 35.3 per cent respectively.

In 2021, there were no changes in electricity taxation in Finland. 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. 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 0.703 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 2021, about 9 per cent of retail customers had a dynamic electricity price supply contract. Share of dynamic priced contracts increased from 2020.

The most popular supply contract type has been a fixed-term contract during last two years. At the end of 2021 about 54 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 37 per cent of retail customers had open-ended supply contract which customer may terminate with two weeks' notice. Share of such contracts decreased from year 2020.

### **Smart meter use**

More than 99 per cent of consumption places in Finland had already a smart meter. The Finnish national legislation required 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 2<sup>nd</sup> generation of smart meters.

Metered hourly consumption data is used for the balance settlement, including also households, in Finland.

### **Switching rates**

In 2021, number of customers switching electricity supplier increased from 2020 and was all-time highest in Finland. The estimated number of customers that switched their supplier was about 584,000 which corresponds about 16.2 per cent of all electricity customers. In 2020 the switching rate was 15.5 per cent.

For households switching rate was 16.2 percent (15.6 per cent in 2020).

However, these figures might include also supplier switches which are only due to merger 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 2021. 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<sup>14</sup> 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.

### **3.2.3 Consumer protection and dispute settlement**

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

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

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

#### **Complaints by household customers**

In 2021, the Energy Authority received from household customers 9 new requests for investigation related to electricity distribution system operators and suppliers. In addition to these, the Energy Authority received 6 requests for investigation from other parties than household customers and opened on its own initiative five new investigations

In 2021, the Energy Authority made decision in 19 cases including ones initiated by the Energy Authority itself or other parties than household customers. 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 and disconnections.

#### **Disconnection rates**

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

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<sup>14</sup> <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)

## **Restrictive contractual practices**

Two suppliers had to stop supplying electricity in June 2021 due to not having a balance responsible party anymore in this period, which led to various uncertain situations that required Energy Authority investigation and attention. According to the section 102 of the Finnish Electricity Market Act customers had to find a new supplier to avoid cut-off their electricity supply. DSOs have in this situation an obligation to ensure electricity supply for a 3-week period from date they have informed customers that their electricity suppliers cannot continue their electricity supply.

Further, during autumn of 2021, the Energy Authority received multiple complaints and advice requests related to these two companies. These companies, for an example, continued billing some of their customers although they could no longer operate as a retailer and sell electricity. The events concerning the companies also required action from other governmental bodies, especially from the consumer authorities, and employed resources there as well.

Closer to the tail end of 2021, the Energy Authority started receiving consumer complaints and advice requests regarding multiple retailers increasing the prices of their contracts. Most of these changes in contract details were due to the increases in the market prices of electricity during the winter period. As the Energy Authority does not have jurisdiction to investigate the basis for these contractual changes, most 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.

These complaints were not the only thing to employ the resources of the Energy Authority during the end of 2021. In December 2021 one retailer went bankrupt with a very short warning period. As a result, multiple consumers had to rely on their DSOs for electricity. Normally in such situation DSOs are obliged to ensure electricity supply for affected consumers for a 3-week period under section 102 § of the Finnish Electricity Market Act. However, due to the national Datahub testing period, there was a temporary law in force from November 1, 2021 until March 31, 2022, and that extended this DSO's period of responsibility to ensure electricity supply until the Energy Authority's decision on suppliers of last resort, to whom the customers were then transferred. The transfer was only carried out had the customers not succeeded to find themselves a new supplier in the meantime. Preparing these decisions as well as resolving suppliers of last resort employed notable amounts of resources from the Energy Authority at this time.

Despite the volatility of the electricity market in 2021, no other suppliers went bankrupt or exited the market during the year, except through a merger.

The Energy Authority made several decisions on breaches of the provisions of the Electricity Market Act and related legislation. It also initiated proceedings of imposing conditional fines. Regarding the issues not falling within the competence of the Energy Authority, in most cases the persons making the complaints were advised to contact the nationwide Consumer Advisory Services.

## **Protection of energy poor and vulnerable household customers**

Energy poverty or vulnerable customers are not defined in the national energy legislation. There isn't any public intervention in suppliers' price setting either. In Finland, the social security system is in place for those people who cannot afford the necessary housing expenses including energy bills.

However, some restrictions to disconnection due to non-payment exist in the Electricity Market Act 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 2021 the Energy Authority did not make such investigations on reasonableness of electricity prices under the obligation of supply.

### **Availability of comparison tools**

To promote effective competition in the electricity retail market, the Energy Authority has since 2006 maintained a web-based system designated to facilitate price comparisons and supplier switching. 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. All retail suppliers are obligated to maintain up-to-date information on their public electricity price offers for household customers and other small end-users on this service. In 2021, this comparison tool fulfilled 7 out of 8 criteria that are set in the Directive (EU) 2019/944.

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 price comparison tool maintained by the Energy Authority, there are also other similar services for comparing electricity price offers maintained by private parties. Some of these tools also provide possibility to customers to make a supply contract with a chosen supplier.

### **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 decree has a transitional period until the 1<sup>st</sup> of January 2023 from which date the netting and calculation of compensation inside the imbalance settlement period have to be offered by the Datahub. Before that, and as regards the calculation of compensation even until the 30<sup>th</sup> of June 2023, the provisions allow 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 consumers and energy companies in individual contractual disputes. The disputes between household consumers and entrepreneurs 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 Board's written decision is a recommendation, and the parties are not obliged to follow it. 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 entrepreneurs.

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 businesses are solved in a general court of law or in an arbitral tribunal if agreed so. In 2020, the Ministry of Economic Affairs and Employment started to prepare legislation for dispute settlement between business customers and energy companies as required by the Directive (EU) 2019/944. The ministry's suggestion is to set up an independent Energy Market Disputes Board to specifically solve contractual disputes between energy companies and business customers. The Board would operate alongside of the Consumer Disputes Board. The Energy Authority supports the ministry's suggestion, but the related legislation is still waiting for parliamentary proceedings.

# 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 5).

**Table 5. Indicators for gas network**

Indicators	2018	2019	2020	2021
Maximum gas daily consumption TWh/d <sup>15</sup>	0,161	0,143	0,110	0,179
Pipeline entry capacity TWh/y HCV <sup>16</sup>	80	80	109	109
Pipeline exit capacity (exports) TWh/y HCV <sup>17</sup>	0	0	29	29
LNG Gas Storage Capacity nm <sup>3</sup> <sup>18</sup>	80 000	80 000	80 000	80 000
Number of TSOs	1	1 <sup>19</sup>	1	1
Number of DSOs	25	22	18	18

### 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, the ownership of transmission system operation was transferred to the Ministry of Finance on 1 January 2020.

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.

Energy Authority has an ongoing process with Gasum Oy in Market Court concerning accounting unbundling and cross subsidization in financial statements 2017-2020. On 17 July 2020, the

<sup>15</sup> Until end of 2019 energy volumes are expressed by using low calorific value and from 2020 by using higher calorific value.

<sup>16</sup> Technical capacity without limitations (caused for example by compressor station delays)

<sup>17</sup> Technical capacity without limitations

<sup>18</sup> Storage capacity in offgrid LNG terminals. In Finland there are no other gas storages

<sup>19</sup> Until end of 2019 TSO was a part of vertically integrated gas wholesale supply company (unbundling only in accounts).

Energy Authority has also made a proposal to the Finnish Market Court to impose a penalty of EUR 79.7 million on Gasum for non-compliance with the Agency's decisions on cross-subsidization through demerger.

## **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 national legislation, gas TSO 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 network tariffs and charges**

According to the Natural Gas Market Act, the network operators 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.

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 windfall 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 2015, the Energy Authority confirmed with its decisions the methodology to be followed in natural gas system operation during the third and fourth regulatory periods in 2016 – 2019 and 2020 – 2023.

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. According to the Natural Gas Market legislation, the Energy Authority shall approve gas transmission system tariffs applicable in interconnection points for year 2020 and 2021 prior entry into force. The Energy Authority approved in November 2020 entry and exit tariffs and other terms and conditions applicable in 2021 in interconnection points of Imatra and Balticconnector.

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 Commission Regulation on establishing a network code on harmonized transmission tariffs structures for gas (Tariff Network Code) 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
- the levels of discounts set out in Article 9(3) and 16.

The consultation was open from 12<sup>th</sup> October until 5<sup>th</sup> November 2021. The Energy Authority gave in November 2021 a motivated decision on the level of multipliers, seasonal factors and discounts.

### **Regulation of LNG tariffs and access**

As all LNG terminal projects in Finland have received state-aid, European Commission has requested that the regulation concerning the 3<sup>rd</sup> party access and ex-ante approval of terminal tariffs shall be applied to those LNG terminals.

In March 2018, the Energy Authority approved tariffs for the off-grid LNG terminal in Pori and in December 2020 the Energy Authority approved tariffs for the off-grid LNG terminal in Tornio. In October 2020, the Energy Authority approved tariffs for the Hamina LNG terminal.

The third LNG terminal in Hamina will be opened for commercial operation in fall 2022. The Hamina terminal will be the first on-grid LNG terminal in Finland. The Hamina terminal will be connected to both the low-pressure DSO network and high-pressure TSO network. Commercial operation will start with only high-pressure injection service capacity available.

### **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.<sup>20</sup>

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<sup>20</sup> 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> .

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 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 20<sup>th</sup> of May 2022.

According to national regulation, TSOs obligation is to submit their capacity allocation and congestion management rules to NRA for confirmation. In November 2021, 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.

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

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

During 2021-2022 the Finnish and Baltic transmission system operators have been working on the proposal for 4-country single entry tariff zone, without internal cross-border entry and exit fees. In November 2021, the national regulatory authorities of Finland, Estonia, Latvia and Lithuania received an application from the TSOs for a coordinated opinion on gas transmission entry tariff and inter-transmission system operator compensation mechanism among Finnish, Estonian, Latvian and Lithuanian gas TSOs. The objective is that the 4-country single entry tariff zone enters into force from the beginning of gas year 2023.

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

## 4.1.6 Implementation of Network Codes and guidelines

Finland has availed itself of the possibility of the derogation allowed by the Natural Gas Market Directive. Following this, certain provisions from the European natural gas market regulation, e.g. network codes, were not applied in Finland.

Finland decided to end the derogation 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 the end of 2019, the Finnish natural gas market was isolated with a pipeline connection only to the importing country Russia. There was also only one gas wholesale supplier.

Commissioning of the Balticconnector pipeline in December 2019 connected the Finnish market to the Estonian and Baltic gas markets and enabled gas market opening for competition from 1 January 2020. During year 2021 almost all gas consumed in Finland was imported through two pipeline connections: Imatra connection (18,8 TWh) and Balticconnector (6,3 TWh). In 2021, available capacity at Balticconnector increased from level 33 GWh/d to level 55 GWh/d due to finalization of compression stations in Estonia. Small amount of biogas was produced domestically. Besides pipeline gas there were two off-grid LNG terminals in use during 2021.

Some indicators on the gas wholesale market are presented in the following table (Table 6).

**Table 6. Natural gas wholesale market indicators. (2021 figures preliminary)<sup>21</sup>**

Natural gas wholesale market indicators	2018	2019	2020	2021*
Domestic gas production (only biogas) GWh	934	894	876	905
• Biogas injected into the transmission grid GWh	101,42	95,40	108,81	144,64
Total gas demand TWh	24,7	23,2	25,4	25,1
• Imports volume (by pipeline) TWh	24,7	24,7	25,3	25,1
• Exports volume (by pipeline) TWh	n/a	n/a	0	0,07
Number of active wholesale companies	1	1	34	39
Number of traders active in the wholesale market	n/a	n/a	16	19
Gas delivery from transmission grid to customers (mcm/y)	2,456	2,480	2,256	2,235
• Heat and power plants	875	820	742	708
• Industrial customers	1,337	1,341	966	1,000
• DSO grids	232	258	503	513
• Other customers	11	62	46	13

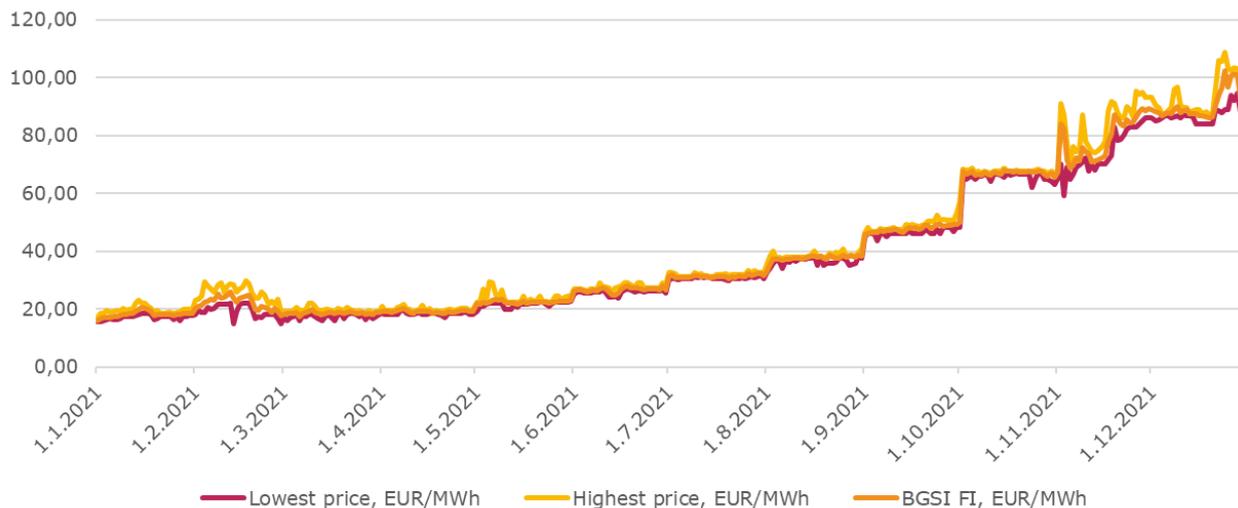
Despite the opening of the gas market and entry of new market actors, the Finnish gas wholesale market is still rather concentrated. In 2021, three largest shippers covered 76 percent (based on GWh) of the total gas market in Finland.

<sup>21</sup> Until the end of 2019 energy volumes are expressed by using low calorific value and from 2020 by using higher calorific value.

Finnish wholesale gas market is characterized by large share of gas used by end-users connected directly to the transmission grid. Only about 23 per cent of gas is used by customers connected to the distribution grid. Large industrial end users and heat and power plants covered approximately 76 percent of the total gas consumption in 2021.

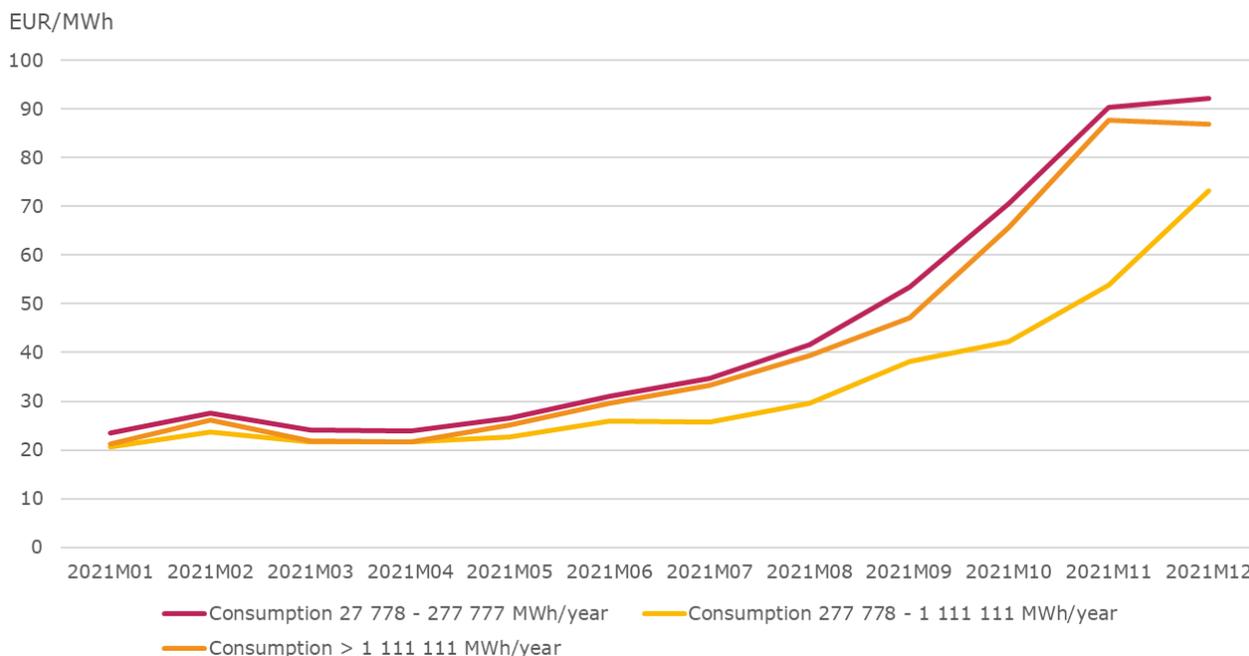
## Prices

Since the beginning of 2020 gas trading services has been provided by GetBaltic, the common Finnish-Baltic gas exchange. The following figure (Figure 4) illustrates the daily prices of fulfilled trades for Finland in GetBaltic. The price level started to increase during autumn 2021.

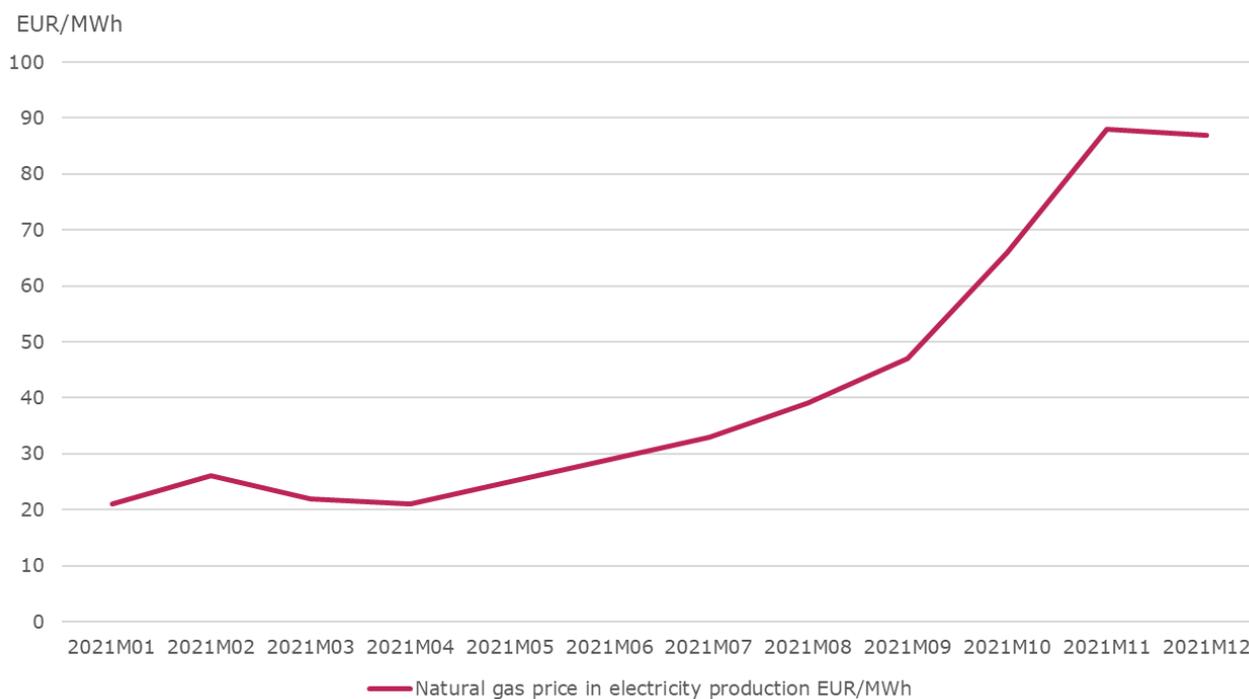


**Figure 4. Price of fulfilled trades for Finland on a daily market in GetBaltic in 2021 (source: GetBaltic).**

Figure 5 illustrates how the natural gas price developed during year 2021 within different gas consumption groups of transmission network customers. The prices increased heavily during year 2021 in every consumption level. The prices increased less in the consumption group where the annual gas consumption was between 287 GWh and 1100 GWh. In Figure 6 can be seen that the price of natural gas increased also in power production during year 2021.



**Figure 5. Price of natural gas to transmission network customers in 2021 (excl. taxes). (Source: Statistics Finland)**



**Figure 6. Price of natural gas in power production. (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 7).

**Table 7. Natural gas retail market indicators. (2021 figures preliminary)**

Natural gas retail market indicators	2018	2019	2020	2021*
<b>Number of DSO customers</b>	<b>27,674</b>	<b>32,858</b>	<b>28,014</b>	<b>26,470</b>
• Small houses and customers using only for cooking	24,915	29,535	28,809	23,800
• Housing buildings	727	1,905	1,065	679
• Commercial and public buildings	1,085	1,252	1,219	1,120
• Local district heating	116	113	104	99
• Greenhouses	29	27	23	16
• Industrial customers	648	640	597	552
• Power plants	13	9	9	8
• Gas tanking stations	86	141	141	140
• Others	55	46	47	59
<b>Evolution of the retail price of gas for reference customer categories<sup>22</sup>, EUR/MWh</b>				
• Consumption <278 MWh/y	na	na	na	110.29
• Consumption 278 - 2 777 MWh/y	na	na	na	82.83
• Consumption 2 778 - 27 777 MWh/y	na	na	na	96.54
• Consumption 27 778 - 277 777 MWh/y	na	na	na	91.40

### Market opening and competition

The retail supply of natural gas covers about 23 per cent of the total consumption. There are only nearly 26,900 gas end-users in the natural gas market. The largest customer segment, (nearly 24,000 customers, about 88 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 10,8 mcm (about 0.5 per cent of total gas consumption). In Finland, only a few thousand customers are using gas for heating their houses.

The number of retail suppliers has been stable in 2021. There are 15 companies registered as retailers and 18 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, also gas retail market has been opened for competition and all gas customers have been able to choose their supplier. However, in order to switch a gas supplier, the customer shall 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

<sup>22</sup> Situation as of 31.12. Excluding taxes. Data before 1 January 2021 is not available. Source Statistics Finland.

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 7 illustrates gas retail price development for certain reference customer categories in 2021.

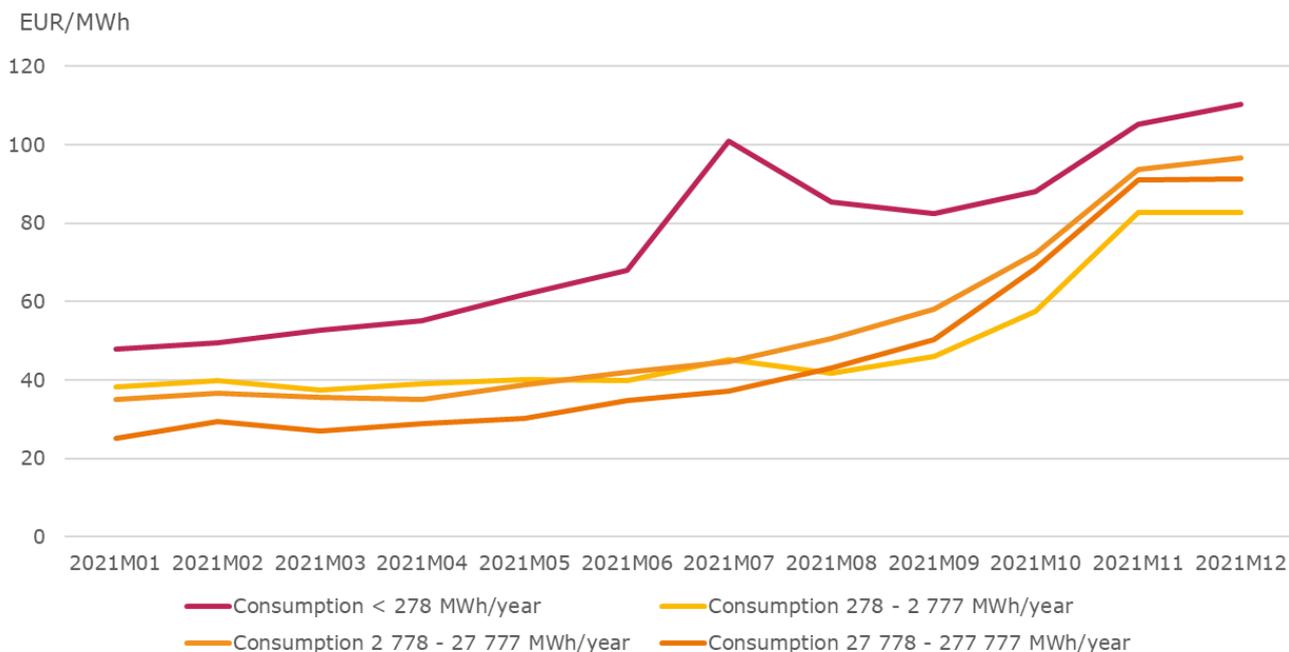


Figure 7. Price of natural gas to distribution network customers (excl. taxes). (Source: Statistics Finland)

### **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 2021, Energy Authority did not make any investigations on gas retail prices under 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 2021, 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, the Energy Authority did not receive any new requests for investigation from household customers during 2021.

## **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 entrepreneurs 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 Board's written decision is a recommendation, and the parties are not obliged to follow it. 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 entrepreneurs.

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 businesses are solved in a general court of law or in an arbitral tribunal if agreed so.

## **4.3 Security of supply**

### **4.3.1 Monitoring balance of supply and demand**

The Energy Authority has a responsibility for monitoring the security of supply of gas. The Energy Authority maintains information on transmission network capacity and availability, while the Ministry of Employment and the Economy has the responsibility for preparing the estimates for the demand. In 2021 there were no changes in these competences.

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. Energy Authority publishes annually a report on gas security of supply situation.

Natural gas used in Finland was imported from Russia and Estonia in 2021. 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, and third one, with connection to natural gas grid in Hamina, is planned to be in commercial use in October 2022.

The importing capacity from Russia was about 220 GWh/d in 2021. The transmission capacity between Estonia and Finland is 80 GWh/d. However, only about 30 GWh/d of that capacity was available in early 2021 and around 55 GWh/d in late 2021 due to delayed commissioning of compressor stations in Estonian side. Puiatu compressor station was commissioned in April 2021 and Paldinski compressor station in June 2021. During the peak demand in 2021 gas consumption was 179 GWh/d.

#### **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.

The gas crisis management team coordinates activities, which are related to the severe gas supply disruptions. The group consists of members in Finnish National Emergency Supply Organization's natural gas division as well as coordinator person from the Ministry of Employment and the Economy.