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National Report 2019 to the Agency for the Cooperation of Energy Regulators and to the European Commission

Finland

CONTENT

1 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 2019 and data presented in the report reflects this period as far as possible. In some points also the developments in 2020 are mentioned.

In 2019, the Energy Authority have actively participated in the implementation of European network codes and guidelines. In the implementation focus has been shifted from European to regional approval processes.

In addition, opening of Finnish gas markets for competition from 1 January 2020 has required in 2019 lot of efforts from the Energy Authority in approving necessary market rules and terms and conditions. A pioneer work to create Finnish-Baltic gas market – the first cross-border gas market merger in EU – is a challenging but also interesting task for the Energy Authority.

The Clean Energy Package adopted in EU in 2019 will bring new tasks for the Energy Authority. 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

2 Main developments in electricity and gas markets

2.1 Evaluation of the market development and regulation

Electricity market development

Electricity consumption in Finland fell in 2019 by 1.5 per cent. Domestic electricity generation decreased by 2.1 per cent (1.4 TWh). The share of net electricity import covered 23 per cent of consumption. The net import from Sweden increased by 16 per cent and the net export to Estonia increased by 60 per cent. Imports from Russia remained stable.

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 2019 - 2020 to be about 11,900 MW (incl. strategic reserves). The highest hourly load in 2019 was 14,542 MWh/h. The interconnector capacity between Finland and neighbouring countries (5,100 MW) is enough to cover the deficit in own generation capacity during the peak load situation.

Improved hydro situation during the second half of 2019 together with increased wind generation capacity in Sweden have increased amount of cheap electricity. However, limited available electricity transmission capacity from Sweden to Finland has not always been enough for to cover market needs. Therefore, bottlenecks between Finland and Sweden have caused price difference between Finland and Sweden. In 2019 number of hours when the wholesale electricity prices in Finland were same as in Northern and Central Sweden decreased. Last year Finland and Northern and Central Sweden had same day-ahead price in 60 per cent of hours. At the same time, Finland and Estonia had same price in 88 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 2019, the Energy Authority decided after public tendering procedure to purchase 611 MW as strategic reserve capacity for the period of 2020 – 2022.

In 2019, the supplier switching rate was at the all-time highest level. About 13.9 per cent of electricity customers in Finland switched their electricity supplier in 2019.

Gas market development

On 1 January 2020 Finnish natural gas market was opened for competition. Commissioning of Balticconnector pipeline between Finland and Estonia in December 2019 enabled gas market opening and the integration of regional gas market between Finnish and Baltic states.

An ownership unbundled gas transmission system operator was established through a partial division which became effective on 1 January 2020.

Market opening together with development and approval of necessary market rules and terms and conditions required lot of efforts from the Energy Authority and stakeholders.

In 2018, the TSOs of Estonia, Latvia and Finland signed a memorandum of understanding to continue developing strong collaboration and the regional gas market. The objective is to integrate the markets of these countries so that the common entry-exit zone will be established. As a result of the separate inter-TSO compensation agreement between the Finnish, Estonian and Latvian TSOs signed in 2019, a common tariff area has been established 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.

Opening of gas market has shown benefits. During the first half of 2020 about one third of natural gas used in Finland was imported from Baltic states through the Balticconnector. Finnish gas users have also benefitted from lowered gas wholesale prices.

In April 2020, energy ministries, regulators and transmission system operators from Estonia, Finland, Latvia and Lithuania gave their agreement to a roadmap[1] 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.

National regulation

On 1 March 2020 new amendments to the Natural Gas Market Act came into force. These amendments give power to the Energy Authority to approve ex-ante entry and exit charges applied in interconnection points (Balticconnector and Imatra) for years 2020 and 2021.

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 2019, Energy Authority supervised that all DSOs and retailers have made their preparation plans for implementation of the Datahub. According to the regulation the Datahub will go-live on 22 February 2022.

2.2 Report on the implementation of the Clean Energy Package

General

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.

In May 2020, the Government submitted to the Parliament a proposal to designate Energy Authority as the competent national authority defined in the Risk-preparedness Regulation (2019/941). The Parliament approved it in June 2020.

According to the plans, the Ministry aim to submit other proposals to implement CEP electricity market provisions to the Parliament in fall 2020.

Provisions on flexibility and aggregation

In 2019, Energy Authority together with other Nordic energy regulators prepared in the framework of NordREG recommendations for a Nordic framework for independent aggregators[2]. This

[1] 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

[2] http://www.nordicenergyregulators.org/wp-content/uploads/2020/02/A-New-Regulatory-Framework_for_Independent_Aggregation_NordREG_recommendations_2020_02.pdf

recommendation was published in February 2020 and submitted to Nordic Ministries to support implementation of CEP.

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. During winter-spring 2019 – 2020 Energy Authority discussed in the Forum together with relevant stakeholders on independent aggregators and new tasks for the DSOs. Based on these discussions and NordREG recommendations Energy Authority prepared suggestions to implement independent aggregator provisions in the Finnish legislation. These suggestions were submitted to the Ministry in June 2020.

Retail market provisions

In 2019, Energy Authority participated within NordREG also in the preparation of recommendations for implementation of some of the retail market articles of the CEP[3]. The recommendations are focusing on articles 10, 12, 14 and 18 of the Internal Electricity Market Directive. These articles include basic contractual rights, fees relating to switching of suppliers, billing, and comparison tools. NordREG selected these retail market related articles in the new electricity directive as particularly important to implement in a similar way in the Nordic countries.

[3] https://www.nordicenergyregulators.org/2019/11/nordreg-publishes-recommendations-for-how-to-implement-new-eu-legislation/

3 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 (2019 figures preliminary)

Indicators	2016	2017	2018	2019*
Number of TSOs	1	1	1	1
Number of high-voltage DSOs[4]	12	11	11	10
Number of DSOs	77	77	77	77
Length of electricity grid (km)				
• 400 kV (km)	5,400	5,400	5,500	5,500
• 220 kV (km)	1,600	1,600	1,600	1,300
• 110 kV (km)	16,500	16,400	16,400	16,500
• 1-70 kV (km)	145,800	148,500	151,800	152,900
• 0.4 kV (km)	242,800	246,100	249,200	251,400

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 2019, there were no changes in the ownership of Finnish TSO, Fingrid. Majority (53.14 percent) of shares of Fingrid is owned by the State of Finland and the National Emergency Supply Agency, while the rest is owned by Finnish financing and insurance institutions.

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 2019. Further, there are 10 high-voltage distribution system operators having only 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.

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

Totally, 36 distribution system operators were in 2019 over the threshold value. In addition, some other distribution system operators have voluntarily legally unbundled network activities. At the end of 2019 a total of 48 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 2019 these requirements were applied to 17 distribution system operators in Finland.

3.1.2 Network extension and optimization

Investments plans

In 2019, 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 2019, investments to the transmission system was EUR 123 million. A bit lower than yearly average of the decade which was EUR 150 million.

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 is included in the 4th list of Projects of Common Interest published by European Commission in October 2019[5].

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. 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[6].

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.

Fingrid is participating together with the Åland TSO (Kraftnät Åland) and the Estonian TSO (Elering) in a Smart Grid deployment project called "CrossFlex project" included in the 4th PCI-list[7]. The project's overall aim is to support RES integration and increase security of supply in mainland

[5] https://ec.europa.eu/energy/sites/ener/files/c_2019_7772_1_annex.pdf
[6] Final report is available from https://tem.fi/en/working-group-to-explore-smart-grids-potential-for-the-electricity-market
[7] https://www.fingrid.fi/en/electricity-market/market-integration/the-future-of-the-electricity-markets/flexible-resource-project/

Finland, the Åland Islands and Estonia by cross-border provision of flexibility services provided by distributed generation connected to both distribution and transmission networks.

Fingrid is also participating together with TSOs from Estonia, France, Latvia and Denmark and DSOs from Estonia, Latvia and Lithuania in Data Bridge project which is also included in the 4th PCI-list. The project aims to build a common European Data bridge Platform, to enable integration of different data types (smart metering data, network operational data, market data), with a view to develop scalable and replicable solutions for the EU.

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 in its supervision decisions for the 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 include obligations to return to the customers any surplus profit for the completed regulatory period through lower network charges for the new regulatory period. The supervision decisions correspondingly confirm that the network operator may allow raise network charges for the new regulatory period, with the amount by which the earnings accruing to the network operator from the previous regulatory period fell below the reasonable earnings level.

According to the Act on Supervision of Electricity and Gas Markets the methodology confirmed by the regulator may include the following items:

- method for the valuation of regulated asset base
- method for determining approved rate of return on capital
- method for determining realised profit of network operations
- method for setting efficiency targets for network operations

The network will be included into the regulated asset base in the net present value instead of book value. Ever since the first regulatory period, the Energy Authority has encouraged system operators to make investments in the electricity network. In the regulation model, all investments in the network will annually be taken into account in the regulated asset base, which is

used to determine the reasonable rate of return. Thus, the confirmed methodology allows necessary investments into the networks to carried out to in a manner allowing those investments to ensure viability of the networks as required by the Article 59(7)(a).

The net present value of the network will be updated annually. Approved rate of return on capital is determined using a WACC-model (Weighted Average Cost of Capital). The parameters of WACC are fixed for the regulatory period expect the risk-free rate that is updated annually.

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 achieving a regulatory model that is incentivizing more innovations and investments in the networks in order to ensure viability of the networks.

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

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

According to the Electricity Market Act, at the request of the customer (either generator or load), the transmission and distribution system operators shall give him/her a comprehensive and sufficiently detailed estimate on the costs of connection. The Energy Authority has confirmed in 2020 by its decisions the methodology for pricing of grid connections in distribution networks.

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.

In the year 2019 the average change in distribution prices was moderate 2 percent.

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 storm or snow related 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 met the demands. DSOs had to submit by 31 December 2017 to the Energy Authority a request of delay to fulfil these obligations if they have found substantial reasons for it. In June 2019, the Energy Authority granted delay to fulfil these obligations until end of 2032 for two DSOs and until end of 2036 for eight DSOs.

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 17,600 MW at the end of 2019. However, the entire capacity is not available during the peak load periods. The Energy Authority has estimated in autumn 2019, that 11,900 MW of Finnish electricity generation capacity (incl. peak load reserves) will be available for the consumption peaks in winter 2019–2020. The Energy Authority estimated also, that peak load will be 15,300 MW for the same time period, which however turned out to be almost 3 000 MW smaller due to relatively warm winter. 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 2019, 14,542 MWh/h was reached in January. It was highly affected by outside temperature and length of cold spell. The electricity import capacity is around 5,200 MW. During the peak load hour net import was 3,564 MWh/h.

Investments in generation capacity

In 2019, more than 200 MW of wind power capacity was commissioned. One coal-fired CHP-unit was replaced by biomass unit, leading to almost 30 MW increase in power output. In addition, one coal-fired CHP power plant was partly mothballed, leading to around 150 MW reduction in power output.

The most significant ongoing 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 new unit should have been commissioned by the end of 2009. According to the latest estimates, it will be in operation in 2021.

Fennovoima Oy is planning to construct a new nuclear power plant unit in Pyhäjoki. The project has received a decision-in-principle from the Finnish Government and the Parliament in 2014. The project is still preparing material for the construction license granted by the Government after obtaining favourable opinion from the Radiation and Nuclear Safety Authority. The unit will be 1,200 MW and according to the current plans it would be in operation in 2028.

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. In addition, wind power capacity is increasing also without any support because of power purchase agreements.

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.

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 has been made since the Estlink 2 between Finland and Estonia started operation in 2014.

Third AC connection between Finland and Sweden is planned to be in operation in late 2025.

Further, a new investment to replace Fennoskan 1 HVDC-connection between Finland and Sweden might happen in the late 2020s.

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.

In 2019, the Energy Authority acquired strategic reserve capacity for the period from 1st of July 2020 until 30th 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 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.

3.1.6 Cross-border issues

Technical cooperation between Union and third country transmission system operators

In 2019, there were no changes in technical cooperation between Finnish and Russian 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. Electricity can be imported from Russia by customers, who have made an agreement on a fixed transmission right with Fingrid and an agreement on energy purchases with a Russian organisation responsible for electricity sales. The maximum trading capacity from Finland to Russia is 320 MW.

In August 2011, a new trading scheme, so-called direct exchange trade, was adopted in electricity trade from Russia to Finland. Direct exchange trade is a first step towards more market-focused procedures in electricity trade between Russia and Finland and at the same time between

Russia and the EU. In this model an electricity market player engaged in direct exchange trade buys electricity in the electricity exchange in Russia and sells it directly to the day-ahead market in Nord Pool. The player can also trade in the secondary market the offered electricity not sold in the day-ahead market, in other words in Nord Pool's or the Russian intra-day market. So far, the volume of direct trading is limited to 140 MW, while in conventional bilateral trade is 1,160 MW.

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[8]. 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.

Capacity which have not been used on the day-ahead market is offered to the intraday market, where trading finishes no later than one hour before the hour of operation. However, intraday trading in Finland and between Finland and Estonia is possible until 30 minutes before the hour of operation.

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. However, as an interim solution coordinated net transfer capacity (CNTC) method will be applied until common intraday market platform is able to use parameters of flow-based method.

Table 2 shows the costs of the countertrade paid by Fingrid and congestion income to Fingrid during the years 2016 - 2019.

Table 2. Net costs of countertrade and congestion income.

	2016	2017	2018	2019
Net costs of countertrade, MEUR	**3.9**	**1.8**	**4.1**	**0.9**
• Countertrade between Finland and Sweden, MEUR	2.5	0.4	1.9	0.1
• Countertrade between Finland and Estonia, MEUR	0.1	0.1	0.1	0.5
• Countertrade inside Finland, MEUR	1.2	1.3	2.2	0.3
Congestion management income to Fingrid, MEUR	**39.9**	**25.8**	**29.6**	**73.0**
• From interconnectors between Finland and Sweden, MEUR	37.5	25.5	28.2	65.5
• From interconnectors between Finland and Estonia, MEUR	2.4	0.3	1.4	7.5

[8] Available from https://www.entsoe.eu/publications/system-operations-reports/#nordic

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 2019 congestion management income for the Finnish TSO totalled EUR 73.0 million (EUR 29.6 million in 2018). Fingrid uses congestion income to investments that aim to relieve the congestions. Fingrid used in 2019 EUR 0.6 million from congestion incomes Fingrid received in 2019 for financing transmission grid investments. Rest of congestion incomes, EUR 72.4 million will be used later for financing investments to improve the market functioning.

3.1.7 Implementation of Network Codes and guidelines

System Operation Guideline (SO GL)

In 2019, the Energy Authority approved several regional methodologies jointly with relevant Nordic regulatory authorities pursuant to SO GL. Before approval, several proposals, namely FRR dimensioning, ramping restrictions and coordinated actions to reduce were requested to be amended to comply with Guideline requirements and to ensure that Guideline objectives can be met.

Emergency and Restoration Network Code (ER NC)

In 2019, the Energy Authority approved several national 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.

Forward Capacity Allocation Guideline (FCA GL)

In January 2019 the Energy Authority received from the Nordic CCR TSOs a proposal on the long-term capacity calculation methodology in line with the FCA GL. The Nordic NRAs were unable to agree on a common request for amendment, due to which the proposal was referred ACER for approval in May 2019. ACER gave its decision on the methodology in October 2019.

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 have 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 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.

The Energy Authority has started in spring 2020 together with other Nordic NRAs to prepare for the next assessment which will be done in autumn 2020 and decisions will be done by April 2021.

Capacity Allocation & Congestion Management Guideline (CACM GL)

In 2019, the Energy Authority has actively contributed the common implementation work.

In spring 2019 Energy Authority approved together with other European regulatory authorities the all TSO proposals for scheduled exchange methodologies both intra-day and day-ahead.

The Energy Authority approved in May 2019 for Nasdaq Oslo ASA passporting rights for providing day-ahead trading services in Finland based on its designation as nominated market coupling operator (NEMO) in Sweden.

European Market Coupling Operator ASA (EMCO/former Nord Pool) applied for re-designation of their nominated market coupling operator status in accordance with article 4 of CACM GL. Energy Authority re-designated EMCO for indefinite period in December 2019 with obligations to inform relevant changes to Energy Authority.

In 2019 the Energy Authority discussed with other NRAs on the CACM GL cost reporting and after submission of the European cost report in accordance with article 80 of the CACM GL the cost sharing and recovery processes for the 2017 costs were launched on member state level where relevant. The Energy Authority started this assessment work in co-operation with the other Nordic NRAs based on the common cost guidance paper.

The launch of Nordic Multi-NEMO Arrangement (MNA) reached its final regulatory steps in December 2019 when the Energy Authority approved coordinated decision concerning clearing and settlement rules simultaneously with other Nordic NRAs. The first trading day with Nordic MNA in place was successfully completed on 03 June 2020. Few days before on 25 May 2020, EPEX SPOT launched their Intraday continuous trading and clearing services in Denmark, Finland, Norway and Sweden.

By introducing the MNA in the region, the Single Day-Ahead Coupling (SDAC) is accessible to more than one NEMO in the 12 Nordic bidding zones. In addition to the Nord Pool AS, also EPEX SPOT SE is now providing day-ahead and intraday trading services in Finland. Nasdaq Oslo ASA has announced that they will start providing day-ahead trading services later.

The capacity calculation methodology in Nordic Capacity Calculation region (CCR) in line with article 20 of CACM 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.

The Energy Authority received proposals from Fingrid for Coordinated redispatching and countertrading and the related cost sharing pursuant to CACM articles 35 and 74 for both Nordic and Baltic CCRs respectively. The proposals concerning Nordic CCR were approved in January 2019 and the proposals concerning Baltic CCR were approved in June 2019.

Electricity Balancing Guideline (EB GL)

In 2019, 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.

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 Energy Authority in June 2020 a request to approve derogation from the implementation of 15 minutes imbalance settlement until 22 May 2023.

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 in order 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.

In June 2019, Fingrid sent a proposal to the Energy Authority for a national pilot project to reduce minimum bid size in the mFRR balancing market from 5 MW to 1 MW. The Energy Authority approved in August 2019 changes in terms and conditions for providers of mFRR for the pilot project. Pilot project is allowed to continue until end of 2020.

Since 2017, Fingrid has had at national level pilot projects for the independent aggregator. In these pilots FIngrid is looking for a model and operating methods for independent aggregator activities in the balancing power and reserve markets. In 2020, Fingrid announced to expand the independent aggregator operating model pilot in the balancing energy market in order to gain additional experience.

Demand Connection Code (DCC NC)

Fingrid has prepared requirements for demand connections (KJV2018). The requirements are based on the DCC NC and Fingrid has made in it national amendments and clarifications. 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). The requirements are based on the RfG NC and Fingrid has made in it national amendments and clarifications. 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. The requirements are based HVDC network code. 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

Electricity wholesale market indicators	2016	2017	2018	2019
Electricity Production (TWh)	**66,2**	**65,0**	**67,5**	**66,1**
• Hydro power	15,6	14,6	13,1	12,3
• Wind power	3,1	4,8	5,9	6,0
• Solar power	0	0,0	0,2	0,2
• Nuclear Power	22,3	21,6	21,9	22,9
• CHP district heating	12	11,6	11,8	12,4
• CHP industry	8,9	9,1	9,7	9,6
• Conventional thermal power	4,3	3,3	4,9	2,6
Total electricity demand (TWh)	**85,1**	**85,4**	**87,4**	**86,1**
Imports volume (TWh)	**22,1**	**22,2**	**22,5**	**23,9**
Exports volume (TWh)	**3,2**	**1,8**	**2,6**	**3,9**
Traded volume in the spot electricity market (TWh)				
• Day-ahead buy volume (FI)	60,2	60,0	61,6	63,2
• Day-ahead sell volume (FI)	45,7	44,4	48,6	50,1
• Intraday buy volume (FI)	0,7	1,0	1,1	1,0
• Intraday sell volume (FI)	0,8	0,9	1,0	1,0
Average spot electricity price (FI) (EUR/MWh)	**32,45**	**33,19**	**46,80**	**44,04**
Generation fuel mix by source (GW)				
• Coal	1,9	1,9	1,9	1,6
• 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	1,9	1,8	1,8	1,8
• Biofuels	2,0	2,2	2,3	2,6
• Waste	0,2	0,2	0,2	0,2
• Hydro	3,2	3,2	3,2	3,2
• Wind	1,6	2,0	2,0	2,2
• Solar	0	0	0,1	0,2
• Other	0	0	0	0
Total installed generation capacity (GW)	**16,7**	**17,2**	**17,4**	**17,7**

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. In 2019 Nord Pool AS provided power exchange services for the trading in day-ahead and intraday markets with delivery in Finland and Nasdaq OMX provided services for trading with financial products in an organized marketplace.

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 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 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.

In January 2016, EPEX SPOT SE announced to the Energy Authority its willingness to offer day-ahead and intraday trading services with delivery in Finland by using so-called passport method. The Energy Authority decided in February 2016 that EPEX SPOT SE has right to offer day-ahead and intraday trading services with delivery in Finland. EPEX SPOT SE launched in Finland their intraday continuous trading and clearing services on 25 May 2020 and started offering also day-ahead trading services on 3 June 2020.

In January 2019, after being designated as a NEMO in Sweden, also 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. Nasdaq Oslo ASA has not yet started offering day-ahead trading services in Finland.

Finland has been part of the the European Cross-Border Intraday (XBID) solution since the 1st wave of XBID go-live in June 2018. After the launch of the 2nd wave in November 2019, XBID covers 22 European countries[9]. 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 the Nordic power exchange covered 74 per cent of the Finnish physical consumption in 2019. In 2019, the volume of electricity traded in Nord Pool AS in day-ahead market in Nordic and Baltic states amounted to 382 TWh.

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

[9] In the 1st wave of XBID go-live on 12 June 2018 countries were: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Luxembourg, Norway, The Netherlands, Portugal, Spain and Sweden. In the 2nd wave of XBID go-live in November 2019 countries coupled to XBID were: Bulgaria, Croatia, Czech-Republic, Hungary, Poland, Romania and Slovenia

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 at Nord Pool after area prices are calculated for all bidding areas. Flows between the Nordics and the Netherlands, Germany, Poland and the Baltics from the area price calculation are taken into account in system price calculation. These flows are used when calculating the System price either as import/sales or as export/purchase orders. In system price calculation area bidding areas in Norway, Denmark, Sweden and Finland constitute one common bidding area (capacities between these are set to infinity).[10]

In 2019, the average system market price at the Nord Pool Spot was 11 per cent lower than in 2018. The average system price in 2019 was EUR 38,94/MWh. The average Finnish area price in 2019 was EUR 44.04/MWh, showing a decrease of 6 per cent year-on-year.

In 2019, about 60 per cent (in 2018: 76 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 88 per cent (in 2018 95 per cent) of time in 2018.

Figure 1 presents the percentage of hours during the year 2018 when equal day-ahead price existed. In this picture the bidding zones of each country are grouped for clarity.

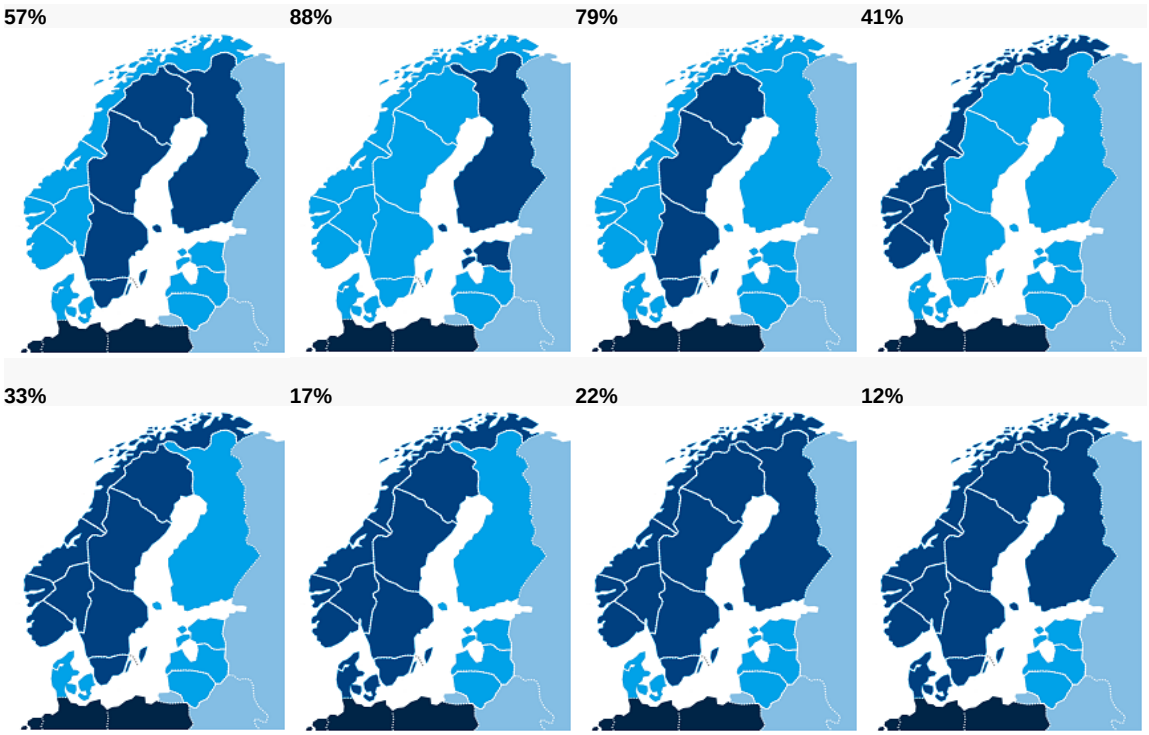

Figure 1. Percentage of hours during which different bidding zones have had equal day-ahead market prices in 2019

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

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 (2019 figures preliminary).

Electricity retail market indicators	2016	2017	2018	2019*
Number of electricity customers (1000)	**3,498**	**3,533**	**3,577**	**3,614**
• Household customers (1000)	3,058	3,087	3,117	3,148
• Other customers (1000)	441	446	460	467
Number of electricity suppliers	73	73	72	71
Market share of the three largest suppliers by metering points, %	35-40%	35-40%	35-40%	40-45%
Number of retailers with market shares >5%	4	4	4	7
Number of retailers with customer shares > 5%	3	3	3	5
Switching rate (switching companies), %	**12.1%**	**11.1%**	**10.9%**	**13.9%**
• Households, %	12.4%	11.3%	11.1%	14.3%
• Other customers, %	9.9%	11.0%	10.2%	12.3%
Share of customers having a smart meter, %	>99%	>99%	>99%	>99%
Share of customers having different type of electricity supply contracts (as of 31.12)				
• Fixed-term contract, %	42%	46%	42%	49%
• Open-ended contract, %	51%	45%	49%	40%
• Dynamic price contract, %	7%	9%	9%	11%
HHI in terms of sold energy	525-550	na	450-475	725-750
• Households	825-850	na	575-600	800-825
• Other customers	500-525	na	450-475	750-775
HHI in terms of metering points	700-725	na	625-650	850-875
• Households	750-775	na	650-675	875-900
• Other customers	500-525	na	450-475	800-825
Evolution of the price of electricity for a typical household consumer[11], cent/kWh	**15.59**	**16.34**	**17.96**	**18.62**
• Network charges (excl. taxes)	5.01	5.51	5.93	6.18
• Energy costs and supply margin (excl. taxes)	5.31	5.42	6.30	6.58
• Taxes	5.27	5.42	5.73	5.86
Number of final household consumers with a network service contract for partial self-generation	3,500	7,500	13,200	21,400
Installed capacity of small-scale power generation[12], MW	**136.5**	**177.0**	**200.9**	**277.8**
• Photovoltaic, MW	27.1	66.4	119.7	196.9
• Wind, MW	19.1	16.5	14.3	14.4
• Bio, MW	15.9	16.3	12.9	12.2
• Hydro, MW	34.2	36.2	30.8	29.0
• Diesel, MW	37.4	38.2	20.9	22.9
• Other, MW	2.8	3.3	2.4	2.4

[11] Household annual consumption 5000 kWh/year. Situation as of 31.12
[12] Only generator units with nominal capacity max 1 MVA. Connected to the network

Market opening and competition

Number of retail suppliers has been stable. At the end of 2019, there were 71 retail suppliers. Number of new entrants has gradually increased since 2010. At the same time, some electricity retail companies have been merged into bigger ones.

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 five retailers have more than five per cent of electricity customers. Number of larger retailers have increased from 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 40-45 per cent.

The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) in terms of energy volumes to measure market concentration in retail market is about 725 – 750 showing competitive marketplace. This figure has increased from 2018.

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 transmission system operator, Fingrid 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 DSOs and retailers are well-prepared for the commissioning of the Datahub. In 2019, Energy Authority supervised that all DSOs and retailers have made their preparation plans for Datahub implementation and reached necessary milestones. According to the regulation Datahub will go-live on 21 February 2022.

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.

Decrease of wholesale energy prices especially during the second half of 2019 was not moved yet to the energy prices for so-called obligation to supply contracts. Typically, prices of those contracts will follow changes in wholesale prices with delay. In 2019, prices of those contracts including taxes increased 4.5 per cent for a residential customer with annual 5,000 kWh consumption. For a household with electric heating increase was 2.6 per cent.

On the other hand, offer prices for new contracts follow more closely changes in wholesale prices. 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 fell by 6.4 per cent. For a small house with electric heating (annual consumption 18,000 kWh) the price decrease was 10.3 per cent. The average price of offers for a two years fixed-term contract for a residential customer lowered with 5.4 per cent and for a household customer with electric heating decrease was 2.7 per cent.

Price of electricity distribution grid services including taxes was 4.2 per cent more expensive for household consumers – for electrically heated households 3.7 per cent – at the end of 2019 than at the end of 2018.

In 2019, the electricity bill for apartment house households and households with electrical heating increased in total by 4.3 and 3.0 per cent respectively.

In 2019, 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. Suppliers and distribution system operators are allowed to offer prepayment systems in order to invoice end users in advance based on the estimation. However, 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 instead of load curves in most consumption points 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 2019, about 11 per cent of retail customers had a dynamic electricity price supply contract.

Suppliers are also providing fixed-term contracts with the most common duration being one or two years. At the end of 2019 about 49 per cent of retail customers in Finland had a fixed-term supply contract.

At the end of 2018, about 40 per cent of retail customers had open-ended supply contract which customer may terminate with two weeks' notice.

Smart meter use

By the end of 2019, more than 99 per cent of consumption places in Finland had already a smart meter. The Finnish national legislation requires that each DSO should have hourly registering

smart meters installed in at least 80 per cent of consumption places by the end of 2013. The Ministry is currently defining technical requirements for the 2nd generation of smart meters.

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

Switching rates

In 2019, number of customers switching electricity supplier increased from 2018 and was all-time highest in Finland. The estimated number of customers that switched their supplier was about 508,000 which corresponds about 13.9 per cent of all electricity customers. In 2018 the switching rate was 10.9 per cent.

For households switching rate was 14.3 percent (11.1 per cent in 2018).

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 2019. 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.

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 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 2019, the Energy Authority received 13 new requests for investigation related to electricity system operators and retailers. In addition to these, the Energy Authority opened on its own initiative one new investigation concerning an electricity system operator. In 2019 the Energy Authority made decision or closed the investigation in 18 cases. Some of these cases were already received in previous years.

However, 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 submitted fell into the following categories: connection charges, the network tariffs, quality of supply, metering, inconsistencies in invoicing and general complaints regarding practices of the distribution system operators and suppliers.

Disconnection rates

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

Restrictive contractual practices

Throughout the year but especially in the final quarter of 2019, the Energy Authority received numerous queries and complaints concerning a single electricity retailer. The queries concerned unusually large pre-payment bills, many of which did not reflect the consumption estimation provided by the customers' DSO, the retailer's failure to send the required number of invoices based on actual consumption and to include sufficient information on the invoices, failure to provide a final closure account within six weeks of supplier switch and unilateral changes to terms and conditions of the supply contract, including prices.

The retailer's conduct did not amount to a breach of the provisions of the Electricity Market Act (588/2013) in most cases and the persons making the complaints were advised accordingly. Towards the end of the year two investigations concerning the retailer were opened with a further 5 investigations in the first quarter of the year 2020. Handling the complaints and answering queries concerning the retailer was a significant effort at the Energy Authority in the final quarter of 2019. The Competition and Consumer Authority received over 500 complaints concerning the retailer in the year 2019.

Protection of energy poor and vulnerable household customers

Energy poor or vulnerable customers are not defined in the national energy legislation. There is no 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 in order 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 his 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 in a dominant position within the area of responsibility of a distribution system operator has so-called obligation to deliver responsibility. The obligation means that the retailer shall deliver 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 (obligation to deliver). They shall not include any unreasonable conditions or limitations that would restrict competition within electricity trade. The Energy Authority may

order the retailer referred to here to deliver electricity to the customers within the obligation to deliver.

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. In 2019 the Energy Authority did not make such investigations on reasonableness of electricity prices under obligation of supply.

Customer consumption data provision

The Electricity Market Act was amended in 2019 with a provision regarding end user's and electricity producer's right to their own metering and consumption data and the means how the data has to be provided. Although, the corresponding provision was already previously set out in the Government decree, it is now more detailed and covers the requirements of the Directive (EU) 2019/944.

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. The system has also been developed to better inform customers about the origin of the electricity they purchase. All retail suppliers are obligated to maintain up-to-date information on their public electricity price offers on this service.

In 2019, the Energy Authority renewed the service with aim to better fulfil customers' needs. The new service was taken into use in November 2019. The Energy Authority 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 agreement 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 make a contract with party who is willing to buy the surplus. The regulation does no 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 will 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 delayed these investments.

The Ministry of Employment and Economic Affairs has been preparing amendments to the regulation which would improve such local energy communities' possibilities to consume and share

within the community self-generated energy. Draft amendments have been in public consultation in April-May 2020. Draft provisions would allow DSOs voluntarily to provide virtual net metering in balance settlement for members of the local energy communities inside the imbalance settlement period until go-live of Datahub in 2022.

Dispute settlement

The Energy Authority does not have power for dispute settlements between consumers and energy companies in individual contractual disputes. In Finland, the disputes between household consumers and businesses 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 businesses.

The Consumer Ombudsman may bring the class action, for instance, against a network operator or supplier and act as the representative of the class 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 Gas market

4.1 Network regulation

The Finnish natural gas market was opened for competition on January 1, 2020. Thus during 2019 all the preparatory work for the market opening had to be completed. The most important work streams related to the market opening were 1) preparation of the framework for the new competitive market and 2) preparation of the unbundling of the previous vertically integrated gas company.

The tasks described above included public consultation on the tariffication and balancing services as well on the terms for transmission services. As the derogation was in force until the end of 2019, the NRA did not have the competence provided by the network codes and thus the various public consultations had to be arranged so that both the legal framework and the requirements of the new framework could be met.

Some key indicators on gas networks are presented in the following table (Table 5).

Table 5. Indicators for gas network

Indicators	2016	2017	2018	2019
Maximum gas daily consumption (mill. m3/day)	17.7	14.3	16.0	14.2
Gas delivery from transmission grid (mill. m3/year)	2,371	2,214	2,456	2,480
• Heat and power plants	824	677	875	820
• Industrial customers	1,315	1,312	1,337	1,341
• DSO grids	225	218	232	258
• Other customers	7	7	11	62
Number of TSOs	1	1	1	1[13]
Number of DSOs	24	24	25	22
Number of TSO connection points	224	223	223	222
Number of DSO customers	28,200	27,900	27,800	32,900

4.1.1 Unbundling

Unbundling of TSO

In 2019, 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.

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. The Energy Authority made its interim decision on the certification in

[13] TSO was not unbundled until end of 2019

May 2020 and submitted it to the European Commission. European Commission's opinion on the certification of Gasgrid Finland Oy was adopted on 2 July 2020.

As Finland has a derogation from the unbundling requirements of the Directive, the certification of the natural gas TSO has not been done in Finland yet. Certification of the natural gas TSO will be done in 2020.

Unbundling of DSO

Legal and operative unbundling requirements are 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 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 setting both transmission and distribution network tariffs and 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 of setting 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.

According to the Act on Supervision of Electricity and Gas Markets the methodology confirmed by the regulator may include the following items:

- method for the valuation of regulated asset value
- method for determining approved rate of return on capital
- method for determining realised profit of network operations

- method for setting efficiency targets for network operations

The network will be included into the regulated asset base in the net present value instead of book value. Ever since the first regulatory period, the Energy Authority has encouraged system operators to make investments in the electricity network. In the regulation model, all investments in the network will annually be taken into account in the regulated asset base, which is used to determine the reasonable rate of return.

The net present value of the network will be updated annually. Approved rate of return on capital is determined using a WACC-model (Weighted Average Cost of Capital). The parameters of WACC are fixed for the regulatory period expect the risk-free rate that is updated annually.

According to the Natural Gas Market legislation, the Energy Authority shall to approve gas transmission system tariffs applicable in interconnection points for year 2020 and 2021 prior entry into force. The Energy Authority approved in June 2019 entry and exit tariffs and other terms and conditions applicable in 2020 in interconnection points of Imatra and Balticconnector.

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 3rd 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 LNG terminal in Pori and in February 2019 the Energy Authority approved tariffs for the LNG terminal in Tornio.

4.1.3 Balancing

In 2019, all the balancing services were provided by the vertically integrated gas company, Gasum Oy.

As a part of preparatory work towards opening of gas markets, terms and conditions for balancing and rules for balance settlement in retail market were developed by Gasum Oy. In July 2019, Energy Authority approved terms and conditions for balancing and the rules for balance settlement applicable from 1 January 2020.

4.1.4 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 connections except for the Imatra entry point.

In 2018, the TSOs of Estonia, Latvia and Finland signed a memorandum of understanding to continue developing strong collaboration and the regional gas market. The objective is to integrate the markets of these countries so that the common entry-exit zone will be established.

As a result of the separate inter-TSO compensation agreement between the Finnish, Estonian and Latvian TSOs signed in 2019, a common tariff area has been established 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. Finland, however, remains as a separate balancing zone.

The Energy Authority approved in June 2019 capacity allocation methodology applicable in the Balticconnector interconnection point during period 1 January – 31 December 2020. 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.

4.1.5 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 application of the network codes have applicable in Finland.

Even though the European network codes were not applied in Finland in 2019, the Energy Authority has taken them into account while approving methodologies and terms and conditions applicable from 1 January 2020.

4.2 Competition and market functioning

4.2.1 Wholesale markets

Market opening

Until end of 2019, the Finnish natural gas market was isolated with a pipeline connection only to the importing country Russia. In 2019, there was only one gas importer and wholesale supplier, Gasum Oy. A separate marketplace, operated by Kaasupörssi Oy and owned by Gasum Oy, was available for trading gas on the secondary market.

Commissioning of 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.

In 2019, Energy Authority together with other relevant stakeholders and the TSO performed preparatory work for opening gas markets for competition. This included among other things development of several market rules and approval of terms and conditions.

Finnish wholesale gas market is characterized by large share of gas used by end-users connected to the transmission grid. Only about 10 per cent of gas is used by end-users connected to the distribution grid. Some indicators on gas wholesale market are presented in the following table (Table 6).

Table 6. Natural gas wholesale market indicators.

Gas wholesale market indicators	2016	2017	2018	2019
Natural gas consumption (TWh)	23.8	22.3	24.7	23.2
• Large industrial end-users (%)	55%	59%	54%	54%
• CHP, district heating and power generation (%)	35%	31%	36%	33%
• End-users connected in distribution grid (%)	9%	10%	9%	10%
• Other (%)	0%	0%	0%	2%

Natural gas accounts for around 5 per cent of Finland's total energy consumption. In 2019, there were no significant changes in the number of market actors.

Prices

In 2019, Gasum Oy had to sell gas to their wholesale customers based on public tariff. Pricing of the energy sales of natural gas was based on the natural gas supply contract between Gasum and Gazprom's subsidiary company Gazprom Export. The supply contract was based on the special structure of Finland's natural gas market, which reflects the fact that the price of natural gas follows not just changes in oil prices, but also fluctuations in the price of coal and domestic market energy prices.

Estimated national average natural gas prices in December 2016 – 2019 for one industrial reference customer are shown in next table (Table 7). The total wholesale price of natural gas excluding taxes increased by an average of 15 per cent during the course of 2018. The price for natural gas energy excluding taxes decreased by 20.5 per cent between December 2018 and December 2019. There were no changes in natural gas transmission prices between December 2018 and December 2019. Taxes for natural gas increased on 1 January 2019.

Table 7. Natural gas price for a reference customer in December.[14]

Evolution of gas price for a reference customer (EUR/MWh)	2016	2017	2018	2019
Total (excluding VAT)	47.23	51.16	56.94	52.17
• Network charges (excl. levies)	9.38	9.96	9.96	9.96
• Energy costs and supply margin	20.42	22.60	27.12	21.56
• Taxes	17.42	18.61	19.86	20.65

Transparency

The REMIT regulation also applies to gas markets. Market participants which operate in a wholesale energy markets in gas are obliged to register to their national regulatory authority and are obliged 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

Market opening and competition

The retail supply of natural gas covers only about 7 per cent of the total consumption. There are only about 30,000 customers in the natural gas market. The largest customer segment, (about 25,000 customers) consists of households who buy natural gas for cooking. However, the total natural gas consumption of this segment amounts to only 0,3 mcm (about 0.015 per cent of total consumption).

At the end of 2019, there were 22 natural gas retail suppliers, all of them with some affiliate connection to DSOs. The customers segments vary among suppliers, some serve mostly households others only industry. The share of the top three retail suppliers is about 60 per cent of the total volume.

[14] Reference customer: annual consumption 150,000 MWh, 4,000 hours. Prices based on Low Calorific Value

From 1 January 2020, also gas retail market have been opened for competition and all gas customers have been able to choose their supplier. However, in order to switch the supplier customer shall have a remotely readable gas mater.

Prices

In retail level, many retailers have only a few customers which are also different in their gas consumption profile. Therefore, any representative average prices for these customer groups are not possible to define.

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

According to the Natural Gas Market Act the retailer in a dominant market position in a natural gas distribution network shall supply natural gas at reasonable price upon the request of a end-user using gas mainly for heating apartment or other end-users whose connection capacity is maximum 250 kW(obligation to supply).

As regards the supervision of natural gas retail pricing under obligation to deliver, the powers of the Energy Authority are ex post by their nature. In 2019, Energy Authority did not make any investigations on gas retail prices under obligation to deliver.

Furthermore, until end of 2019 gas retail customers have not been able to switch the gas supplier.

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 their own consumption data 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.

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 consumers. The requirements set out in the Directive 2009/73/EC and its Annex 1 have been implemented in the national legislation.

Regarding the compliance with the natural gas market legislation, the Energy Authority did not receive any new requests for investigation and make any decisions during 2019. The Energy Authority opened one case on its own initiative.

The phone calls or other written inquiries to the Energy Authority from the energy companies' customers or other market participants have not been calculated.

Dispute settlement

The Energy Authority does not have power for dispute settlements between consumers and energy companies in individual contractual disputes. In Finland, the disputes between household consumers and businesses 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 businesses.

The Consumer Ombudsman may bring the class action, for instance, against a network operator or supplier and act as the representative of the class 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 2019 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 in 2019. There's no natural gas production in Finland. Small-scale biogas is produced and injected into the gas transmission and distribution network in five different locations. There are also two off-grid LNG-terminals in Finland, and third one, with connection to natural gas grid, is planned to be commissioned at the end of 2020. In addition, propane can be produced indigenously as it is the only gas to be stocked in small amounts by Gasum Oy for immediate substitute for the possible lack of natural gas. From the beginning of 2020 natural gas has been transported also between Finland and Estonia.

The importing capacity from Russia is estimated to be about 9,000 MW. During the peak demand hour in 2019 consumption was 6,590 MWh/h (7 757 MWh/h in 2018). In natural gas shortage situation market-based mechanisms are used to reduce gas consumption at the first stage. The price of gas that exceeds gas users intended capacity is increased to reduce consumption. During 2019 there was no need to increase the price of natural gas to reduce consumption.

4.3.2 Measures to cover peak demand and shortfalls of suppliers

In natural gas shortage situation marked-based mechanisms are used to reduce gas consumption at the first stage. The price of gas that exceeds gas users guaranteed capacity is increased to reduce consumption. This kind of market-based mechanism is typically used 0-2 times during the wintertime. If shortage situation continues transmission system operator may cut down consumption of non-gas dependent customers. If the shortage situation continues, substitute fuels (HFO, LFO, coal, peat, wood and LPG), a special propane air mixing unit of 350 MW and movable LNG-regasification plant of 75 MW can be used.

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.

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.