

National Report 2018 to the Agency for the Cooperation of Energy  
Regulators and to the European Commission

Finland

# CONTENT

<b>1 Foreword</b> .....	<b>4</b>
<b>2 Main developments in electricity and gas markets</b> .....	<b>6</b>
<b>2.1 Legal framework</b> .....	<b>6</b>
2.1.1 Electricity and gas market legislation .....	6
2.1.2 Other electricity and gas market related political issues .....	6
<b>2.2 Electricity market</b> .....	<b>7</b>
2.2.1 Unbundling .....	7
2.2.2 Wholesale market .....	7
2.2.3 Retail market .....	8
2.2.4 Infrastructure.....	10
2.2.5 Security of Supply .....	10
2.2.6 Regulation .....	11
<b>2.3 Gas market</b> .....	<b>12</b>
2.3.1 Unbundling .....	12
2.3.2 Wholesale market .....	12
2.3.3 Infrastructure.....	13
2.3.4 Security of Supply .....	13
2.3.5 Regulation .....	14
<b>2.4 Consumer protection and dispute settlement</b> .....	<b>14</b>
<b>3 Electricity market</b> .....	<b>15</b>
<b>3.1 Network regulation</b> .....	<b>15</b>
3.1.1 Unbundling .....	15
3.1.2 Technical functioning.....	17
3.1.3 Network tariffs for connection and access .....	20
3.1.4 Cross-border issues .....	22
3.1.5 Compliance .....	24
<b>3.2 Promoting Competition</b> .....	<b>24</b>
3.2.1 Wholesale markets .....	24
3.2.2 Retail market .....	27
<b>3.3 Security of supply</b> .....	<b>32</b>
3.3.1 Monitoring balance of supply and demand.....	32
3.3.2 Monitoring investments in generation and interconnector capacities.....	33
3.3.3 Measures to cover peak demand or shortfalls of suppliers.....	35
<b>4 Gas market</b> .....	<b>38</b>

<b>4.1 Network regulation</b> .....	<b>39</b>
4.1.1 Unbundling .....	39
4.1.2 Technical functioning.....	40
4.1.3 Network and LNG tariffs for connection and access .....	40
4.1.4 Cross-border issues .....	41
4.1.5 Compliance .....	41
<b>4.2 Promoting Competition</b> .....	<b>42</b>
4.2.1 Wholesale markets .....	42
4.2.2 Retail market .....	43
<b>4.3 Security of supply</b> .....	<b>44</b>
4.3.1 Monitoring balance of supply and demand.....	44
4.3.2 Expected future demand and available supplies .....	44
4.3.3 Measures to cover peak demand or shortfalls of suppliers.....	45
<b>5 Consumer protection and dispute settlement</b> .....	<b>47</b>
<b>5.1 Consumer protection</b> .....	<b>47</b>
<b>5.2 Requests of investigation</b> .....	<b>47</b>

# 1 Foreword

This national report is prepared by the Energy Authority to the Agency for the Cooperation of Energy Regulators and to the European Commission on the state of the Finnish electricity and natural gas markets in 2014 as required by Article 37(1)(e) of the Directive for the Internal Market in Electricity (2009/72/EC) and Article 41(1)(e) of the Directive for the Internal Market in Natural Gas (2009/73/EC).

The report continues the series of annual national reports published since 2004. It covers the main steps the Energy Authority has taken and the results obtained as regards each of the tasks listed in Article 37 of the Electricity Market Directive and Article 41 of Natural Gas Market Directive. It contains a description of the powers and tasks of the regulatory authority, an overview of the regulation and performance of electricity and natural gas sectors and an update of security of supply with regard to both gas and electricity. Focus in this report is in year 2017.

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*In electricity markets, the share of net electricity import reached record level in 2017 and covered 23.9 per cent of consumption*

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The highest amount of electricity came from Sweden, although imports from Sweden fell slightly on the previous year. Imports from Russia grew slightly and net export to Estonia decreased. Increase in electricity consumption in 2017 was covered by increased net import as the level of Finnish domestic electricity generation was decreased.

Total installed generation capacity in Finland was about 17,400 MW at the end of 2017. However, all installed capacity is not available during the peak load situation.

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*The total available generation capacity in the peak load situation has been decreasing during past years and in winter 2017 - 2018 it was estimated to be about 12,000 MW.*

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The highest hourly load in 2017 was 14,273 MWh/h. During the peak load situation, the electricity system worked well and there were not any major disturbances in generation and interconnection capacities. Domestic not-running generation capacity was also available.

The interconnector capacity between Finland and neighbouring countries is enough to cover the deficit in own generation capacity during the peak load situation.

The limited transfer capacity has restricted the transmission of electricity from Sweden to Finland, which is why the wholesale electricity prices in Finland were different from the prices in Northern and Central Sweden 27 per cent of hours last year. In 2017, Finland and Estonia had same price 98 per cent of hours. In December 2016 Finnish and Swedish TSOs announced their agreement to build up a new AC-interconnector between the two countries by 2025.

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).

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*In 2017, the Energy Authority decided after public tendering procedure to purchase 727 MW as peak load reserve capacity for the period of 2017 - 2020.*

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Finland has been active in roll-out of smart meters and in using hourly data in balance settlement. Almost all Finnish DSOs have been trying to install smart meters to all their customers. A smart meter has been installed in over 99 per cent of consumption places.

The go-live for the common Nordic Balance Settlement was on May 1, 2017. The implementation includes harmonising and integration of national grid and bidding area level balance settlement. A common operational unit, eSett Oy is responsible for imbalance settlement and invoicing of the Balance Responsible Parties in Finland, Sweden and Norway.

In 2017, the rate of supplier switching among electricity customers decreased slightly. About 11 per cent of electricity customers in Finland switched the electricity supplier last year.

In June 2017, the Finnish Parliament approved the new Natural Gas Market Act which came into force 1 January 2018.

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*According to the new Natural Gas Market Act, Finnish natural gas market will be opened for competition in the beginning 2020*

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Finnish Baltic Connector Oy and Estonian Elering AS made in October 2016 a final decision to invest in the construction of the Balticconnector gas pipeline between Finland and Estonia by the end of 2019. Before that decision, European Commission decided to support construction of the project by EUR 187.5 million.

In addition to this, there are ongoing projects to build up small-scale LNG terminals. The first off-grid natural gas LNG terminal in Finland was taken into operation in 2016 and the second one in 2018.

In 2017, the consumption of natural gas in Finland continued to decrease.

In 2017, there were no major changes in duties and authority of the Energy Authority. Instead of being just a supervisor of the electricity and gas markets as well as the national emissions trading authority, the Energy Authority has duties also to promote renewable energy and energy-efficiency.

Simo Nurmi  
Director General  
Energy Authority

## 2 Main developments in electricity and gas markets

### 2.1 Legal framework

#### 2.1.1 Electricity and gas market legislation

Due to planned remarkable increase of electricity and gas network tariffs by some DSOs in early 2016, the Finnish Government started to prepare regulation to set maximum threshold for an increase of electricity and gas network charges. On 1 September 2017, came into force amendments to the electricity market legislation which restrict DSOs' and TSO's right to increase network tariffs by maximum 15 per cent during rolling period of 12 months.

The new Natural Gas Market Act was approved by the Parliament in June 2017 and came into force 1 January 2018. According to the new Natural Gas Market Act, Finnish gas markets will be opened for competition in the beginning of 2020.

The Energy Authority has also received new tasks e.g. to monitor risk preparedness plans of electricity and gas DSOs.

#### 2.1.2 Other electricity and gas market related political issues

In November 2016, the Finnish Government published the National Energy and Climate Strategy for 2030<sup>1</sup>. It outlines the actions that will enable Finland to attain the targets specified in the Government Programme and adopted in the EU for 2030, and to systematically set the course for achieving an 80–95 per cent reduction in greenhouse gas emissions by 2050.

The strategy outlines that with minor exceptions, Finland will phase out the use of coal for energy by 2030. The minimum aim is to have 250,000 electric and 50,000 gas-powered vehicles on the roads. The electricity market will be developed at the regional and the European level. The flexibility of electricity demand and supply and, in general, system-level energy efficiency will be improved. Technology neutral tendering processes will be organised in 2018–2020, on the basis of which aid will be granted to cost-effective new electricity production from renewable energy.

The share of renewable energy in the end consumption will increase to approx. 50 per cent and the self-sufficiency in energy to 55 per cent.

In September 2016, the Ministry of Economic Affairs and Employment established a working group to explore smart grids' potential for the electricity market. Its goal is 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 working group published in October 2017 an interim report and it will submit its final report by 30 September 2018.

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<sup>1</sup> Available: <http://tem.fi/documents/1410877/2769658/Government+report+on+the+National+Energy+and+Climate+Strategy+for+2030/0bb2a7be-d3c2-4149-a4c2-78449ceb1976>

## 2.2 Electricity market

### 2.2.1 Unbundling

#### **Development in TSO unbundling and certification of TSO**

In July 2018, 53.14 per cent of Finnish TSO, Fingrid was owned by the State of Finland and the National Emergency Supply Agency, while the rest was owned by Finnish financing and insurance institutions. In 2017, there were no changes in the ownership of Fingrid.

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

#### **Development in DSO unbundling**

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.

Totally, 43 distribution system operators were in 2017 over the threshold value. In addition, some distribution system operators under this threshold value have voluntarily legally unbundled network activities. At the end of 2017 a total of 48 distribution system operators of 77 distribution system operators operating in Finland were legally unbundled.

The requirement for separate management for the electricity network company is limited to legally unbundled system operators with 50,000 customers or more and at the end of 2017 it covered 20 distribution system operators in Finland.

The requirements for professional interests and compliance programmes are applied to legally unbundled electricity system operators with 50,000 customers or more.

### 2.2.2 Wholesale market

#### **Development in market integration**

The Finnish electricity wholesale market is a part of the North European power market. Finland forms an integrated wholesale electricity market with other Nordic and Baltic states. The Nordic market has been price coupled with the North Western European electricity market since 2014.

At the end of 2017, the electricity transmission capacity from the other Nordic countries, Russia and Estonia to Finland amounted to around 5,116 MW.

Finland is heavily dependent on integrated European electricity markets as there is a significant deficit in generation capacity compared to peak load.

#### **Development in market concentration**

During past few years, the most significant change in the structure of the Finnish electricity wholesale market and in the development of market concentration has been the closure of condensing power plants of large power producers. At the same time, quite many wind power plants have been built. Some new companies have come into the market while the share of the biggest companies has decreased a bit. The new companies and power plants are mainly related to wind power.

The Finnish electricity generation sector is characterized by a large number of actors. The total number of companies producing electricity has raised a bit to some 150 and the number of production plants was circa 400. The share of the three biggest generating companies of the total installed capacity is about 50 per cent.

## **Development in electricity generation and consumption**

In electricity markets, the share of net electricity import reached record level in 2017 and covered 23.9 per cent of consumption. The increase in net import was driven especially by decreasing net export to Estonia. The highest amount of electricity came from Sweden, although imports from Sweden fell slightly on the previous year. Imports from Russia increased slightly.

Finnish electricity production amounted to a total of 65.0 TWh in 2017. Finnish hydropower production accounted for 17.1 per cent of the total electricity consumption, while the rate for nuclear power production was 25.2 per cent. CHP accounted for 24.7 per cent of Finland's total electricity consumption. The share of wind power increased to 5.6 per cent.

Electricity consumption in Finland increased slightly in 2017. The total electricity consumption was 85.5 TWh. The combined share of housing, agriculture, services and construction from the total electricity consumption was 50 per cent last year, while industry accounted 47 per cent of the total Finnish consumption.

## **Capacity allocation**

In 2017, there were no changes in the capacity allocation model. Congestions across the borders are managed by implicit auctions in the day-ahead market. Remaining transmission capacity after day-ahead allocation is provided for intraday market and balancing.

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

## **Development of trading in power exchanges**

In December 2015, the Energy Authority designated pursuant to Article 4 of the CACM regulation (2015/1222) Nord Pool AS to act as a nominated electricity market operator in Finland. In January 2016, EPEX SPOT SE announced to the Energy Authority its interest to start offering day-ahead and intraday trading services in Finland.

In 2017, the volume of electricity traded in Nordic and Baltic day ahead markets increased to 394 TWh, and in the intraday market the volume was 6.7 TWh (includes also Nord Pool intraday trading in Germany).

The share of power bought through Nord Pool AS was 71 per cent of the Finnish electricity consumption in 2017.

## **Development of wholesale prices**

The electricity wholesale prices in the Nordic wholesale electricity market remained low, due to the general low trend of prices in Europe and increased amount of RES generation in Nordic area.

The daily system market price in Nordic area was 9 per cent higher than in 2016. The average system price in 2017 was 29.41 EUR/MWh. In 2017, the average price in the bidding zone Finland was 33.19 EUR/MWh, showing a increase of 2 per cent year-on-year.

### **2.2.3 Retail market**

#### **Development in market concentration**

In 2017, there were no major changes in the number of retail suppliers. To serve Finland's circa 3.5 million electricity customers, there are 73 retail suppliers of which 56 offered in 2017 their products nation-wide.

Electricity retail market in Finland is quite competitive. Even though the exact market shares of individual retailers are not available, the Energy Authority has estimated that four electricity



retailers have larger than five per cent share of retail market. The market share of the three largest companies in the retail market for small and medium-sized customers has been estimated to be 35-40 per cent. The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) to measure market concentration in electricity retail market is round 500 – 700 showing competitive marketplace.

During 2017, there were 10 electricity retailers in the Finnish electricity retail market without obligation to supply. These retailers are also fully independent from the Finnish network companies. These retailers have less than 10 per cent of electricity retail customers in Finland.

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.

### **Development in supplier switching**

The rate of supplier switching among electricity users slightly decreased in 2017. A total of 11.0 per cent of electricity users switched their supplier during the year.

### **Development of retail electricity prices**

In January 2018, household consumers paid on average 3.0 percent more for their electricity than in January 2017, whereas for electrically heated households the increase was 1.0 percent.

Increase in the wholesale electricity prices were also reflected in the retail prices of electrical energy. The obligation to supply price of electrical energy decreased by 1.4 per cent on average over the course of the year 2017. The prices of all other contract types, except two-year fixed-term contract, increased few percent over the course of the year.

The electricity distribution price including taxes was 8.7 per cent more expensive for household consumers and 6.3 per cent more expensive for electrically heated households at the beginning of 2018 than at the beginning of 2017.

### **Development in supply contracts**

Roll-out of smart meters to nearly all electricity customers and the use of hourly measured consumption data in balance settlement have made possible for electricity supplier to offer all customers dynamic electricity price contracts where electricity price reflects the price at the spot market. At the end of 2017, about 9 per cent of retail customers in Finland had such supply contract.

The most common type of supply contract is a fixed term contract which was chosen by about 46 per cent of retail customers in Finland. About 45 per cent of customers had an open-ended contract at the end of 2017.

### **Promotion of retail competition**

To promote retail competition the Energy Authority has maintained since 2006 a web-based price comparison tool to facilitate supplier switching and, in general, to increase customers' awareness on electricity prices. The price comparison tool is also developed to inform household consumers better about the origin of the electricity. All retail suppliers are obligated to maintain up-to-date information on their public electricity price offers on this tool. On average about 150,000-200,000 price comparisons with this tool has been made per month. Energy Authority has started a project to renew the price comparison tool to better fulfil customers' needs and new price comparison tool will be launched in 2018.

According to the Electricity Market Act, electricity transmission system operator Fingrid has a task to develop the exchange of information required for electricity trade and imbalance settlement. The Ministry of Economic Affairs and Employment assigned in April 2015 Fingrid to develop

and implement a centralised information exchange system for the electricity retail market, a datahub to Finland. The datahub has been planned to be in operation in April 2021.

### **Retail market integration**

Since 2005, Nordic energy regulators have been working to promote and facilitate a common end-user market for electricity in Finland, Denmark, Sweden and Norway. In October 2009, Nordic ministers for energy expressed their political support to the initiative to establish a common Nordic end user market. The Energy Authority has actively continued working towards that target.

NordREG, the cooperative organisation for Nordic regulatory authorities, has prepared several recommendations for the Nordic ministries to facilitate the establishment of a single Nordic electricity retail market. However, implementation of the recommendations in the various Nordic countries and the establishment of a common Nordic retail market are ultimately dependent on national political decision-making.

## **2.2.4 Infrastructure**

### **Development in transmission network investments**

In 2016, Finnish TSO Fingrid has developed 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.

In December 2016 Finnish and Swedish TSOs announced their agreement to build up a new AC-interconnector between the two countries by 2025.

### **Roll-out of smart meters**

By the end of 2017 more than 99 per cent of consumption places in Finland had already a smart meter. Metered hourly consumption data is used for the balance settlement, including also households, in Finland.

## **2.2.5 Security of Supply**

### **Development in competences of NRA for security of supply**

In 2017, there were no changes in competences of the Energy Authority for security of supply.

The Capacity Reserve Act came into effect in March 2011. The peak load reserve capacity will be used as a strategic reserve to ensure that the balance between supply and demand is achieved only if the balance will not be achieved in commercial market. According to Capacity Reserve Act the Energy Authority evaluates and decides the required size of peak load reserve capacity and arranges the tendering process in order to choose which power plants and consumption units capable for demand response would be accepted to the capacity reserve arrangement.

The current strategic reserve capacity period started in July 2017 and it will last until June 2020. The capacity procurement was made in the beginning of 2017 and 729 MW of strategic reserve was procured (power plants 707 MW and demand side flexibility 22 MW).

### **Development in generation investments**

The most significant generation investment project in Finland is the construction of nuclear power plant unit Olkiluoto 3. The completion of the building of this 1,600 MW unit has been delayed for several years. Originally, the new unit should have been commissioned by the end of 2009. According to the latest estimates, it will be in operation in September 2019.

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 and is waiting for a construction license, which is expected to be granted in 2019. The unit will be 1,200 MW and it is planned to be in operation in 2024.

Metsä Group`s new pulp mill started its operation in 2017. The power production capacity is 260 MW and the total net capacity is around 160 MW.

In 2017, a total of almost 400 MW capacity of wind power was commissioned. Grid connected solar power capacity more than doubled during 2017 and total solar power capacity was in the end of 2017 about 66 MW.

Some replacement investments in power generation were made during 2017 but there was no significant change in total capacity (except wind power). Most of the condensing power plants are already closed in Finland and currently many CHP producers are considering whether they should invest for CHP or just heating capacity in the future.

Capacity adequacy is a challenge in Finland and it will be a challenge also in the future. Controllable generation capacity has been decreasing and at the same time intermittent renewable capacity is increasing.

### **Development in supply and demand balance**

The Energy Authority has estimated, that Finnish electricity generation capacity will not be able to cover demand during peak load situations. The resulting capacity deficit must be covered by importing electricity from other countries.

Based on reports submitted by power plant operators to the Energy Authority, total installed power generation capacity in Finland was about 17,400 MW at the end of 2017. However, the entire capacity is not available during the peak load periods. The Energy Authority has estimated in autumn 2017, that a total of 12,000 MW of Finnish electricity generation capacity was available for the consumption peaks in winter 2017–2018.

The highest hourly load, 14,273 MWh/h was reached in January 2017. It was highly affected by outside temperature and length of cold spell. The Energy Authority has estimated that the capacity requirement covered by electricity imports was around 3,400 MW at its highest peaks during the winter of 2016–2017, and around 3,200 MW during the winter of 2017–2018.

The electricity import capacity is around 5,200 MW. During January 2017 also a new record of actual imports was made: net import was 4,309 MWh/h and during same hour production in Finland was 9,963 MWh/h.

## **2.2.6 Regulation**

### **Network regulation**

In the field of electricity, the Energy Authority is responsible for regulating 77 distribution network operators, 12 regional high-voltage distribution network operators and one transmission system operator.

Since the end of 2004, Finland has applied the ex-ante regulation of network pricing as required by the current Electricity Directive. 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.

## 2.3 Gas market

### 2.3.1 Unbundling

In 2017, there were no changes in the unbundling regime of natural gas operations. Finland has availed itself of the possibility of an exemption allowed by the Natural Gas Market Directives and thus there is neither legal nor operational unbundling of natural gas transmission network operation. However, according to the new Natural Gas Market Act Finland will end-up derogation in the beginning of 2020 when gas markets in Finland will be opened for competition.

The gas transmission system operator, Gasum Oy is fully state-owned, vertically integrated company which is also the only importer and wholesale supplier of gas in Finland. Furthermore, has been downward vertically integrated into retail supply. In spring 2017, Gasum Oy sold their retail supply business to another company. Furthermore, as a part of new Gas Market Act the gas transmission system operator shall be unbundled by using so-called TSO-model by the beginning 2020.

Approximately 80 per cent of the Finnish gas DSOs are wholly or mainly owned by municipalities. The rest 20 per cent of the DSOs are owned by industrial users of natural gas or by private investors.

### 2.3.2 Wholesale market

#### Development in market integration

The natural gas market in Finland is relatively isolated and small. Finland has natural gas pipeline connection only to the Russian Federation. There is only one importer and wholesale supplier – Gasum Oy – which also owns and operates the natural gas transmission network.

In October 2016 Finnish Baltic Connector Oy and Estonian Elering AS made decisions to build up the Balticconnector gas pipeline between Finland and Estonia by the end of 2019. The new pipeline would allow development of a regional gas market in Finland and Baltic states and further market integration towards Europe.

#### Development in gas markets

In 2017, the consumption of natural gas in Finland continued to decrease. The reduction in demand was about 6.3 per cent year-on-year. A total of 22.4 TWh of natural gas was consumed in 2017. The consumption of natural gas decreased because of gas price compared to other fuels, low price levels in the electricity market and low coal prices.

At present, natural gas is imported into Finland only from Russia. In addition to the natural gas imported from Russia, biogas produced in Finland is supplied to the natural gas transmission network.

Large end-users account about 92 per cent of the natural gas consumption in Finland. Energy and power companies used about 34 per cent of gas in CHP, district heat and power production. Large industrial end-users consumed about 58 per cent of total gas consumption in Finland. The key industrial sectors were forest and chemical industries whose consumption corresponded to 56 per cent of Finland's total gas consumption. Natural gas accounts for around 5 per cent of Finland's total energy consumption. In 2017, there were no significant changes in the number of market actors.

#### Development in natural gas prices

The wholesale supply of natural gas to the large Finnish end-users and retailers is based on cost based contracts between Gasum Oy and the customers. Customers buy natural gas from Gasum Oy based on a public tariff.

The total wholesale price of natural gas, including transmission and natural gas energy, increased by an average of 18 per cent during the course of 2017.

The price for natural gas energy excluding taxes increased by 9 per cent between January 2017 and January 2018. The price of natural gas energy is index-linked to the price of heavy fuel oil and the price of imported coal, as well as to the domestic energy index. Of these price factors, the price of heavy fuel oil rose by 17 per cent, the price of coal increased by 7 per cent and the energy price index decreased by 0.2 per cent in between January 2017 and January 2018.

Natural gas transmission price declined 5 per cent in 2017.

On natural gas market in Finland, only natural gas users with a consumption of more than 5 million cubic meters and with remote metering can trade in the secondary market with the gas that they have acquired for their own use or retail. Additionally, Gasum Oy offers short term products that are sold on the secondary market operated by Kaasupörssi Oy, which is a subsidiary of Gasum Oy. Total trading amounted to 777 GWh or 43 per cent less than during the previous year. Secondary market trading of these were 368 GWh or 1.7 per cent of the total Finnish consumption of natural gas in 2017. Retail market

### **Development in market concentration**

In 2017, there were no major changes in the retail market structure.

The retail supply of natural gas covers only about 8 per cent of the total consumption. In Finland, there are only about 23,200 customers in the natural gas market. The largest customer segment, (about 16,400 customers) consists of households who buy natural gas for cooking. However, the total natural gas consumption of this segment amounts to only 0,3 mcm (0.015 per cent of total consumption). At the end of 2017 there were 24 natural gas DSOs. All of them are active also in retail supply. Many of the natural gas retailers in Finland are relatively small having only dozens of customers. The share of the top three retail suppliers is about 50 per cent of the total natural gas consumption in the retail level.

### **Development in supplier switching**

As supplier switching in the Finnish natural gas retail market is not possible, all suppliers are in a monopoly situation within their network area.

## **2.3.3 Infrastructure**

In October 2016, Finnish Baltic Connector Oy and Estonian Elering AS made decisions to build up the Balticconnector gas pipeline between Finland and Estonia by the end of 2019.

In September 2016, the first off-grid LNG terminal in Finland was taken into operation. There are also ongoing projects to construct other two small-scale LNG terminals on the coast of Finland. One of them will be connected in the distribution network and the other will be an off-grid terminal. All these LNG-terminals will serve mainly local industrial users, maritime of use LNG and LNG trucks.

## **2.3.4 Security of Supply**

Natural gas used in Finland is imported from Russia. There is no natural gas production in Finland.

Small-scale biogas is produced and pumped to the gas transmission network in two different locations. Production capacity of biogas was approximately 154 GWh/a in the end of 2017 (not all connected to grid).

In addition, propane can be produced indigenously as it is the only gas to be stocked in small amounts by Gasum Oy for immediate substitute for the possible lack of natural gas.

The importing capacity of Gasum Oy is estimated to be about 9,000 MW. Peak load was 6,400 MWh/h in 2017. Peak load was lower than previous year due to relatively warm winter in 2017. There were no new transmission lines built during the 2017. The capacity of Balticconnector -pipeline between Finland and Estonia will be about 3,000 MWh/h.

## **2.3.5 Regulation**

### **Network regulation**

In the natural gas sector, there are 24 local distribution network operators and one transmission system operator. The Balticconnector pipeline connection to Estonia is developed by a project company Balticconnector Oy. The Energy Authority is responsible for regulating natural gas distribution network operators and natural gas transmission network operator. Additionally, the Energy Authority is supervising the wholesale and retail supply activities of the operators as Finnish gas markets are not opened for competition.

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

### **Supervision of natural gas prices**

As there is no gas-to-gas competition in the Finnish gas markets, all natural gas suppliers have an obligation to supply. Supplier set their prices by themselves without any ex-ante approval by the regulator nor any other authority. However, based on the legislation, supply tariffs under obligation to supply should be reasonable.

In 2016, Energy Authority did not make any decisions on reasonableness of natural gas supply prices.

## **2.4 Consumer protection and dispute settlement**

In 2017, the Energy Authority received 90 new requests for investigation or other written inquiries from customers related to electricity system operators and retailers. In addition to these, Energy Authority opened five new investigations concerning electricity system operators and retailers from its own initiative. In 2017 Energy Authority made decisions or ended the investigation in 87 cases. Some of these cases were already received in previous years.

With regard to the natural gas markets, the Energy Authority received not requests for investigation and made no decisions during 2017.

The statistics do not include the phone calls or other written inquiries, which were not registered to the Energy Authority's document management system.

The requests of investigation and other inquiries submitted fell into the following categories: connection charges, the network tariffs, quality of supply, metering, inconsistencies in invoicing and general complaints regarding practices of the supplier. In 2017, the number of requests for investigation or other written inquiries fell slightly but remained at a relatively high level, partly due to increases in network tariffs put into effect by some electricity system operators in the previous year.



## 3 Electricity market

### 3.1 Network regulation

#### 3.1.1 Unbundling

##### TSO unbundling and certification

Finland has chosen so-called TSO-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 9 of the Electricity Directive. According to the national legislation, transmission system operator shall own transmission network it operates.

Transmission system operator, Fingrid Oyj was established in November 1996 by joining two previously existing transmission network operators. It started its operations in September 1997. Fingrid owns the Finnish main grid and all significant cross-border connections.

In July of 2018, 53.14 per cent of Fingrid's shares were owned by the State of Finland and the National Emergency Supply Agency. Rest of shares were owned by Finnish financial and insurance institutions.

The Energy Authority gave the final decision on the certification of Fingrid in March 2014 after receiving the opinion on the preliminary decision from the European Commission in January 2014. The certification decision was conditional as the Energy Authority required that by the end of 2016 one minor owner of Fingrid should have given up his rights in Fingrid's decision making.

In January 2015, the Energy Authority granted a new network license to Fingrid and nominated it as a system responsible transmission network operator in Finland in line with the Electricity Market Act.

##### Development in DSO unbundling

According to the Electricity Market Act, 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.

Totally, 36 distribution system operators of 77 were at the end of 2017 over the threshold value. Some distribution system operators under this threshold value have voluntarily legally unbundled network activities from electricity supply and generation activities. At the end of 2017, 48 distribution system operators were legally unbundled.

The legally unbundled distribution system operators are not required to be structured in any special legal form. The only limitation is that the separated companies cannot both be public utilities because then these companies would be part of the same legal entity.

Many of the distribution system operators have been either municipal utilities or companies in which the majority of the shares are owned by municipalities. There are no requirements for ownership unbundling of the DSOs. Most of the legally unbundled distribution system operators still belong to same group of companies as electricity retailers and/or generators. In many cases the parent company of a legally unbundled distribution system operator is a generating or retailing company. On the other hand, some electricity retailers are owned by a group of distribution system operators. In most cases the legally unbundled distribution system operators belonging to a group of companies have shared services with the company group. These most often include brick and mortar offices, managerial, and financial responsibilities. There are also available independent service providers for the construction and maintenance of the network.

Some electricity system operators have outsourced part of their operational tasks to these service providers.

Majority of the electricity system operators have the economic ownership of the assets. However, there are some electricity system operators who are operating with leased out network assets and thus they don't have the economic ownership of their network assets. In addition to these there are some other DSOs whose network assets are partially leased, like some substations. Regardless of whether the electricity system operator has or doesn't have the economic ownership of the assets, it needs to fulfil the technical, economic and organisational preconditions for the electricity system license:

- The organisation of the applicant corresponds to the scope and nature of its system operations;
- The applicant has a sufficient staff in its service;
- The applicant has in its service an operating manager and, if the applicant carries out electrical works, a manager of electrical works, that meets the eligibility requirements laid down in or by virtue of the Electrical Safety Act (410/1996);
- The applicant has the economic conditions for profitable electricity system operations;
- The applicant has the right to decide on the resources needed for the operation, up-keep and development of an electricity system; and
- The grid operator to be placed under the systems responsibility has delegated the functions related to the national balance responsibility to its separate operational entity or a subsidiary wholly owned by it.
- The applicant has unbundled electricity distribution network operations from other operations or electricity transmission operations.

The fifth point is comparable to the Article 26(2)(c) in the Directive 2009/72/EC. The corresponding principle has been de facto applied in Finland established practise of granting an electricity system license since year 1995. Besides these requirements, any additional rules that would provide the electricity system operators with more financial independence are not required. There isn't for example any formal restriction preventing that cash flow (e.g. in the form of dividends or transactions) of electricity distribution system operator can be used by the holdings. The functional unbundling requirements are applied to legally unbundled distribution system operators with some limitations, with the exception of the requirement in the article 26(2)(c), which is applied to all distribution system operators.

The functional unbundling requirements are applied only to legally unbundled distribution system operators because the requirements are related to the legal organs of the company (the board of directors and the managing director) and are not therefore applicable to vertically integrated company. In practice, the distribution system operators need to be first legally unbundled before the functional unbundling requirements are applicable.

The requirement for separate management for the electricity network company is applied to legally unbundled system operators with 50,000 customers or more. At the end of 2017 it covered 20 distribution system operators in Finland. According to Electricity Market Act, a person managing a network operator engaged in a legally unbundled electricity network operation with 50,000 customers or more may not act as the managing director of a utility in charge of electricity generation or electricity supply or as a member of its board of directors or a corresponding organ, if the network operator and the utility are under the control of the same party. The threshold of 50,000 customers is lower than the directive requires.

The requirements for professional interests and compliance programs are also applied to legally unbundled electricity system operators with 50,000 customers or more. The ministerial degree, which sets the detailed content of the requirements, was updated in fall 2013. The Energy Authority has prepared and published a recommendation for compliance program.



The accounting unbundling requirement is applied to the electricity system operators, which are not required to be legally unbundled. The accounting unbundling is also required in the legally unbundled companies, which have other activities besides 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 EUR 500,000 and the share is less than 10 per cent of the company's total revenue. Accounting unbundling requirements are specified with the ministerial decree. The Energy Authority has issued guidelines on the compilation of unbundled financial statements. These guidelines are not legally binding but they show the procedure the Energy Authority considers fulfilling the requirements of the legislation.

Both the distribution system operators and the transmission system operator are under the obligation to publish unbundled financial statements with certain formula as a part of the statutory financial statement, annual report or corresponding other public document available to the stakeholders.

The unbundled income statements, balance sheets and any supplementary information of unbundled operations are audited as part of the statutory auditing. The Energy Authority has issued the guidelines in co-operation with chartered accountant on the auditing of unbundled financial statements. These non-binding guidelines aim to help the audit of unbundled financial statements in different electricity system operators and inform the auditors about the unbundling requirements.

Even if there are legally unbundled distribution system operators, many of them still have the same corporate presentation with the electricity supply and generation activities. Obligations regarding communication and branding of the DSOs were implemented in the Finnish regulation in fall 2013. The Electricity Market Act sets obligations to legally unbundled electricity system operators to ensure that its brand separates from those in the same group of companies as electricity retailers and/or generators and that it appears in communication with its own identity.

### **3.1.2 Technical functioning**

#### **Balancing services**

The Nordic countries have established common regulation power market in the year 2002 to handle balancing. Imbalances are handled and settled according to common rules defined in System Operation Agreement between the Nordic TSOs. Balancing is managed within the Nordic control areas as one system consisting of all four Nordic TSOs. The balance management is based on frequency requirements agreed on the System Operation Agreement. However, imbalances within a country are settled according to principles that vary from one country to another.

Figure 1 presents the balance management in the context of the Nordic electricity market model. Besides the regulation power market for actions during the specific operating hour, Elbas-market can be used for the intra-day trading and revisions of nominations after the day-ahead spot market (EISpot) has closed.

Physical market Power transactions		Specific operating hour	Balance settlement
<b>ELSPOT</b>	<b>ELBAS</b>	<b>Regulation power market</b>	<b>Balance energy</b>
12 - 36 h	1 - 32 h		max 3 months
Bilateral transactions		Balance management	Power balances of the parties

Fixed transactions must be agreed and reported before the specific operating hour

Figure 1 Balance management in the Nordic electricity market model (Source: Fingrid Oyj).

In the Nordic regulation power market, all bids are collected in the joint Nordic merit order list and according to this list the production increases and decreases are carried out where they are most advantageous in the price order, however, taking into account congestions between control areas. This leads to the effective utilisation of the Nordic balancing resources.

The balance between production and consumption within a specific operating hour is created through the regulation market by the upward and downward regulation of production and consumption to handle physical imbalances taking into account the effects on congestions.

The price of the regulation power during the specified operating hour (the imbalance settlement period in Finland is 60 minutes) is determined based on ordered up- or down-regulations. This implies that the price of the regulating power is known only after the end of the specific operating hour. It has been agreed, that the price of up-regulation is the most expensive up-regulation bid ordered by the TSO during the specific operating hour. All those who have participated in the up-regulation during the specific operating hour receive the same compensation per MWh. Respectively the price of down-regulation is the cheapest down-regulation bid ordered by the TSO during the specific operating hour. All those who have participated in the down-regulation during the specific operating hour receive the same compensation per MWh.

The TSO provides information on forecasts and values for the reserves before, during and after the operating hour and also regulation prices after the operating hour. Most of this information is given only to the market participants and to Nord Pool. Publicly available information can be found on Fingrid's website [www.fingrid.fi](http://www.fingrid.fi) and Nord Pool's website [www.nordpoolspot.com](http://www.nordpoolspot.com).

The Finnish, Norwegian and Swedish TSOs decided in 2012 to implement a harmonised Nordic Balance Settlement model at TSO level. The implementation includes harmonising and integration of national grid and bidding area level balance settlement. A common operational unit, eSett Oy responsible for imbalance settlement and invoicing of the Balance Responsible Parties in Finland, Sweden and Norway is jointly owned by the Finnish, Norwegian and Swedish TSOs. The project's goals have been firstly to provide similar operating conditions to all balance responsible parties despite the area and country, secondly to offer balance settlement in similar principles to all market participants through one unit and thirdly to create common rules and standards for data exchange in cooperation with other actors in the electricity market. The go-live for the common Nordic Balance Settlement was on May 1, 2017.

## Quality of service and supply

According to the Finnish legislation, the electricity system operators have various obligations:

- obligation to develop the electricity network;
- obligation to connect; and
- obligation to transmit electricity

Since September 2013, the legislation has also included obligations for DSOs to plan and develop their network with aim to restrict storm related interruptions to 36 hours in rural areas and 6 to hours in urban areas gradually by the end of 2028. 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.

In addition to this, also the regulation model provides incentives system operators to improve the quality of electricity in two ways: by taking into account network investments in the regulated asset base and by treating the losses caused to customers by interruptions as items comparable with costs.

The Energy Authority has not set specific targets for electricity quality improvement. The outturns required from system operators must be equal to the average outturns of previous years. However, the regulation model provides incentives to system operators to improve the quality of electricity supply, because by having fewer and shorter interruptions compared to average level of previous years the system operator will have also higher rate of return. Similarly, electricity quality impairment lowers the permitted rate of return for the system operator.

**Virhe. Viitteen lähde ei löytnyt.** shows interruptions in transmission and distribution networks during the years 2007-2017. The numbers include both planned and unplanned interruptions. In Finland, storms and other circumstances caused by weather or animals have a remarkable influence on interruptions because about 73 per cent of MV distribution network are overhead lines. Thus, annual variations in interruption times may be significant.

**Table 1. Interruptions in transmission and distribution networks in 2007-2017.**

	Interruptions minutes lost per customer per year										
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Transmission	1.5	1.6	2.7	5.0	6.9	1.3	2.3	8.3	2.0	1.4	2.1
Distribution	85	89	62	143	343	94	186	80	170	81	70

The Electricity Market Act states, that the DSOs shall pay standard compensations to the customers if the interruption time is 12 hours or more. If the interruption time is at least 12 hours, the standard compensation is 10 per cent of the customer's annual network access charges. The compensation increases stepwise with the interruption time. The maximum compensation is 200 per cent of the annual network charges when the interruption time has exceeded 12 days. Maximum compensation per incident rose to EUR 2,000 on January 1, 2018.

In 2017, due to interruptions of 12 hours or more electricity distribution system operators have paid as standard compensations total amount of EUR 4,9 million (2016: 7.36 million) to about 36 800 customers (2016: 105,000 customers).

## Monitoring time to connect

The Energy Authority has not collected statistics on actual time to connect consumers and producers. Actual connection date and time is agreed between network system operator and customer when they are making the connection agreement.

If the connection of consumer to the network is delayed from the agreed connection date and time, customer has right to abstain from paying connection charge until the connection has been done. Furthermore, if the connection has been delayed from the agreed the customer his right to receive a standard compensation which is 5 per cent of the connection charge during the first two weeks and after that 10 per cent per week. Maximum amount of standard compensation is 30 per cent of the connection charge and EUR 3,000.

The Energy Authority has not collected information in how many cases and how much network system operators have paid standard compensation due to delays in connecting customers.

### **Monitoring safeguard measures**

In 2016 there has not been any incidents in Finland, which would have required to implement safeguard measures as defined in Article 42.

### **RES regulatory framework**

In Finland, there are no priority for RES connections. However, the regulation states, that connection charges for small-scale electricity generation (production capacity up to 2 MVA) may not include costs related to reinforcements of existing network. Furthermore, the regulation requires, that network charges for input of electricity production to distribution networks shall be based on amount of energy and may not exceed on annual average 0,07 cent/kWh (excluding taxes). These requirements are not restricted to RES power generation.

RES does not have priority access according to the Finnish electricity market legislation. In Finland RES producers like any other electricity market actors are also responsible for their power balance.

In Finland, RES support in form of a feed-in tariff is available for wind power plants, biogas power plants (gas produced by digestion), wood-fuelled power plants which also produce heat for utilization and timber chip power plants. The feed-in tariff for wind, biogas and wood fuel power plants comprises the target price less the three-month average price of electricity in day-ahead market in the Finnish bidding zone. The target price is EUR 83.50/MWh. The feed-in tariff payable to timber chip power plants is determined according to the three-month average price of emission rights and the energy tax on peat.

The feed-in tariff paid in Finland comprises a state subsidy granted by the Energy Authority. Electricity producers that receive the feed-in tariff are responsible for selling to the market electricity they produce and any arising net energy costs. The feed-in tariff is applied for from the Energy Authority in three-month periods in arrears.

The regulation has set a quota of 2,500 MVA for maximum total amount of wind power capacity that could be approved to the feed-in tariff system. Amount of wind power capacity in applications sent to the Energy Authority has already exceeded this amount.

In November 2017, the Finnish Government gave to the Parliament a proposal for amending Act on Production Subsidy for Electricity Produced from Renewable Energy Sources. The amended act was approved by the Parliament in May 2018.

## **3.1.3 Network tariffs for connection and access**

### **Regulation of network tariffs for connection and access**

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. 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. The process is in line with the Article 37(10).

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

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

The network will be included into the regulated asset base in the net present value instead of book value. Ever since the first regulatory period, the Energy Authority has encouraged system operators to make investments in the electricity network. In the regulation model, all investments in the network will annually be taken into account in the regulated asset base, which is used to determine the reasonable rate of return. Thus, the methodology provides incentives to transmission and distribution system operators to develop and to make necessary investments into their network in order to ensure viability of the networks as required by the Article 37(6)(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 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 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 as required by the Article 37(6)(a).

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 fixed in January 2011 by its decisions the methodology for pricing of grid connections in distribution networks.

### **3.1.4 Cross-border issues**

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

Congestions across the borders between Finland and Sweden, Finland and Norway and Finland and Estonia are managed by implicit auctions in the day-ahead market. Implicit auctions imply that market-based methods are applied in capacity allocation, and thus congestion management is wholly integrated to the functioning of wholesale market. In the implicit auction the energy and transmission capacity between various bidding areas is allocated in a single process to the parties of electricity trading.

Capacity which may not have been used on the Elspot day-ahead market is offered to the Elbas intraday market, where trading finishes no later than one hour before the hour of operation. However, Nord Pool AS started in autumn 2016 a pilot for reduced intraday gate closure time. In the pilot, market participants may trade in Elbas intraday market in Finland, Estonia and Latvia until 30 minutes before the hour of operation. The 30-minute intraday gate closure will be continued as an interim solution until the XBID trading solution, and possible other related changes, take effect.

The day-ahead interconnector capacities for the next day are announced before noon and the intraday capacities in the afternoon. Finland is considered as a single bidding zone and congestions within Finland and after day-ahead market closure are managed by counter-trade.

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 prices differences between area prices and the Nordic system price market actors may use EPADs (Electricity Price Area Differentials).

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 current electricity forward market provides 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.

Fingrid makes 1,300 MW of transmission capacity from Russia available to the electricity market on its 400 kV connections from Russia. Fingrid has reserved a volume of 100 MW to be used as a power system reserve. Electricity can be imported from Russia by customers, who have made an agreement on a fixed transmission right with Fingrid and an agreement on energy purchases with a Russian organisation responsible for electricity sales.

In August 2011, a new trading scheme, so-called direct exchange trade, was adopted in electricity trade from Russia to Finland. Direct exchange trade is a first step towards more market-focused procedures in electricity trade between Russia and Finland and at the same time between Russia and the EU. In this model an electricity market player engaged in direct exchange trade buys electricity in the electricity exchange in Russia and sells it directly to the day-ahead market in Nord Pool. The player can also trade in the secondary market the offered electricity not sold in the day-ahead market, in other words in Nord Pool's or the Russian intra-day market. So far, the volume of direct trading is limited to 140 MW, while in conventional bilateral trade is 1,160 MW. The maximum trade capacity from Finland to Russia is 320 MW.

In implicit auctions (market splitting) price areas exist, when there is not enough capacity between these areas and the price of electricity will vary between these areas depending on the amount of congestions. When no congestions exist, prices are equal within the price areas.

In 2017, about 73 per cent (in 2015 66 per cent) of the time Finland and Northern- and Central-Sweden (SE1-SE3) belonged to the same price area. Finland had the same price with Estonia 99 per cent (in 2016 90 per cent) of time in 2017.

Figure 2 presents the percentage of hours during the year 2017 when same day-ahead area price existed. In this picture the price areas are grouped for clarity.

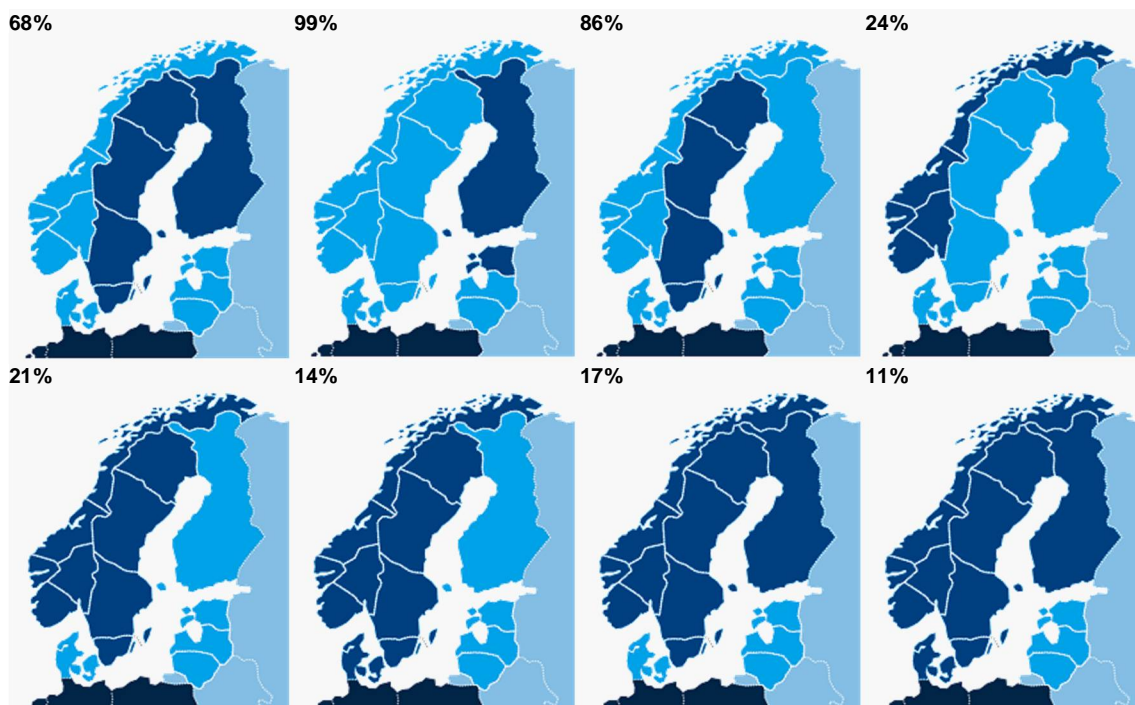


Figure 2. Percentage of hours during which different price areas groups have had equal prices in 2017

Counter trade is used to relieve both national and inter-regional congestions during the daily network operation. Costs of counter trade are paid by the TSO. Table 2 shows the costs of the counter trade paid by Fingrid during the years 2007 - 2016.

Table 2. Net costs of counter trade in Finland during the years 2007 - 2016 in million Euros.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Costs, MEUR	0.244	0.127	0.085	0.2	1.6	4.7	0.88	10.1	3.8	3.9

Source: Fingrid Oyj.

Congestion management method applied to allocate all interconnector capacity in Nordic market, i.e. implicit auction, fulfils the requirements set in the congestion management guidelines. Remaining transmission capacity after day-ahead allocation is set for intra-day market and cross-border balancing. Nordic TSOs publish information either on their own website (e.g. [www.fingrid.fi](http://www.fingrid.fi)) or Nord Pool's website ([www.nordpoolspot.com](http://www.nordpoolspot.com)).

During the year 2017 congestion management income for the Finnish TSO totalled EUR 26 million EUR (EUR 39.9 million in 2016). Fingrid uses congestion income to investments that aim to relieve the congestions.

### **TSO investment plans**

Fingrid has published the latest national ten-year network investment plan in summer 2017. The Energy Authority made by September 2017 an assessment that the plan is in line with the community-wide TYNDP from 2016 and the regional investment plan made for Baltic Sea Region. Fingrid will publish the next national ten-year network investment plan in autumn 2019.

### 3.1.5 Compliance

According to the Finnish legislation, the Energy Authority shall supervise that the provisions of the Electricity Market Act and any rules and regulations issued under it, as well as Regulation 714/2009 are complied with. However, the construction of cross-border interconnectors and the import and export of electricity are supervised by the Ministry of Employment and the Economy.

In 2017 there were no such cases where the Energy Authority should follow the binding decisions of the Agency or the Commission according to the Article 37(1)(d) or guidelines according to the Article 39.

As the Finnish transmission system operator, Fingrid is ownership unbundled from other operations provisions in Article 37(3)(a)(b)(e) and Article 37(5) are not relevant for Finland.

The Energy Authority ensures compliance of electricity transmission and distribution system operators with their obligations under the Directive and other relevant Community legislation as required in Article 37(1)(b) by using mainly ex-post supervision. Investigation may start based on a request from any market actor or on the Energy Authority's own initiative. In 2016 any such investigation cases were not started.

Since September 2013 the Energy Authority has also had right to propose to the Market Court to impose administrative fines to network system operators or other electricity market actors for the non-compliance with their obligations pursuant to the Electricity Market Act or the Regulation as required in the Article 37(4)(d).

## 3.2 Promoting Competition

### 3.2.1 Wholesale markets

Since September 2013 the Finnish legislation has included explicit provisions regarding monitoring the level of transparency, including of wholesale prices, and ensuring compliance of electricity undertakings with transparency obligations and monitoring the level and effectiveness of market opening and competition in line with Articles 37(i)-(k). The Energy Authority does also the market surveillance due to the REMIT regulation (1227/2011) and the Transparency Regulation (543/2013)

The development of shares of different generation forms, imports and exports can be seen in the following table.



Table 3. Electricity production by source and import from neighbouring countries in 2008 - 2017.

TWh		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>GROSS PRODUCTION</b>		77,1	71,6	80,4	73,5	70,3	71,2	68,1	68,6	68,7	67,5
	<i>Cons. in power plants</i>	2,9	2,9	3,4	3	2,6	2,9	2,6	2,5	2,6	2,5
<b>PRODUCTION</b>		74,2	68,7	77	70,6	67,7	68,3	65,5	66,1	66,1	65,0
	<i>Hydro power</i>	16,9	12,6	12,8	12,3	16,6	12,6	13,2	16,6	15,6	14,6
	<i>Wind power</i>	0,2	0,2	0,3	0,5	0,5	0,8	1,1	2,3	3,1	4,8
	<i>Nuclear power</i>	22	22,5	21,9	22,2	22,1	22,7	22,6	22,3	22,3	21,6
	<i>Conv. therm power</i>	34,9	33,3	42	35,4	28,6	32,2	28,5	24,9	25,2	24,0
	<i>Co-gen. CHP</i>	26,7	24,2	28,5	25,9	22,8	23,4	22,1	20,8	20,8	21,1
	<i>distr. heat</i>	15,5	14,8	17,4	14,9	13,5	13,7	12,9	12,1	11,8	12,0
	<i>industry</i>	11,2	9,4	11,1	10,9	9,3	9,7	9,3	8,7	9,0	9,1
	<i>Condensing etc.</i>	8,2	9,1	13,5	9,6	5,7	8,8	6,3	4,0	4,4	3,0
	<i>conv.</i>	8,2	9,1	13,5	9,6	5,7	8,8	6,3	4,0	4,4	3,0
	<i>GT etc.</i>	0	0	0	0	0	0	0	0	0	0
<b>IMPORTS</b>	<i>from</i>	16,1	15,5	15,7	17,7	19,1	17,6	21,6	21,5	22,4	22,6
	<i>Sweden</i>	2,8	1,9	2	5,1	14,2	12,4	18,1	17,4	15,7	15,6
	<i>Norway</i>	0,2	0,1	0,1	0,1	0,08	0,05	0,06	0,03	0,2	0,3
	<i>Russia</i>	10,9	11,7	11,6	10,8	4,4	4,7	3,4	3,9	5,9	5,8
	<i>Estonia</i>	2,3	1,8	2	1,7	0,4	0,5	0,03	0,1	0,7	0,9
<b>TOTAL SUPPLY</b>		90,2	84,2	92,7	88,8	86,8	85,9	87,1	87,6	88,5	87,6
<b>EXPORTS</b>	<i>to</i>	3,3	3,4	5,2	3,8	1,6	1,9	3,7	5,1	3,4	2,1
	<i>Sweden</i>	3,3	3,2	4,8	3,2	0,03	0,2	0	0	0,3	0,4
	<i>Norway</i>	0	0,1	0,2	0,1	0,09	0,1	0,1	0,06	0,0005	0
	<i>Russia</i>	0	0	0	0	0	0,03	0	0,02	0,05	0
	<i>Estonia</i>	0	0	0,2	0,5	1,5	1,5	3,5	5,0	3,0	1,7
<b>GROSS CONSUMPTION</b>		86,9	80,8	87,5	84,4	85,1	84,0	83,4	82,5	85,1	85,5
	<i>Incl. Electric boilers</i>	0,1	0,1	0,1	0						

Source: Adato Energia Oy, Energiateollisuus ry, Statistics Nordel, Fingrid Oyj

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

#### **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. Nord Pool AS provides power exchange services for the trading in day-ahead and intraday markets with delivery in Finland and Nasdaq OMX provides services for trading with financial products in an organised market place.

Energy Authority has designated in December 2015 Nord Pool AS to perform day-ahead and intraday coupling in Finland as a nominated electricity market operator (NEMO) in the line with Commission Regulation establishing a guideline on capacity allocation and congestion management (2015/1222).

January 2016, EPEX Spot SE announced 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. The Energy Authority approved in April 2017 multi-NEMO arrangements proposed by Fingrid. EPEX Spot SE has not yet started offering day-ahead or intraday trading services with delivery in Finland.

Since February 2014, the calculation of zonal electricity prices, generation, offtake volume and transfers between bidding zones has been performed on a European basis. The responsibility of performing the technical calculation is allocated for different European power exchanges on a rotating basis. Complementing the calculations, the power exchanges participating in this arrangement have agreed upon a back-up system, where the primary rotating responsibility to perform the calculation is backed up by secondary, likewise rotating responsibilities by a number of power exchanges to perform a secondary calculation, that could replace the primary calculation in case that could not be performed.

In 2017, the volume of electricity traded in Nord Pool AS in day-ahead market in Nordic and Baltic states amounted to 394 TWh.

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. From the early 5 per cent the share of electricity procured from the Nordic power exchange has increased to cover 71 per cent of the Finnish physical consumption in 2017.

#### **Prices**

The basis of the price formation in the Nordic power market is the 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, a bid for the following day has to 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 2017, the daily system market price at the Nord Pool Spot was 9 per cent higher than in 2016. The average system price in 2017 was EUR 29.41/MWh. The average Finnish area price in 2017 was EUR 33.19/MWh, showing an increase of 2 per cent year-on-year. In 2017, about 68 per cent of the time Finland and Sweden belonged to the same price area (65 per cent in 2016). Finland had the same price with Estonia 99 per cent of time in 2017 (91 per cent in 2016).

## **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 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 have to 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. In the Electricity Market Act it is stated that: "A power plant operator shall notify the electricity market 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 decree.

On the basis of the Electricity Market Act, the power plant operator is obliged to notify the Energy Authority of a planned maintenance outage of its power plant practising separate electricity generation, with an output of 100 MVA, which would take place between the 1<sup>st</sup> of December and the 28<sup>th</sup> 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 1<sup>st</sup> of December and the 28<sup>th</sup> of February.

### **3.2.2 Retail market**

Number of retail supplier has been stable. In 2017, there were 73 retail suppliers, of which 56 offered their products nationwide. 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.

In Finland 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 four electricity retailers have larger than five per cent share of retail market. The market share of the three largest companies in the retail market for small and medium-sized customers has been estimated to be 35-40 per cent. The Energy Authority has estimated that the Herfindahl-Hirschman index (HHI) to measure market concentration in retail market is round 500 – 700 showing competitive marketplace.

Number of new entrants and fully independent suppliers has increased gradually since 2010. At the end of 2017, there were 10 electricity retailers in the Finnish electricity retail market without obligation to supply. These retailers are also fully independent from the Finnish network companies. At the end 2017, these retailers had a roughly 10 per cent of retail customers in Finland.

**Table 4. The largest companies in the electricity retail market (market shares according to energy sold to end users connected to the distribution network).**

	No. of companies with >5% retail market	Number of fully <sup>2</sup> independent suppliers	Market share of three largest retail companies (%)		
			large and very large industrial	small-medium industrial and business	very small business and household
2010	4	< 5	N/A	35-40	
2011	4	5	N/A	35-40	
2012	4	6	N/A	35-40	
2013	4	6	N/A	35-40	
2014	4	6	N/A	35-40	
2015	4	8	N/A	35-40	
2016	4	9	N/A	35-40	
2017	4	10	N/A	35-40	

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

#### Prices

Electricity suppliers decide 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. However, according to the Electricity Market Act an electricity retailer in a dominant position within the area of responsibility of a distribution system operator shall deliver electricity at reasonable prices to consumers and other users of electricity whose place of use is equipped with main fuses of 3x63 amperes at maximum or whose site of electricity use receives annually no more than 100,000 kWh of electricity (obligation to deliver).

An electricity retailer in a dominant position shall have terms of retail sale and prices, and the criteria underlying these publicly available to the customers encompassed by the retailer's obligation to deliver. They shall not include any unreasonable conditions or limitations that would restrict competition within electricity trade. The Energy Authority may order the retailer referred to here to deliver electricity to the customers within the obligation to deliver.

The prices of electricity within the obligation to supply system do not have to be approved by the regulator before the supplier takes them into use. By virtue of the Electricity Market Act the Energy Authority may investigate either on the basis of a complaint or at its own initiative the pricing of electricity. In 2017 the Energy Authority did not make such investigations.

There are 63 electricity retailers having the obligation to supply within at least one distribution network area of responsibility.

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.

In line with the Articles 37(1)(i) and 37(1)(j) the price information is regularly analysed in order to aid market development and made publicly available in easily comparable form in the Energy Authority's price comparison web service ([www.sahkonhinta.fi](http://www.sahkonhinta.fi)).

<sup>2</sup> Fully independent supplier does not have an obligation to supply (not incumbent supplier).

In 2017, there were small decrease in retail prices. The average price of electricity in open-ended contract followed the normal seasonal variation ending up to slight decrease. The prices of fixed-term contracts for one year went up and down throughout the year and increased slightly at the end of the year.

The margins of spot bound, dynamically priced contracts remained almost unchanged and the increased wholesale prices weakened a bit their position as the cheapest alternative for consumers.

In 2017 the average price of electrical energy under obligation of supply including taxes for a residential customer with 5,000 kWh/a consumption decreased by 1.2 per cent. For small houses with electric heating (consumption 18,000 kWh/a) the decrease was 1.9 per cent.

The electricity distribution price including tax was 8.7 per cent more expensive for household consumers – for electrically heated households 6.3 per cent – at the beginning of 2018 than at the beginning of 2017.

In 2017, the electricity bill for apartment house households and households with electrical heating increased in total by 3.4 and 1.0 per cent respectively.

The estimated national average electricity prices during the second half of 2016 for three reference customer bands defined by Eurostat are shown in Table 5. Energy costs and supply margin for household customer at the table are based on public energy tariffs. Negotiated and actual energy prices might differ marginally from the ones presented here.

**Table 5. Electricity prices (cent/kWh) for reference customer bands during period 1.7-31.12.2017. <sup>3</sup>**

cent/kWh	Band Dc	Band Ib	Band Ie
Network charges (excl. levies)	5.64	3.59	0.70
Levies included in network charges	-	-	-
Energy costs and supply margin	4.85	4.12	3.77
Non-recoverable taxes*	5.31	0.70	0.70
Total	15.81	8.41	5.17

\*For household reference customer non-recoverable taxes include electricity tax and VAT, for industrial reference customers include electricity tax only

### **Monitoring market opening and competition**

The Energy Authority monitors that all necessary information is available to all retail market participants and overlooks that suppliers follow the transparency requirements set by the Electricity Market Act. Monitored parameters include price level and spread and switching rates. In addition to this, in 2016 Energy Authority has started to collect information on how many customers have chosen different type of supply contract (e.g. open-ended contract, fixed term contract or dynamically priced contract). The Energy Authority publishes statistics on electricity prices monthly and other information annually.

In line with the Articles 37(1)(k) and 37(1)(l) contractual issues are dealt with case-specifically in co-operation with the Finnish Competition and Consumer Authority and contractual freedom, compatible with Community law, is respected.

<sup>3</sup> Prices are based on the new methodology by Eurostat for collecting electricity prices from 2007 onwards. Prices are average of the 6 months. Definitions for reference customer bands are:

- Band Dc: household customers with annual consumption of 2 500-5 000 kWh/year,
- Band Ib: commercial customers with annual consumption of 20-500 MWh/year and
- Band Ie: commercial customers with annual consumption of 20-70 GWh/year.

Since 2007 the Energy Authority has collected information on supplier switching from the distribution system operators. In 2017, the estimated number of customers that switched their supplier was about 385,000. Table 6 shows the supplier switching rates in 2007 - 2017.

**Table 6. The share of customers who have changed the supplier in 2007 - 2017.**

	Households and other permanent dwellings		Other customers		Total
	< 10000 kWh/a	>10000 kWh/a	Max 3x63 A	>3x63 A	
2007	3.0 %	6.8 %	3.3 %	8.0 %	4.0 %
2008	3.4 %	5.6 %	2.8 %	6.2 %	4.4 %
2009	7.2 %	10.9 %	5.1 %	11.6 %	8.1 %
2010	8.0 %	10.5 %	4.8 %	12.6 %	7.6 %
2011	7.0 %	11.7 %	4.7 %	14.1 %	7,6 %
2012	6.6 %	9.6 %	4.1 %	13.0 %	7.6 %
2013	10.2 %	12.7 %	3.1 %	18.0 %	10.1 %
2014	11.8 %	11.2 %	2.4 %	12.9 %	9.8 %
2015	12.5 %	13.1 %	5.8 %	16.1 %	11.4 %
2016 <sup>4</sup>	12.2 %		9.9 %		11.9 %
2017	12.5 %		6.1 %		11.0 %

Since 2016, the Energy Authority has started to collect annually data on the shares of different types of customer contracts. An open-ended contract is a contract that may be terminated with two weeks' notice. At the end of 2017, about 45 per cent of retail customers had a such supply contract.

There are also fixed-term contracts with the most common duration being one or two years. If a fixed-term supply contract has been concluded outside the obligation to supply with a consumer for a period longer than two years, the consumer may terminate the contract after the period of two years in the same way as he may terminate a contract that is valid indefinitely. At the end of 2017 about 46 per cent of retail customers in Finland had a fixed-term supply contract.

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 2017, about 9 per cent of retail customers in Finland had a dynamic electricity price supply contract.

Nationally, the legal provisions on information exchange between the parties are set forth in the Decree, issued by the Ministry of Employment and the Economy in December 2008. It is supplemented by the branch organisation's recommendations. These rules set the framework for the information exchange during the supplier switching: what kind of information and in which timetable the new supplier and the DSO have to send to the other market actors and also what are the conditions for the present supplier to reject the supplier switching process. Market actors shall ensure before taking into use that their information exchange systems can send and receive standard protocol messages.

New supplier shall notify the network operator about the new contract. This notification shall be done at the earliest three months and at the latest 14 days before the contract enters force. If

<sup>4</sup> Since 2016 grouping used in data collection has been changed. Data has been divided into two customer groups: household customers and other customers.

metering changes are needed in the consumption site, a notification shall be available to a network operator at the latest 21 days before. However, the Energy Authority has not collected statistical information on actual time delays for switching.

In autumn 2016 an amendment into Government decree came into force. The new amendment was made to clarify the supplier switching process during so-called misselling situation when customer argues that he has not made a new supply contract with a supplier. In such a situation, the customer should provide to DSO a written notification that he has denied the new supply contract to new supplier. Based on this notification the DSO shall stop the supplier switching process.

### **3.2.2.2 Investigations and measures to promote effective competition**

The Energy Authority publishes monthly statistics on retail and network prices to promote and facilitate competition and public market analysis. In addition, all relevant information on supply prices is provided to the Finnish Competition and Consumer Authority where necessary.

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.

In 2017 the Energy Authority gave three decisions regarding the customers' right to receive their electricity invoices free of charge. In two of the cases the issue arose from a discount granted to customers who choose an invoicing method other than paper invoicing. The Energy Authority stated in its decisions that such discounts are in conflict with the Electricity Market Act as they result in the same outcome as charging an extra fee from customers who choose paper invoicing. One of these decisions was contested by the addressee and proceedings were started in the Market Court regarding the right to give discounts to customers choosing certain billing methods. In April 2018, the case was referred to the Court of Justice of the European Union for preliminary ruling.

Another issue that has been the subject of recent Energy Authority decisions concerns the information given by retail suppliers to customers before a contract for the supply of electricity is formed between the two. The distinction between products for which the price formation mechanism is bound to market prices, i.e. it results from a reference value beyond the influence of the parties, and products which loosely follow market prices but for which the price is ultimately set by the retailer has been muddled by retail market participants. On two occasions in 2017 the Energy Authority gave a decision concerning a product that was presented as a "market price product" and the impression was given by the supplier that the price is bound to the prices of products in the electricity wholesale market, whereas in reality the supplier applied a variable margin subject to arbitrary changes and did not indicate what the reference value used to form the price is or there was no real reference value at all.

The Energy Authority has in its decisions referred to the requirements set by the Electricity Market Act on the information to be given to the customer before a contract for the supply of electricity can be concluded. Concerning the situation presented above, the terms of the contract and the price formation mechanism must be clear and unequivocal in order to satisfy the requirements of the Act. The customer must have the possibility to calculate the cost of their electricity based on the information retailers are obliged to disclose.

The practice of offering these pseudo-market-based products has led to further investigations regarding the failure to comply with the prescribed notification period for changes in the prices of retail electricity products. Where the price formation is not a truly market-based process, i.e. the supplier may change some or all price components, the change in price must be directly communicated to customers a full calendar month before the changes are put into force. In its decisions the Energy Authority stated that suppliers have failed to comply with the notification period where they have e.g. released the new price on their website just 14 days before the new price enters into force.



The Energy Authority has the right to cooperate with the Finnish Competition and Consumer Authority, the Financial Supervisory Authority, national regulatory authorities from other EEA countries, the Agency and the European Commission. According to Section 10 of the Administrative Procedure Act of Finland (434/2003) an authority shall provide the requested assistance, within its competence and as required by the nature of the matter, to another authority for taking care of an administrative matter; it should also otherwise promote inter-authority co-operation.

To promote effective competition in the electricity retail market, the Energy Authority has since 2016 maintained a web-based system designated to facilitate price comparisons and supplier switching. The system has also been developed to better inform customers about the origin of the electricity they purchase. All retail suppliers are obligated to maintain up-to-date information on their public electricity price offers on this service. In 2016, the Energy Authority initiated a project to renew the service with aim to better fulfil customers' needs. The new service has been planned to be taken into use by the end of 2018. The Energy Authority has also addressed issues concerning different forms of abuse of the price comparison website by suppliers aiming to appear as one of the suppliers with the cheapest products. However, the development of a new price comparison website is well underway and the new platform will contain tools which help with tackling some of these issues.

Since 2005, Nordic energy regulators under the NordREG organisation have been working to promote and facilitate a common end-user market for electricity in Finland, Denmark, Sweden and Norway. The main objective for the end-user market integration is to minimize regulatory and technical obstacles for suppliers willing to operate across the Nordic countries. NordREG has made several recommendations in order to harmonise rules and processes among Nordic countries. However, implementation of these recommendations in Finland has been delayed as it requires national political decisions.

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.

## **3.3 Security of supply**

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

The Energy Authority has a responsibility for monitoring the security of supply situation for electricity. During the year 2017 Finland has not implemented any safeguard measures as mentioned in the Article 42.

The Energy Authority maintains information on generation and interconnector capacity, while the Ministry of Employment and the Economy has the responsibility for preparing the estimates for the demand of electricity. In 2017 there were no changes in these competences.

Production capacity of electricity is decreasing because of low profitability - low electricity price. Especially some coal condensing power plants are under threat of decommissioning prematurely. Because of large combustion plants directive (2001/80/EC) some older plants are exiting the market.

The Ministry of Employment and the Economy prepared the National Energy and Climate strategy for 2030. In the base scenario estimated electricity consumption in Finland would be in 2020 about 88 TWh and about 92 TWh in 2030.

Table 7 presents the short-term estimation of peak load demand in very cold winter day.



**Table 7. Short term forecast for peak load demand.**

Winter season	2018-2019	2019-2020	2020-2021
Estimated peak load, MW	15,300 MW	15,400 MW	15,500 MW

In the years 2018 - 2020, domestic electricity generation capacity will not be sufficient to cover the electricity consumption during peak consumption periods in a normal year. Dependency to electricity import at winter times will be 2,000 – 4,000 MW. Electricity production capacity in use in Finland will be about 12,000 MW at winter period 2018 - 2019. Importing capacity is around 5,200 MW.

Dependency on imports will significantly decrease once the new nuclear power plant unit (Olkiluoto 3) has been completed. Originally, the new unit should have been commissioned by the end of 2009. Currently the official estimation of commissioning the plant is during autumn 2019. After Olkiluoto 3 has been completed Finland will still be dependent on electricity import and it is possible that even more power plants will be decommissioned in near future.

### **3.3.2 Monitoring investments in generation and interconnector capacities**

#### **Monitoring investments in generation capacity**

The total available generation capacity during the winter season 2017 - 2018 was about 12,000 MW.

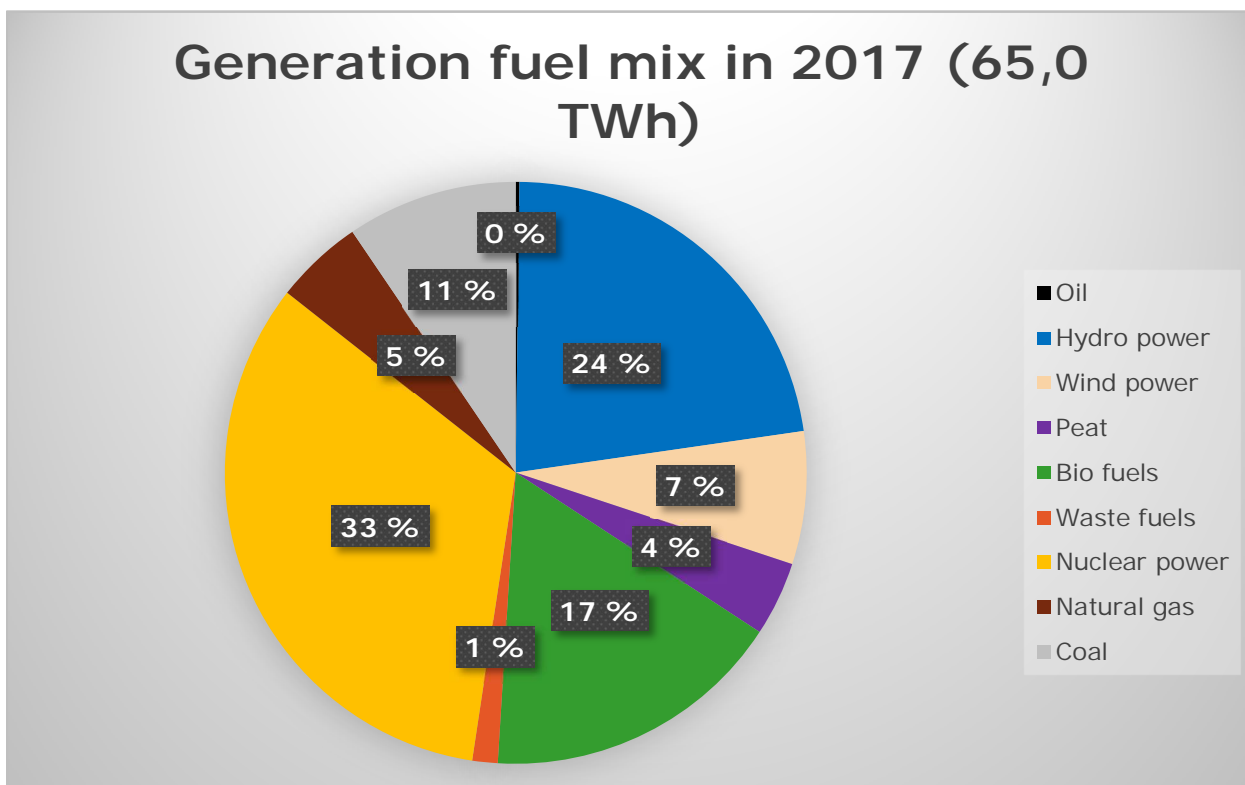
The capacity included also 729 MW of peak load reserve. The peak load reserve is considered as a strategic reserve and it is not available for the electricity market. New period for strategic reserve started 1<sup>st</sup> of July 2017. The reserve consists of four power plants (707 MW) and two DSR facilities (22 MW).

Total installed generation capacity in Finland was about 17,400 MW in the end of 2017. Installed wind generation capacity was about 2,000 MW at the same time. However, the available amount of wind generation in peak load period in winter is assumed to be 120 MW (capacity factor 6% at cold winter day). Estimated available generation capacity in the winter season 2018 - 2019 is about 12,000 MW.

**Table 8. Electricity Generation Capacities in Peak Load Period in 2007 - 2018, MW**

	Separate Electricity Generation				Gas turbines and engines	Combined Heat and Power		Capacity of power stations	Power system reserves
	Hydro power	Nuclear power	Con- densing power	Wind power		Indus- try	District heat		
2007	2,350	2,720	2,800	-	10	2,450	2,790	<b>13,120</b>	1,046
2008	2,350	2,700	2,650	-	-	2,450	3,150	<b>13,300</b>	1,180
2009	2,350	2,700	2,650	-	-	2,450	3,150	<b>13,300</b>	1,180
2010	2,550	2,700	2,200	-	-	2,300	3,350	<b>13,100</b>	1,180
2011	2,575	2,730	2,200	-	-	2,365	3,490	<b>13,360</b>	1,240
2012	2,595	2,750	2,045	-	-	2,370	3,490	<b>13,155</b>	1,240
2013	2,610	2,765	2,045	-	-	2,330	3,550	<b>13,300</b>	1,556
2014	2,610	2,765	1,650	-	-	2,330	3,430	<b>12,800</b>	1,540
2015	2,640	2,765	760	-	-	2,330	3,430	<b>11,900</b>	1,580
2016	2,600	2,780	850 <sup>5</sup>	-	-	2,000	3,300	<b>11,600</b>	1,400
2017	2,550	2,792	970	100	-	1,990	3,260	<b>11,660</b>	1,400
2018	2,570	2,807	970	120	-	2,250	3,290	<b>12,007</b>	1,400

Generation fuel mix for energy from the year 2017 is presented in Figure 3. During the next year it is not expected to be any significant changes in fuel mix for power generation in Finland. Use of coal might slightly decrease and wind power will increase.



**Figure 3. Generation fuel mix for energy (TWh) in 2016. Source: Finnish Energy Industries.**

<sup>5</sup> Includes peak load reserve

Electricity production capacities under planning or construction at the moment are presented in Table 9.

**Table 9. Forthcoming new generation capacity in 2017-2019**

MW	Hydro	CHP		Nuclear power	Wind Power
		District heating	Industry		
2018	2			5	
2019	3.3	30		1,600	21
2020	5.5	2.5			
2021	5.5				

The driver for increasing wind power capacity is the feed-in tariff system introduced in 2011. Feed-in tariff is available for wind power, bio-gas and wood-driven power capacity. Wind power capacity has been targeted to increase up to 2,500 MVA by year 2020.

### **Monitoring investments in interconnection capacity**

Any new investments in interconnection capacity has not been made since the Estlink 2 between Finland started operation in the beginning of 2014.

There is and has been large request to increase transmission capacity between Finland and Sweden. In autumn 2016, Fingrid and Swedish TSO Svenska Kraftnät announced that they have started planning of new AC cable between northern Finland and Sweden. The connection is evaluated to be operational in 2025 with capacity of 800 MW.

There will also be need to replace Fennoskan 1 DC – connection between Finland and Sweden. It is estimated that the new investment might happen in the late 2020s.

### **3.3.3 Measures to cover peak demand or shortfalls of suppliers**

#### **Strategic power reserves**

There's a strategic power reserve capacity mechanism in place in Finland. The Act on Peak Load Reserves to Ensure Balance between Supply and Demand (so-called Capacity Reserve Act) came into effect on March 1, 2011 and replaced the previous act. The peak load reserve is used to ensure that the balance between supply and demand is achieved if the balance has not been achieved in commercial market i.e. in the day-ahead market of Nord Pool. However, the peak load reserve capacity is not allowed to participate and bid on the commercial market.

The Energy Authority has tasks to evaluate and decide the required size of the peak load reserves and to arrange the tendering process and to make the procurement decisions. The Energy Authority also supervises the profit of the peak load power plants.

During the peak load season, from December to end of February, power plants in the peak load reserve are in 12 hours' readiness. Otherwise, power plants are in one month readiness. The use of peak load reserve capacity is very rare, the last time reserve was activated during the winter 2009-2010.

The owners of the selected reserve capacity will receive fixed compensation for providing the reserve capacity. The activation of reserve capacity will happen with the cap price of the markets. When the reserve capacity is activated to balance supply and demand, only actual costs caused by the activation are remunerated.

The Finnish TSO, Fingrid is responsible for making agreements with the selected power plants and Fingrid pays the compensations to the power plants. The peak load reserve system is funded by the fees collected from the Finnish electricity end-users.

In 2016, the Energy Authority approved terms and conditions for the use of peak load reserves and the methodology for collecting payments from the electricity users to cover costs of this system for the period July 2017 to June 2020.

In 2016, the Energy Authority started preparations for the procurement of peak load reserve capacity for the period of July 2017 to June 2020 by evaluating needed amount of reserve capacity. After a tendering process in winter 2017 four power plant units and two demand side flexibility facilities were selected to the peak load reserve. These six units comprise reserve capacity of total 729 MW.

### **Responsibilities of TSO regarding security of supply and operational security**

The transmission system operator Fingrid secures the system operation in Finland by delivering the following services:

- Maintenance of operational security
- Maintenance of frequency (by power reserves)
- Maintenance of voltage
- Data exchange to maintain operational security

Maintenance of operational security implies that power system is planned and operated in a way that the impacts of disturbances are minimised. Here the grid planning, transmission limits, disturbance management and reserves (frequency controlled and fast disturbance reserves, black start reserves) are considered.

The power system in Finland is planned in accordance with principles agreed jointly between Nordic TSOs in Nordic Grid Code<sup>6</sup>. The main planning principle is that the power system shall withstand any single fault (n-1 criteria). A dimensioning fault (worst possible fault) varies on the basis of the operational situation of the Finnish grid, but is often the tripping of the largest production unit or an extensive busbar fault.

Electricity transmission in the main grid are kept during real time operation within the predefined limits given by operational reliability calculations, which take into account potential faults and planned outages in the power system. The transmission limits are defined for each probable fault and network situation. Short-term congestion problems in the main grid are managed commercially through counter trade, and long-term congestions are managed by applying price areas or by investments in the grid.

The Nordic electricity grid is synchronously interconnected and the frequency may vary in normal state between 49.9 and 50.1 Hz. The frequency containment reserve for normal operation, frequency containment reserve for disturbances and automatic frequency restoration reserve are power reserves which are activated automatically by frequency changes. Within the Nordic power system, it has been agreed that countries maintain continuously a frequency containment reserve for normal operation (FCR-N) of 600 MW. Of this volume, Finland's share is presently 138 MW.

For disturbance management purposes, both power and transmission reserves are maintained in the Finnish power system. TSO is responsible for the maintenance of reserves that are needed in the Finnish power system. For this, TSO uses its own resources and also purchases reserve maintenance from other resource owners. Restoration of the power system from severe disturbance incidents is headed by TSO's Power System Control Centre.

The frequency containment reserve for disturbances (FCR-D) begins to activate when frequency goes below 49.9 Hz, and the full reserve has been activated at a frequency of 49.5 Hz. The reserve used includes both active power reserves of power plants and load shedding. During a

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<sup>6</sup> Available on website [www.entsoe.eu](http://www.entsoe.eu)

normal operational situation, the interconnected Nordic system is required to have approximately 1,200 MW of frequency controlled disturbance reserves, of which Finland's obligation is approximately 260 MW.

The manual frequency restoration reserve (FRR-M) consists of active and reactive power reserves that can be activated manually within 15 minutes. After activating this reserve, the power system has been restored to such a state that it can withstand another potential disturbance. In the Nordic grid, each country must have a volume of fast disturbance reserve that equals the country's dimensioning fault. Dimensioning fault will increase in Finland after Olkiluoto 3 is operating.

Table 10 presents summary of reserves for securing system operation in Finland.

**Table 10. Summary of reserves for securing system operation 2017 in Finland (Source: Fingrid Oyj).**

Type of reserve	Contractual capacity	Obligation
Frequency controlled normal operation reserve (FCR-N)	- Yearly market, 55.0 MW - Hourly market, 134.7 MW - Vyborg DC link, 90 MW - Estonia DC links, 35 MW	138 MW
Frequency Containment Reserve for Disturbances (FCR-D)	- Yearly market, 455.7 MW - Hourly market, 471,4 MW	265 MW
Automatic Frequency Restoration Reserve (FRR-A)	-	0–70 MW
Manual Frequency Restoration Reserve (FRR-M)	- Fingrid's reserve power plants 935 MW - Leasing reserve power plants 262 MW	max 1100 MW

The voltages in the power system are maintained at a technically and commercially optimal level during both normal and disturbance situations. The objective of voltage level and reactive power adjustment is to prevent overvoltage and undervoltage, to achieve nominal voltages specified in agreements (110 kV network) and to minimise the grid losses. The voltage level in the Finnish transmission grid is adjusted by using reactors and capacitors. The voltage ratio between different voltage steps is controlled with on-load tap changers of transformers.

Instantaneous reactive power reserve is also needed in order to secure the technical functioning of the Finnish power system during the disturbances. The reactive power reserves of the main transmission grid are located in synchronised generators. Reactors and capacitors also serve as reserves. Reactive power reserves are activated automatically when the voltage in the grid decreases as a result of a disturbance. Compensation is paid to power producers for reactive power reserves reserved in generators.

TSO takes care of data exchange required by the maintenance of operational reliability in the power system. TSO and parties connected to the grid supply each other with planning and measurement data needed in the maintenance of operational reliability. Such data includes production plans, generator power measurements, and status data on generator circuit breakers and connecting stations. If necessary, the amount of data exchanged and the technical details of data exchange are agreed upon between TSO and the other party through a separate data exchange agreement.

## 4 Gas market

The Finnish natural gas market has been under sector-specific regulatory supervision since the assertion of the Natural Gas Market Act in August 2000. The Natural Gas Market Act was amended first at the beginning of the year 2005 to implement the Natural Gas Market Directive (2003/55/EC) and the second time in 2013 to include the requirements of the Gas Directive 2009/73/EC.

The Finnish natural gas market is presently isolated with a pipeline connection only to the importing country Russia. There is only one importer and wholesale supplier – Gasum Oy – which also owns and operates the natural gas transmission network.

A separate market place, operated by Kaasupörssi Oy and owned by the natural gas TSO, has been established for trading gas on the secondary market.

Finland has availed itself of the possibility of a derogation allowed by the Natural Gas Market Directive. Following this, the natural gas market has not been opened in the manner specified in the directives. This exemption is effective as long as Finland does not have a direct connection to the natural gas network of any other EU Member State and as long as Finland has only one main natural gas supplier.

In June 2017, the Finnish Parliament approved a new Natural Gas Market Act (587/2017) which came into force 1 January 2018. The intention of the new act is to open the gas market for competition by 1 January 2020, require unbundling of the TSO and lift the derogation. At the same time the commissioning of Balticconnector pipeline will connect the Finnish market to the Estonian and Baltic gas markets in fact creating the environment for establishing a common entry-exit zone for Finland and the Baltics.

In a European comparison, the Finnish natural gas market is highly exceptional. There were 24 local natural gas distribution network operators at the end of the year 2017. As can be seen from the Figure 4, all the Finnish natural gas DSO's and the consumption sites of natural gas are situated in the southern part of the country along the main transmission pipeline.



Figure 4. Map of natural gas network in Finland (source: Finnish Gas Association)



The first off-grid LNG terminal in Pori (in the west-coast of Finland) was commissioned in autumn 2016. Another small-scale off-grid LNG terminal in Tornio (in northern Finland) is also under construction and will be in operation in 2018. These terminals would serve industrial users, maritime of use LNG and LNG trucks.

In June 2017, it was announced to the construction of a small-scale LNG terminal has been started also in Hamina (in the south-coast of Finland). This terminal will be connected into local gas distribution network and provide gas customers connected into local distribution network and other off-grid customers. In 2014 State of Finland granted investment support for all these LNG terminals.

## 4.1 Network regulation

### 4.1.1 Unbundling

Finland has availed itself of the possibility of an exemption allowed by the Natural Gas Market Directives and thus there is neither legal nor operational unbundling of natural gas transmission network operation. Furthermore, Finland has not applied legal and operative unbundling in distribution network operations because Member States are free to decide that the unbundling provisions are not applied to network operators with fewer than 100,000 customers. All Finnish distribution system operators fall below the limit set by the Directive.

As a result of this, the natural gas market in Finland is characterized by vertical integration. The only wholesale supplier of natural gas – Gasum Oy – is the sole importer and operator of the transmission system. Furthermore, it has been downward vertically integrated into retail supply. However, Gasum Oy sold its gas retail supply business in early 2017.

Gasum Oy is fully state-owned company since OAO Gazprom sold its shares to the State of Finland in December 2015. According to the coming new Act, gas transmission system operations shall be unbundled from electricity and gas generation and supply by the beginning of 2020 by using so-called TSO-model. As Finland has a derogation from the unbundling requirements of the Directive, the certification of the natural gas TSO has not been done in Finland yet. Certification of the natural gas TSO will be done in 2020.

The project promoter for the Balticconnector-pipeline in Finnish side is state-owned company Baltic Connector Oy.

Approximately 80 per cent of the Finnish gas DSOs are wholly or mainly owned by municipalities. The rest 20 per cent of the DSOs are owned by industrial users of natural gas. In Finland, retail supply of natural gas is done in most cases within the same company as gas distribution. There is no natural gas production in Finland.

The accounting unbundling applies to all natural gas 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.

Accounting unbundling requirements are specified with the ministerial degree and the Energy Authority has issued the non-binding guidelines on the compilation of unbundled financial statements. Both the distribution system operators and the transmission system operator shall to publish unbundled accounts with certain formula as a part of the statutory financial statement.

The unbundled income statements, balance sheets and any supplementary information of separated operations are audited as part of the statutory auditing. The accounts are not subject of a separate audit and this audit is not addressed to the requirements of the regulator in any extent. Auditors are required to give their opinion in the auditor's report on whether the income



statements and balance sheets and the supplementary information conform to Natural Gas Market Act and any rules and regulations related to it.

The Energy Authority has issued non-binding guidelines aim to help the audit of unbundled financial statements in different electricity system operators and inform the auditors about the unbundling requirements.

The Energy Authority supervises that the network companies are fulfilling the unbundling requirements. The Authority has also powers to oblige the companies to correct mistakes or omissions. A conditional fine may be imposed to make decisions effective. As a final mean the Energy Authority may also withdraw the network license from the company.

#### **4.1.2 Technical functioning**

In the natural gas sector, there are 24 local distribution network operators and one transmission system operator. The transmission system operator is also the sole importer and wholesale supplier of natural gas.

Unplanned interruptions of gas supply in Finland are very rare. In 2016, interruptions occurred only in one distribution system operators' networks. Therefore, any key figures on average interruptions per customers are not feasible to calculate and present.

#### **4.1.3 Network and LNG tariffs for connection and access**

According to the Natural Gas Market Act, the network operators are able to 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 present methodology of setting network tariffs includes all items mentioned above, besides efficiency targets for distribution network operations.

The network will be included into the regulated asset base by using the net present value instead of a book value. The net present value of network will be updated by taking into account depreciation and investments. The approved rate of return on capital is determined by using a WACC-model (Weighted Average Cost of Capital). The methodology provides incentives to the transmission and distribution system operators to develop their network as all network investments are included into regulated asset base. For natural gas TSO the confirmed methodology includes also incentives to maintain and improve its cost efficiency and security of supply level.

The Energy Authority collects annually from the network operators several kinds of data of network operations, like tariffs of network services, financial information and technical key figures. Annually collected technical key figures include i.e. information on quality of supply. The Energy Authority has also powers to ask additional information from the transmission and distribution system operators on network operations for the supervision purposes.

According to the natural gas market legislation, charges of transmission and distribution services shall be public. TSO and DSOs shall have public charges and terms and conditions for network services.

As all LNG terminal projects in Finland have received state-aid, European Commission has requested that the regulation of the 3<sup>rd</sup> party access and ex-ante approval of LNG tariffs are applied to those terminals. The operator of the LNG terminal in Pori has not yet sent its final application on the LNG tariffs to the Energy Authority for approval.

#### **4.1.4 Cross-border issues**

The Finnish natural gas transmission network is presently only connected to the Russian natural gas pipeline. There is only one natural gas wholesale company, Gasum Oy. The company imports natural gas and transmits it through its own transmission network to large-scale consumers and distribution companies. Gasum Oy is also the owner of the Finnish side of the natural gas interconnector between Finland and Russia.

Because there is only one undertaking acting at the same time as an importer, a wholesale supplier and a transmission system operator, there is no need for specific management of interconnection capacity or congestion.

In 2017, there were no changes in gas transmission capacity between Finland and Russia.

In October 2016, Finnish state-owned company Baltic Connector Oy and Estonian gas TSO Elering AS made a final decision to invest in the construction of the Balticconnector gas pipeline between Finland and Estonia by the end of 2019. The new pipeline links Finnish and Baltic gas transmission networks and makes transfer of natural gas from Finland to Baltic states and vice versa possible.

#### **4.1.5 Compliance**

According to the Finnish legislation, the Energy Authority shall supervise that the natural gas transmission system operator, distribution system operators and suppliers are compliant with the provisions of the Natural Gas Market Act and any rules and regulations issued under it. As according to the Article 49(1) Finland has a derogation from the Article 9 of the Directive 2009/73/EC there are no legal obligations for the certification of the Finnish natural gas transmission system operator. Therefore, also provisions in Article 41(3) and Article 41(5) are not relevant for Finland. The Energy Authority ensures compliance of natural gas transmission and distribution system operators with their obligations under the Directive and other relevant Community legislation as required in Article 41(1)(b) by using mainly ex-post supervision. Investigation may start based on a request from any market actor or on the Energy Authority's own initiative. In 2014 any such investigation cases were not started.

The Energy Authority has powers to order in the obliging decision how the mistake or omission should be mended. The obliging decision may also include an order to refund customer a fee

incorrectly charged from him. The Energy Authority may also impose a conditional fine to make a decision effective. Thus, the powers of the Energy Authority are compliant with the Article 41(4)(a)(b)(c)(e). Since September 2013 the Energy Authority has also had right to propose to the Market Court to impose administrative fines to network system operators or other natural gas market actors for the non-compliance with their obligations pursuant to the Natural Gas Market Act or the Regulation as required in the Article 41(4)(d).

In 2016 there were no such cases, where the Energy Authority should follow the binding decisions of the Agency or the Commission according to the Article 41(1)(d) or guidelines according to the Article 43.

## 4.2 Promoting Competition

### 4.2.1 Wholesale markets

#### Market

In the year 2017, the size of the Finnish natural gas market was 2.2 Bcm (2.3 Bcm in 2016, at 0 °C), which was all imported from Russia. The importing capacity is estimated to be about 9,000 MW.

There is only one importer and wholesale supplier – Gasum Oy – which also owns and operates the natural gas transmission network.

About 58 per cent of gas is used in Finland by industrial end-users, mainly chemical and forest industry. About 34 per cent of gas is used energy and power companies in CHP, district heat and power production. Only about 8 per cent of gas is used by customers connected to the local distribution networks. Less than 150 customers – large industrial end-users as well as power and district heating plants - use more than 90 per cent of the total natural gas consumption in Finland.

Gas end-users connected to the transmission network and gas retail suppliers buy gas for their own use or retail from Gasum Oy based on the public tariff. On natural gas market in Finland, only natural gas users with a consumption of more than 5 million cubic meters and with remote metering can trade in the secondary market with the gas that they have acquired for their own use or retail. Additionally, Gasum Oy offers short term products that are sold on the secondary market operated by Kaasupörssi Oy, which is a subsidiary of Gasum Oy. Total trading amounted to 777 GWh or 43 per cent less than during the previous year. Secondary market trading of these were 368 GWh or 1.7 per cent of the total Finnish consumption of natural gas in 2017.

#### Prices

Pricing of the energy sales of natural gas is based on the natural gas supply contract between Gasum and Gazprom's subsidiary company Gazprom Export. The supply contract is based on the special structure of Finland's natural gas market, which reflected in the fact that the price of natural gas follows not just changes in oil prices, but also fluctuations in the price of coal and domestic market energy prices.

The total wholesale price of natural gas, including transmission and natural gas energy, increased by an average of 18 per cent during the course of 2017.

The price for natural gas energy excluding taxes increased by 9 per cent between January 2017 and January 2018. The price of natural gas energy is index-linked to the price of heavy fuel oil and the price of imported coal, as well as to the domestic energy index. Of these price factors, the price of heavy fuel oil rose by 17 per cent, the price of coal increased by 7 per cent and the energy price index increased by 0,2 per cent on average between January 2017 and January 2018.

The natural gas transmission price declined 5 per cent in 2017.

Estimated national average natural gas prices in December 2017 for one industrial reference customer are shown in Table 11. In household customer groups or smaller industrial customers there are only a few customers within distribution companies and therefore any representative average prices for these customer groups are not possible to define.

**Table 11. Natural gas price for a reference customer in December 2017.<sup>7</sup>**

EUR/MWh	I4-1
Network charges (excl. levies)	9,96
Energy costs and supply margin	22,59
Taxes	18,61
Total (excluding VAT)	51,16

## **Competition**

The wholesale supply of natural gas to the large Finnish end-users and retailers is based on cost based contracts between Gasum Oy and the customers. Those customers buy natural gas from Gasum Oy based on a public tariff.

According to the Natural Gas Market Act the supplier in a dominant market position in a natural gas network shall supply natural gas at a reasonable price upon the request of a customer connected to the network, if the customer has no other economically competitive options to purchase natural gas through a natural gas network (obligation to supply).

Because the Finnish gas market has not been fully opened to competition and there is only one importer/wholesaler, the obligation to supply applies to all gas suppliers. Therefore, the customers in every customer category have the same right to purchase natural gas at a reasonable price. As regards the supervision of natural gas wholesale or retail pricing, the powers of the Energy Authority are ex post by their nature.

### **4.2.2 Retail market**

The retail supply of natural gas covers only about 8 per cent of the total consumption. In Finland, there are only about 23,200 customers in the natural gas market. The largest customer segment, (about 16,400 customers) consists of households who buy natural gas for cooking. However, the total natural gas consumption of this segment amounts to only 0,3 mcm (0.015 per cent of total consumption).

At the end of 2017, there were 24 natural gas retail suppliers. Many of the natural gas retailers in Finland are relatively small having only dozens of customers. The share of the top three retail suppliers is about 50 per cent of the total volume. In addition to the original domestic retail suppliers, there are also retail suppliers owned by foreign-based companies. The market entrance of the foreign-based companies has occurred through acquisitions.

No new retail suppliers without any affiliate connection to either TSO or DSOs in Finland have entered the market since the introduction of natural gas markets.

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

The Natural Gas Directive allows to Finland a derogation from the obligation to liberalise its natural gas market, as long as Finland only has one main supplier of natural gas and is not

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<sup>7</sup> Reference customer: annual consumption 150,000 MWh, 4,000 hours.

connected to the European gas network. For that reason, supplier switching is not possible in the present situation.

#### **4.2.2.2 Recommendations on supply prices, investigations and measures to promote effective competition**

The Energy Authority publishes monthly statistics on natural gas prices in order to promote competition and public market analysis.

### **4.3 Security of supply**

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

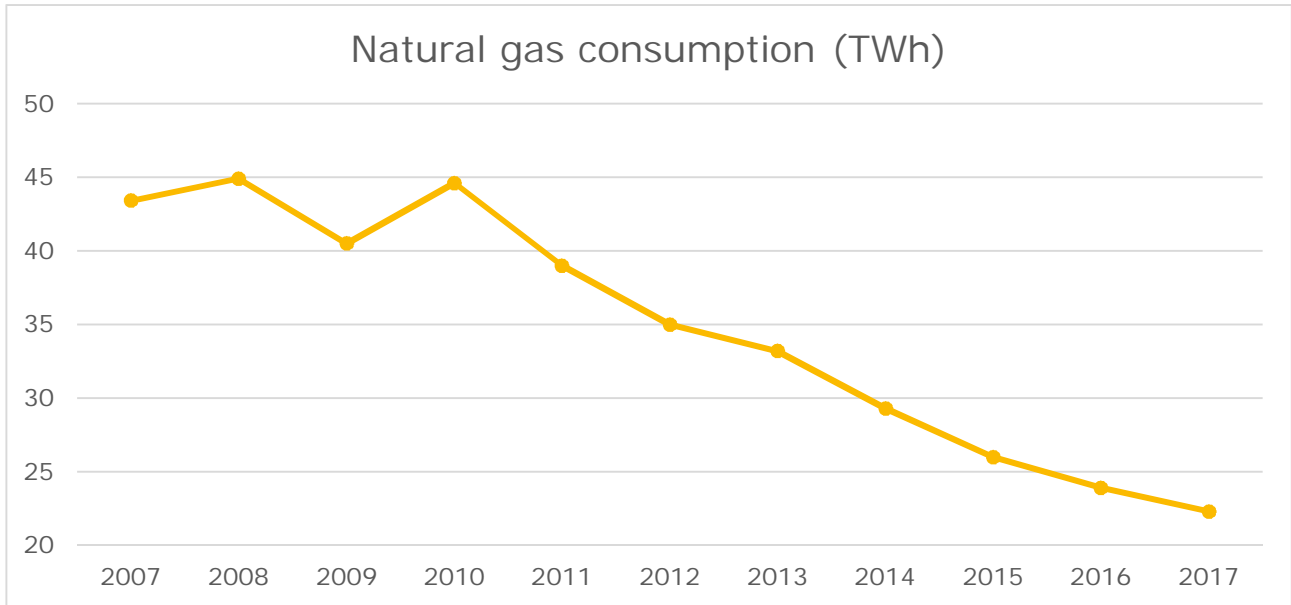
The Energy Authority has a responsibility for monitoring the security of supply of gas. The Energy Authority maintains information on transmission network capacity and availability, while the Ministry of Employment and the Economy has the responsibility for preparing the estimates for the demand. In 2017 there were no changes in these competences.

According to the Natural Gas Market Act, the role of the regulator 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 a report on security of supply of gas every year.

Natural gas used in Finland is imported from Russia. There's no natural gas production in Finland. Small-scale biogas is produced and pumped to the gas transportation network in two different locations. In addition, propane can be produced indigenously as it is the only gas to be stocked in small amounts by Gasum Oy for immediate substitute for the possible lack of natural gas. The importing capacity of Gasum Oy is estimated to be about 9,000 MW. During the peak demand hour in 2017 consumption was 6,400 MWh/h. In natural gas shortage situation market based mechanisms are used to reduce gas consumption at the first stage. The price of gas that exceeds gas users intended capacity is increased to reduce consumption. During winter 2016-2017 or 2017-2018 there was no need to increase the price of natural gas to reduce consumption.

#### **4.3.2 Expected future demand and available supplies**

The competitiveness of natural gas compared to other fuels has weakened during past few years and thus the usage of gas has decreased. Taxation of natural gas in Finland has also made gas less competitive compared to other energy sources. Development in natural gas consumption in 2006 - 2016 is shown in Figure 5.



**Figure 5. Development in natural gas consumption in Finland in 2007 – 2017.**

Currently there are no specific plans to expand natural gas transmission network in Finland into new geographical areas.

In October 2016, Finnish Baltic Connector Oy and Estonian Elering AS made decisions to build up the Balticconnector gas pipeline between Finland and Estonia by the end of 2019. This pipeline will link Finnish and Baltic natural gas transmission networks and would enable that the Baltic natural gas storage facilities and LNG terminal could be used to improve reliability in natural gas transmission to Finland.

In August 2016, the first off-grid LNG terminal in Pori (on the west-coast of Finland) with capacity of 30,000 m<sup>3</sup> was taken into operation. Another off-grid terminal with capacity of 50,000 m<sup>3</sup> is under construction in Tornio (in the northern Finland). This terminal will be in operation in 2018.

In June 2017, investment decision to build up a small-scale LNG terminal in Hamina (in the south-coast of Finland) was made. This terminal with capacity of 30,000 m<sup>3</sup> will be connected to local distribution network.

These small-scale LNG-terminals will serve mainly local industrial users, maritime of use LNG and LNG trucks. The LNG terminal in Hamina will serve also gas customers connected to the local distribution network.

#### **4.3.3 Measures to cover peak demand or shortfalls of suppliers**

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

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



During system malfunction almost all 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.

## 5 Consumer protection and dispute settlement

### 5.1 Consumer protection

The Energy Authority monitors the transmission system operators', distribution system operators' and suppliers' overall compliance with the electricity and natural gas market legislation.

In 2017, the Energy Authority received 90 new requests for investigation or other written inquiries from customers or other market participants related to electricity system operators and retailers. In addition to these, Energy Authority opened five new investigations concerning electricity system operators and retailers on its own initiative. In 2017 Energy Authority made decisions or closed the investigation in 87 cases. Some of these cases were already received in previous years.

With regard to the natural gas markets, the Energy Authority received no requests for investigation and made no decisions during 2017.

The statistics do not include the phone calls or other written inquiries which were not registered to the Energy Authority's document management system.

### 5.2 Requests of investigation

In 2017, the number of requests for investigation or other written inquiries fell slightly but remained at a relatively high level, partly due to increases in network tariffs put into effect by some electricity system operators in the previous year. Dispute settlement

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

The Consumer Ombudsman may bring the class action, for instance, against a network operator or supplier and act as the representative of the class in a general court of law.