

What you should know about the electricity market



Finnish Energy Industries



FINGRID



Publisher: Finnish Energy Industries and Fingrid Oyj
Author: Maarit Kauniskangas
Layout: Innocorp Oy
Translation Agency: Audipek Translation Agency

What you should know about the electricity market
ISBN 978-952-5615-40-1 (PDF)



Contents



4 Introduction

6 Electricity market - from producers to consumers

8 Electricity - where does it come from, where does it go?



11 Electricity from the power exchange

13 From the power plant to consumers

15 What does the price of electricity consist of?



16 When a consumer buys electricity

18 How to buy electricity and invite tenders from electricity suppliers

19 Contents of the electricity bill



20 Outlook

22 Glossary

23 Further information



Introduction



Electricity is one of those everyday things that we often take for granted and only notice when something goes wrong. Many people only really think about their own electricity usage when they receive their electricity bill – am I using too much electricity or is it possible to receive electricity at a cheaper rate from somewhere else? But do we know how the price of electricity is formed?

The above questions are related to the functioning of the electricity market. However, people may make assumptions on the functioning of the markets based on fairly superficial knowledge. The purpose of this brochure is to help to understand how the electricity market functions and the kinds of impacts its operations have on society and the environment, as well as on the electricity bills of individual consumers.

The share of electricity in energy consumption increases even if overall energy consumption is reduced. There are more and more electrical appliances at home and workplaces. The heating of detached houses can be made more effective by using heat pumps, which in themselves are powered by electricity, but they reduce the need for other heating. On a larger scale, increasing the efficiency of industrial production processes may increase the need for electricity, but it will reduce environmental emissions and the need for other fuels.

Efficient functioning of the electricity market requires openness and free competition. In terms of running order, generation methods with lowest variable costs are uti-

lised first. The most expensive production methods are taken into use when a lot of electricity is needed for a short period of time. These situations may arise, for example, on very cold days in the winter. On the other hand, in a dry year it is not possible to produce the normal amount of electricity with favourably-priced hydropower, so it will also be necessary to resort to more expensive production forms.

In terms of the environment, the fuels used in electricity generation play a key role. The effectiveness of the production method also has an impact on the environment. The selection of the electricity generation method and fuels is affected by, for example, EU emissions trading. The production costs of electricity produced by a coal-fired power plant increase when the producer has to acquire emission allowances corresponding to the amount of carbon dioxide emissions. Therefore, the price of electricity is an incentive to generate electricity with methods that produce as few carbon dioxide emissions as possible.

The wholesale price of electricity is determined on the power exchange according to supply and demand. The wholesale price is only one part of the consumer's electricity bill, which also includes electricity trade costs, network service fees and electricity taxes.

Therefore, it is worth studying your electricity bill in more detail. Could another electricity supplier offer electricity at a more favourable price? Inviting tenders from electricity suppliers is not as difficult as you may think. Keeping an eye



on your own electricity consumption will also become easier with the introduction of remotely read electricity meters. And it is also possible to reduce your own electricity consumption with easy measures – it is worth knowing, which electrical

appliances could be switched off at home and in the workplace.

There is no return to a world without electricity in the future. Therefore, it is worthwhile for electricity users to understand how the electricity market works. ●



Electricity market - from producers to consumers

In addition to Great Britain, Sweden and Norway, Finland has been among the first countries to open its electricity market to competition. In Finland, the market began to open up in stages in 1995. At that time, electricity production and sales were separated from electricity transmission and distribution, the business operation of which is subject to licence. Since 1998, also households have been able to request for tenders from electricity suppliers. Tenders

cannot be requested for electricity transmission and distribution. Consumer would not benefit from the construction of several parallel electricity networks.

The Nordic electricity market is functioning well. Opening of the market to competition has been facilitated by the fact that there have traditionally been a lot of electricity producers and suppliers in the Nordic countries. Industry is also a significant electrici-

ty generator, especially in Finland. Today, there are more than a hundred companies producing electricity, just under a hundred electricity suppliers and hundreds of power plants in Finland. Conversely, the electricity market in many European countries is still fairly concentrated despite the fact that they have opened their electricity market to competition. ●





Electricity flows from the power plants to consumers, such as homes and factories, via the electricity network. The network companies take care of electricity transmission. The producers sell electricity to the exchange, to retailers or direct to major customers.



Electricity - where does it come from, where does it go?

Finland is one of the top countries in Europe in electricity consumption calculated per head. This is because of Finland's industrial structure and its northern location. Industry accounts for about half of total electricity consumption. Finland has plenty of energy-intensive industry, such as the forest and metal industries, whose production processes need copious amounts of electricity. On the other hand, industry also owns a lot of electricity generation in Finland. Both the manufacturing industry and electricity generation in Finland are committed to constant development of their energy efficiency in accordance with special energy efficiency agreements.

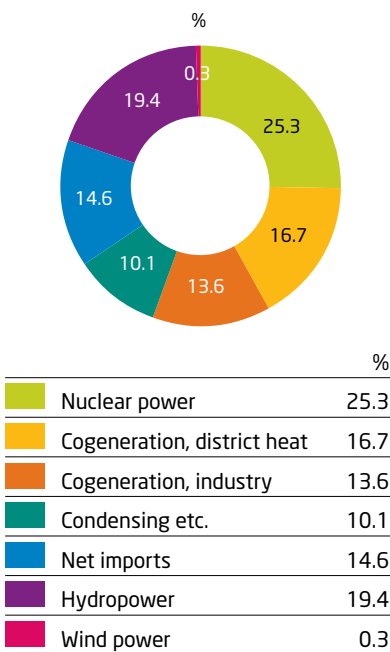
Energy efficiency agreement
The company pledges to reduce its energy use and/or offer its customers advice and consumption reporting, and that way to promote its customers' efficient energy use.

Housing and agriculture account for approximately a quarter of total electricity consumption. As Finland is the coldest of the EU countries

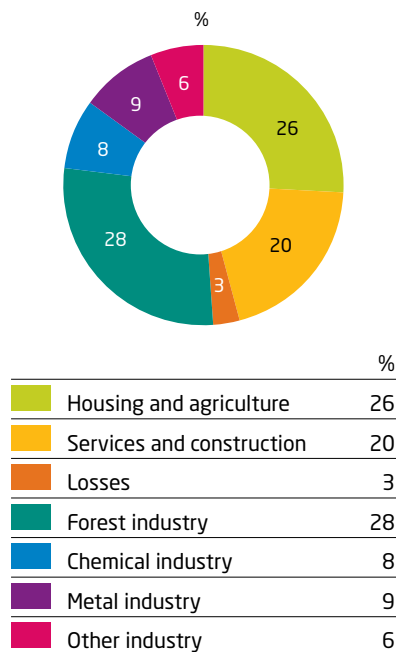
and its winters are dark, electricity is needed especially for heating and lighting. Electricity consumption varies according to the time of day and season. For example, on a cold winter's day, consumption may be substantially higher than in the holiday period in the summer.

In the Nordic countries, electricity is produced in a variety of ways: by hydro, nuclear and wind power and in power plants fired by coal, peat, natural gas and biomass. In the Nordic markets, electricity is imported to and exported from Finland according to the market situation. In the Nordic countries, electricity trade is also carried on with the neighbouring countries.

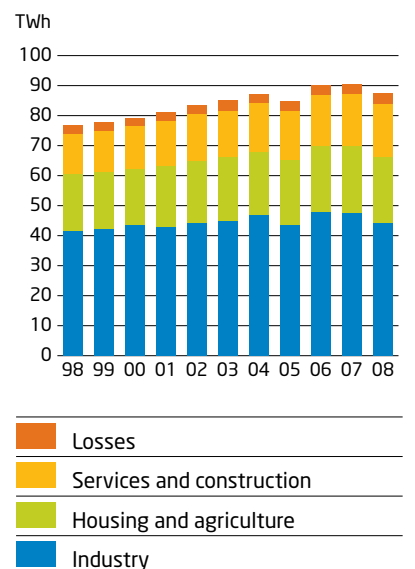
Net supply of electricity 2008
87.2 TWh



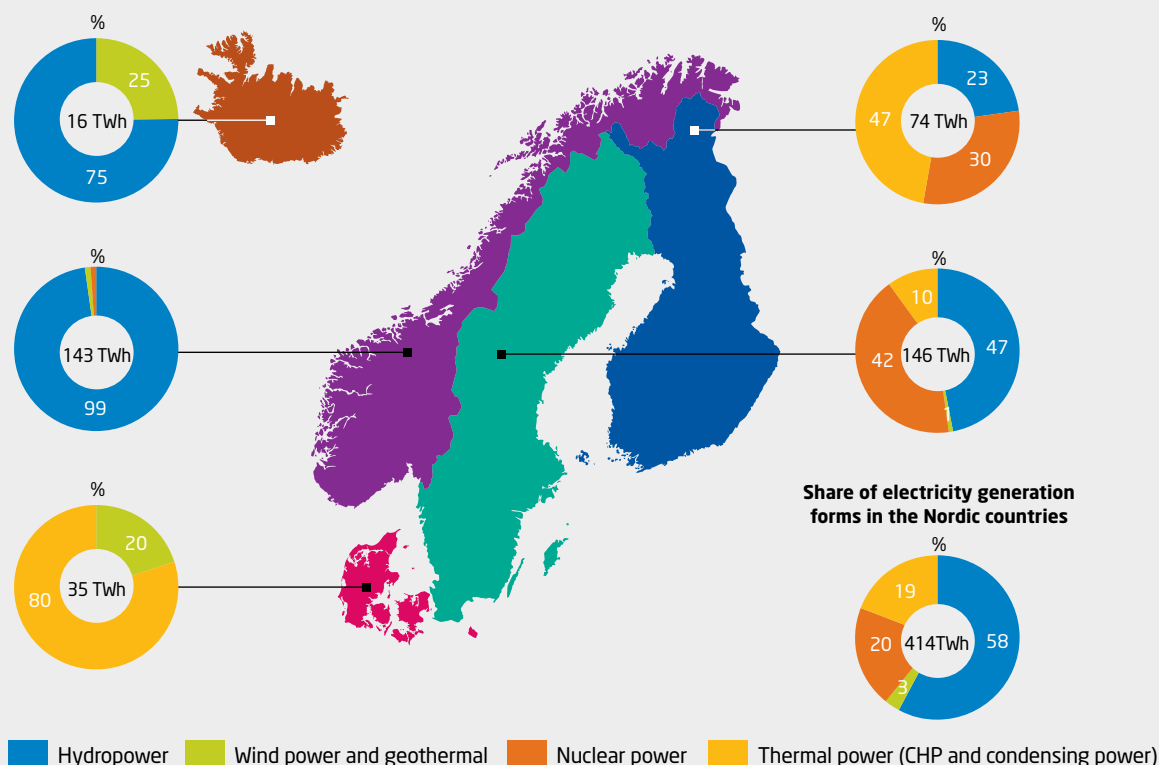
Total electricity consumption 2008
87.2 TWh



Electricity consumption 1998-2008



Electricity generation in the Nordic countries 2008



As there is free competition in the Nordic electricity market, the electricity production method is selected on the basis of supply and demand. Power plants that generate electricity vary from one another to a great extent in terms of their cost structure or regulating properties. For example, the operating costs of some power plants are low, but their construction is expensive. These plants include nuclear power plants. As their variable costs are low, it is worth using them for as many hours a year as possible. As a matter of fact, the market steers operations in this direction. These kinds of power plants are called base-load power plants.

However, sometimes the demand for electricity grows so high that it pays to start up, for example, plants fired by gas or coal in order to pro-

Regulating power
Electricity generation or consumption that can be altered rapidly, when necessary

duce the necessary extra electricity. This electricity is more expensive than that produced by hydro or nuclear power due to the operating and fuel costs.

The weather affects Nordic electricity generation also in other ways than in the form of electricity consumption. In a normal year, hydropower meets about half of the electricity needs of the Nordic countries. However, during a dry year with low rainfall, it is not pos-

sible to produce the normal amount of electricity by hydropower. Most of the hydropower plants in Finland are run-of-river plants, and their electricity generation can be regulated only for short periods of time. Especially in Norway and Sweden, there are storage power plants where water is stored in large storage reservoirs and production can be regulated to periods corresponding to consumption.

Although the Nordic countries are an integrated electricity market area, they differ from one another to a great deal in the way electricity is produced. In Norway, almost all electricity is produced by hydropower, and in Sweden hydropower accounts for almost half of the generated electricity. In Sweden, almost as much electricity is produced by nuclear power



Fossil fuels

For example, coal, oil and natural gas. Their use creates, e.g., carbon dioxide emissions in the atmosphere.

as by hydropower. Energy-efficient combined heat and power generation (CHP) is very widespread in Finland.

CHP plants use, e.g., coal, natural gas, peat and biomass as fuel. Biomass includes, for example, logging residues. Wind power has rapidly increased its share in the past few years, but the amounts of electricity produced by wind power are

still small in the Nordic countries, with the exception of Denmark. There, wind power already accounts for almost one-fifth of electricity generated, but in Finland it was only 0.4 per cent in 2008.

In 2008, 66% of electricity generated in Finland was greenhouse gas emission-free. Emissions were caused by the use of coal, natural gas and peat. The share of nuclear power was 30 per cent and that of renewable energy sources 36 per cent of electricity generation.

Various forms of electricity generation differ from one another to a great extent in terms of their technology, environmental impacts, and their construction and operating costs. All production forms are needed, some constantly, some occasionally. ●

Greenhouse gases

Create a so-called greenhouse effect in the atmosphere, resulting in global warming. The most significant greenhouse gases are carbon dioxide, methane and chlorinated hydrocarbons.

How does emissions trading work?

The EU has selected emissions trading as a method of reducing emissions to the degree required by international agreements. The target of emissions trading is to reduce the emissions of greenhouse gases from energy production and industry and to increase the use of renewable and other emission-free energy sources. Emissions from industry and energy production can also be reduced by increasing the efficiency of production processes.

Greenhouse gases are produced, for example, in the combustion of fossil fuels. The sharp increase in the amount of greenhouse gases, such as carbon dioxide and methane, in the

atmosphere causes global warming. Emissions trading is based on international climate negotiations and the Kyoto Protocol, the signatory countries of which are committed to reducing their greenhouse gas emissions. The EU has defined how much carbon dioxide its industry and energy production are allowed to produce.

Companies have to verify their own emissions each year. Companies can buy and sell emission allowances according to their need on the international exchange. The price of emission allowances is affected by the expense of emissions reduction and the number of emission allowances on offer.

As a result of emissions trading, electricity generation with fossil fuels is becoming more expensive. The greatest impact of emissions trading on the electricity market has been the fact that it has changed the mutual competitiveness of different electricity production methods. For example, the profitability of power plants that use hydro and nuclear power to generate electricity has grown compared to plants that use fossil fuels to produce electricity. As emissions trading increases the production costs of the electricity produced from fossil fuels, it will also raise the price of electricity in the wholesale market.

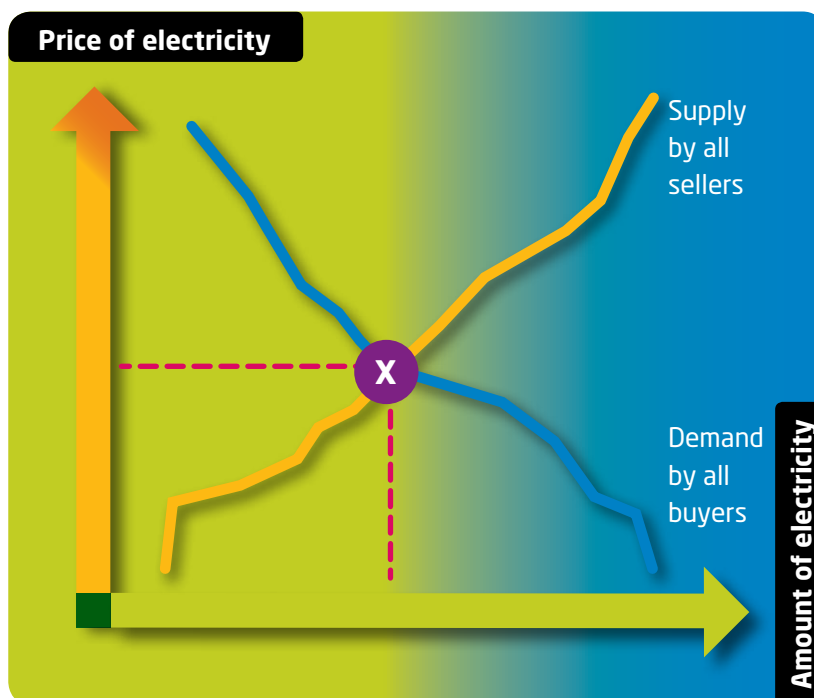
Electricity from the power exchange

In the wholesale market, electricity is traded on the power exchange. The wholesale price of electricity is determined according to supply and demand. Approximately 70 per cent of the electricity consumed in the Nordic countries is traded on the Nordic power exchange.

The Nordic power exchange was first established in Norway in 1993 when the electricity market opened to competition in that coun-

Power exchange

Electricity market place where the wholesale price of electricity is determined.



The price and production volume of electricity are determined in the market on the basis of supply and demand. With the market price, the producers are willing to produce exactly the amount of electricity the buyers are prepared to buy at that price. The bids and offers with the green background are realised at the price X and the offers with the blue background are not realised.

try. The exchange started to expand by degrees, in Finland in 1998. The Nordic power exchange, Nord Pool Spot, is owned by the Nordic transmission system operators, in Finland by Fingrid Oyj.

As its name indicates, the power exchange functions as a marketplace in the electricity market in the same way as the stock exchange in the stock market. Electricity is bought in the power exchange by industrial enterprises and retailers. In practice, the buyers of electricity tell the exchange how much electricity they want to buy and at what price, and correspondingly the sellers make their own bids.

The wholesale price of electricity is determined in the intersection of supply and demand – all sales and purchase bids. In the Elspot market

of the power exchange, the wholesale price of electricity is formed separately for each hour of the following 24-hour period.

However, the need for electricity may fluctuate, for example, when consumption expectations or the wind forecast show an unexpected change. On the other hand, an electricity producer's power plant may develop a fault and the producer has to acquire more electricity to sell. In such a case, electricity may be acquired from the Elbas intra-day market where the price of electricity often deviates from the Elspot price.

The price level of offers by electricity producers is affected by the way the electricity offered by them is produced, i.e. the variable costs of the power plants they are using. If the electricity demand peaks momentarily, more expensive methods are needed for producing the electricity. That is when the price of electricity rises. Correspondingly, when demand is low, the price will fall.

In the Nordic electricity market, wholesale electricity has the same price throughout the area only for some hours of the year. Different



prices occur in so-called bottleneck situations – when there are congestions in the transmission network. To provide for these, the Nordic market area has been divided into price areas. There are fewer bottlenecks between Finland and Sweden than in Southern Scandinavia.

Congestions may arise, for example, if more electricity should be transmitted to Finland than the transmission connection between Finland and Sweden is capable of delivering. That is when the price of electricity in Finland is higher than

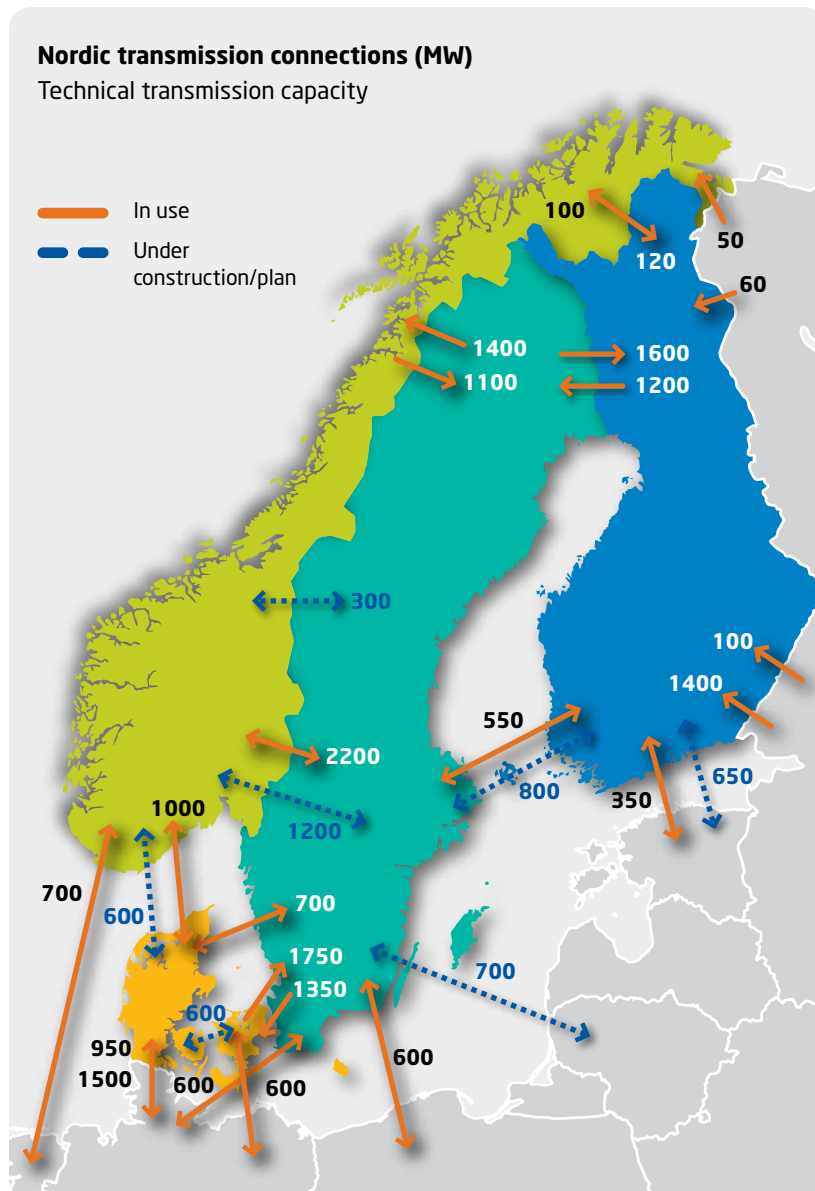
Physical market
For example, a power exchange trading in electricity deliveries for the hours of the next day.

in Sweden. Thus, it is more expensive to produce electricity in Finland than the electricity imported from Sweden would cost.

Efforts are made to prevent congestions by increasing the electric-

ity transmission capacity. Congestions may also arise inside different countries or price areas. Then the transmission system operator will reduce the transmission need with the objective of increasing production in areas of underproduction and decreasing production in areas of overproduction.

On the power exchange, the wholesale price of electricity is therefore determined separately for each hour of the following 24-hour period. If the customer wants to ensure that he receives electricity at a certain price, it is possible to hedge the price of electricity with derivative contracts in the financial market even for years to come, in the same way as the price of oil in the oil market. Hedging is a common practice.



Financial market
Trading in electricity derivative contracts, with the buyers and sellers hedging the price of electricity for a certain period of time.

On Nord Pool Spot, in the physical marketplace of electricity, about 300 TWh of electricity is traded each year, which is approximately 70 per cent of the electricity consumed in the Nordic countries. Its value is several billions of euros. In the electricity financial market, which operates separately from the electricity physical market, there are several different players in addition to electricity producers and buyers, for example, various companies offering risk management services and investment banks. The volume of the financial market is about five or six times that of the physical market. ●

From the power plant to consumers

When the electricity market was opened to competition, electricity transmission was left outside competition. It would not have been sensible to start building parallel networks to compete with one another. The operation of the electricity network can be described as a regulated and controlled monopoly. Network operation requires a network licence issued by the authorities. The Energy Market Authority supervises the activities of a network company and that its network service fee is reasonable.

Main grid

The nationwide high-voltage power grid. In Finland, the transmission system operator Fingrid is responsible for ensuring that the power system works on the national level.

In practice, this means that Finnish consumers can buy electricity from any electricity supplier operating in Finland who is offering electricity to the consumer's place of electricity use. The consumer cannot choose his electricity network company as electricity transmission is the responsibility of the network operator in whose area of responsibility the customer lives.

Electricity is first transmitted from a major power plant to Fingrid's main grid. Fingrid is responsible for ensuring that the electricity





system is working throughout Finland and enables the functioning of the electricity market. For this reason, the company's operations are kept separate from the rest of the players in the electricity market. Fingrid owns Finland's main grid and all significant connections to neighbouring countries.

The main grid is a high-voltage network from where electricity is transmitted to distribution networks via regional networks. The distribution networks are divided further into two voltage levels, medium- and low-voltage networks. Households are connected to low-voltage networks.

Local or regional network companies are responsible for the distribution networks. In Finland, there is a total of 380,000 kilometres of electricity network. This would

Regional network

Electricity is transmitted from the main grid to the regional network, which is also part of the high-voltage network.

Distribution network

Households and the majority of companies have joined the distribution network, which consists of medium- or low-voltage networks.

reach nine and a half times around the world. The main grid accounts for 14,000 kilometres of this.

Know more about your electricity use - save electricity

Consumers pay for electricity transmission in their electricity bill. Electricity would not move anywhere from the power plant without an electricity network. Network service fees cover the network company's services in electricity network operations.

Costs arise, e.g. from the capital invested in network operations, construction of a new network, and the maintenance of the electricity network. The service includes operational monitoring of the electricity network, repair of faults in all situations, other customer services and metering of electricity consumption. Power transmission poles need space, and therefore the lease and maintenance of the transmission line corridors around the poles, including clearing, are part of the tasks of network companies. Moreover, network service fees include some of the costs of the building and maintenance of the national main grid. The costs arising from the above-mentioned services are mainly fixed, and the amount of energy transmitted has hardly any impact on them.

Metering of electricity consumption will be undergoing a complete reform in the next few years. New remotely read electricity meters have already been installed in the

premises of some electricity customers. The objective is that the majority of customers would have them by 2014. Remotely read meters provide information about electricity consumption with the accuracy of one hour. In the future, all of the customers' bills will be based on verified meter readings, whereas until now customers have received a bill based on actual consumption once a year. When electricity users receive considerably more accurate information about their own electricity consumption, it will make it easier for them to increase the efficiency of their own electricity use.

Remotely read meters can also speed up the repair of faults. For

Remotely read electricity meter

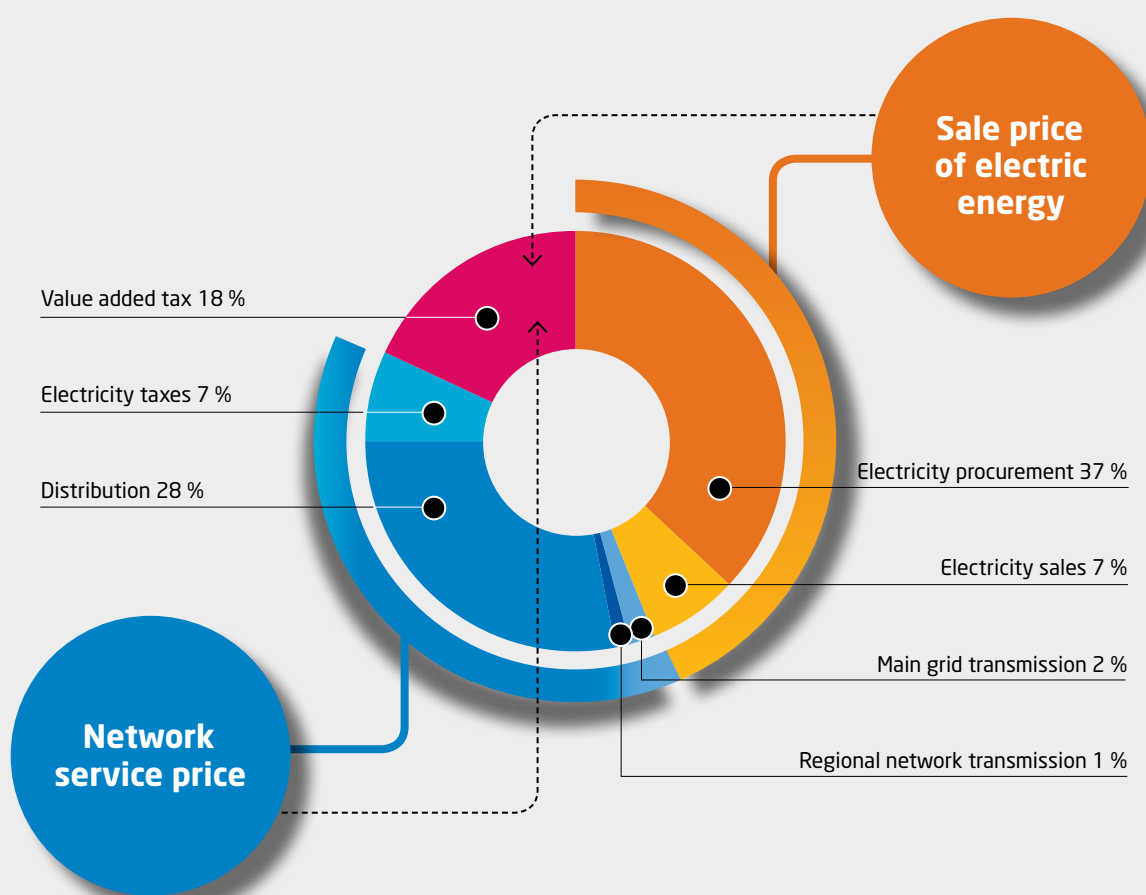
A meter on which the network company can read metering information without entering the premises.

example, the network company will be informed about a power cut instantly and can send engineers to repair the fault with immediate effect. The network company and electricity supplier ensure the data protection of consumption readings. The information is used for network functioning, customer service, invoicing of electricity, and energy efficiency services.

The scope of the project of introducing remotely read meters is so huge that only the electrification of Finland's countryside was a larger project, aimed at improving the distribution networks. Everyone will benefit from the project as energy efficiency is improved, the stability of the electricity system increases, and the operations of the electricity market are made more effective. ●

What does the price of electricity consist of?

Breakdown of the electricity price of a household customer 1 January 2009



Source: Energy Market Authority

The retail price of electricity includes both the procurement and sale of electricity. Network service price includes distribution, regional and main grid transmissions. Electricity tax is charged in its entirety in connection with the network service fee. Value added tax is levied on energy and network service fee.



When a consumer buys electricity

A consumer buys electricity by concluding a contract with the electricity supplier. The contract may be either a single overall delivery contract or separate electricity sale contract and electricity network contract. Usually, customers who have not made their electricity suppliers compete only have one overall delivery contract, and those who have invited tenders have a separate contract for electricity sales and transmission.

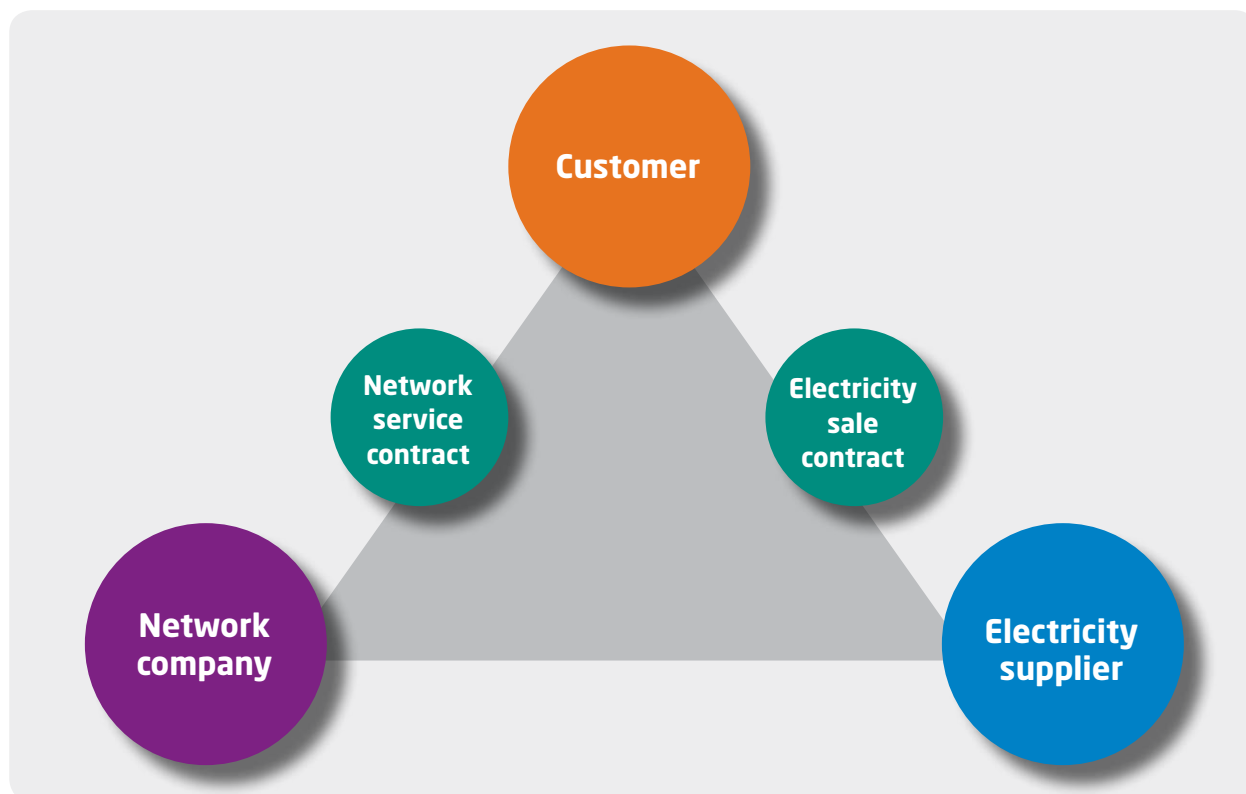
In Finland, most of the electricity sale contracts for households

are valid until further notice. In these contracts, the price of electricity follows the development of the electricity market with a delay. The electricity supplier decides on the timing of price changes and notifies the customer of the change of price at least one month in advance. The period of notice for termination of the contract is two weeks.

The consumer can also sign a fixed-term electricity sale contract for one or two years. In this contract, the price of electricity will not change during the contract

period. A fixed-term contract also binds the customer, and therefore a new contract must not be concluded during the fixed term. After the fixed term has expired, the contract will continue to be valid until further notice unless otherwise agreed with the supplier. A fixed-term contract may help in balancing the household consumption expenses. The consumer will be able to hedge the electricity price in the same way as an industrial company acquiring derivatives on the power exchange.





The customer has concluded an electricity sale contract with the electricity supplier and a network service contract with the network company.

In the third contract alternative, the price of electricity changes constantly. The contracts are usually valid until further notice. The price may be tied to the quotations of the power exchange. These contracts are fairly popular in Norway, but they have not become very common in Finland. Especially customers who are able to schedule their electricity consumption to cheaper periods, such as those living in a detached house, will benefit from this kind of a contract.

Electricity sale contracts include various ways of metering electricity consumption. With general electricity, the price of electricity will not change according to the time of day or year when electricity is consumed. Electricity can also be metered separately as night-time and daytime electricity. A consumer who buys night and day electricity separately is usually able to regulate

his consumption of electricity, such as the heating of a detached house, to the cheaper night time rate. In the contracts, electricity can also be itemised by season, which means that electricity has a different price in the summer and in the winter.

When remotely read meters become more common, electricity suppliers will have an even better opportunity to tailor electricity sale contracts according to the needs of customers. Corporate customers already have considerably more tailor-made contracts than households. Companies also more frequently hedge their electricity procurement.

Today, electricity is also sold with pro-environmental brands. For example, if a customer has purchased electricity produced by wind power, the electricity supplier will also have to procure the same amount of electricity produced

by wind power. As it is not possible to separate electricity in the network, the buyer of environmentally friendly electricity receives the same kind of electricity as everyone else.

On the electricity bills and marketing materials, electricity suppliers have to provide information on the energy sources and environmental impacts of the electricity they have sold.

The majority of Finns still have not invited tenders from their electricity suppliers. They have an electricity sale contract with the supplier with a delivery obligation. The supplier with a delivery obligation is the local market leader. It is obliged to offer a public price and the same terms and conditions for customers within the delivery obligation area of the network in question. These customers include consumers and small enterprises. ●



How to buy electricity and invite tenders from electricity suppliers

An electricity sale contract can be concluded online or by phoning the electricity supplier. When you are moving house or switching electricity suppliers, all you need to do is to contact the preferred electricity supplier. The customer does not have to terminate the old electricity contract, but the electricity supplier will terminate it at request. Furthermore, the customer does not have to contact the network company responsible for electricity transmission as the electricity supplier will take care of this.

If the electricity supplier has previously been part of the same group of companies as the network company managing the electricity transmission, the consumer has received only one electricity bill with itemised electricity supplies and transmission. In future, there will be two

Energiamarkkinavirasto



electricity bills: one from the electricity supplier and one from the network company for the transmission of electricity. Supplier switching will have no impact on the transmission fee, either.

Competitive tendering is becoming more common in Finland. The

Energy Market Authority has compiled statistics on competitive tendering of electric energy since 2007. An increasing number of customers have switched their electricity supplier, yearly about 4–8 per cent. In Sweden and Norway, competitive tendering is more common. There, the corresponding figures are approximately 8–10 per cent.

Competitive tendering is often regarded as difficult, although in reality filling an online form on the electricity supplier's website or phoning the supplier is all that is needed. In addition to the necessary personal and contact details, supplier switching is facilitated by provision of the metering point ID, which is found on the electricity transmission bill. It is also advisable to mention the annual consumption estimate, which is also found on the electricity bill, although it is possible to conclude the contract without this information. The new contract can start two weeks from the request at the earliest. A fixed-term contract for electricity supply is valid for the period stated in the contract and it cannot be discontinued due to competitive tendering.

Where can I find information about the prices of electricity suppliers in order to compare prices? Up-to-date price information is available, for example, on the website of the Energy Market Authority at www.sahkonhinta.fi. When you enter the details of your household's electricity consumption in the price comparison engine, the programme will draw up a table, starting from the most favourably priced electricity supplier. ●



Contents of the electricity bill

Estimated bill of Electricity Company Ltd

Sähköyritys Oy		LASKUERITTELY 2/2	
<p>Keijo Kuluttaja Mäkiriinne 15 A 31 02100 Espoo</p>		<p>Asiakasnumero 12345678 Laskun numero 91011123 Laskun päiväys 02.11.2009 Käyttöpaikkatunnus 123456 Käyttöpaikka Mäkiriinne 15 A 31 02100 Espoo</p>	
<p>Arvioitu vuosikulutus 3 Mittarinumero 19280213 Päiväenergia 2 11950 kWh Yöenergia 10860 kWh</p>			
ARVIOLASKU AJALTA 01.10.2009–31.10.2009			
<p>Sähkön myynti: Sähköyritys Oy 4</p>		Yksikköhinta	Yhteensä
Perusmaksu	01.10.2009–31.10.2009	3,95 e/kk	3,95
Päiväenergia 2	01.10.2009–31.10.2009	996 kWh	6,68 c/kWh
Yöenergia	01.10.2009–31.10.2009	905 kWh	5,99 c/kWh
Yhteensä sis. alv 22 % 7			124,69
<p>Sähkön siirto: Sähköyritys Oy Aikasiirto 5</p>			
Perusmaksu	01.10.2009–31.10.2009	6,72 e/kk	6,72
Siirtomaksu, päivä	01.10.2009–31.10.2009	996 kWh	2,95 c/kWh
Siirtomaksu, muu aika	01.10.2009–31.10.2009	905 kWh	1,70 c/kWh
Sähköverot 1lk	01.10.2009–31.10.2009	1 901 kWh	1,0773 c/kWh
Yhteensä sis. alv 22 % 7			71,97
ARVIOLASKU YHTEENSÄ			196,66
Seuraavan laskun suunnitelman mukainen eräpäivä on 03.01.2010.			
Nykyisen vuosienusteen mukaiset keskihinnat tämän hetkisillä hinnoilla.			
	Vuosikustannus	Nykyinen vuosiennuste	Keskihinta 8
Sähkön myynti	1 496,17 e	22 810 kWh	6,56 c/kWh
Sähkön siirto	863,52 e	22 810 kWh	3,79 c/kWh

Maksuihin sisältyy perus-, energia- ja siirtomaksut sekä sähköverot, ei muita mahdollisia maksuja ja kuluja.

Jos maksat laskusi mieluiten verkkopankissa etkä ole vielä ottanut käyttöösi e-laskua, toimi heti. Ottamalla e-laskun säästät paperia ja luontoa. Lue lisää e-laskusta osoitteessa www.sahkooyritysoy.fi/elasku.

1 Metering point ID

You will need this when concluding a new electricity contract.

2 Electricity product

For example, general electricity, seasonal electricity, night-time electricity, etc. in accordance with the electricity sale contract.

3 Annual consumption estimate

An estimate of the customer's future electricity consumption, based on the customer's consumption in the previous year or on other more detailed information.

4 Sales fee

Usually formed of the basic fee (€/month) and the fee based on electricity consumption (cents/kWh). You can request for tenders from electricity suppliers.

5 Network service fee

Formed of the basic fee (€/month) and the fee based on electricity consumption (cents/kWh). The network service fee is the same regardless of your electricity supplier.

6 Electricity tax

The product of the amount of transmitted energy and the unit price of electricity tax.

7 Value added tax

Paid on the whole sum, including the electricity tax.

8 Average price of electric energy and transmission calculated from annual consumption

Includes information on total annual costs complying with the current annual forecast or the average price of annual consumption with current prices in accordance with the forecast.

The balancing bill would also show information about the actual electricity consumption during the invoicing period and any credit. Payments of estimated bills are deducted from the electricity bill. You will be credited, if you have used less electricity than the estimated amount during the year, and debited, if you have used more electricity than the estimated amount. The appearance of the bills will change slightly when moving from estimated and balancing bills to bills based on constant meter reading.



Outlook

The deregulation of the electricity market has brought competition to electricity production and sales. Competition is used to increase the efficiency of resource use and to gain cost savings in the national economy. When the market is open, also the consumers are able to freely choose their electricity supplier. Free competition is also used for promoting the entry of renewable energy on the market.

Pan-European integration of the electricity market has been recorded

in the targets of the European Union. Integration is only in its early stages. It has been implemented furthest so far in the wholesale electricity market in the Nordic countries. The next step in the Nordic countries is the integration of retail trade.

In the integrated electricity market of the future, electricity consumption will be directed to an increasing extent to periods of time when the prices are low. Throughout Europe, electricity is produced wherever it is most economical and

least harmful to the environment at any given time. Consumer choices are growing.

Global carbon dioxide emissions are reduced along with the increased energy efficiency of industry and households. Moreover, replacing other energy forms with electricity will reduce carbon dioxide emissions. For example, the engine of an electric vehicle has a higher efficiency rate than a combustion engine. Many industrial processes have already been



modified to be more energy efficient with the aid of electricity, such as drying of pulp by pressing instead of heating.

One of the benefits of electricity use is its good regulatability and steering. Nevertheless, there is still scope for improving the efficiency of its use. For example, the operation of an electric motor can be boosted with a frequency converter. It is also possible to save in other energy use by using electricity. Heat pumps are a good example of this: they are used for creating heat with a smaller amount of energy than in many other heating appliances. Furthermore, tighter structure and better insulation of buildings requires mechanical ventilation, i.e. appliances powered by electricity.

In the future, the everyday use of electricity may look like this: 'A

wind front sweeps across Northern Europe. Electricity produced by wind power is distributed with a pan-European integrated electricity network. Smart building service technology in homes receives information about favourably priced electricity, which is instantly utilised, for example, by charging up an electric vehicle in the garage and switching on the back boiler. In hydropower plants, water is pumped into reservoirs so that the plants will be able to produce the maximum amount of hydropower even after the wind front has passed.

Households will also be able to sell electricity. Therefore, for example, you can benefit from the electricity generated by solar panels even when the house itself is not consuming any electricity.' ●



How to save electricity at home and at work

- Maintain a room temperature of about 21 degrees. Reducing the temperature by one degree corresponds to an annual saving of about five per cent in the heating costs. Set the intake air temperature in ventilation a few degrees lower than the room temperature.
- Switch off the TV, digibox, computer, modem and other similar appliances when not using them.
- Do not leave appliances in the stand-by mode. The stand-by mode of appliances easily accounts for some 10% of household electricity consumption.
- Choose a laptop computer because it consumes only 10-20% of the amount of electricity a desk-top computer uses.
- Only wash full loads in the washing machine.
- Use underfloor heating sparingly. Use the actual heating system for space heating.





Glossary

CHP plant

Combined heat and power generation. CHP is short for Combined Heat and Power.

Derivatives market

With a derivative contract, the buyer and seller of electricity agree on a certain electricity price for a certain period of time. The purpose is to hedge the electricity price against major fluctuations.

Distribution network

Households and the majority of companies have joined the distribution network, which consists of medium- or low-voltage networks.

Emission allowance

The right of an industrial or energy production plant operating in a country within the emissions trading scheme to emit carbon dioxide into the atmosphere. Surplus allowances can be sold and more allowances can be bought, if necessary. One emission allowance corresponds to one tonne of carbon dioxide emitted into the atmosphere.

Energy efficiency agreement

The company pledges to reduce its energy use and/or offer its customers advice and consumption reporting, and that way to promote its customers' efficient energy use.

Feed-in tariff

A certain level of income is ensured for producers by paying them a feed-in tariff in addition to the price obtained from the market. For example, in many countries, electricity generation by wind power is supported by the feed-in tariff.

Financial market

Trading in electricity derivative contracts with the buyers and sellers hedging the price of electricity for a certain period of time.

Fossil fuels

For example, coal, oil and natural gas. Their use creates, e.g. carbon dioxide emissions into the atmosphere.

Greenhouse gases

Create a so-called greenhouse effect in the atmosphere, resulting in global warming. The most significant greenhouse gases are carbon dioxide, methane and chlorinated hydrocarbons.

Kyoto Protocol

The Protocol was approved in 1997 and it entered into force in 2005. It has been ratified by 176 countries. It obliges its signatories to reduce greenhouse gases to a certain level on country-specific terms.

Main grid

The nationwide high-voltage power grid. In Finland, the transmission system operator Fingrid is responsible for ensuring that the power system works on the national level.

Nord Pool Spot power exchange

A leading power exchange in Europe trading in physical electricity. The company is owned by the Nordic transmission system operators.

Physical market

For example, a power exchange trading in electricity deliveries for different hours of the next day

Purchasing of electricity

A consumer buys electricity by concluding a contract with the electricity supplier.

Regional network

Electricity is transmitted from the main grid to the regional network, which is also part of the high-voltage network.

Regulating power

Electricity generation or consumption that can be altered rapidly, when necessary

Remotely read electricity meter

A meter that provides information about electricity consumption with the accuracy of one hour. The network company can read metering information without entering the premises.

Power exchange

Electricity market place where the wholesale price of electricity is determined.

Supplier with a delivery obligation

An electricity supplier who is the market leader in the network company's area of responsibility, responsible for selling electricity to the consumers and small enterprises in the distribution network area at a public price and on the same terms.

Variable costs

Costs the amount of which is affected by the amount of production, for example, fuel costs.

Further information

General information about the electricity market

<http://www.energia.fi/fi>

Website of the Finnish Energy Industries.

<http://www.fingrid.fi/>

Website of Fingrid, Finland's electricity transmission system operator, providing information about its tasks and the state of Finland's power system.

<http://www.energiamarkkinavirasto.fi/>

Website of the Energy Market Authority with information about the operation of and decisions made by the Authority, and statistics and other information about the price of electricity and the electricity market.

http://ec.europa.eu/energy/index_en.htm

The Energy website of the European Commission.

<http://www.entsoe.eu/>

Website of the European transmission system operators' co-operation organisation, with statistics and information about European transmission system projects.

<http://www.energia.fi/fi/sahko>

Information about the operation of the electricity market, electricity generation, electricity network and consumer issues.

<http://www.energia.fi/fi/kaukolampo>

Information about combined heat and power generation, district heating and district cooling.

Statistics and market information

<http://www.energia.fi/fi/tilastot>

Energy statistics, also a good links directory of international energy statistics.

<http://www.nordpool.com/>

Up-to-date information about the wholesale market price of electricity and the prices of electricity and emission allowance derivatives.

<http://www.tilastokeskus.fi/til/ene.html>

Energy Statistics of Statistics Finland.

<http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/>

Energy website of Eurostat, the statistical office of the European Union.

<http://www.iea.org/stats/index.asp>

Statistics website of the International Energy Agency IEA.

Information about household electricity usage, energy efficiency and inviting tenders for electricity

<http://www.motiva.fi/>

Information about efficient and sustainable use of energy and materials.

<http://www.sahkonhinta.fi/>

Competitive tendering of electricity suppliers

<http://www.energia.fi/fi/sahko/kotijasahko>

Information about the impact of household electrical appliances on electricity consumption and tips on the energy-efficient use of appliances.



Finnish Energy Industries

Finnish energy industries
Fredrikinkatu 51-53 B, 00100 Helsinki
P.O.Box 100, 00101 Helsinki
Tel. (09) 530 520, Fax (09) 5305 2900
www.energia.fi



FINGRID

Fingrid Oyj
Arkadiankatu 23 B, 00100 Helsinki
P.O.Box 530, 00101 Helsinki
Tel. 030 395 5000, Fax 030 395 5196
www.fingrid.fi