energy authority

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

Year 2020

Finland

CONTENT

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 2020 and data presented in the report reflects this period as far as possible. In some points also the developments in 2021 are mentioned.

In 2020, the Energy Authority have actively participated in the implementation of European network codes and guidelines. In the implementation focus has been in regional – Nordic and Baltic - approval processes.

In addition, Finnish gas markets opened for competition on 1 January 2020. The first year of open gas markets has shown its benefits but there are still room to improve market rules and terms and conditions according to gained experiences.

The Clean Energy Package adopted in EU in 2019 will bring new tasks for the Energy Authority. In 2020, Energy Authority received new tasks being nominated as a national competent authority in Finland pursuant to the Regulation on risk-preparedness in electricity sector (2019/941). 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
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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 2020 by 6 per cent. This was especially due to decrease in electricity consumption in industry sector which decreased by 8 per cent. COVID-19 situation influenced in industrial activities but effects on electricity consumption were rather small.

The share of net import covered 18 per cent of consumption and decreased from 2019 (in 2019 shae was 23 per cent). Especially import from Russia collapsed (decreased by 63 per cent). The net import from other Nordic countries (mainly from Sweden) increased by 17 per cent and the net export to Estonia and further to Baltic states increased by 74 per cent.

Wind power generation increased by 29 per cent and covered 12 per cent of electricity generation in Finland. Due to good hydro situation also share of hydro power increased by 27 per cent compared to 2019. In 2020 share of hydro was 24 per cent. Share of nuclear power remained stable and was 34 per cent of electricity production in Finland. Share of biomass, peat and coal in electricity production was decreased. Total domestic electricity generation remained stable and was 66 TWh.

In peak load situation the Finnish generation capacity is not enough to cover the demand. The Energy Authority has estimated total available generation capacity in the peak load situation in winter 2020 - 2021 to be about 11,400 MW (incl. strategic reserves). The highest hourly load in winter period 2020 - 2021 was 14,267 MWh/h. The interconnector capacity between Finland and neighbouring countries (5,100 MW) has been enough to cover the deficit in own generation capacity during the peak load situations.

Very good hydro situation together with increased wind generation capacity and windy weather increased in 2020 amount of cheap electricity especially from Sweden. However, available electricity transmission capacity from Sweden to Finland has not always been enough for to cover market needs. Therefore, bottlenecks between have increased price differences between Finland and Sweden and also between Finland and Estonia. In 2020 number of hours when the wholesale electricity prices in Finland were same as in Northern and Central Sweden decreased. Last year Finland and Northern Sweden (SE1) had same day-ahead price in 37 per cent of hours. With the Central Sweden (SE3) Finland had same day-ahead price in 56 per cent of hours. In 2020, Finland and Estonia had same price in 67 per cent of hours.

Based on the Capacity Reserve Act the Energy Authority has responsibility to estimate and procure capacity reserves needed to ensure the balance between supply and demand (strategic reserve). In December 2019, the Energy Authority decided after public tendering procedure to purchase 611 MW as strategic reserve capacity for the period of July 2020 – June 2022.

In 2020, the supplier switching rate was at the all-time highest level. About 15.5 per cent of electricity customers in Finland switched their electricity supplier in 2020. However, this number includes also some switches which were caused by restructuring of some supply companies.

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. Energy Authority adopted in August 2020 the certification decision of ownership unbundled gas transmission system operator Gasgrid Finland Oy.

Market opening together with development and approval of necessary market rules and terms and conditions required in 2019 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.

Gas delivery from the transmission grid to end-users and distribution grids fell by 9 per cent. Especially gas deliveries to heat and power plants and industrial customers were decreased.

Opening of gas market has shown benefits. In 2020 about one third of natural gas used in Finland was imported from Baltic states through the Balticconnector. The rest was imported from Russia through Imatra interconnection point. Finnish gas users have also benefitted from lowered gas wholesale prices. Unfortunately, transmission capacity of Balticconnector available for the market was not enough to meet market needs due to delayed compressor station investments in Estonia and it has been continuously congested during winter periods.

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 2020, the Energy Authority supervised whether all DSOs and retailers have made their preparatory actions for Datahub implementation. With the exception of a few individual market actors, all reached necessary milestones. According to the regulation the Datahub will go-live on 21 February 2022.

In December 2020, the Government adopted amendments to the regulation which facilitates establishment of local energy communities and groups of active customers. The regulation allows netting of electricity input and output through the same meter to the distribution grid within imbalance settlement period. This includes also dividing feed-in from the generation to the members of the community or group in the balance settlement. These amendments facilitate eg. establishing local energy communities within housing cooperatives where a cooperative invests

[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

in joint solar panels in the rooftop and the electricity from the panels will be shared among the members of the cooperative. Amendments have come into force 1 January 2021. However, netting for local energy communities and groups of active customers will be done in the Datahub from 1 January 2023. Before that, DSOs may decide by themselves if they are willing to provide the netting service to their customers.

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, and it came into force on 1 September 2020.

Implementation of electricity market directive into Finnish national legislation has been delayed.

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 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.

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

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 (2020 figures preliminary)

Indicators	2017	2018	2019	2020*
Number of TSOs	1	1	1	1
Number of high-voltage DSOs[3]	11	11	10	9
Number of DSOs	77	77	77	77
Length of electricity grid (km)				
• 400 kV (km)	5,400	5,500	5,500	5,500
• 220 kV (km)	1,600	1,600	1,300	1,300
• 110 kV (km)	16,400	16,400	16,500	16,500
• 1-70 kV (km)	148,500	151,800	152,900	153,600
• 0.4 kV (km)	246,100	249,200	251,400	253,200

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 2020, 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 2020. Further, there are 9 high-voltage distribution system operators having only high-voltage 110 kV network.

The Electricity Market Act requires, that electricity network operations must be legally unbundled from electricity trade operations and electricity generation if the annual quantity of electricity transmitted to the customers through the network operator's 0.4 kV distribution network has been 200 GWh or more during three consecutive calendar years.

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

Totally, 36 distribution system operators were in 2020 over the threshold value. In addition, some other distribution system operators have voluntarily legally unbundled network activities. At the end of 2020 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 2020 these requirements were applied to 17 distribution system operators in Finland.

3.1.2 Network extension and optimization

Investments plans

In 2020, 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 2020, Fingrid invested by EUR 169.7 million of which investments to the grid were EUR 137,3 million. Investments to the grid were increased by EUR 33.9 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 – Aurora-line – is included in the 4th list of Projects of Common Interest published by European Commission in October 2019[4].

According to the Finnish Electricity Market Act, all DSOs shall submit updated grid development plans (GDP) to the Energy Authority bi-annually. The GDPs should include actions which demonstrate that each DSO will improve and maintain quality of supply requirements set in the legislation. In June 2021 The Parliament approved amendments to the Finnish Electricity Market Act and in addition to the earlier quality of supply requirements, legislation will include requirements for DSOs to do investments in cost-effective ways and to consider possibilities of using flexibility services instead of grid investments. The process to implement the new legislation requirements to the GDPs is still ongoing and the new GDPs are scheduled to be collected first time in summer 2022.

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

Smart grid development

In September 2016, the Ministry of Economic Affairs and Employment established the Smart Grid Working Group to explore smart grids´ potential for the electricity market. Its goal was to explore and propose concrete measures through which smart grids can facilitate the ability of customers to actively participate in the electricity market and generally promote the maintenance of security of supply. The final report with proposals was published in October 2018[5].

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.

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

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

Fingrid has been 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[6]. The project's overall aim is to support RES integration and increase security of supply in mainland 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 has also been 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

[6] https://www.fingrid.fi/en/electricity-market/market-integration/the-future-of-the-electricity-markets/flexible-resource-project/

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 2020 the average increase in distribution prices was moderate 2.5 percent for household consumers.

Government's proposal

The Parliament adopted in June 2021 amendments to the electricity market legislation which decreases the allowed maximum price increase of network charges to 8 percent within a twelve-month rolling period. The amendment also includes other actions that will prevent the pressure for increases in network charges.

3.1.4 Security and reliability regulation

Network security and reliability rules

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

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

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

3.1.5 Monitoring balance of supply and demand

Balance of supply and demand

Based on information submitted by power plant operators to the Energy Authority, total installed power generation capacity in Finland was about 17,600 MW at the end of 2020. However, the entire capacity is not available during the peak load periods. The Energy Authority has estimated in autumn 2020, that 11,400 MW of Finnish electricity generation capacity (incl. peak load reserves) will be available for the consumption peaks in winter 2020–2021. The Energy Authority estimated also, that peak load will be 15,100 MW for the same time period, which however turned out to be 800 MW smaller. The domestic electricity production capacity is not sufficient to cover the consumption during peak load periods, and thus electricity imports from neighbouring countries is needed.

The highest hourly load of the year 2020, 12,388 MWh/h was reached in February. The winter 2019/2020 was relatively warm, and the peak load didn't reach the level of previous years. The electricity import capacity is around 5,200 MW. During the peak load hour net import was 2,539 MWh/h.

Investments in generation capacity

In 2020, more than 200 MW of wind power capacity was commissioned. Two coal-fired CHP-unit were decommissioned, leading to 220 MW decrease 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 public information, it will be connected to the grid for the first time in October 2021 and will start regular electricity production in February 2022.[7]

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 2029.

Wind power capacity will continue to increase in the coming years. Seven wind power projects will receive public support, based on the results of technology neutral RES auction organized by the Energy Authority in 2018. However, majority of wind power projects are being developed without any support at the moment. More than 21 000 MW of wind power capacity is being planned, taking into account all phases of planning process.

At the end of 2020, about 293 MW of solar power were connected to the grid. This consists mainly from small-scale solar panels (capacity less than 1 MVA); only total capacity of 4.6 MW is from solar power plants with capacity above 1 MVA. Annual increase of solar power capacity was 91 MW (45 per cent).

A part of CHP old capacity has been decommissioned and replaced by heat-only production. Due to low profitability of electricity production, these kinds of investments may become more common in the coming years. Heat production will also be more and more based on heat pumps, which will increase electricity consumption.

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

Interconnector capacity

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

Third AC connection between Finland and Sweden, Aurora Line, is in the planning phase and scheduled to be in operation in 2025. It will increase interconnection capacity from Finland to Sweden (SE1) with 900 MW and from Sweden to Finland with 800 MW.

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

[7] https://www.tvo.fi/en/index/news/pressreleasesstockexchangereleases/2021/thetermsoftheol3eprprojectcompletionhavebeenagreed.html

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.

In June 2021, Energy Authority prepared a proposal to the Government on the reliability standard according to the Article 265 the Electricity Market Regulation (2019/943). The Government adopted the reliability standard (loss of load expectation, LOLE= 3 hour/year and expected energy not served, EENS =1,800 MWh/year) in July 2021.

3.1.6 Cross-border issues

Technical cooperation between Union and third country transmission system operators

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

Capacity allocation and congestion management

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

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

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

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

and intraday markets. In October 2020, all regulatory Authorities of CCR Nordic agreed to approve the amended day-ahead/intraday capacity calculation methodology. [8]

The flow-based method has not been implemented yet. Nordic TSOs have planned to start external parallel runs with the flow-based method in day-ahead timeframe in autumn 2021.

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

Table 2. Net costs of countertrade and congestion income.

	2016	2017	2018	2019	2020
Net costs of countertrade, MEUR	**3.9**	**1.8**	**4.1**	**0.9**	**0.7**
• Countertrade between Finland and Sweden, MEUR	2.5	0.4	1.9	0.1	0.1
• Countertrade between Finland and Estonia, MEUR	0.1	0.1	0.1	0.5	0.2
• Countertrade inside Finland, MEUR	1.2	1.3	2.2	0.3	0.4
Congestion management income to Fingrid, MEUR	**39.9**	**25.8**	**29.6**	**73.0**	**146.7**
• From interconnectors between Finland and Sweden, MEUR	37.5	25.5	28.2	65.5	122.7
• From interconnectors between Finland and Estonia, MEUR	2.4	0.3	1.4	7.5	24.1

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.

Good hydro situation, decreased consumption due to mild weather and very low electricity prices caused price differences and congestions and thus also lead to record-high congestion incomes for Fingrid in 2020.

In 2020 congestion management income for the Fingrid totalled EUR 146.8 million (EUR 73.0 million in 2019). Fingrid uses congestion income to investments that aim to relieve the congestions. Fingrid did not use congestion incomes in 2020 for financing transmission grid investments. At the end of the year 2020, Fingrid had EUR 219.1 million of unused congestion income, which 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 2020, the Energy Authority continue to co-operate with TSOs and NRAs to meet System operation guideline (2017/1485) requirements on Nordic and national levels. Before approval, some proposals, there have been preparatory actions on next matters FRR dimensioning, ramp-

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

ing restrictions, FCR additional properties and ROSC. The Energy Authority have taken coordinated actions to meet Guideline requirements and to ensure that Guideline objectives can be met.

In the beginning of February 2020, the Energy Authority received a national proposal concerning new balancing reserve type, Fast Frequency Reserve (FFR). FFR isn't clearly on the scope of SO GL or NordREG EB TF. Justification of this reserve is that the current set of reserves can't deliver as fast reserve that FFR requires. Power system continuous decreasing inertia is the reason for increasing amount of faster frequency deviations in power system. Special feature on this proposal is that BSP can make combinated FCR and FFR bid if the resource is prequalificated as FFR resource. FFR and FCR are quite similar on technical level, but FCR is technically slower and it therefore can't cover FFR needs. The Energy Authority approved this national proposal in May 2020.

In September 2020, the Energy Authority received proposal among all the other Nordic NRAs on amended ramping methodology in accordance with SO GL art 137 (3)(4). Proposal main content was including NordLink HVDC link to scope of existing proposal. In the end of November 2020 Nordic TSOs amend the proposal and resubmitted it to Nordic NRAs. Content of resubmission was to include SO GL required art. 6(6) implementation timescale on proposal. Also, in November 2020 all Synchronous area Nordic Regulatory Authorities made joint agreement on the proposal and yhe Energy Authority approved the proposal in December 2020.

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.

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

In accordance with Article 30(3) of the FCA Guideline, the Energy Authority 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.

During spring 2020, the subsequent analysis in line with Article 30 (4) of the FCA guideline revealed that the hedging opportunities in the Estonian bidding zone were no longer insufficient. This was largely due to the fact that previously the Estonian market participants had used the Helsinki EPAD as their main hedging tool due to the low liquidity of the Tallinn EPAD. The changes in the markets resulted in decreased correlation between the Finnish and Estonian bidding zones, making it impossible for the Estonian market participants to acquire a sufficient hedge using the Helsinki EPAD. The Finnish and Estonian NRA´s came to the conclusion that the hedging opportunities were insufficient and agreed to request the Finnish and Estonian TSOs to issue transmission rights on the FI-EE -border. The Energy Authority gave its decision on the matter in June 2021.

Discussions between the relevant NRAs on the decision on the sufficiency of the hedging opportunities for the Finnish and Swedish bidding zones is still ongoing, and no decision has been made yet. The Energy Authority has identified some potential issues based on the market data, which is supported by the results of the public consultation. The decision will likely made in early fall 2021.

Capacity Allocation & Congestion Management Guideline (CACM GL)

In 2020, the focus has been in amendments to the current CACM regulation and enforcement questions for which the Energy Authority has actively contributed.

Energy Authority participated to the process of finding solution to the European shipping discussion and approved in fall together with other European regulatory authorities the all NEMOs proposals for European transit shipping arrangements and integrated it already previously approved Nordic shipping arrangements. .

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 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.

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

In April 2020 the Nordic CCR TSOs sent a new proposal for amendment of the CCM, following ACER´s decision on the long-term capacity calculation methodology for the same region. The Nordic CCR NRAs considered the proposal to be for the most part in line with the regulation, but saw need to specify the implementation plan more precisely in order to ensure proper parallel runs and sufficient functionality before starting to use the new flow-based calculation. Energy Authority and the other Nordic CCR NRAs approved the methodology with some additions on in October 2020. At the same time, the NRAs also agreed to add a checkpoint to the implementation process. During this checkpoint, the relevant NRAs will assess the functionality of the methodology based on the TSO´s report which builds on experience from the parallel runs.

Electricity Balancing Guideline (EB GL)

In 2020, Energy Authority have participated together with other European NRAs and ACER in the common European decision-making processes to approve methodologies pursuant to the EB GL. Also, Energy Authority follow Nordic TSOs co-operation project NBM (Nordic balancing model) which is closely related to EB GL implementation.

The EBGL requires that by 18 December 2020 all TSOs shall apply the imbalance settlement period of 15 minutes in all scheduling areas while ensuring that all boundaries of market time unit shall coincide with boundaries of the imbalance settlement period. The regulation allows that the national regulatory authority may, at the request of the TSO or at its own initiative, grant the relevant TSOs a derogation from this obligation until 1 January 2025.

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

However, in March 2019 Nordic TSOs announced that they have identified risk of delay in the implementation of 15 min imbalance settlement period in the Nordics by December 2020. Fingrid submitted to the Energy Authority in June 2020 a request to approve derogation from the implementation of 15 minutes imbalance settlement until 22 May 2023. In February 2021, the Energy Authority approved the derogation request after coordination with other Nordic NRAs. However, the Energy Authority requested Fingrid to prepare parallel an alternative approach to meet the new implementation date even if there will be any problems with implementation timetable in other Nordic countries.

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 was allowed to continue until end of 2020.

In November 2020, Fingrid sent a fixed term proposal to Energy Authority to continue national pilot project for lower minimum bid size in the mFRR balancing market. The Energy Authority questioned if the proposal should be valid until further notice whether than fixed term. Fingrid amend the proposal to be valid until further notice and resubmitted it to Energy authority in December 2020. The Energy Authority approved changes in T&C for mFRR providers late December 2020.

In December 2020 Fingrid submitted a proposal concerning single price model. Proposal was consisting of mFRR, FCR and BRP terms and conditions. Fingrid stated that single price model aFRR terms and conditions will be submitted later to the Energy Authority in 2021.

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 on it also 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	2017	2018	2019	2020
Electricity Production (TWh)	**65.0**	**67.5**	**66.1**	**66.1**
• Hydro power	14.6	13.1	12.3	15.6
• Wind power	4.8	5.9	6.0	8.0
• Solar power	0.0	0.2	0.2	0.3
• Nuclear Power	21.6	21.9	22.9	22.4
• CHP district heating	11.6	11.8	12.4	9.6
• CHP industry	9.1	9.7	9.6	8.1
• Conventional thermal power	3.3	4.9	2.6	2.2
Total electricity demand (TWh)	**85.4**	**87.4**	**86.1**	**81.1**
Imports volume (TWh)	**22.2**	**22.5**	**23.9**	**21.6**
Exports volume (TWh)	**1.8**	**2.6**	**3.9**	**6.7**
Traded volume in the spot electricity market (TWh)				
• Day-ahead buy volume (FI)	60.0	61.6	63.2	59.0
• Day-ahead sell volume (FI)	44.4	48.6	50.1	45.2
• Intraday buy volume (FI)	1.0	1,1	1.0	1.0
• Intraday sell volume (FI)	0.9	1.0	1.0	1.0
Average spot electricity price (FI) (EUR/MWh)	**33.19**	**46.80**	**44.04**	**28.02**
Generation fuel mix by source (GW)				
• Coal	1.9	1.9	1.6	1.4
• Natural gas	1.8	1.8	1.8	1.8
• Petroleum	1.3	1.3	1.3	1.3
• Nuclear	2.8	2.8	2.8	2.8
• Peat	1.8	1.8	1.8	1.5
• Biofuels	2.2	2.3	2.6	2.7
• Waste	0.2	0.2	0.2	0.2
• Hydro	3.2	3.2	3.2	3.2
• Wind	2.0	2.0	2.2	2.4
• Solar	0.0	0.1	0.2	0.3
Total installed generation capacity (GW)	**17.2**	**17.4**	**17.7**	**17.6**

Market opening

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

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

In January 2016, EPEX SPOT SE announced to the Energy Authority its willingness to offer day-ahead and intraday trading services with delivery in Finland by using so-called passport method.

The Energy Authority decided in February 2016 that EPEX SPOT SE has right to offer day-ahead and intraday trading services with delivery in Finland. In January 2019, after being designated as a NEMO in Sweden, 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.

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

EPEX SPOT SE launched in Finland their intraday continuous trading and clearing services on 25 May 2020 and started offering day-ahead trading services on 3 June 2020. Nasdaq Oslo ASA has not yet started offering day-ahead trading services in Finland.

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

The share of electricity bought from the power exchange in relation to the Finnish electricity consumption has increased considerably since Finland joined the Nordic power market area in June 1998. The share of electricity procured from Nord Pool power exchange covered 70 per cent of the Finnish physical consumption in 2020. Electricity procurement from EPEX SPOT was considerably lower, and it covered less than 4 per cent of Finnish electricity consumption in 2020.

In 2020, the volume of electricity traded in Nord Pool AS in day-ahead market in Nordic and Baltic states amounted to 718 TWh. The volume of electricity traded in EPEX SPOT was 14 TWh in Nordic states in 2020.

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

Prices

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

In Nordic area Nord Pool Spot calculates so-called system price which is an unconstrained market clearing reference price for the Nordic region. It is calculated without any congestion restrictions by setting capacities to infinity. The system price is calculated locally by Nord Pool Spot after area prices are calculated for all bidding areas. Flows between the Nordics and the Netherlands, Germany, Poland and the Baltics from the area price calculation are taken into account in system price calculation. These flows are used when calculating the System price either as import/sales

or as export/purchase orders. In system price calculation area bidding areas in Norway, Denmark, Sweden and Finland constitute one common bidding area (capacities between these are set to infinity).[9]

In 2020, the average system market price was 72 per cent lower than in 2019. The average system price in 2020 was EUR 10,93/MWh.

The average Finnish area price in 2020 was EUR 28.02/MWh, showing a decrease of 36 per cent year-on-year.

In 2020, about 37 per cent (in 2019: 60 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 67 per cent (in 2019 88 per cent) of time in 2020.

Figure 1 presents the percentage of hours during the year 2020 when equal day-ahead price existed. In this picture the bidding zones of each country are grouped for clarity.

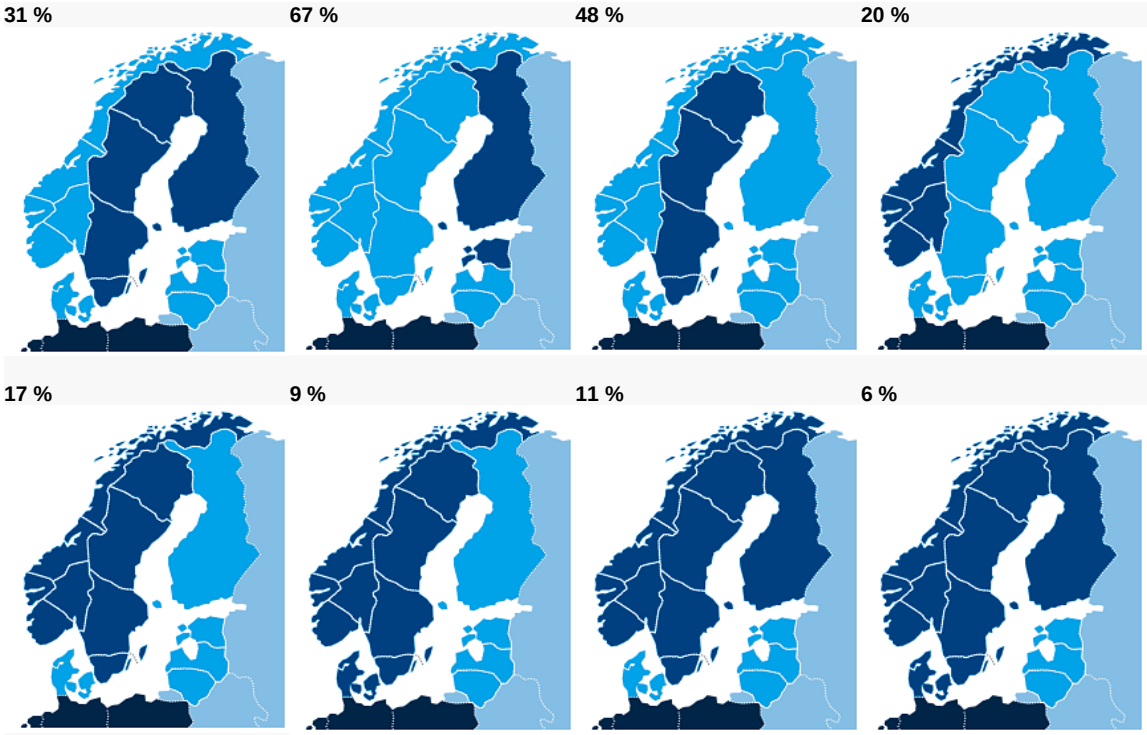

Figure 1. Percentage of hours during which different bidding zones have had equal day-ahead market prices in 2020

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

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

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 (2020 figures preliminary).

Electricity retail market indicators	2016	2017	2018	2019	2020*
Number of electricity customers (1000)	**3,498**	**3,533**	**3,577**	**3,614**	**3,585**
• Household customers (1000)	3,058	3,087	3,117	3,148	3,085
• Other customers (1000)	441	446	460	467	500
Number of electricity suppliers	73	73	72	71	63
Market share of the three largest suppliers by metering points, %	35-40%	35-40%	35-40%	40-45%	45%
Number of retailers with market shares >5%	4	4	4	7	6
Number of retailers with customer shares > 5%	3	3	3	5	6
Switching rate, %[10]	**12.1%**	**11.1%**	**10.9%**	**13.9%**	**15.5%**
• Households, %	12.4%	11.3%	11.1%	14.3%	15.6%
• Other customers, %	9.9%	11.0%	10.2%	12.3%	14.7%
Share of customers having a smart meter, %	>99%	>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%	52%
• Open-ended contract, %	51%	45%	49%	40%	40%
• Dynamic price contract, %	7%	9%	9%	11%	8%
HHI in terms of sold energy	525-550	na	450-475	725-750	875-900
• Households	825-850	na	575-600	800-825	875-900
• Other customers	500-525	na	450-475	750-775	975-1000
HHI in terms of metering points	700-725	na	625-650	850-875	925-950
• Households	750-775	na	650-675	875-900	950-975
• Other customers	500-525	na	450-475	800-825	825-850
Evolution of the price of electricity for a typical household consumer[11], cent/kWh	**15.59**	**16.34**	**17.96**	**18.62**	**18.64**
• Network charges (excl. taxes)	5.01	5.51	5.93	6.18	6.38
• Energy costs and supply margin (excl. taxes)	5.31	5.42	6.30	6.58	6.40
• Taxes	5.27	5.42	5.73	5.86	5.86
Number of final household consumers with a network service contract for partial self-generation	3,500	7,500	13,200	21,400	29,800

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

[11] Household annual consumption 5000 kWh/year. Situation as of 31.12

Installed capacity of small-scale power generation[12], MW	136.5	177.0	200.9	277.8	363.5
• Photovoltaic, MW	27.1	66.4	119.7	197.3	288.1
• Wind, MW	19.1	16.5	14.3	14.4	11.8
• Bio, MW	15.9	16.3	12.9	13.1	11.7
• Hydro, MW	34.2	36.2	30.8	29.4	28.0
• Diesel, MW	37.4	38.2	20.9	22.6	22.5
• Other, MW	2.8	3.3	2.4	2.4	1.4

Market opening and competition

Number of retail suppliers has been stable. At the end of 2020, there were round 63 retail suppliers supplying electricity for households and other small-scale end-users. Number of suppliers has been decreased as some electricity retail companies have been merged into bigger ones. In addition, there are some suppliers which are supplying electricity only for large end-users.

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

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

Even though the exact market shares of individual retailers are not available, the Energy Authority has estimated that seven electricity retailers have larger than five per cent share of retail market (based on energy volume) and six retailers have more than five per cent of electricity customers. Number of larger retailers have increased since 2018 due to merger of some retailers.

The market share of the three largest companies in the retail market for small and medium-sized customers has been estimated to be about 45 per cent. This has also increased a bit during last few years.

The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) in terms of energy volumes to measure market concentration in retail market is about 875 – 900 and still showing rather competitive marketplace. However, also this metric has been increasing. Number of new entrants and their market share have been low.

These figures show gradually increasing market concentration in electricity retail market.

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

The new provisions have also given powers to the Energy Authority to monitor and supervise that DSOs and retailers are well-prepared for the commissioning of the Datahub. In 2020, Energy Authority supervised whether all DSOs and retailers have made their preparatory actions for Datahub implementation. With the exception of a few individual market actors, all reached necessary milestones. According to the regulation Datahub will go-live on 21 February 2022.

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

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

Prices

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

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

Despite of the increase in the wholesale energy prices especially during the second half of 2020, the retail prices decreased slightly. This was partly due to the fact that the retail prices were already well above the wholesale prices which were low after 2019. In 2020, the prices of the so called obligation to supply contracts including taxes decreased 2.7 per cent for a residential customer with annual 5,000 kWh consumption. For a household with electric heating increase was 0.9 per cent.

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 8.6 per cent. For a small house with electric heating (annual consumption 18,000 kWh) the price decrease was 6.6 per cent. The average price of offers for a two years fixed-term contract for a residential customer lowered with 1.7 per cent and for a household customer with electric heating decrease was 5.4 per cent.

Price of electricity distribution grid services including taxes was 2.4 per cent more expensive for household consumers – for electrically heated households 0.9 per cent – at the end of 2020 than at the end of 2019.

In 2020, the electricity bill for apartment house households and households with electrical heating increased in total by 0.2 and 0.0 per cent respectively.

In 2020, 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

[13] Available at: Implement Consulting Group - Nordic Data Hub Interoperability (nordicenergyregulators.org)

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 2020, about 8 per cent of retail customers had a dynamic electricity price supply contract. Share of dynamic priced contracts decreased from 2019.

The most popular supply contract type has been a fixed-term contract during last two years. At the end of 2020 about 52 per cent of retail customers in Finland had a fixed-term supply contract. Most commonly, fixed-term contracts are made for one or two years.

About 40 per cent of retail customers had open-ended supply contract which customer may terminate with two weeks' notice. Share of such contracts remained stable.

Smart meter use

More than 99 per cent of consumption places in Finland had already a smart meter. The Finnish national legislation required that each DSO should have hourly registering smart meters installed in at least 80 per cent of consumption places by the end of 2013. 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 2020, number of customers switching electricity supplier increased from 2019 and was all-time highest in Finland. The estimated number of customers that switched their supplier was about 566,000 which corresponds about 15.5 per cent of all electricity customers. In 2019 the switching rate was 13.9 per cent.

For households switching rate was 15.6 percent (14.3 per cent in 2019).

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

Distortion or restriction of competition

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

position. The Energy Authority may report relevant information to the Competition and Consumer Authority, but such cases have not occurred in 2020. 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 household consumers.

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

Complaints by household customers

In 2020, the Energy Authority received from household customers 15 new requests for investigation related to electricity distribution system operators and suppliers. In addition to these, the Energy Authority received 10 requests for investigation from other parties than household customers and opened on its own initiative one new investigation concerning an electricity supplier.

In 2020, the Energy Authority made decision in 31 cases including ones initiated by the Energy Authority itself or other parties than household customers. Some of these cases were already received in previous years.

These statistics do not include the phone calls or other written inquiries from the energy companies' customers or other market participants received during the year. The requests for investigation and other inquiries fell into the following categories: connection charges, network tariffs, quality of supply, metering, contractual issues, invoicing and disconnections.

Disconnection rates

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

Restrictive contractual practices

Throughout the year 2020, the Energy Authority received numerous queries and complaints concerning two electricity retailers. 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 key contractual information prior to concluding the contract, 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 Energy Authority made several decisions on breaches of the provisions of the Electricity Market Act and related legislation. It also initiated and completed proceedings of imposing conditional fines. Regarding the issues not falling within the competence of the Energy Authority, in most cases the persons making the complaints were advised to contact the nationwide Consumer Advisory Services. Handling the complaints and answering queries concerning these two retailers was a significant effort at the Energy Authority in 2020.

Also the Competition and Consumer Authority received over 900 contacts concerning these retailers in the year 2020. Furthermore, in April 2020, the Consumer Ombudsman took one of these retailers to the Market Court for not rectifying its practices despite the supervisory measures. In May 2021, the Market Court imposed on this retailer several prohibitions enhanced with conditional fines.

Protection of energy poor and vulnerable household customers

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

However, some restrictions to disconnection due to non-payment exist in the Electricity Market Act to protect household customers in specific circumstances. If the non-payment is caused by the end user's financial difficulties due to serious illness, unemployment or some other special cause, principally through no fault of 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 supply. The obligation means that the retailer shall supply electricity at reasonable prices to consumers and other users of electricity whose place of use is equipped with main fuses of 3x63 amperes at maximum or whose site of electricity use receives annually no more than 100,000 kWh of electricity. Terms and conditions regarding this obligation shall not include any unreasonable provisions or limitations that would restrict competition within electricity trade. The Energy Authority may order the retailer referred to here to sell electricity to the customers within the obligation to supply.

The prices of electricity within the obligation to supply system do not have to be approved by the regulator before the supplier takes them into use. By virtue of the Electricity Market Act the Energy Authority may investigate either on the basis of a complaint or at its own initiative the pricing of electricity. In 2020 the Energy Authority did not make such investigations on reasonableness of electricity prices under the 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. In November 2019, the Energy Authority took into use the renewed service with aim to better fulfil customers' needs. The system has been developed to inform customers about the origin of the electricity they purchase and about the suppliers willing to buy their customers' self-generated surplus electricity. All retail suppliers are obligated to maintain up-to-date information on their public electricity price offers for household customers and other small end-users on this service. In 2020, this comparison tool fulfilled 12 out of 14 criteria that are set in the Directive (EU) 2019/944.

The Energy Authority has provided a lot of advice to end-users and suppliers about the procedures and functionalities of the comparison tool. It has also addressed issues concerning different forms of abuse of the price comparison website by suppliers aiming to appear as one of the suppliers with the cheapest products. Yet, some technical issues related to entering and display of suppliers' data on the service remained partly unresolved in 2020.

In addition to the price comparison tool maintained by the Energy Authority, there are also other similar services for comparing electricity price offers maintained by private parties. Some of these tools also provide possibility to customers to make a supply contract with a chosen supplier. The number of commercial comparison tools is around 10.

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

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

Increasing number of customers have installed PV panels to cover part of their electricity consumption with a self-generated energy. Normally those panels are of size that they do not create surplus which could be injected to the network.

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

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

that, and as regards the calculation of compensation even until the 30th of June 2023, the provisions allow DSOs voluntarily to provide these services in their distribution network for members of the local energy communities or the group of active customers.

Dispute settlement

The Energy Authority does not have powers for dispute settlements between consumers and energy companies in individual contractual disputes. The disputes between household consumers and entrepreneurs in individual cases may be solved in the Consumer Disputes Board which is a neutral and independent expert body whose members represent consumers and business in a balanced way. The Board's written decision is a recommendation and the parties are not obliged to follow it. A dispute handled by the Board can always be taken to a court of law. Furthermore, the Consumer Advisory Service is a national service that provides information on consumer rights, and mediation assistance in disputes between household consumers and entrepreneurs.

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

Individual disputes between non-household customers and businesses are solved in a general court of law or in an arbitral tribunal if agreed so. In 2020, the Ministry of Economic Affairs and Employment started to prepare legislation for dispute settlement between business customers and energy companies as required by the Directive (EU) 2019/944.

Gas market

4.1 Network regulation

The Finnish natural gas market was opened for competition on January 1, 2020. Thus, the year 2020 was the first fully competitive year in the Finnish natural gas market history.

Prior to market opening for competition, the Energy Authority arranged 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 Energy Authority 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.

In the initial phases of competitive market, the approval decisions on terms and conditions for capacity allocation and transmission services were given only for a term of one year to gain practical experience from open gas markets.

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	2020
Maximum gas daily consumption (mill. m3/day)	17.7	14.3	16.0	14.2	10.4
Gas delivery from transmission grid (mill. m3/year)	2,371	2,214	2,456	2,480	2,256
• Heat and power plants	824	677	875	820	742
• Industrial customers	1,315	1,312	1,337	1,341	966
• DSO grids	225	218	232	258	503
• Other customers	7	7	11	62	46
Number of TSOs	1	1	1	1[14]	1
Number of DSOs	24	24	25	22	18
Number of TSO connection points	224	223	223	222	219
Number of DSO customers	28,200	27,900	27,800	32,900	32,900

4.1.1 Unbundling

Unbundling of TSO

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

Due to the Natural Gas Market legislation, gas transmission system operations were ownership unbundled from electricity and gas generation and supply by the 1 January 2020. A new gas TSO Gasgrid Finland Oy was unbundled through a partial demerger from Gasum Oy that entered into force on 1 January 2020. Furthermore, the ownership of transmission system operation was transferred to the Ministry of Finance on 1 January 2020.

[14] TSO was a part of vertically integrated gas wholesale supply company until end of 2019 (unbundling only in accounts).

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 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. Final certification decision was given on 19 August 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 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.

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

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 off-grid LNG terminal in Pori and in February 2019 the Energy Authority approved tariffs for the off-grid LNG terminal in Tornio.

The third LNG terminal in Hamina will be opened in 2021. The Hamina terminal will be the first on-grid LNG terminal in Finland. However, the Hamina terminal will in its initial operation only be connected to the low-pressure DSO network.

4.1.3 Balancing

Prior to 2020, 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. In July 2019, Energy Authority approved terms and conditions for balancing and the rules for balance settlement applicable from 1 January 2020.

Based on experiences from opened markets, Gasgrid Finland proposed in June 2020 some amendments to the approved terms and conditions for balancing and the rules for balance settlement. In July 2020, Energy Authority approved proposed amendments applicable from 1 September 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 interconnections except for the Imatra entry point for gas importing from Russia. The full capacity of Balticconnector was not reached in 2020, primarily due to the delay in completion of Puiatu and Paldiski compressor stations in Estonia.

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. In November 2020, Energy Authority approved capacity allocation methodology applicable in the Balticconnector interconnection point during period 1 January – 31 December 2021. The decisions were coordinated with the Estonian national regulatory authority.

In the approved methodology auctioning at Balticconnector is not applied, but instead capacity is allocated implicitly.

Delays in reaching full capacity of Balticconnector have shown that Balticconnector interconnector has been congested (in direction from Estonia to Finland) during winter periods in 2020. Thus, there have been more nominations than available capacity (Figure 2). TSOs allocate capacity to the market actors in pro rata.

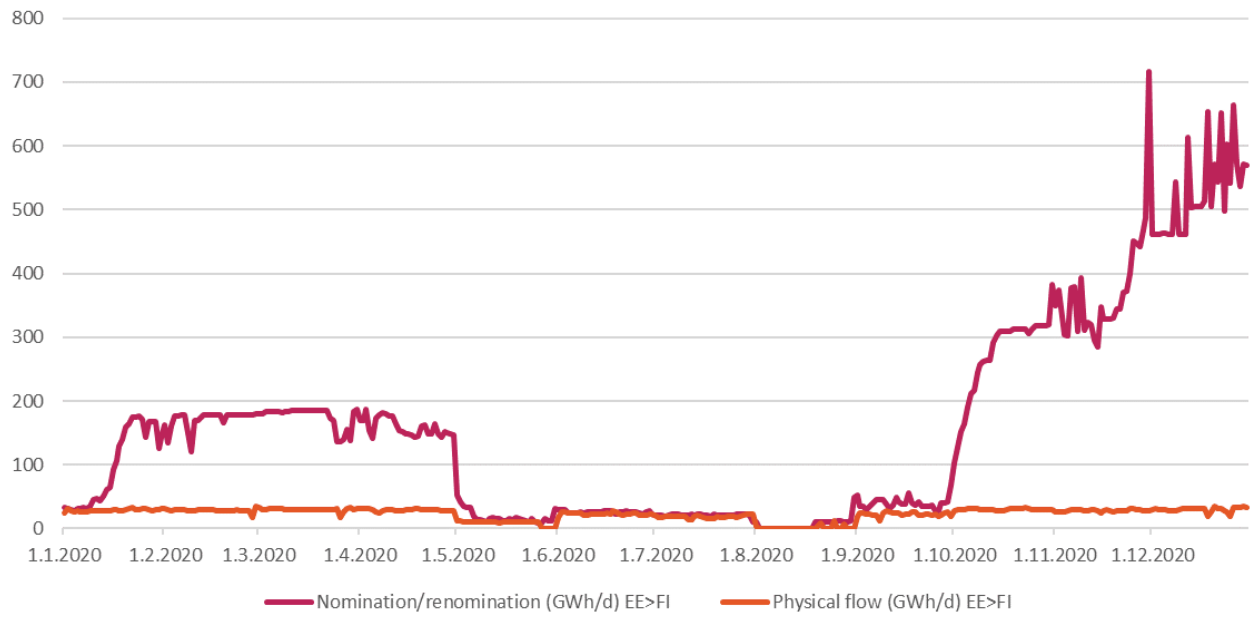

Figure 2. Nominations and physical flow in Balticconnector from Estonia to Finland in 2020 GWh/day. (source ENTSOG)

In 2020, about one third gas consumption was covered by import from Estonia to Finland through Balticconnector. Following figure (Figure 3) shows physical gas flows to Finland from Imatra and Balticconnector interconnection points in 2020 (GWh/day).

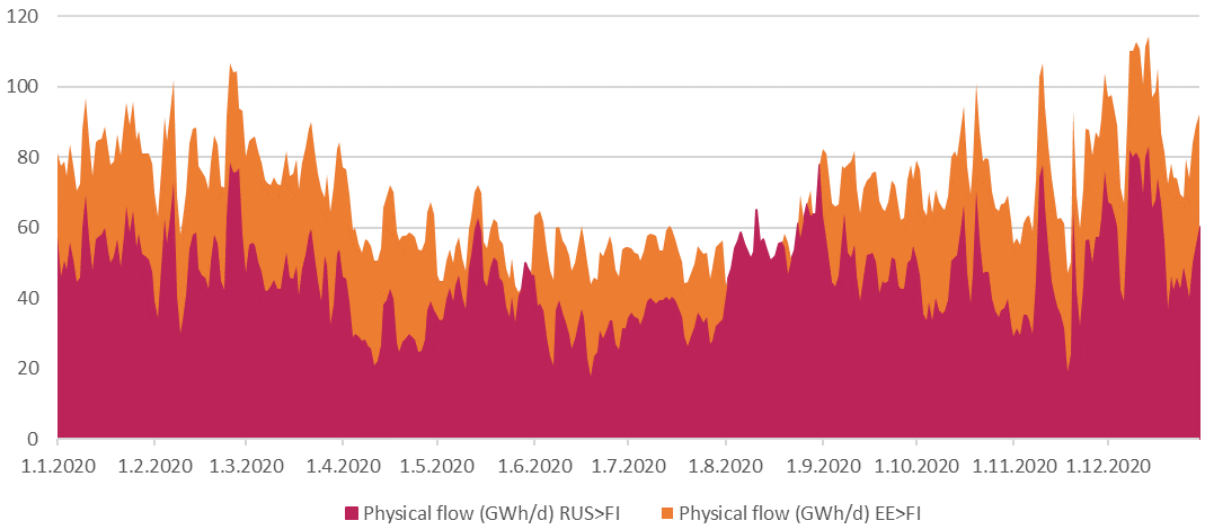

Figure 3. Physical flow to Finland through Imatra and Balticconnector interconnection points, GWh/day (source ENTSOG).

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. 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. [15]

Gas wholesale market indicators	2016	2017	2018	2019	2020
Gas entry in interconnection points (TWh)	**23.8**	**22.3**	**24.7**	**23.2**	**25.4**
• Imatra interconnection point	23.8	22.3	24.7	23.2	16.9
• Balticconnector interconnection point	-	-	-	-	8.5
Natural gas consumption (TWh)	**23.8**	**22.3**	**24.7**	**23.2**	**25.4**
• Large industrial end-users (%)	55%	59%	54%	54%	54%
• CHP, district heating and power generation (%)	35%	31%	36%	33%	33%
• End-users connected in distribution grid (%)	9%	10%	9%	10%	10%
• Other (%)	0%	0%	0%	2%	3%

Prices

Until 2019, Gasum Oy had obligation 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.

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

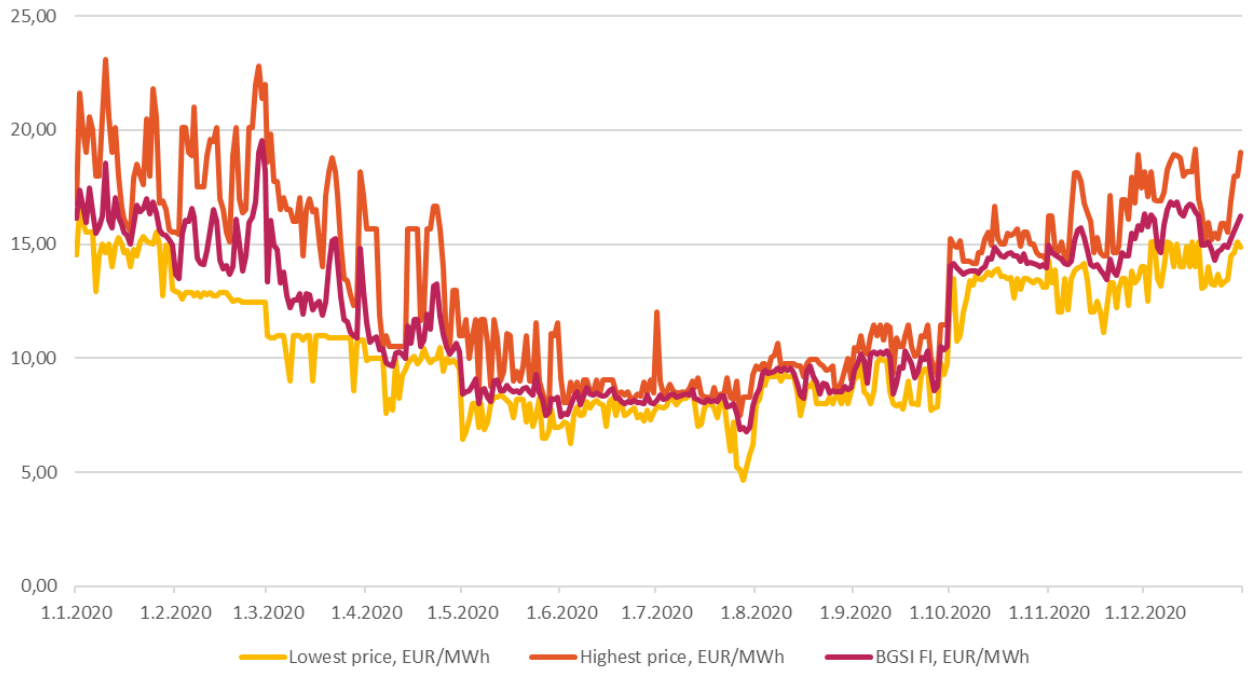

Figure 4. Price of fulfilled trades for Finland on a daily market in GetBaltic in 2020 (source: GetBaltic).

[15] Until end of 2019 energy volumes are expressed by using low calorific value and from 2020 by using gross calorific value. Thus, volumes in 2020 are not directly comparable with volumes in 2016 – 2019.

According to the fulfilled trades in GETBaltic, average gas energy price for Finland was 12.2 EUR/MWh.

Table 7. Price of natural gas to transmission network customers (excl. taxes). Source: Statistics Finland [16]

Price of natural gas (EUR/MWh)	2021
Transmission network customers	
• Consumption 27 778 - 277 777 MWh/year	23.39
• Consumption 277 778 - 1 111 111 MWh/year	20.72
• Consumption > 1 111 111 MWh/year	21.26

For a reference customer using gas for energy generation (annual consumption 1,000 GWh) gas price (excl taxes) decreased on average by 14.3 per cent during period December 2019 – January 2021.

Table 8. Price of natural gas in energy generation (excl. VAT). Source: Statistics Finland [17]

Price of natural gas (EUR/MWh)	2016	2017	2018	2019	2020
Excluding taxes	22.79	25.09	29.16	24.16	na
Including taxes	38.47	41.84	47.04	42.75	na

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 nearly 33,000 gas end-users in the natural gas market. The largest customer segment, (about 25,000 customers, about 76 per cent of all gas end-users) consists of households who buy natural gas only for cooking. However, the total natural gas consumption of this segment amounts to only 0,3 mcm (about 0.015 per cent of total gas consumption).

At the end of 2020, there were 25 natural gas retail suppliers. The customer segments vary among suppliers, some of gas suppliers serve mostly households while others have only industrial customers.

[16] Prices in January. The prices correspond to the gross calorific value. Similar information on gas prices in 2020 or before is not available.
[17] Prices in December for customer annual gas consumption 1000 GWh and demand 166.7 MW. The prices correspond to the gross calorific value.

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

Table 9. Price of natural gas to distribution network customers (excl. taxes). Source: Statistics Finland [18]

Price of natural gas (EUR/MWh)	2021
Distribution network customers	
• Consumption < 278 MWh/year	47.76
• Consumption 278 - 2 777 MWh/year	38.28
• Consumption 2 778 - 27 777 MWh/year	34.99
• Consumption 27 778 - 277 777 MWh/year	25.13

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 an 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 supply, the powers of the Energy Authority are ex post by their nature. In 2020, Energy Authority did not make any investigations on gas retail prices under obligation to supply.

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

4.2.3 Consumer protection and dispute settlement

Ensuring access to consumption data

According to Natural Gas Market Act end users have a right to receive the metering data on their own consumption free of charge. Likewise, they have a right to give any other party access to that data. The metering data must be given in the format that corresponds to general procedures followed by the industry and the network system operator.

In 2020, the Energy Authority investigated one case regarding practices of a distribution system operator in providing the consumption data to a customer.

[18] Prices in January. The prices correspond to the gross calorific value. Similar information on gas prices in 2020 or before is not available.

Consumer protection

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

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

Complaints by household customers

Regarding the compliance with the natural gas market legislation, the Energy Authority did not receive any new requests for investigation from household customers during 2020. From other parties than household customers the Energy Authority received two requests for investigation. These cases were handled and closed in the same year by the decisions of the Energy Authority.

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 inquiries concerned access to consumption data, metering, invoicing and switching supplier.

Dispute settlement

The Energy Authority does not have powers for dispute settlements between consumers and energy companies in individual contractual disputes. The disputes between household consumers and entrepreneurs in individual cases may be solved in the Consumer Disputes Board which is a neutral and independent expert body whose members represent consumers and business in a balanced way. The Board's written decision is a recommendation and the parties are not obliged to follow it. A dispute handled by the Board can always be taken to a court of law. Furthermore, the Consumer Advisory Service is a national service that provides information on consumer rights, and mediation assistance in disputes between household consumers and entrepreneurs.

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

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

4.3 Security of supply

4.3.1 Monitoring balance of supply and demand

The Energy Authority has a responsibility for monitoring the security of supply of gas. The Energy Authority maintains information on transmission network capacity and availability, while the

Ministry of Employment and the Economy has the responsibility for preparing the estimates for the demand. In 2020 there were no changes in these competences.

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

Natural gas used in Finland was imported from Russia and Estonia in 2020. There's no natural gas production in Finland. Small-scale biogas is produced and injected into the gas transmission and distribution network in six different locations. There are also two off-grid LNG-terminals in Finland, and third one, with connection to natural gas grid, is planned to be commissioned in early 2022.

The importing capacity from Russia is estimated to be about 220 GWh/d. The transmission capacity between Estonia and Finland is 80 GWh/d. However, only about 30 GWh/d of that capacity was available during the year 2020 due to delayed commissioning of compressor stations in Estonian side. During the peak demand in 2020 gas consumption was 110 GWh/d.

4.3.2 Measures to cover peak demand and shortfalls of suppliers

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

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

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

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

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