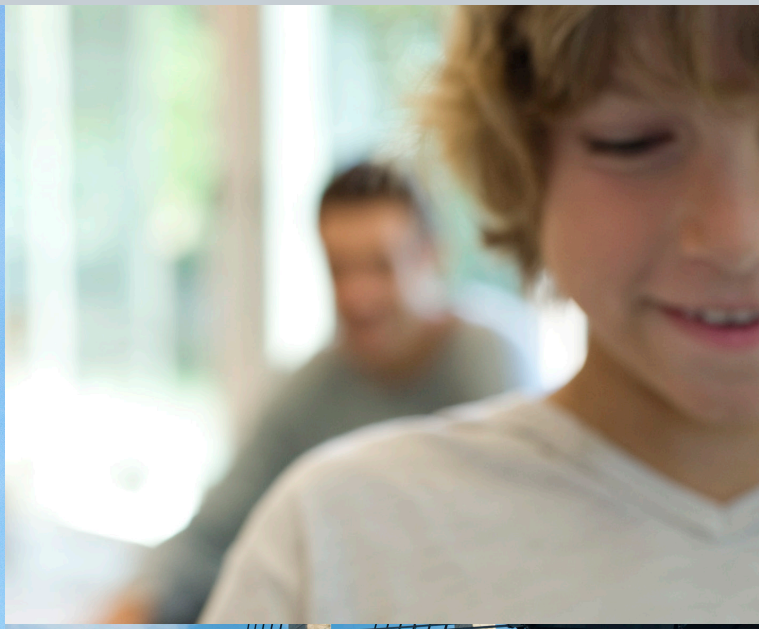
Energimarknadsinspektionen
Swedish Energy Markets Inspectorate

Ei R2018:11

THE SWEDISH ELECTRICITY AND NATURAL GAS MARKET 2017



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Swedish Energy Markets Inspectorate R2018:11
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This report is available at www.ei.se

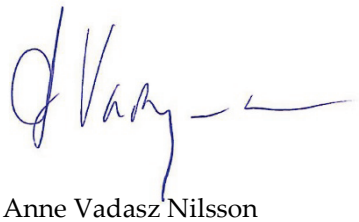
Preface

The Swedish Energy Markets Inspectorate (Ei) is the regulatory authority for the markets for electricity, natural gas and district heating, and constantly monitors the development of these. The purpose of this report is to describe the development of the electricity and natural gas market in 2017.

According to Ei's instruction, the authority must perform tasks pursuant to Directive 2009/72/EC of the European Parliament and of the Council concerning common rules for the internal market in electricity and Directive 2009/73/EC of the European Parliament and of the Council concerning common rules for the internal market in natural gas. This involves annual compilation of a report in accordance with the reporting requirements pursuant to the Directive. This report involves regulation issues, competition issues and issues relating to security of supply.

The report is compliant with the structure devised in consultation with the European regulatory authorities and the EU Commission. This report, together with the national reports of all member states, will be available in Swedish and English on the website of CEER, the Council of European Energy Regulators: www.ceer.eu.

Eskilstuna, June 2018



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Summary

– Development on the electricity and natural gas market

Trade on the Swedish electricity and natural gas markets is subject to competition. Electricity and natural gas network operations are regulated monopolies as it would be inappropriate, both economically and environmentally, to build parallel networks throughout the entire country.

In its role as a regulatory authority, Ei must constantly monitor and analyse development on the electricity and natural gas markets and submit proposals for amendments to regulatory frameworks or other actions in order to promote the function of the markets.

The electricity market

The Swedish electricity network

The Swedish electricity network is made up of 564,000 kilometres of cabling, of which approximately 382,000 kilometres is buried and 182,000 kilometres is overhead. The electricity network can be divided into three levels: transmission network, regional networks and local networks. The transmission network transports electricity over long distances, at high voltages. The regional networks transport electricity from the transmission network to the local networks, and in some cases directly to major electricity consumers. The local networks are connected to the regional networks and transport electricity to households and other end-customers.

Svenska kraftnät, a state enterprise, is the owner of the Swedish transmission network and is responsible for maintaining the power balance and reliability of the Swedish electricity network. Svenska kraftnät is certified as a system operator by the Swedish Energy Market Inspectorate (Ei). Ei is tasked with reviewing Svenska kraftnät in its capacity as a regulatory authority.

The local and regional utilities are responsible for ensuring that the level of maintenance of their own networks is sufficient to guarantee that the reliability of supply will be upheld.

The Swedish electricity network is operated as a regulated monopoly, where Ei reviews the utilities' revenues and assesses whether they are reasonable. Between 2016 and 2017, network charges increased by 2 per cent on average for customers living in apartments, 2.9 per cent for customers living in houses with 16 A fuse protection, and by 1.9 per cent for customers living in houses with 20 A fuse protection.

Ei decides revenue frameworks of how much the network operators are allowed to charge their customers over a four-year period. In 2017 Ei has decided on whether the individual electricity utilities' revenue frameworks should increase or decrease

for the period 2016–2019. This is dependent on whether revenues were lower or higher than the revenue framework in the previous period.

Wholesale market for electricity

A total of 394 TWh of electricity was traded on the Nord Pool physical trading platform in the Nordic region and Baltic states in 2017. This is an increase of 0.7 per cent on 2016, and a new volume record.

Total energy consumption in Sweden, including transmission losses, amounted to just over 140 TWh in 2017. Electricity consumption has increased only marginally compared with 2016, and it remains low in relation to its levels in the 2000s. Average temperatures in 2017 were higher than normal, although the summer months were slightly colder.

Electricity production throughout Sweden increased by approximately 8 TWh to 159.1 TWh in 2017, although electricity consumption remained relatively constant throughout the same period. At the end of the year, net yields were therefore added together to give an export of approximately 17.3 TWh.

Wind power production in Sweden increased by about 11 per cent in 2017 compared with the previous year. However, this type of power still represented just over 10 per cent of total electricity production.

End-customer market for electricity

In 2017, there were 123 electricity suppliers on elpriskollen.se, Ei's price comparison site. At the end of the year, the three biggest electricity suppliers had a total market share of 41 per cent in terms of number of customers. This figure has remained at approximately the same level over the past four years.

In 2017, most of the total cost of electricity for consumers – 45 per cent – was made up of tax and VAT. The cost for electricity supply amounted to 29 per cent, while the cost of transmission and distribution accounted for 26 per cent.

The most common electricity supply contract in Sweden is the variable price contract. The long-term trend is that more and more people are abandoning fixed contracts and assigned contracts in favour of variable price contracts. 47 per cent of Swedish household customers had concluded variable price contracts by December 2017, representing a reduction of 4 percentage points compared with December 2016. 30 per cent of customers had a fixed price contract with a tie-in period of one, two or three years.

The natural gas market

The Swedish natural gas network

The Swedish natural gas network is small compared with the rest of Europe and comprises 600 kilometres of transmission pipeline and approximately 3000 kilometres of distribution pipeline. The natural gas network is located on the west coast in southern Sweden.

There is also an urban and vehicle gas network in the Stockholm region. The urban and vehicle gas networks comprise around 500 kilometres and 40 kilometres of pipeline respectively.

There are also a number of small local gas networks around Sweden. Many of the small local networks are used primarily for transporting vehicle gas-type natural gas from production plants to fuelling stations.

Neither the gas network in Stockholm nor the small local gas networks are connected to any transmission network.

The western Swedish gas network and the gas network in Stockholm are the networks covered by the provisions of the Natural Gas Act. According to the Natural Gas Act, natural gas also includes biogas insofar as it is technically possible to use this gas in a natural gas system. There are currently nine biogas producers connected to the western Swedish natural gas system, two of which are connected in order to feed gas into the transmission network. Another two biogas producers are connected to the Gasnätet Stockholm AB network.

Utilities' revenues are regulated in advance, in a similar way to the rules on the electricity market. This means that revenues are regulated in a revenue framework extending over a four-year period. This framework defines an upper limit for the total revenues that companies are allowed to receive from their natural gas activities.

Prior to the first regulatory period in 2015–2018, these companies submitted applications in June 2014 for revenue frameworks totalling SEK 7.3 billion. Ei made decisions on revenue frameworks amounting to almost SEK 6 billion in October 2014. Four out of nine natural gas stakeholders appealed against Ei's decisions to the Administrative Court in Linköping. The Administrative Court gave its verdicts in February 2016. The verdicts mean that Ei won its cases in respect of important elements with regard to these companies' returns. However, the court opposed Ei with regard to depreciation periods and elements of the cost of capital. Both Ei and the companies appealed against the verdicts to the Administrative Court of Appeal in Jönköping in 2016. The Administrative Court of Appeal in Jönköping gave its verdict in November 2017, establishing longer depreciation periods for the transmission network company and a higher return for the gas utilities that appealed, compared with the decisions made by Ei. Ei appealed against these verdicts to the Supreme Administrative Court, and in April 2018 the Supreme Administrative Court stated that Ei cannot appeal.

Wholesale market for natural gas

Natural gas covers about 2 per cent of Sweden's total energy need and is therefore a relatively small source of energy. However, natural gas represents more than 20 per cent of final energy consumption in municipalities where the natural gas network is developed, which is in line with the average throughout the rest of Europe.

Sweden does not extract natural gas itself; all its natural gas supplies come from Denmark. Sweden saw the consumption of 8.7 TWh of natural gas in 2017, representing a decrease of 1.9 TWh on 2016.

In practice, Sweden has no domestic extraction of natural gas. Its gas is obtained from Denmark or Germany and then transported via Danish transmission pipelines and on up through the western Swedish natural gas network. A small number of Swedish stakeholders are active on the Danish gas exchange Gaspoint Nordic, which has been affiliated to the pan-European gas exchange PEGAS since 24 November 2016.

End-customer market for natural gas

The western Swedish natural gas network has around 35,000 natural gas customers, the largest of which are major industries and CHP plants and around 30,200 are household customers. The City of Stockholm urban and vehicle gas network has around 60,400 customers, of which around 2400 are corporate customers and 13 are industries.

There were a total of seven stakeholders on the Swedish end-customer market for natural gas at the end of 2017, six of which are in the western Swedish natural gas network and one is in the City of Stockholm urban and vehicle gas network.

Customers' overall gas costs have changed relatively little since deregulation took place in 2007. This is because the gas trading price has remained relatively constant at approximately SEK 0.30–0.35 per kWh. The network charge has also remained stable at approximately SEK 0.20–0.27 per kWh. Tax on natural gas has increased by approximately SEK 0.09 since 2007.

The single biggest expenditure item, 47 per cent of the total cost of gas for household customers, is made up of VAT and energy tax.

Consumer protection and disputes

Ei makes sure that companies on the electricity and natural gas markets operate in compliance with legislation, and in some cases it helps to resolve disputes between consumers and electricity network owners.

A lack of supply quality causes enormous inconvenience to customers and results in high costs for society. Disruptions cost society around SEK 1 billion each year. Shortcomings in power supply quality may also give rise to major costs. An effective electricity supply is extremely important to the function and development of society.

This was why Ei implemented a supervision initiative in 2016–2017 which included reliability of supply, power supply quality and the quality of the information on power outages submitted to Ei each year by the electricity utilities. The aim of this supervision was to follow up the utilities to ensure that they were implementing measures promoting supply quality in the electricity network in both the short and long term.

In its supervision, Ei worked on the basis of information from the annual report on outages. The utilities that reported outages lasting more than 24 hours or customers with more than 11 outages in 2014 or companies with indications of quality defects in their reporting of outages were selected for supervision. The

companies were ordered to report on the measures to be undertaken to address the shortcomings in areas where Ei identified defects in their supply quality.

Another supervision initiative began in 2017 with regard to outage data for 2016. This task involves 41 supervision assignments relating to a lack of supply quality. This work is expected to be completed in spring 2018.

Consumers have the opportunity to report any company failing to comply with the provisions of the Electricity Act and the Natural Gas Act. As the authority responsible for supervision, Ei can then examine whether the company has breached its statutory obligation. Ei received a total of 24 reports in 2017. Of these, 21 reports related to electricity utilities' obligations in accordance with the Electricity Act, and one report related to electricity suppliers' obligations in accordance with the same law. Two reports were submitted concerning gas utilities' obligations in accordance with the Natural Gas Act.

Ei operates in partnership with the Swedish Consumer Agency to provide the Hallå konsument [Hey consumer] information service. This is an online service where consumers can view information about their rights on a number of markets, including the energy markets. Ei provides intelligence and information on issues relating to the energy markets.

1 The electricity market

The Swedish electricity market was reformed in 1996. Trading in production of electricity has been subject to competition since then, while network operations involve a large number of regulated monopolies. The aim of exposing the production and sale of electricity to competition is to increase consumers' freedom of choice and pave the way for effective use of production resources.

Electricity network operations, on the other hand, are a natural monopoly, which means that having a number of such businesses within the same geographical region is not efficient in cost-benefit terms. This is why the Swedish Energy Markets Inspectorate regulates revenues for electricity utilities.

1.1 The electricity network

The Swedish electricity network is made up of 564,000 kilometres of power cables, of which approximately 382,000 kilometres are underground cables and 182,000 kilometres are overhead lines. The electricity network can be divided into three levels: transmission network, regional networks and local networks. The transmission network transports electricity over long distances, at high voltages. The regional networks transport electricity from the transmission network to the local networks, and in some cases directly to major electricity consumers. The local networks are connected to the regional networks and transport electricity to households and other end-

Figure 1. The Swedish transmission network for electricity and other connections to other countries

Source: Svenska kraftnät

1.1.1 Functional unbundling of electricity companies

Network operations must not be pursued by the same legal entity as the entity producing or trading in electricity. The aim of this is to prevent cross-subsidisation between companies pursuing different types of electricity business. Financial reporting of network operations must also be kept separate from all other business. This means that electricity network operations must be both legally separate and separated in the accounts from companies producing or trading in electricity. However, an electricity utility may produce electricity if this is intended for coverage of network losses or to replace loss of electricity in the event of a power outage. Besides this, there is a requirement for certain utilities to be functionally separate from companies that produce or trade in electricity.[1] This functional unbundling is applicable to companies that run network operations and form part of a group where the overall electricity network exceeds 100,000 electricity consumers.

All companies running network operations and that form part of the same group as a company that produces or trades in electricity must compile a monitoring plan [2]in accordance with the Electricity Act. The companies must also publish an annual report describing the measures they have implemented according to the plan. The purpose of the monitoring plan is to ensure that companies operate objectively and do not favour any market stakeholder. The monitoring plan must specify what measures are to be implemented by the company to counteract discriminatory behaviour in respect of other market stakeholders.

In 2017, Ei began planned supervision of the unbundling rules. Among other things, Ei examines how the Customer Service, Finance and IT functions have been distributed between the lines of business within a company, or between companies if a group is involved. This supervision began with a pilot study of three electricity utilities and one natural gas company in the autumn of 2017. A further review will be taking place in spring 2018, and decisions will be made as a result of the supervision.

Ei inspects the transmission network operator

Svenska kraftnät, which operates and administers the Swedish transmission network, is also the authority acting as the system operator[3] for the Swedish electricity network. Svenska kraftnät's job is to administer, run and develop a cost-effective, reliable and eco-friendly power transmission system in a commercial manner, and to sell transmission capacity and otherwise pursue activities linked with the power transmission system. According to the EU's Internal Market in Electricity Directive, Ei is tasked with reviewing Svenska kraftnät in its capacity as a regulatory authority.[4]

[1] In accordance with Directive 2009/72/EC of the European Parliament and of the Council concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.
[2] 1997:857 Chap. 3 section 17
[3] 'Transmission network operator' and 'transmission network company' are common synonyms for 'system operator'.
[4] There is no independent system operator in Sweden. This is why the provisions specifically addressing supervision of independent system operators are not applicable to Ei.

Revenue frameworks for Svenska kraftnät and other electricity utilities have been established in advance since 1 January 2012. Svenska kraftnät had a supervision period of one calendar year until 2015, while other electricity utilities had a supervision period of four calendar years as a rule. However, like the other electricity utilities Svenska kraftnät has had a supervision period of four years since 2016. A revenue framework refers to the maximum overall revenues that may be taken by an electricity utility from its network operations in a supervision period[5]. Supervision of Svenska kraftnät for 2017 has involved making a decision on whether the revenue framework for the 2016–2019 supervision period should be increased, given the fact that revenues from the earlier period were lower than the revenue framework.

According to the EU's Internal Market in Electricity Directive,[6] transmission system operators must be certified. Ei received an application for certification from Svenska kraftnät in the autumn of 2011 and made a decision in July 2012 to certify Svenska kraftnät as a system operator for the Swedish electricity transmission network. This certification will remain valid until further notice, but it may be reviewed by Ei if the system operator fails to meet the requirements for certification.

1.1.2 Technical function of the electricity network

Reliability of supply in the electricity network is assessed by Ei on the basis of outage reports

An effective electricity supply is extremely important to the function and development of society. The outage data that electricity utilities are obliged to report to Ei each year in accordance with the Electricity Act is used to assess and analyse reliability of supply in the Swedish electricity networks. Detailed outage reporting has taken place at customer level since 2011, reporting both short and long outages. A range of key figures and indicators can be calculated from this data. Long-term and extensive power outages must also be reported to Ei continuously.

One of the purposes of this reporting initiative is to make it possible for Ei to assess the supply quality in the electricity networks and intervene if the measures implemented are insufficient to guarantee reliability of supply for customers. The assessment of supply quality also forms the basis for quality adjustment of the revenue framework for each electricity utility. Tabell 1 shows power outages in local networks between 2003 and 2016. These figures indicate average values per customer and are divided into unannounced and announced outages. Announced outages are outages of which customers were notified well ahead of time prior to the outage. These may be justified for reasons relating to operation or electrical safety, such as for repairs and preventive maintenance with a view to maintaining good operating reliability and reliability of supply. According to the Electricity Act, the announced outage must not continue for longer than required by the activity.

[5] 1997:857 Chap. 1 section 5 a
[6] 2009/72/EC Article 10

Table 1. Power outages in local networks due to faults in the network in question, average values per customer[7]

Year	SAIFI, announced outages (outages/year)	SAIFI, unannounced outages (outages/year)	SAIDI, announced outages (minutes/year)	SAIDI, unannounced outages (minutes/year)
2003	0.19	0.90	27	118
2004	0.19	0.89	25	72
2005	0.21	1.26	32	890
2006	0.19	1.05	22	88
2007	0.31	1.49	22	307
2008	0.50	1.04	26	104
2009	0.22	0.88	20	63
2010	0.14	1.03	20	71
2011	0.19	1.31	16	174
2012	0.14	1.03	17	75
2013	0.14	1.02	18	139
2014	0.15	0.98	16	69
2015	0.14	0.96	16	107
2016	0.15	0.85	18	61

Statistics for 2017 will be completed in summer 2018. Source: Ei

On average, rural electricity networks are affected by more outages and longer outage periods than electricity networks in urban districts. Years with many powerful storms (such as 2005 and 2007) also have a greater impact on rural networks than on networks in urban districts. Supply reliability is affected by factors such as the type of cabling used. Rural networks are generally more exposed to weather-related disruptions, partly due to the fact that these networks frequently have a higher proportion of uninsulated overhead cables and a lower proportion of buried cables than is the case with urban networks. The proportion of buried cables in local networks has increased with a view to reducing the vulnerability of these electricity networks in respect of extreme weather. However, buried cables may be affected by disruptions that are not dependent on the weather, such as outages caused by cable rupture due to excavation work or ageing components. As regards overhead cables, insulated cables are more robust than uninsulated cables. Approximately 98 per cent of local networks' total cable length in the low-voltage network is insulated. At medium and high-voltage level in the local networks, around 75 per cent of cables are insulated[8].

Regulatory framework relating to reliability of supply and compensation for outages

The electricity utilities are obliged to perform risk and vulnerability analyses and devise action plans showing how they will improve reliability of supply in their own networks. The purpose of the provisions is to ensure that electricity utilities take preventive steps to reduce vulnerability in the electricity network and help to meet the Electricity Act's functional requirements stating that power outages must

[7] SAIFI = System Average Interruption Frequency Index (average number of outages per customer throughout the year (number of outages/year))
SAIDI = System Average Interruption Duration Index (average outage time per customer throughout the year (outage minutes/year)).

[8] These figures relate to 2016. Statistics for 2017 will be completed in autumn 2018.

not exceed 24 hours. Ei has issued regulations on the annual reporting of risk and vulnerability analyses in electricity networks, which also means that a report based on the risk and vulnerability analysis and the action plan must be submitted to Ei.

Besides the functional requirements of the Electricity Act, Ei has also prescribed other requirements must be met for electricity transmission to be deemed to be of good quality. Elements of the regulations relating to technical requirements for treeproofing of regional network cables and functional requirements for higher load levels were issued in 2010, while regulations relating to power quality requirements were issued in mid-2011. In 2013, these regulations were supplemented with guidelines concerning the number of outages at customer level.

According to the Electricity Act, electricity consumers affected by outages in their electricity supply for at least 12 hours are entitled to compensation from the electricity utility to which they are connected. This requirement is applicable to outages that fall within the extensive liability of the network owner.[9] This compensation is defined by a template and must be paid automatically. The Electricity Act also regulates the entitlement to damages from electricity utilities in the event of injury or damage to property or assets. Ei has issued regulations on how a network owner should notify customers of the rules relating to compensation for outages.

1.1.3 Electricity network charges for connection and transmission

The Swedish electricity network is run by a large number of companies in regulated monopolies. Ei regulates these companies' revenues in order to ensure that companies holding sole rights to operate an electricity network in a certain region – known as a concession – do not exploit their monopoly position. According to the Electricity Act, electricity network charges must be reasonable, objective and non-discriminatory. Reasonableness relates to a utility's total revenues, while objectiveness means that the company's overall charges for a customer category must reflect the costs incurred by the utility for precisely this category. Therefore, companies are allowed to have different charges for different customer categories, such as customers living in houses and customers living in apartments. That said, companies must not benefit one customer category at the expense of another.

According to the Electricity Act,[10] electricity utilities are entitled to charge fees to cover costs incurred due to operation and maintenance, plus a reasonable return on the business capital. To simulate competition, Ei has defined a streamlining requirement and a requirement for good supply quality.

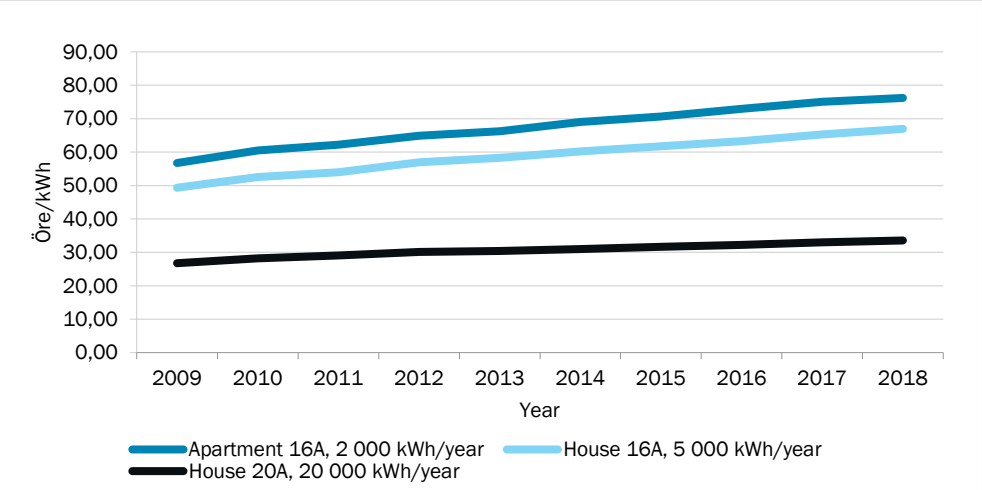
The electricity network charge frequently comprises a fixed element (subscription charge) and a variable element (electricity transmission charge). The fixed element varies according to the extent of the fuse protection or the power for which the customer has subscribed. The variable element is altered depending on the customer's consumption. For a house with heating that runs on electricity, the fixed

[9] Incidents within the extensive liability are incidents that the company can reasonably predict and for which the utility companies can be expected to dimension the design and operation of the network.
[10] 1997:857 Chap. 5 sections 8 and 9

and variable elements of the charge are approximately the same. Ei collects data for 15 different customer groups to allow it to compare different network owners.

Figure 2 shows how the network charges for different household customer types have developed over the past few years. Between 2016 and 2017, charges increased by 2 per cent on average for customers living in apartments, 2.9 per cent for customers living in houses with 16 A fuse protection, and by 1.9 per cent for customers living in houses with 20 A fuse protection. In monetary terms, the increase is equivalent to SEK 29, SEK 92 and SEK 124 per year respectively. Between 2017 and 2018, charges increased by 1.6 per cent on average for customers living in apartments, 2.5 per cent for customers living in houses with 16 A fuse protection, and by 1.7 per cent for customers living in houses with 20 A fuse protection. In monetary terms, the increase is equivalent to SEK 24, SEK 34 and SEK 11 per year respectively.

Figure 2 Actual development of network charges for household customers[11]



Source: Ei

Customers with low electricity consumption generally have fewer alternative tariffs available to them than customers with high electricity consumption. Most electricity utilities offer only one type of tariff, known as a single tariff, to customers with low consumption. Single tariff means that customers pay the same amount no matter when the electricity is used during the day. The alternative to the single tariff is the time of use tariff, where customers pay different amounts depending on the time of day when they use the electricity.

A number of electricity utilities have introduced output-based tariffs for household customers. These involve a smaller fixed charge linked to the size of the fuse protection, which determines the maximum power withdrawl. Besides the fixed charge, households are charged according to how they use electricity over time. For example, different charges may be levied for different times of the day or different times of the year.

[11] Average value calculated at 2015 price level, not weighted.

Ei's advance decision on electricity network charges

Since 2012, electricity utilities' revenues have been regulated in that Ei establishes a framework in advance for every utility's revenues for a period of four years. This is known as a revenue framework. The present regulatory period runs from 2016 to 2019. In 2017, Ei has decided whether the companies' revenue frameworks for the present period are to increase or decrease, according to whether their revenues were lower or higher than the revenue framework in the previous period.

The advance regulation was introduced as a consequence of requirements in the Internal Market in Electricity Directive. Revenues from electricity network operations used to be regulated by means of subsequent Ei review of the reasonableness of the utilities' charges[12].

The purpose of regulation is to ensure that utilities' operations are run efficiently, at low cost. It aims to ensure that customers pay reasonable prices for their network services. This regulation should help to provide customers with long-term reliability of supply, safeguarding the Swedish electricity supply. Utilities should also be given stable, long-term conditions for their network operations.

The revenue frameworks should cover reasonable costs for running network operations during the regulatory period and provide a reasonable return on the capital required to run the operations, the capital base. Costs for appropriate and efficient operation of a network operation with similar objective criteria should be regarded as reasonable costs for running the network operation. The quality of the ways in which the electricity utilities run their network operations must be taken into account when deciding on the revenue framework.

The regulatory framework was clarified prior to the 2016–2019 regulatory period by introducing more detailed rules to the revenue framework regulation.[13] These rules state – among other things – that the age of the systems must be taken into account when assessing the company's capital costs. The economic life, or depreciation period, has also been established in the revenue framework regulation. As a direct consequence of the Energy Efficiency Directive[14], a provision has also been introduced stating that attention must be paid to the extent to which network operations are run in a manner consistent with or contributing to efficient utilisation of the electricity network. Ei has issued regulations providing more detailed rules on assessment of quality, efficiency and costs, including how the age of systems is to be determined.[15]

If a utility's revenues deviate from the revenue framework, this will impact on the revenue framework for the forthcoming regulatory period. If the company's

[12] Govt. bill 2008/09:141.
[13] Regulation (2014:1064) on revenue frameworks for electricity utilities
[14] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC
[15] Swedish Energy Markets Inspectorate regulations (EIFS 2015:5) on what is meant by quality in the way in which the network concession holder runs network operations when establishing a revenue framework, Swedish Energy Markets Inspectorate regulations (EIFS 2015:6) on what is meant by efficient utilisation of the electricity network when establishing a revenue framework, and Swedish Energy Markets Inspectorate regulations (EIFS 2015:2) on reasonable costs and a reasonable return when calculating revenue frameworks for electricity utilities.

revenues have been lower than permitted by the framework, this means that the revenue framework for the forthcoming period will be increased by an equivalent amount. If the utility has exceeded the framework instead, the revenue framework for the forthcoming period is reduced. An overcharging supplement will also be added if the framework has been exceeded by more than 5 per cent, further reducing the revenue framework.

The Electricity Act also includes rules on reassessment of the revenue frameworks before and after the regulatory period, application and decision times and allocation of charges to specific periods.

In December 2016, the government gave Ei the task of developing current electricity network regulation. In October 2017, Ei submitted its report *Nya regler för elnätsföretagen inför perioden 2020–2023 (Ei R2017:07)* [New rules for electricity utilities for the 2020–2023 period (Ei R2017:07)] to the government, providing proposals on how regulation can be amended for the 2020–2023 regulatory period. Ei's report includes multiple proposals with a view to clarifying and improving the assessment of electricity utility revenues. Among other things, Ei proposes that the method for calculating companies' returns should be indicated by provisions in the regulatory framework and the new depreciation periods should apply. Ei also proposes amendments to the Electricity Act in order to clarify and simplify the legislation.

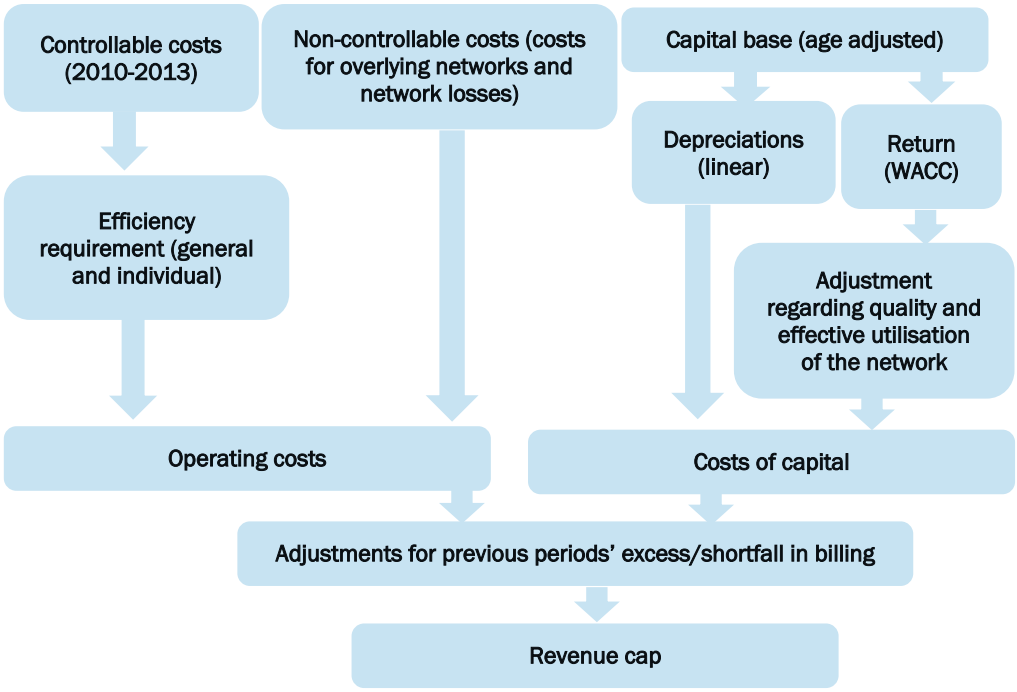
The various elements of the revenue framework

The reasonable costs that are to be covered for the companies in the revenue frameworks are divided into capital costs and running costs that can and cannot be influenced. Figure 3 indicates how the various elements of the revenue framework are interlinked.

Capital cost is the cost of using capital, and the capital base forms a foundation for the capital costs. The capital base includes fixed assets such as electricity cables and network stations that electricity utilities use to run their network operations. The cost is made up of two elements: the cost of capital consumption (depreciation), and the cost of capital tied up (return). The capital base is valued on the basis of the present purchase price, and the return is calculated using the actual cost of capital before tax[16]. When calculating capital costs, EA takes into account investments made during the regulatory period in question.

[16] Established by Ei at 4.53 per cent for 2016–2019 and by the Administrative Court of Appeal at 6.5 per cent for 2012–2015

Figure 3 Elements of the revenue cap for electricity



The return is also affected by the quality of the network operations and how efficiently the network is utilised. Quality is assessed on the basis of disruptions to transmission. The number of network losses, costs for overhead and adjacent networks and load on the network are crucial in the assessment of efficiency. However, this element can only influence the size of the revenue framework by 5 per cent in either direction.

Costs that cannot be influenced include costs for network losses, subscriptions to overhead and adjacent networks, connection to overhead and adjacent networks and costs for public levies. Companies receive full coverage for costs that cannot be influenced.

Examples of costs that can be influenced include costs for operation and maintenance, as well as customer-specific costs for metering, calculation and reporting, for instance. Ei uses the companies' historical costs between 2010 and 2013 as its basis in order to establish the costs that can be influenced for the 2016–2019 regulatory period. The regulation includes a streamlining requirement so that customers will benefit from anticipated productivity increases. Ei has calculated individual streamlining requirements for every company for the 2016–2019 regulatory period. The minimum requirement is 1 per cent per year, while the maximum is 1.82 per cent per year.

Appeals against many Ei decisions

Ei established 177 revenue frameworks for the 2012–2015 regulatory period, and 96 appeals were subsequently submitted to the Administrative Court. These appeals related primarily to what came to be referred to as the transition method and the return, i.e. the cost of capital. The transition method was part of the Ei method and meant that the revenue frameworks were restricted on the basis of the companies' historical charges so as to be reasonable. This method was rejected by the

Administrative Court and the Administrative Court of Appeal. Ei had set the cost of capital to 5.2 per cent. The court changed this to 6.5 per cent.

Ei is of the opinion that the level of the cost of capital for 2012–2015 is unjustifiably high for an operation with an unusually low risk, and so it appealed against the verdicts to the Supreme Administrative Court. However, Ei did not receive review dispensation. The transition method can no longer be applied due to the changes to the regulations as described above.

The companies that did not appeal against Ei's decisions also had the opportunity to request amendment of their revenue frameworks on the basis of the verdicts of the Administrative Court of Appeal. 120 companies submitted such requests. Ei made decisions on these cases in the spring of 2016.

Ei made 185 decisions on revenue frameworks prior to the 2016–2019 regulatory period. 81 appeals were submitted to the Administrative Court as a result of these decisions. The most important issue in the court process for this regulatory period is the level of the cost of capital, which Ei set at 4.53 per cent[17] prior to the regulatory period. The Administrative Court set the cost of capital to 5.85 per cent in verdicts given on 14 December 2016, which means that the revenue frameworks decided upon for the 2016–2019 regulatory period will then increase by approximately SEK 8 billion. Ei has appealed against the Administrative Court's verdicts to the Administrative Court of Appeal, which in November 2017 indicated that Ei would not have review dispensation. Ei chose not to appeal as the authority submitted proposals for new regulation of electricity utilities' revenue frameworks in October 2017. Hence the verdicts of Administrative Court stand.

The revenue framework level

Tabell 2 indicates requested amounts, revenue frameworks decided upon and frameworks following the court proceedings for the 2012–2015 and 2016–2019 regulatory periods[18]. When comparing the different regulatory periods, it must be noted that the amounts for the different regulatory periods are specified in price levels for different years.

Table 2 Revenue frameworks

Revenue frameworks, SEK billions	Frameworks decided upon	Requested amounts	Frameworks after consent during the court proceedings	Frameworks after court proceedings
2012–2015 (price level for 2010)	150	183	160	196[19]
2016–2019 (price level for 2014)	163	176	164	172

Source: Ei

Network regulation within the Nordic region

Ei has worked together with its corresponding authorities as part of the

[17] 4.56 per cent after consent from Ei during the court proceedings.
[18] Svenska kraftnät's revenue framework is not included in the table.
[19] After reconciled information and at the 2014 price level, the SEK 196 billion is equivalent to approx. 201 billion.

cooperation organisation NordREG (Nordic Energy Regulators) on how the regulatory framework and supervision of the operations of distribution utilities should be formulated. This group organised two workshops in 2017, one in April and one in November. The aim of the first workshop was to share experiences relating to incentives in order to reduce network losses, both now and in the future. The workshop was also open to external stakeholders. The second workshop was an internal arrangement for staff of the Nordic regulatory authorities and discussed how the effectiveness of regulation can be gauged.

1.1.4 Cross-border issues

The ability to transmit electricity between electricity regions and countries is an important prerequisite for a joint market. Work is currently ongoing on implementing EU rules with a view to facilitating and guaranteeing cross-border transmission of electricity. Ei has a key part to play in this work and is working in partnership with other relevant regulatory authorities in the EU, and in special fora on a regional level.

Projects of common interest

One important issue for the EU member states is to increase reliability of supply and security for electricity and gas within the EU. To achieve this, a number of projects are being highlighted as what are known as Projects of Common Interest, or PCIs. These projects have a specific regulatory framework that aims to facilitate and coordinate permit processes between countries, but also rules that provide project owners with the opportunity to apply for special EU funding in order to facilitate financing. For the 2014–2020 period, there is an amount of EUR 5.85 billion in what is known as the CEF fund,[20] and project owners can apply for this. These projects must help to integrate the market and increased competition, lead to greater supply security and reduce carbon dioxide emissions.

Ei has a number of tasks to perform according to the regulatory framework, including participation in evaluation of the projects applying to become PCI projects.

Sweden currently has one PCI project for electricity involving the 400 kV cable between Ekhyddan, Nybro and Hemsjö, which is planned to be commissioned in 2023. This project is aiming to increase the reliability of the transmission network and regional networks and safeguard the electricity supply to the NordBalt DC link between Sweden and Lithuania. The existing 400 kV cables in the region are old, and reinvestments will be considered in the near future. These reinvestments will be so extensive that the cables will have to be disconnected for a number of years. It will not be possible to perform this work without significant costs for end-customers in electricity region 4, unless an alternative supply route is established between electricity regions 3 and 4.

The project is helping to increase the transmission capacity between electricity regions 3 and 4 and to reduce transmission losses in the Swedish electricity network by approx. 275 GWh/year, which in turn will result in reduction of environmental impact in the integrated European electrical energy system.

[20] Connecting Europe Facility

1.1.5 Compliance with electricity legislation

Ei's work as a network authority includes supervising authorities to ensure that they are meeting their obligations in accordance with electricity legislation. The Electricity Act[21] states that Ei is also a regulatory authority in accordance with the Regulation on conditions for access to the network for cross-border exchanges in electricity[22]. According to Ei's instruction, the authority must also fulfil the tasks pursuant to the EU's Internal Market in Electricity Directive.

According to the Internal Market in Electricity Directive[23], the national regulatory authorities must comply with and implement the legally binding and relevant decisions made by the Agency for the Cooperation of Energy Regulators[24] (ACER) and the European Commission. No specific legislation is required for this to be applicable in Sweden. To make it possible for Ei to comply with the Commission's decisions, provisions have been introduced in the Electricity Act[25] and the Act on certification of transmission utilities for electricity[26]. These provisions mean that when Ei makes decisions that are affected by the Internal Market in Electricity Directive,[27] the authority has to state that these decisions may be amended or repealed at the request of the European Commission.

According to the Electricity Act,[28] Ei has the right to receive the information and view the documents needed for supervision upon request. Ei may provide notification of the orders needed to ensure compliance with the regulations and conditions subject to supervision[29]. Penalties may be applied in respect of such orders.

[21] 1997:857 Chap. 12 section 1, fourth paragraph.
[22] Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003.
[23] Directive 2009/72/EC of the European Parliament and of the Council concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.
[24] ACER is a collective authority for the EU's regulatory authorities for energy, and Ei is one of its members.
[25] 1997:857 Chap. 12 section 1 b.
[26] 2011:710 Chap. 3 section 4 and Chap. 4 section 3.
[27] 2009/72/EC Article 39.
[28] 1997:857 Chap. 12 section 2
[29] 1997:857 Chap. 12 section 3

1.2 Wholesale market for electricity

The Swedish wholesale market for electricity is part of an integrated Nordic-Baltic market through transmission links. The Nordic-Baltic network in turn is interconnected with the European electricity network. Operational management of the electricity network take place in each country, where the system operator is responsible for ensuring the constant equilibrium of the national electricity network.

Swedish electricity production is mainly based on nuclear power and hydropower. Electricity consumption is influenced by relatively large levels of power-intensive industry, along with the fact that many households are heated using electricity. Trading on the wholesale market mainly takes place on the Nord Pool electricity exchange.

Figure 4 The Nordic-Baltic electricity regions

Source: Ei

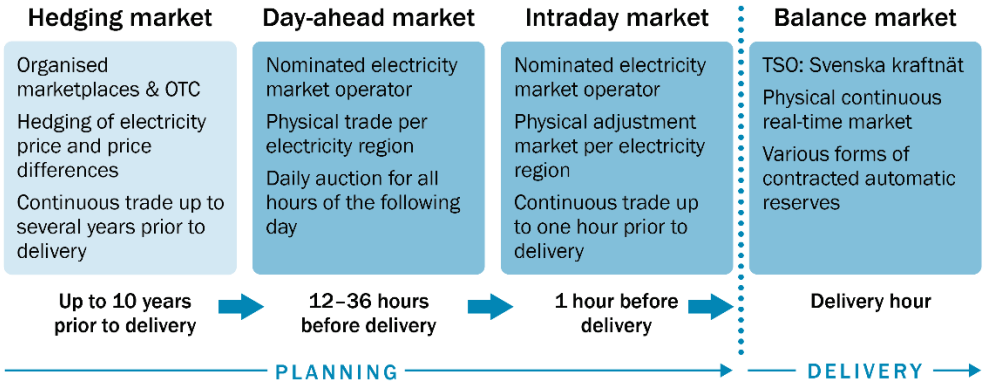
1.2.1 Monitoring of price development, transparency and competition

Trading in electricity on the Nordic-Baltic market

The Swedish electricity trading system is shown in Figure 5 below. The electricity trading system took on its current form at the time of deregulation in 1996, and in its present form it is primarily an *energy-only market*. On an *energy-only market*, producers receive payment on a per-hour basis for the electricity that they sell, not for installed capacity.

The electricity trading system can be divided into four submarkets: a hedging market, a day-ahead market, an intraday market, and finally a balanced market.

Figure 5 The electricity trading system



Source: Ei

There are organised marketplaces for trading on the various submarkets. Besides trading in these marketplaces, it is possible for stakeholders to trade bilaterally. The prices in the organised marketplaces act as reference prices for the bilateral trade.

The hedging market

When trading electricity, market stakeholders need to manage the financial risks inherent in the variation of prices both over time and between different geographical regions. Producers need to do this to safeguard their revenues at a certain level, but it is also necessary for consumers as they wish to achieve a certain level of predictability for their future electricity costs.

There are a number of ways in which to manage and hedge the price of electricity supplies. Most markets use various forms of financial forward agreement to handle the underlying risk in respect of future price levels. 'Financial' in this regard means that the contracts are not linked with any physical supply of energy; they are solely settled economically against a settlement price. Contracts may include different periods (weeks, months and years, for example) and have varying profiles as well (e.g. peak and base load contracts). The large volume of financial contracts on the Nordic market are linked with the system price[30]as a settlement price.

[30] Nord Pool Spot calculates the reference price used in the financial trade. This is known as the system price. Norway, Denmark, Sweden and Finland constitute one bid region in the calculation, while the

Different types of instrument are used in different parts of the EU for hedging the specific price risk for an individual electricity region. Transmission rights are the most common instrument for managing risk in continental Europe, while risk in the Nordic region is primarily managed using what are known as *Electricity Price Area Differentials* (EPAD). The buyer of an EPAD contract hedges the difference between the system price and the price in a specific electricity region. This may, for example, be an electricity region in which the buyer has its physical obligations, such as supply of electricity. In the same way, a producer can sell EPAD contracts in order to hedge production in an electricity region.

Essentially, hedging in Sweden and the rest of the Nordic region takes place when stakeholders trade forward agreements, sometimes in combination with EPADs. The contract can be traded bilaterally, via brokers or on trading platforms. For the Nordic region, both EEX and Nasdaq Commodities arrange trading in and settlement of financial contracts. Contracts that have been traded bilaterally are generally settled at a clearing house. Settlement means that the parties have the clearing house as a counterparty, and hence the clearing house takes over the counterparty risk. As things stand at present, it is possible to hedge financial electricity contracts up to 10 years ahead with Nasdaq Commodities, while EEX offers financial contracts up to 6 years ahead. Trading takes place constantly and is priced according to *pay-as-bid*[31]. Participation in the financial market is voluntary, and hence stakeholders themselves choose which contracts are appropriate to use in order to manage their risk.

The day-ahead market

The day-ahead market, frequently known as the spot market, is the primary market for planning the electricity supplies of tomorrow. Seven electricity exchanges in north-western Europe currently work in partnership in order to calculate market prices and volumes of trade for day-ahead trade. The calculation method – market coupling algorithm – used by the electricity exchanges is known as Euphemia[32]. The fact that the electricity exchanges calculate stock prices jointly means that they calculate flows over wider areas so that available production and transmission capacity is utilised as effectively as possible. The exchanges take it in turns to calculate the prices, so only one electricity exchange at a time calculates the prices for the collective area.

According to EU rules,[33] electricity exchanges require a permit to operate as an electricity exchange in an electricity region. Nord Pool and Epex Spot are allowed to operate as electricity exchanges in Sweden at present, but only Nord Pool has an established operation.[34] Nord Pool's day-ahead market, which is also known as

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Baltic states and Poland constitute individual regions in the same way as in the calculation of electricity region prices. The system price is calculated as if there were no restrictions in transmission capacity between the four Nordic countries.

[31] *Pay-as-bid* means that the buy and sell bids accepted are settled at the price submitted by the stakeholder in the market.

[32] Pan-European Hybrid Electricity Market Integration Algorithm.

[33] Commission guideline CACM (Capacity Allocation and Congestion Management), articles 2.23 and 4-6.

[34] Commission guideline CACM facilitates competition between exchanges. In 2016, EPEX Spot SE has applied for and been granted permission to operate as an electricity exchange on the day-ahead market in Sweden, but it has not begun operating as yet (Ei: 2015-102890).

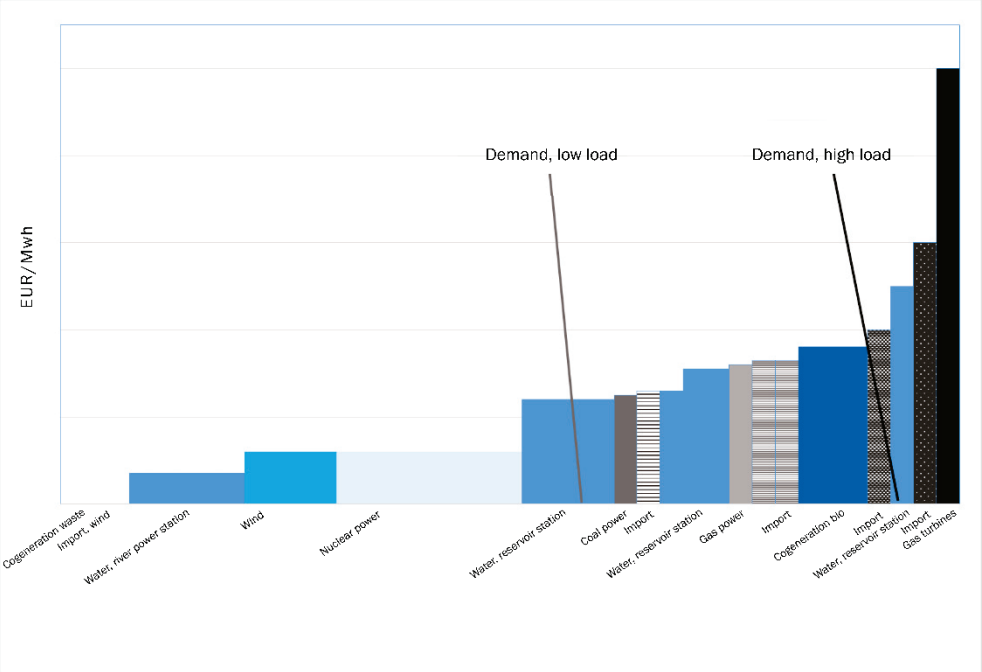
Elspot, is a marketplace for most of the physical electricity trade in the Nordic region and Baltic states. Approximately 90 per cent of all electricity consumed in the Nordic region is traded on Nord Pool (and integrated in the EU-wide market link), while the remaining 10 per cent is traded by means of bilateral agreements.

When trading on the day-ahead market, stakeholders submit their buy and sell bids to the electricity exchange by 12 noon. These bids are applicable for the following day and are submitted for each whole hour. The bids specify how much the stakeholder wishes to buy or sell, at what prices and in which electricity regions. In the next step, when all the bids have been received, the electricity exchange adds together all the bids hour by hour in a buy stage and a sell stage. When buy and sell bids are agreed upon, the market price and the volume to be bought and sold are established. All sell bids that are lower than the established price must produce and sell their electricity on the market in that hour, and all buy bids above the established price have to buy electricity in the hour in question. This is usually termed acceptance of the buy and sell bids, and it means that plants that are prepared to sell at a low price or irrespective of price are used first and that more expensive bids are accepted as required. The electricity exchange must publish the prices for the following day by 1pm.

Marginal pricing is applied on the day-ahead market, which means that all accepted stakeholders can trade at the established market price, regardless of their initial bids. There is no distinction between various production technologies. Hence the bids compete on equal terms regardless of the type of production offered on the market.

Figure 6 presents a basic diagram showing price formation on the spot market and the order in which various power types are accepted. It is worth noting that hydropower producers normally submit bids at several different price levels. This is because a hydropower producer that has access to reservoir capacity has the opportunity to choose between production today and production at a later date, depending on the price paid for its capacity. If the producer expects a higher price in future, it will probably refrain from producing electricity and store the water in the reservoir instead. Another significant element in the supply curve is the import option, which varies in terms of both scope and price from hour to hour.

Figure 6 Pricing in Sweden



Source: Ei

The electricity market is divided into electricity regions in order to manage transmission restrictions. When trading capacity is sufficient between electricity regions, the price is the same in these regions and they will form a collective price region. When trading capacity is insufficient, separate price regions with different prices occur. A price region may therefore comprise one or more electricity regions.

Trading on the day-ahead market accounts for much of the physical trade and pricing. This market is therefore deemed to be key to stakeholders' earning capacity.

The intraday market

Trading on the intraday market opens at 2pm the day before and closes one hour before the hour of supply. The bids are matched continuously when a counterparty is found, which means that trade takes place between two parties and with no price impact on other transactions.

The intraday market is an adjustment market which gives stakeholders the opportunity to trade in balance up to one hour before the operating hour if conditions have changed after the closing of the day-ahead market. For example, the temperature may have deviated from what was forecast, affecting the need for heating and hence consumption. The intraday market is used primarily by balance providers, i.e. the companies that have undertaken to accept the economic risk for imbalances on the market, even though being a balance provider is not obligatory to be allowed to participate in the intraday market.

The volumes on the intraday market in the Nordic region are relatively small (4.9 TWh in 2015) compared with the day-ahead market (361 TWh in 2015). The

intraday market has a greater part to play on other European markets than in the Nordic region as many stakeholders pursue more of their trade there.

The Nord Pool intraday market is known as Elbas. An EU-wide system for intraday trading is currently being developed. According to the regulatory framework intraday trading must be continuous, with implicit allocation of transmission capacity. The European model is being developed as part of the ongoing XBID project.[35]

The balance market

Svenska kraftnät has worked together with the other Nordic system operators to set up the balance market to guarantee their need for real-time regulation resources in a cost-effective way. The balance market comprises marketplaces for automatic and manual reserves.

Svenska kraftnät procures the automatic reserves. The pricing for automatic reserves includes two components: a capacity-related component and an energy-related component. The capacity element is settled according to *pay-as-bid*.[36]

The Nordic regulating power market is the market for manual reserves. Voluntary bids for upward and downward regulation are submitted to the regulating power market, commencing 14 days before the start of the supply day and ending 45 minutes before the supply hour. Only balance providers submit bids.

Marginal pricing is applied on the regulating power market when bids are called off for reasons relating to balance. This means that all activated upward regulation bids have the same price as the most expensive activated bid. Hence stakeholders have an incentive to invite their production at a flexible cost/alternative cost, in the same way as on the spot market. This paves the way for cost-effective allocation of balance resources. Downward regulation for balance reasons is settled at the lowest called-off downward regulation bid.

Bids on the regulating power market are submitted for each individual regulating object and must include information on volume (MW), price (EUR/MWh), information on geographical location and how quickly a called-off bid can be fully activated. Regulating objects may be in the form of production resources or consumption. Bids are ranked in order of price, and the cheapest measures are called off first. The present scheme means that the smallest bids that may be placed amount to 5 MW (in electricity region SE4) or 10 MW (in electricity regions SE1, SE2 and SE3). Bids can be aggregated to a single regulating object within an electricity region if they fall below the minimum permitted bid size. By way of comparison, it can be stated that the minimum bid size on the day-ahead and intraday markets is 0.1 MW. The maximum permitted price for upward regulation bids is EUR 5,000 per MW.[37]

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[35] Information on this project can be found on the Nord Pool website.

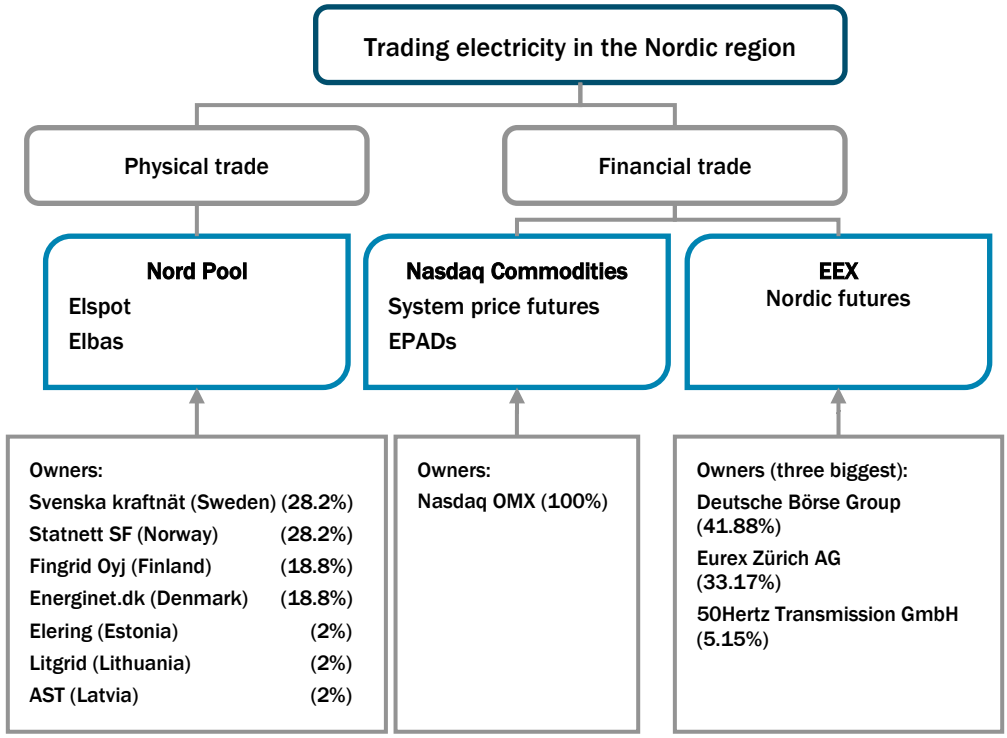
[36] The balance market will be affected by the EU regulatory framework via what is known as the Balance Code.

[37] Full terms and conditions for participation in the regulating power market can be found at www.svk.se.

Exceptions have to be made at times due to transmission restrictions or the time needed until the resource is fully activated. Deviations from the "lowest bid first" principle are known as special regulation. Bids called off as special regulation do not indicate pricing on the regulating power market and are settled according to *pay-as-bid*.

The prices established for upward and downward regulation respectively are used in the subsequent balance settlement.

Figure 7 Trading platforms for electricity on the Nordic-Baltic market



Source: Nord Pool, Nasdaq and EEX

394 TWh[38] of the electricity in the Nordic region and the Baltic states was traded on the Nord Pool physical trading platform in 2017, which is a new volume record and represents an increase of 0.7 per cent compared with 2016. This trade was divided between Elspot and Elbas (387.3 TWh and 6.7 TWh respectively). There were 380 active Nord Pool stakeholders in 2017 (the same number as in 2016).

Market sharing and countertrading to deal with bottlenecks

The need to transmit electricity within Sweden and the Nordic region is largely affected by variations in the availability of hydropower, as well as seasonal variations in consumption. Transmission restrictions in the Swedish transmission network are normally due to extensive hydropower production in the north, which leads to a major need to transmit this electricity southwards; while at the same time the transmission capacity between electricity regions is restricted. Transmission restrictions also occur in situations where there is a great deal of

[38] https://www.nordpoolgroup.com/message-center-container/newsroom/exchange-message-list/2018/q1/512-twh-traded-across-markets-show-strong-year-for-nord-pool/

transmission towards the north, from Denmark and the continent to the west coast of Sweden and on to southern Norway.

Two methods are used in Sweden and the Nordic region to deal with transmission restrictions in the form of bottlenecks: market sharing and countertrading.

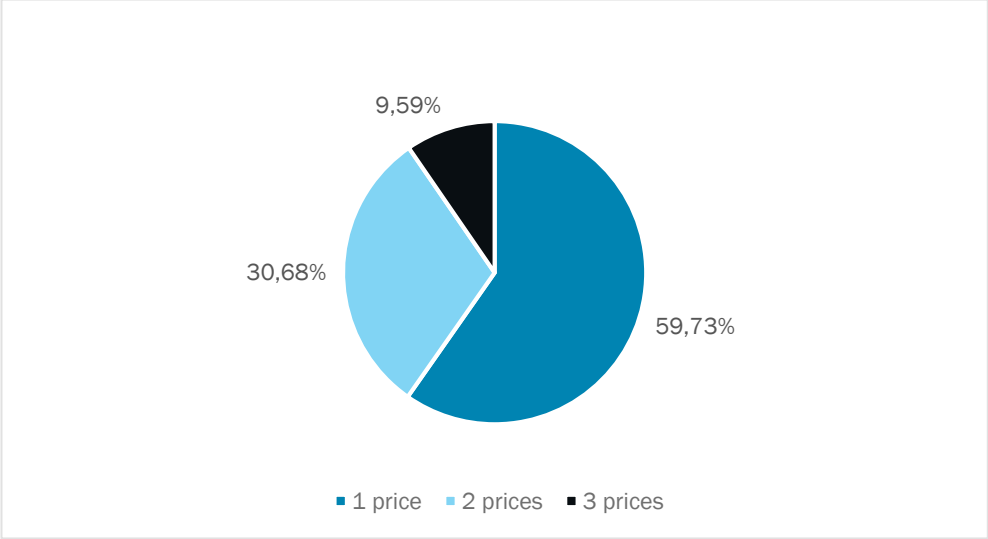
Market sharing involves dividing the electricity market up into submarkets, known as electricity regions (these are also known as spot price regions or bid regions): see Figure 7. The prices in the individual regions are determined by production and consumption in each region, and also by the transmission of power to and from adjacent regions. When two adjacent electricity regions have the same price, this is known as a price region. It is not uncommon for all of Sweden's for electricity regions to form a joint price region, particularly during low-demand hours. Price regions that extend over Danish, Swedish and Norwegian electricity regions are also common. Sweden has been divided into four electricity regions since 2011. The revenues received by Svenska kraftnät from the sale of electricity from high-price regions to low-price regions are earmarked for reinforcement of the transmission network.

Svenska kraftnät is also able to deal with transmission restrictions by means of countertrading. This means that Svenska kraftnät pays for increased electricity production in the shortfall region and/or reduced electricity production in the surplus region. Countertrading costs are charged to Svenska kraftnät, thereby signalling that the network needs to be reinforced.

Sweden was deemed to be one price region throughout most of 2017

In 2017, Sweden was a uniform price region for 59.73 per cent of the time. Most price differences can be found between southern (electricity regions 3 and 4) and northern (electricity regions 1 and 2) Sweden. All in all, there were price differences between northern and southern Sweden more than 9 per cent of time. These price differences occur primarily during periods of transmission restrictions or production losses, particularly in electricity region 4. The price differences between regions 3 and 4 are therefore expected to fall considerably when the new Sydvästlänken [South-West Link] transmission network cable is commissioned in 2018.

Figure 8 Proportion of the time in 2017 when Sweden was divided into 1–3 price regions

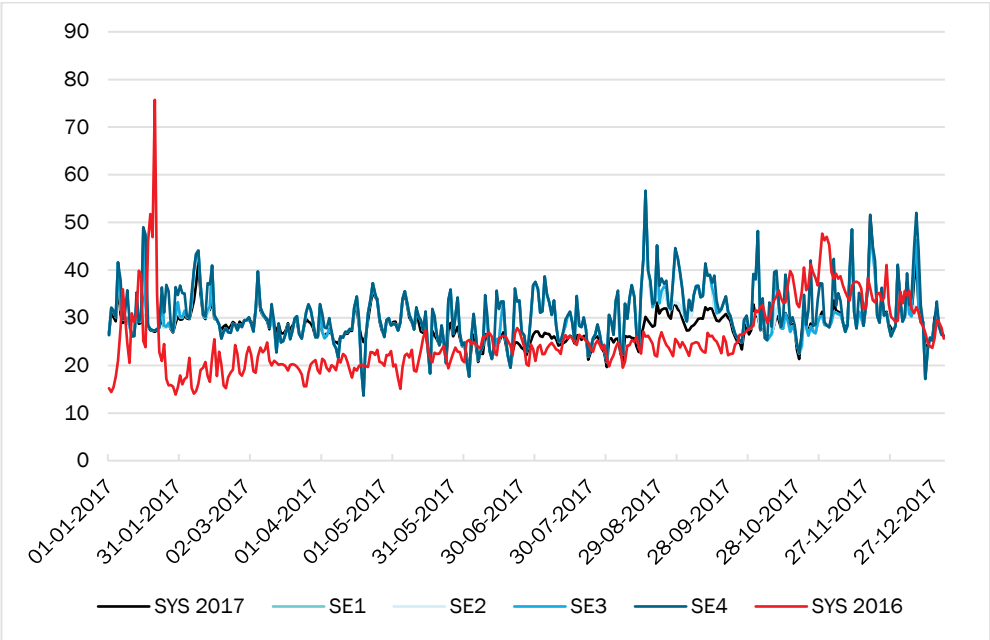


Source: Nord Pool, own calculation on the basis of data

Price development throughout the year

As Figure 9 shows, 2017 began with slightly higher spot prices than in 2016. The highest price was noted in all electricity regions on 23 August, when the mean daily price was SEK 0.5663 per kWh. The lowest prices for Sweden as a whole were noted on 22 April, when all Swedish electricity regions noted a mean daily price of SEK 0.1368 per kWh.

Figure 9 Mean daily prices on Elspot in 2016, öre per kWh[39]



Source: Nord Pool

[39] The figure shows the development in electricity prices throughout the year for all four Swedish electricity regions (SE1–SE4), the system price (SYS 2017) and the previous year's system price (SYS 2016).

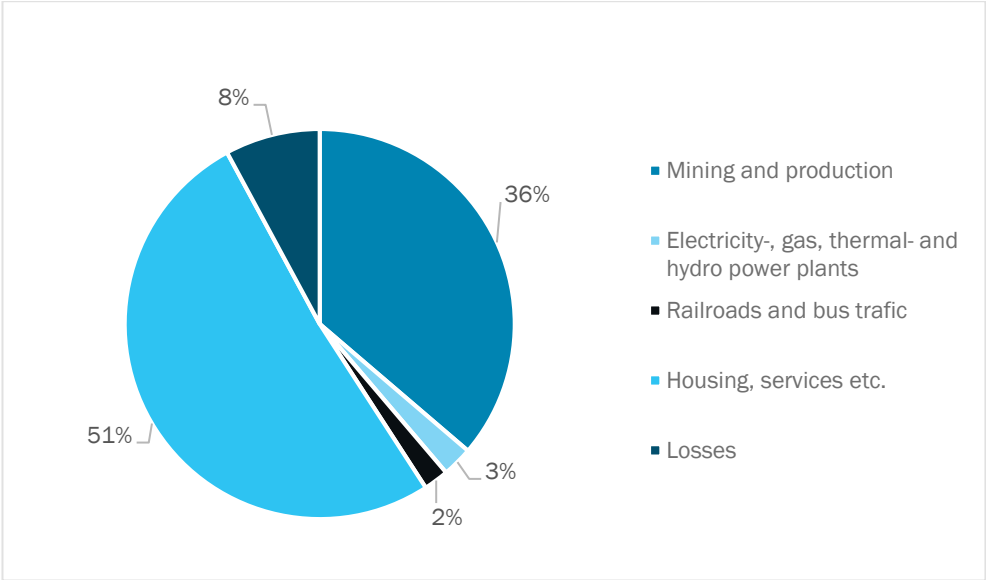
Low electricity consumption, high electricity exports and increased wind power production

Total consumption of electricity, including transmission losses, was slightly in excess of 140 TWh[40] in 2017, representing a marginal increase on 2016. Despite this, electricity consumption was still relatively low compared to levels in the 2000s.

Just over half of this electricity, almost 72 TWh, was consumed in the residential and service sector, which saw approximately same levels as in 2016: see Figure 10. Just as in 2016, industrial electricity consumption amounted to just over 50 TWh throughout the year, accounting for 36 per cent of total electricity consumption.

The relatively low consumption was partly due to the fact that mean temperatures in 2017 were higher than normal. Although the summer was slightly cooler, both the spring and the autumn were milder than normal.

Figure 10 Electricity consumption for 2017, by consumption area



Source: Statistics Sweden

Electricity production in Sweden rose by about 4 per cent in 2017, equivalent to an increase of 6.6 TWh compared with 2016. When the figures for the year were added together, net yields indicate an export of 19 TWh.

Wind power production increased by 11 per cent compared with 2016, and wind power produced 17.3 TWh in 2017. However, this type of power still represented just over 10 per cent of total electricity production.

[40] Preliminary data from Statistics Sweden's monthly statistics. Established annual data for 2017 from the Swedish Energy Agency and Statistics Sweden will be published on 30 November 2018.

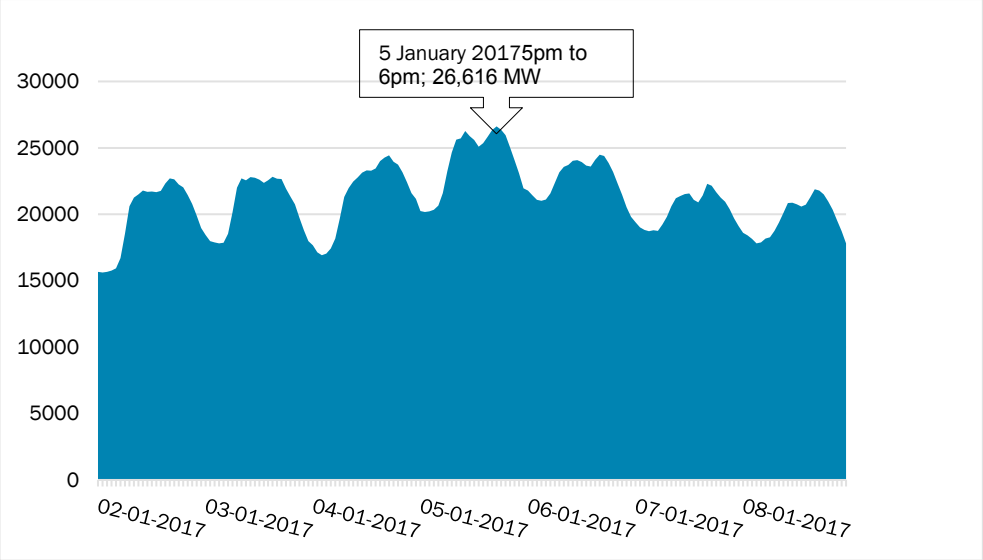
Table 3 Sweden's electricity balance in TWh, 2008–2017. Negative values indicate export

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017[41]
Production in Sweden	146.0	133.7	145.0	147.5	162.0	149.5	151.2	158.3	152.5	159.1
Hydropower	68.6	65.3	66.8	66.7	78.0	60.8	64.2	73.9	61.8	63.9
Nuclear power	61.3	50.0	55.6	58.0	61.4	63.6	62.2	54.3	60.5	63.0
Other cogeneration	14.1	15.9	19.1	16.8	15.5	15.2	13.3	13.5	14.6	14.9
Wind power	2.0	2.5	3.5	6.1	7.2	9.9	11.5	16.6	15.5	17.3
Electricity consumption in Sweden	144.0	138.4	147.0	140.3	142.4	139.5	135.2	135.7	139.8	140.1
Network losses	10.5	10.2	10.7	9.7	11.0	11.0	10.2	10.4	10.7	11.0
Import	15.6	16.4	17.6	14.8	13.1	15.1	13.9	9.3	14.3	11.9
Export	-17.6	-11.7	-15.6	-22.0	-32.7	-25.1	-29.5	-31.9	-26.0	-30.9
Net yields	-2.0	4.7	2.1	-7.2	-19.6	-10.0	-15.6	-22.6	-11.7	-19.0

Source: Swedish Energy Agency and Statistics Sweden

The highest electricity consumption in 2017 occurred between 5pm and 6pm on 5 January, when consumption amounted to 26,616 MW: see Figure 11. This is just under 400 MW less than Sweden's highest electricity consumption to date, which was noted on 5 February 2001 when consumption amounted to 27,000 MW.

Figure 11 Power takeoff in week 1 of 2017, MW



Source: Nord Pool

[41] Preliminary data from Statistics Sweden's monthly statistics. Established annual data for 2017 from the Swedish Energy Agency and Statistics Sweden will be published on 30 November 2018

Good competition on wholesale market

Ei's report on the division of electricity regions indicates that conditions for competition on the wholesale market are good[42]. During transmission restriction period, however, electricity region 1 in the far north and electricity region 4 in the far south may end up in a situation where individual stakeholders have an enormous opportunity for market power. Electricity region 1 is mainly dominated by one major producer, and the region frequently has surplus electricity. But, since electricity region 1 and 2 mostly constitute a common price area, this limits the market power of individual producers.

The situation in electricity region 4 is similar, with a single large producer, although the region often has an electricity deficit and higher average prices than the rest of Sweden. Among other things, this means that the liquidity of hedging instruments, known as EPAD contracts, is low as there are few producers that can issue these. However, Ei is of the opinion that the competitive situation is acceptable as electricity region 4 frequently forms a joint price region with adjacent Swedish and Danish electricity regions, reducing individual stakeholders' market power. The new Sydvästlänken transmission network cable, which is planned to be fully operational in 2018, will improve the situation. With the entire link fully operational, electricity transmission capacity between central and southern Sweden will increase by up to 25 per cent[43].

Swedish electricity production is dominated by a small number of major stakeholders. Vattenfall represents slightly over 40 per cent of total production, and together with Fortum and Uniper the three biggest stakeholders are responsible for approximately 73 per cent of production.[44] In addition the three biggest stakeholders also own a majority of Swedish nuclear power, in various configurations.

Whenever competition on the electricity market is assessed, it is necessary to take into account the fact that Swedish electricity regions rarely form isolated price regions. As a rule, a single price region extends over several national borders, which means that an isolated study of competition in the Swedish electricity regions risks missing how the electricity market operates in practice.

Changes in competition between electricity trading platforms

A new group of EU regulations has come into force over the past few years. The EU regulation establishing a guideline on capacity allocation and congestion management (the CACM guideline) paves the way for competing electricity exchanges in the day-ahead and intraday markets within the same electricity region. These opportunities are of particular interest as regards competition on the electricity market. As things stand at present, all day-ahead and intraday trade in the Nordic-Baltic electricity regions is handled by Nord Pool with no competition from other exchanges. Sweden has previously received an application from Nord Pool to trade for physical wholesale energy products in the Swedish bid regions, and this application has been authorised. EPEX Spot has been notified by Ei that it can start trading in Swedish electricity regions. Nord Pool and EPEX are therefore

[42] Evaluation of the effects of division into electricity regions, Ei R2014:08
[43] Source: Svenska kraftnät
[44] Source: Data from 2016, Swedenergy, Elåret 2016

the nominated electricity market operators permitted to operate in Swedish electricity regions. In March 2017, Ei approved Svenska kraftnät's proposal for an arrangement that will allow multiple nominated electricity market operators to be active simultaneously in the Swedish bid regions.

Opportunity for hedging on the financial electricity market

The EU Commission Regulation establishing a guideline on forward capacity allocation (FCA Regulation) came into force in 2016. In 2017, Ei and other Nordic regulatory authorities have been discussing how the FCA Regulation can be implemented in the Nordic region with a view to investigating the need for hedging options according to the FCA, article 30. Among other things, Ei has worked together with other Nordic regulatory authorities and held discussions with market stakeholders to investigate ways of evaluating options for financial hedging in the electricity regions using long-term transmission rights on Swedish transmission links.

In spring 2017, Ei and other relevant regulatory authorities made coordinated decisions not to allow Svenska kraftnät to issue long-term transmission rights on Swedish transmission links, stating that the hedging options were already considered to be sufficient.

Transparency Regulation increases transparency on the electricity market

The purpose of the Transparency Regulation[45] is to increase transparency on the energy market by ensuring that information from market stakeholders reaches everyone concerned in an effective way. Information to be reported according to the regulation includes physical restrictions on networks, production and consumption. This information is collated in a transparency platform run by the European Network of Transmission System Operators for Electricity, ENTSO-E[46], and can be accessed by the general public. The regulation was adopted in 2013, and reporting began in January 2015. Ei's role is to ensure that there is compliance with the Transparency Regulation in Sweden. Ei began supervision of companies' compliance with the regulation in 2015.

Ei has carried out six supervisory visits in 2017. As an integral part of monitoring according to REMIT[47], Ei also performs regular review of information published by stakeholders on inaccessibility in production, consumption and transmission (market messages). This means that when mapping market manipulation, Ei also performs a review to ensure that stakeholders are reporting in accordance with the Transparency Regulation. This supervision has resulted in no decisions on further action in 2017. That said, with a view to clarifying the demands made of market stakeholders by the Transparency Regulation, Ei has maintained constant communication with stakeholders concerning the regulatory framework and the formulation of various market messages.

[45] Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets

[46] European Network of Transmission System Operators - Electricity

[47] REMIT is an abbreviation of Regulation (EU) No 1227/2011 on Wholesale Energy Market Integrity and Transparency (Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency).

Development of the wholesale market in the Nordic region

Development in the wholesale market and transmission operations in the Nordic region are issues addressed by NordREG within the NordREG Wholesale and Transmission group (W&T). This group is responsible for monitoring the development and proposing measures. These efforts have primarily revolved around exchange of information on network regulations and commission guidelines. Work in 2017 continued implementing the EU regulations CACM, FCA, EB and SO, along with analyses of transmission capacity between the Nordic region and Germany.

Internal bottlenecks in Germany affect Sweden and the Nordic region

Ei has examined how much of the capacity of the foreign links between Sweden and Germany has been allocated to the day-ahead market (Elspot) between 2012 and 2014[48]. Of the three foreign links between the Nordic region and Germany, only the link between Zealand and Germany is not restricted regularly.

The investigation indicated that capacity restrictions most extensively affected the alternating current link between Jutland and Germany, where just one-third of the maximum transmission capacity of 1,780 MW was allocated southbound in 2014. Transmission was more or less restricted on this link for almost all hours. The link between southern Sweden and Germany is also affected by extensive capacity restrictions; primarily in the northbound direction, where just over half of the maximum transmission capacity has been allocated to the market.

Furthermore, Ei has reviewed why these restrictions are so extensive and is able to state that capacity allocation is restricted regularly due to internal bottlenecks in Germany.

In February 2017 Ei, together with the Norwegian Water Resources and Energy Directorate (NVE), was commissioned by the Swedish Ministry of the Environment and Energy to analyse the cost-benefit effects of reduced transmission capacity between the Nordic region and Germany. Working on the basis of previous studies, it was found that Germany's approach to reducing transmission capacities to the Nordic region has an adverse impact on socioeconomic welfare in Sweden and Norway. This report also shows that dividing Germany into several bid regions is more cost-effective than dealing with internal bottlenecks by means of countertrading and redirection[49].

Redirection, just like countertrading, is one way of dealing with transmission restrictions. This is done by reducing production on one side of the transmission restriction while increasing production on the other. This alters the flows of the network and can counteract or reduce any transmission restrictions.

Just as the price of electricity should reflect supply and demand, Ei is of the opinion that bottlenecks in the transmission system should be dealt with in their physical locations as far as possible. If one or more countries insist on having a single price region, customers and producers in other countries cannot be affected

[48] Transmission restrictions between the Nordic region and Germany, Ei R2015:11

[49] Reduced Capacity on German – Nordic interconnectors. Regulatory framework and socioeconomic effects on the European electricity market

by further costs or worse profitability as a consequence. Current handling of bottlenecks, where Nordic producers are affected by how Germany deals with its internal bottlenecks, is not in line with EU ambitions for a single internal energy market.

Collective Nordic balance regulation

In the Nordic region, balance regulation[50] has been handled jointly by Nordic system operators for a decade or so. This means that balance regulation is handled as if the Nordic synchronous region[51] were a single control region. However, each national system operator retains responsibility. There is also a collective market for regulating power where the most effective resources in the Nordic region are used for upward regulation or downward regulation.

The collective balance settlement principles were introduced in 2009. There is currently a collective balance settlement in the Nordic region between Sweden, Norway and Finland, as a step towards a collective end-customer market.[52] System operators are also preparing a collective market for automatic reserves in order to maintain the frequency in the system. The Nordic regulatory authorities are monitoring developments and will make joint decisions on whether changes should be made. Decisions may then be made at a national level. Ei normally makes its decisions by reviewing changes in the general balance agreement between Svenska kraftnät and the companies responsible for balance. An EU regulation on the balance market was adopted in 2017, which means that a lot of the ongoing work will relate to efforts for applying the new regulatory framework.

Continued efforts to increase European harmonisation

According to the EU's Internal Market in Electricity Directive, the regulatory authorities have an obligation to monitor how entry to cross-border infrastructure is managed by system operators. The collective Nordic market is well established, which means that there are changes requiring the regulatory authorities' attention in the first instance. Ei works actively with other Nordic regulatory authorities to ensure that internal rules and practice in the Nordic countries develop towards greater increased harmonisation.

[50] Balance regulation is performed in order to correct frequency deviations – to restore the instantaneous balance in the power system, that is.
[51] Electricity systems where subsystems are connected together with an alternating current link, thereby providing a joint frequency.
[52] The plan at present is for the collective balance settlement to come into force in May 2017.

1.3 The end-customer market

The Swedish end-customer market for electricity has been subject to competition since 1996. There is no price adjustment. There are about 5.4 million electricity customers in Sweden, approximately 4.7 million of whom are household customers.

1.3.1 Monitoring of price development, transparency and competition on the market

Many electricity suppliers – but some only operate locally

According to EIA's regulation[53], electricity trading companies offering electricity contracts to electricity consumers are obliged to report the most common contract types to the price comparison site elpriskollen.se. Elpriskollen is run by Ei and allows comparisons to be made between different electricity trading companies and their current offers. According to Elpriskollen, there were 123 electricity suppliers on the Swedish electricity market[54] at the end of 2017. However, the total number of electricity trading companies does not provide the whole picture of how many companies the individual customer can actually choose between, since various minor local and municipal suppliers choose to operate only in their immediate area.

At the end of the year, the three biggest electricity suppliers had a total market share of 41 per cent in terms of number of customers[55]. This figure has remained at approximately the same level over the past four years.

Relatively stable customer activity

The percentage of customers who have switched to a different electricity supplier has remained relatively constant over the past six years. A total of 9.5 per cent[56] of customers switched to a different electricity supplier in 2017. In terms of volume, these customers accounted for 9.8 per cent of total electricity consumption in Sweden in 2017 (140 TWh).

The number of renegotiated contracts has also remained relatively unchanged over the past nine years. A total of 26.2 per cent[57] of all household customers resubscribed to their electricity supply contracts in 2017.

However, switches and renegotiated electricity contracts do not provide a complete overview of the extent of customer activity on a market. Customers can be active by choosing not to switch their electricity contracts as they feel the price is good. Customers may also be of the opinion that the cost of their electricity

[53] EIFS 2013:7
[54] The number of electricity suppliers is defined as the number of electricity suppliers that have reported at least one of the most common electricity supply contracts to elpriskollen.se at some point during the year.
[55] Source: Energimarknaden 2017 newsletter
[56] Part of the calculation based on data for 2016
[57] Source: Statistics Sweden

accounts for such a small proportion of their overall household expenses that they feel reducing the cost of their electricity is not important.

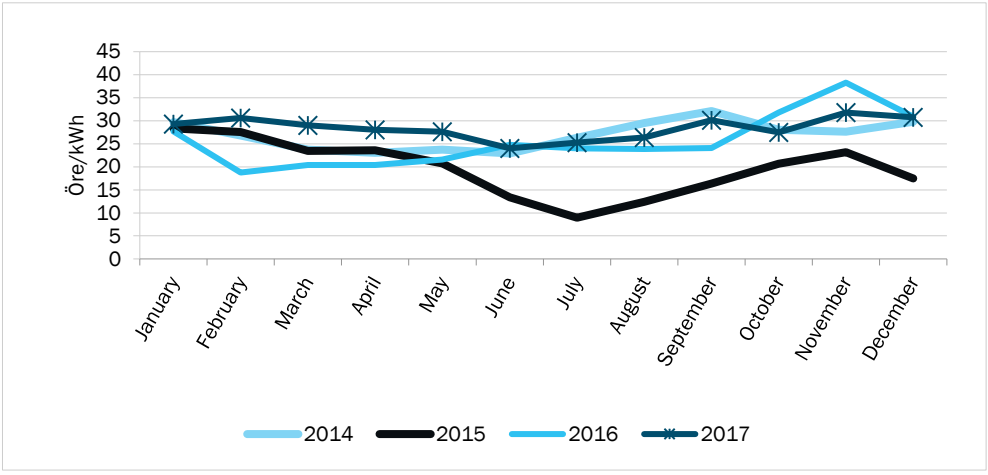
The price of electricity to customers is affected most by the price on the wholesale market

The single biggest element of the price of electricity, accounting for 85–90 per cent[58], is made up of the cost incurred by electricity suppliers to buy the electricity required to cover customers' consumption. Electricity is purchased on Nord Pool or via bilateral agreements with producers. Variable price contracts are based on a spot price adjusted for customers' power outtake profiles, while fixed-price contracts are based on the cost incurred by electricity suppliers to buy electricity on futures adjusted for customers' power withdrawal profiles. In the case of fixed-price contracts, there is also a cost for regional hedging with EPAD contracts[59]. Besides the electricity purchase price, there are also additional costs for electricity certificates, origin marking, administration, electricity tax, VAT and other costs.

Following spot price also meant low prices to end-customers

Spot prices remained relatively even on the Nordic-Baltic Nord Pool electricity exchange in 2017, with the exception of a lower price level between May and August. The lower electricity prices throughout this period were caused by factors such as greater availability of nuclear power compared with the same period in 2016. The average system price in 2017 was SEK 0.2836 per kWh, which can be compared with the 2016 average of SEK 0.2554 per kWh and SEK 0.1968 per kWh in 2015: see Figure 12.

Figure 12 System price, Nord Pool



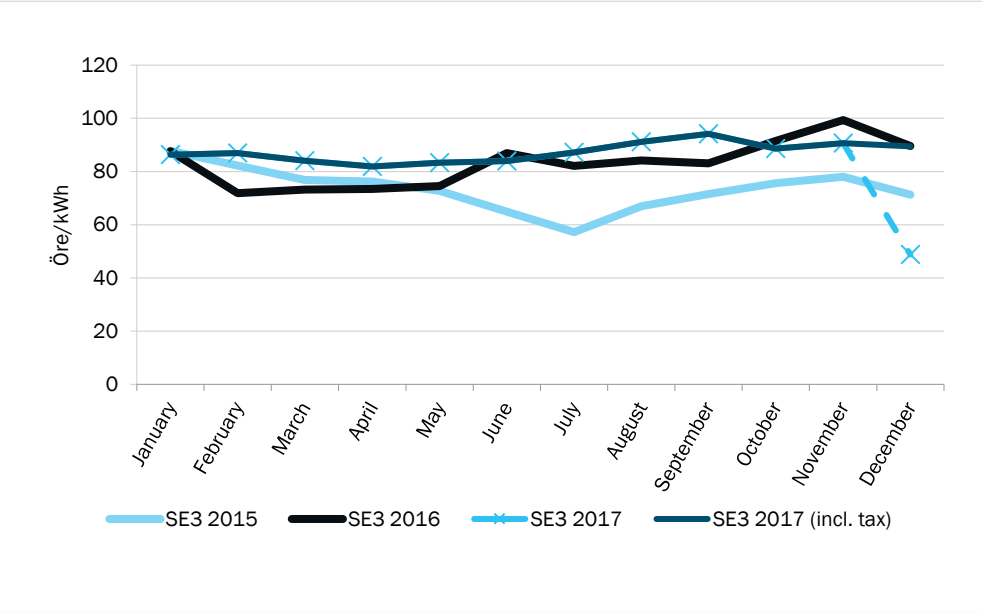
Source: Nord Pool

[58] Source: Ei report "Utvärdering av effekterna av elområdesreformen" [Evaluation of the effects of the electricity region reform], Ei R2014:08

[59] The system price (that is, the price that would be charged if there were no transmission restrictions in the region) is used as a reference price for futures contracts that electricity suppliers use for hedging when they sell fixed-price contracts to their customers. However, the physical in feed from the production source of the actual consumption of electricity are priced in the local electricity regions. As the prices in the electricity regions may vary from the system price, there is a need for stakeholders to hedge against this regional price risk. They do this by trading EPAD contracts.

Figure 13 clearly indicates that variable price contracts offered to customers follow the upturn in the price of electricity on the electricity exchange; which is natural, as most of the price charged to end-customers is made up of the purchase price on the electricity exchange.

Figure 13 Electricity trading price for variable price contracts for a typical customer (20,000 kWh per year), electricity region 3, 2015-2017[60]



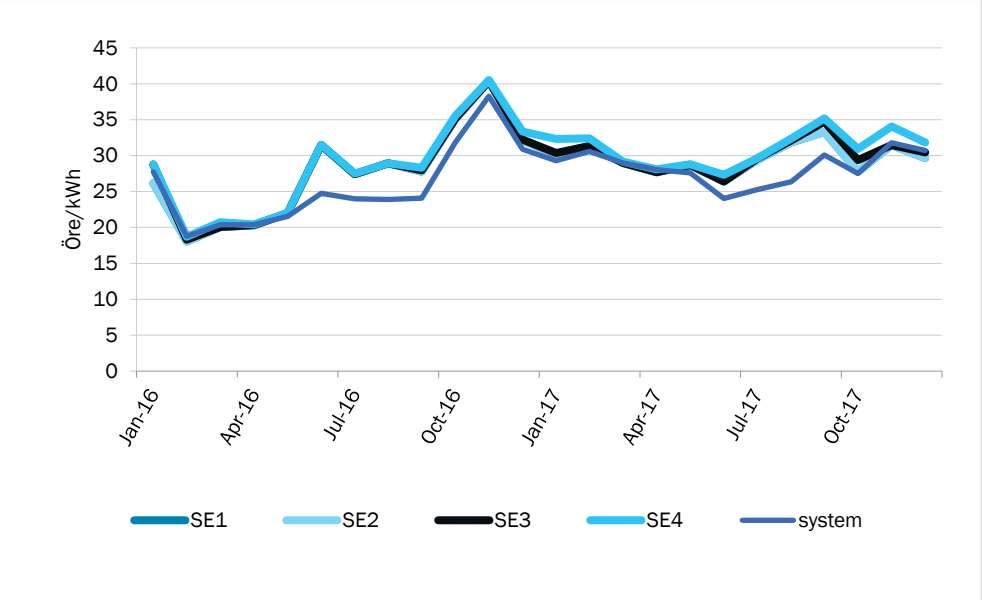
Source: Elpriskollen, Ei

Small price differences between electricity regions

The average price difference between electricity region 4 and electricity region 1 was SEK 0.0129 per kWh in 2017. This is comparable with 2016, when the average difference stood at SEK 0.0054 per kWh. The average difference between electricity regions 4 and 3 was SEK 0.0091 per kWh in 2017, which can be compared with the average SEK 0.0028 per kWh in 2016. November was the month in which the price difference between electricity regions was greatest: electricity region 4, for example, had an average spot price SEK 0.026 higher than in electricity region 1. See Figure 14.

[60] Electricity tax was transferred to utilities as of 1 January 2018

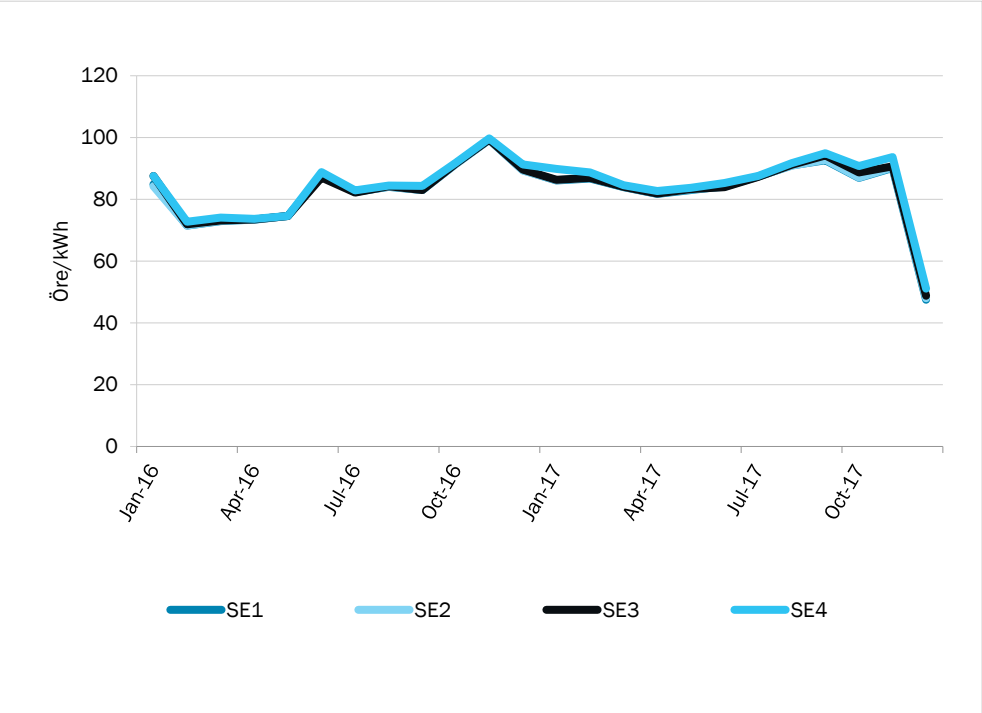
Figure 14 Spot price per electricity region plus system price, 2016–2017



Source: Nord Pool

Figure 15 indicates that prices to end-customers in the various electricity regions follow the spot prices in each electricity region. Price differences between prices to end-customers for variable price contracts between the four electricity regions were small in both 2016 and 2017[61].

Figure 15 Electricity trading price for variable price contracts for a typical customer (20,000 kWh per year).



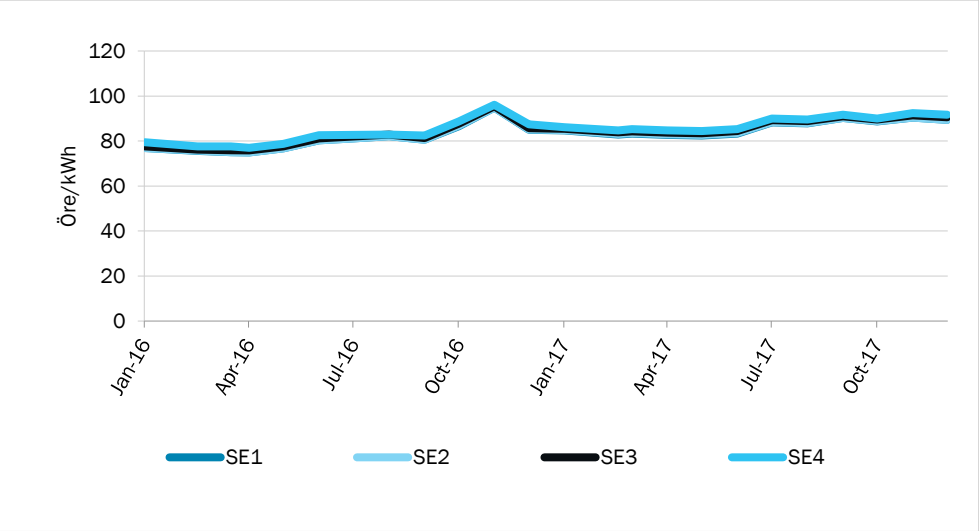
Source: Elpriskollen, Ei

[61] The powerful decline in price for December 2017 is due to electricity tax, which has been transferred to the electricity utilities as of 1 January 2018.

There is not much difference between electricity regions regarding fixed prices with a tie-in period of one year. On average, prices for contract type "fixed price 1 year" were around SEK 0.02 higher in electricity region 4 than in electricity regions 1 and 2 in both 2016 and 2017. The difference between electricity region 3 and electricity region 1 stood at around SEK 0.01 in 2017; see Figure 16.

The reasons for these price differences are evident from electricity suppliers' need for hedging. There is a greater need for hedging in electricity regions where prices change a lot, resulting in increased costs for electricity suppliers and hence a higher price for the electricity that they can offer to end-customers. The lowest prices are available in electricity regions 1 and 2, and the highest in electricity region 4.

Figure 16 Electricity trading price for fixed price 1 year for a typical customer (20,000 kWh per year)

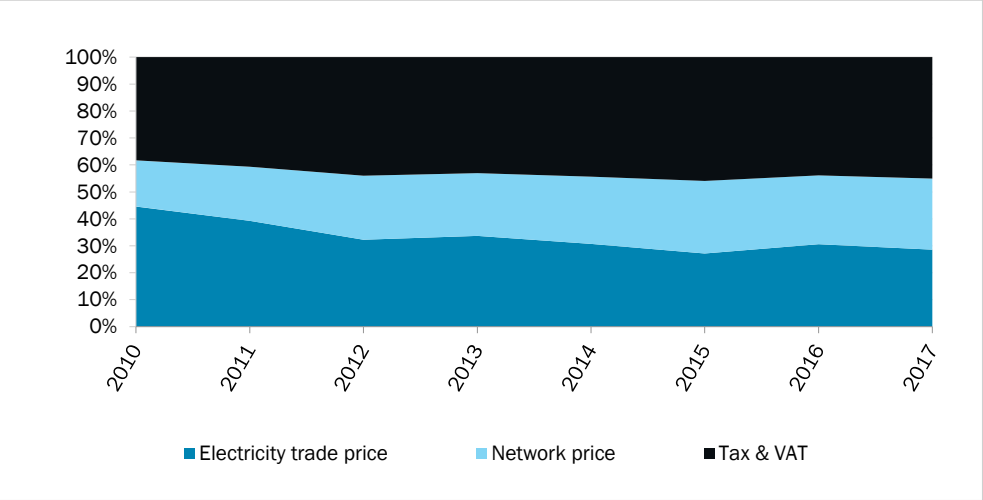


Source: Elpriskollen, Ei

Tax and VAT make up most of the total cost of electricity

The distribution between the various elements in the total cost of electricity that is paid by a house heated by electricity has varied over the past few years. This is because the network charge has risen during this time, while the electricity trading price has fallen. Tax and VAT have also increased slightly over the past few years: see Figure 17.

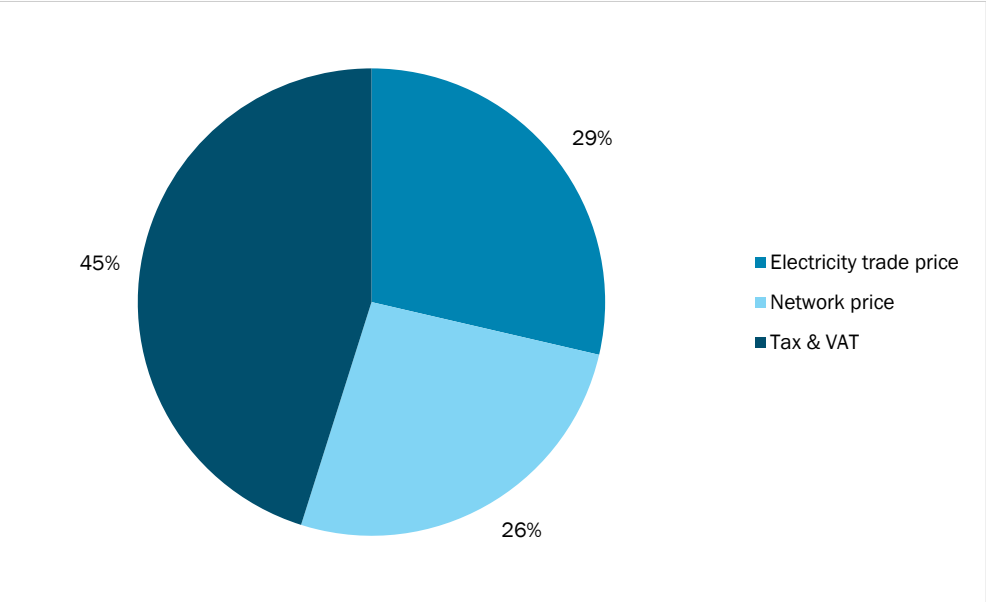
Figure 17 Distribution of the cost of electricity for an electricity consumer using 20,000 kWh per year. Actual cost.



Source: Ei, Statistics Sweden

In 2017, most of the cost – 45 per cent – was made up of tax and VAT. The cost for electricity trading (29 per cent) constituted a larger element of the total cost to the electricity consumer compared with the cost for network transmission (26 per cent): see Figure 18.

Figure 18 Components of the electricity cost in 2017 for an electricity consumer using 20,000 kWh per year. Actual prices.



Source: Ei, Statistics Sweden

Total electricity cost for a consumer

The total electricity cost for 2017 for an apartment customer with an annual consumption of 2,000 kilowatt-hours per year and with a variable price contract totalled approximately SEK 3,900. For a house customer using 20,000 kilowatt-hours per year and with a variable price contract, the cost of electricity in 2017 amounted to approx. SEK 26,000: see Table 4 Total annual cost 2017, variable price, apartment customer in electricity region 3 and 7.

Table 4 Total annual cost 2017, variable price, apartment customer in electricity region 3

2017 annual cost at variable price, apartment customer	SEK
Electricity trading	1 049
Tax	620
Total electricity trading, inc. VAT	**2 086**
Electricity network	1 478
VAT, electricity network	369
Total	**3 933**

Source: Ei

Table 5 Total annual cost 2017, variable price, house customer in electricity region 3

2017 annual cost at variable price, house customer	SEK
Electricity trading	7 777
Tax	6 200
Total electricity trading, inc. VAT	**17 471**
Electricity network	6 494
VAT, electricity network	1 624
Total	**25 589**

Source: Ei

The total annual cost for a customer that has a fixed-price, 1-year contract varies depending on when the customer took out the contract. For an apartment customer using 2,000 kWh per year, the total annual cost in 2017 averaged between SEK 3,800 and SEK 4,000, depending on the month of the year in which the customer took out the contract: see Table 6. For a house customer using 20,000 kWh per year, the total annual cost amounted to between SEK 25,000 and SEK 26,000 kronor in 2017 instead: see Table 7.

Table 6 Total annual cost 2017, fixed price 1 year, apartment customer in electricity region 3

Total electricity cost at fixed price 1 year, apartment customer	SEK
Electricity trading	965–1 042
Tax	620
Total electricity trading, inc. VAT	**1 981–2 078**
Electricity network	1 478
VAT, electricity network	369
Total inc. VAT	**3 828–3 925**

Source: Ei

Table 7 Total annual cost 2017, fixed price 1 year, house customer in electricity region 3

Total electricity cost at fixed price 1 year, house customer	SEK
Electricity trading	7 451–8 131
Tax	6 200
Total electricity trading, inc. VAT	**17 064–17 914**
Electricity network	6 494
VAT, electricity network	1 624
Total inc. VAT	**25 182–26 032**

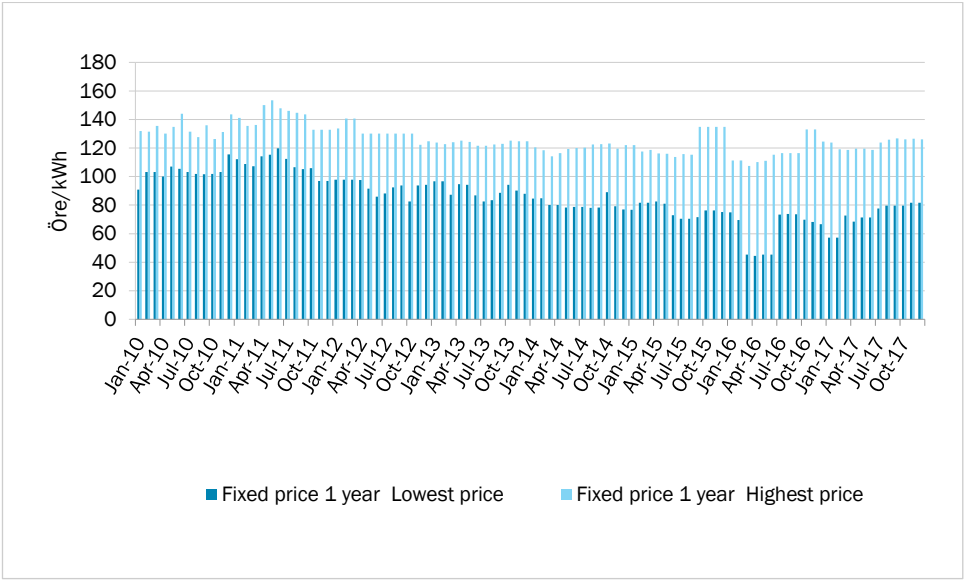
Source: Ei

Price difference between electricity suppliers

The price difference between the highest and lowest price on fixed-price contracts with a tie-in period of 1 year aimed at apartment customers averaged SEK 0.41 between 2010 and 2017: see Figure 19. Calculated as a percentage, the difference between the most expensive and the cheapest contracts of contract type "fixed price 1 year" was 52 per cent over the period.

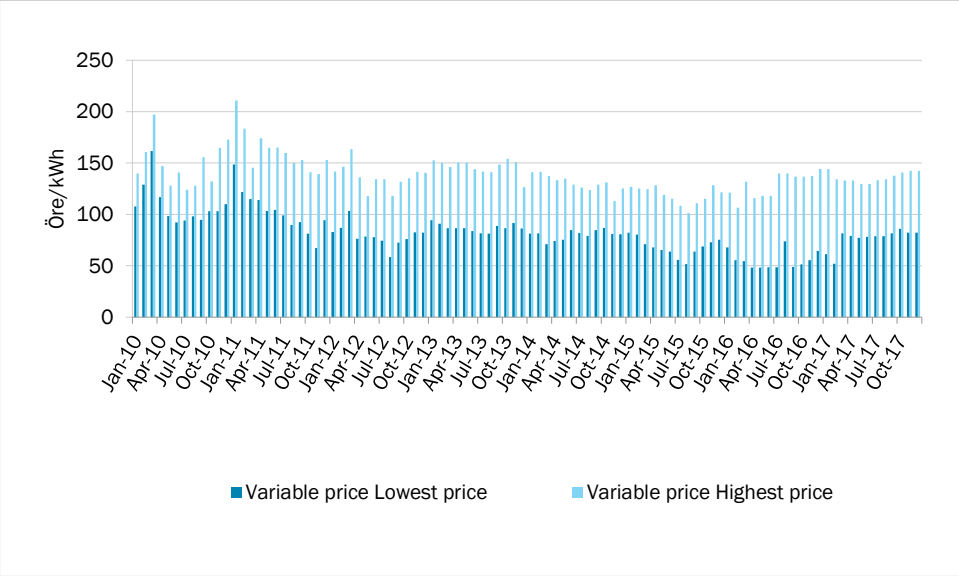
For the variable price contract type, the price difference averaged SEK 0.56 over the period: see Figure 20. As a percentage, this difference amounted to 75 per cent.

Figure 19 Highest and lowest price for the contract type fixed price 1 year, apartment customer, 2,000 kWh per year



Source: Ei

Figure 20 Highest and lowest price for the contract type variable price, apartment customer, 2,000 kWh per year



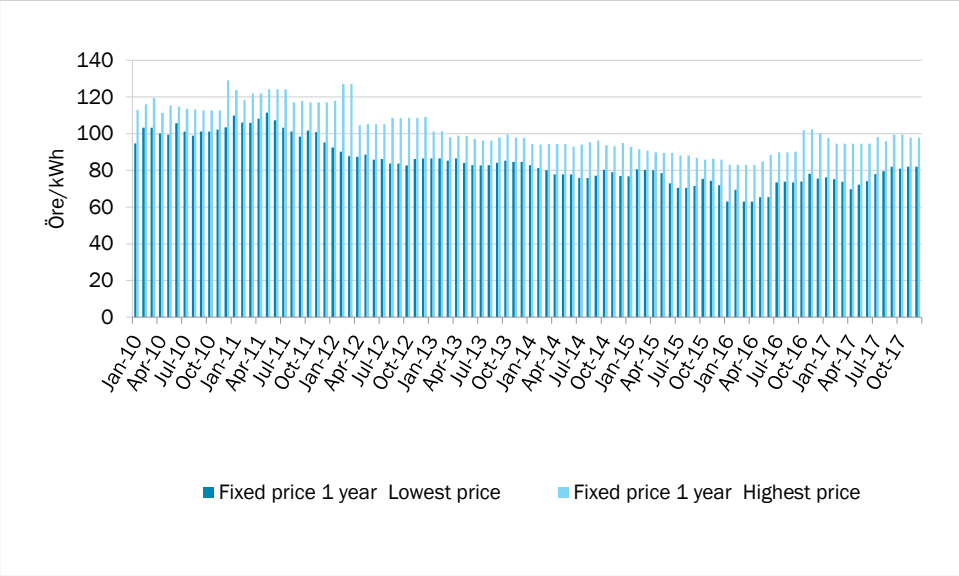
Source: Ei

The price differences on contracts offered to house customers using 20,000 kilowatt-hours per year are not as great as in the contracts offered to apartment customers. This price spread among contracts aimed at customers who consume less electricity is due to the fact that some electricity suppliers have the same fixed annual charge for all customer types, which means that the fixed cost has a major impact on the comparable price for apartment customers who use little electricity, and so the prices charged by these electricity suppliers are extremely high[62]. Another contributory cause may be the fact that house customers who use a lot of electricity are more price-sensitive and price-aware than apartment customers.

On average, the most expensive fixed price contracts with tie-in periods of 1 year were SEK 0.17 more expensive than the cheapest ones between 2010 and 2017: see Figure 21. Expressed as a percentage, the most expensive contracts were 21 per cent more expensive than the cheapest ones on average.

[62] In the majority of cases, the fixed cost is made up of a fixed annual charge in SEK. When calculating the comparable price, the fixed annual charge is spread over the number of kilowatt-hours per year.

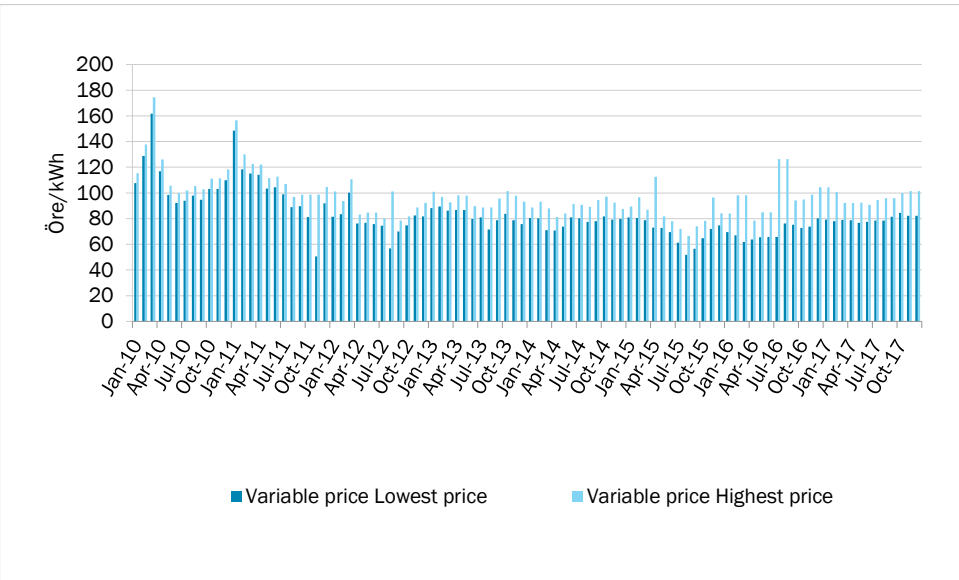
Figure 21 Highest and lowest price for the contract type fixed price 1 year, house customer, 20,000 kWh per year



Source: Ei

The price difference between the most expensive and the cheapest variable price contracts varied less than the price difference for the contract form "fixed price 1 year". On average, this difference was SEK 0.15 throughout the period. On average, the most expensive contracts were 20 per cent more expensive than the cheapest ones over this period: see Figure 22.

Figure 22 Highest and lowest price for the contract type variable price, house customer, 20,000 kWh per year



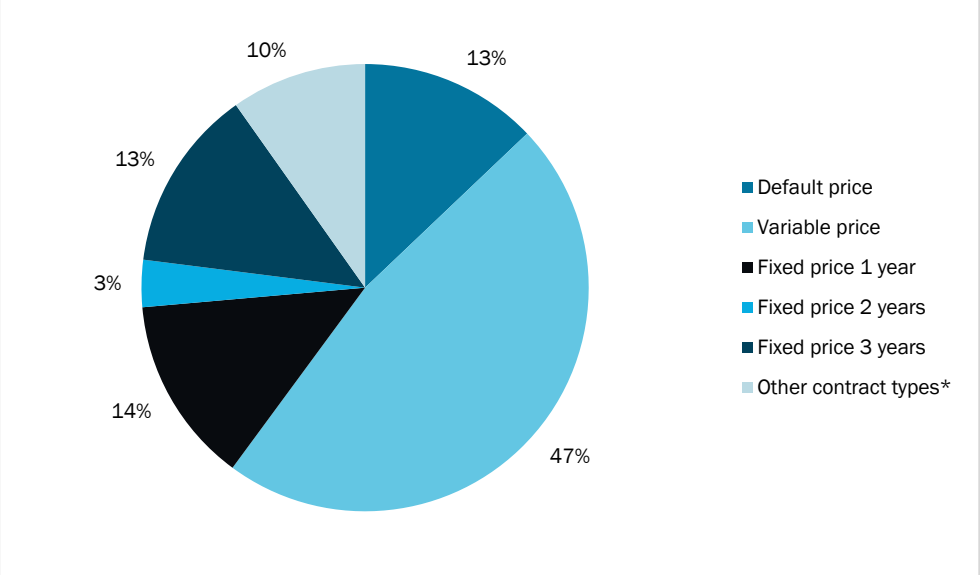
Source: Ei

More customers choose variable price contracts

More customers are abandoning fixed contract forms in favour of variable contracts; this is a trend that has been ongoing for a number of years. 47 per cent of

Swedish household customers had variable price contracts by December 2017, representing a reduction of 4 percentage points compared with December 2016. 30 per cent of customers had a fixed price contract with a tie-in period of one, two or three years: see Figure 23.

Figure 23 Distribution of household customers by contract type, December 2017



*** Other contract forms include contracts with terms other than 1, 2 or 3 years, combination contracts or mixed contracts. Source: Statistics Sweden**

Still many electricity consumers with assigned contracts

Customers on the Swedish electricity market have the option of choosing the electricity supplier they prefer. This means that stakeholders are operating on a free market in competition against other companies, with free pricing. If the customer does not make an active choice, the network owner in question is obliged to assign an electricity supplier. On average, the price of assigned contracts is 20–30 per cent higher than for other contract types. There may be various explanations as to why customers remain with assigned contracts despite high prices. Customers may be unaware that they have a contract type that is more expensive than other contract types, and that they can switch easily to another, cheaper contract. During various regulatory initiatives, Ei has seen that information to assigned customers is lacking. Customers may also consider the cost of electricity to be such a small element of their overall household finances that they do not care about switching.

Energy tax transferred to electricity utilities

The Swedish Parliament (Sveriges Riksdag) has decided that liability for energy tax on electricity will be transferred from electricity trading companies to electricity utilities as of 1 January 2018. As a result of this change, energy tax on electricity will be shown on customers' network invoices instead of on the electricity trading invoice. The total cost of electricity charged to customers will not be affected by the change.

Efforts towards a harmonised Nordic end-customer market

Ei has been cooperating with its Nordic sister authorities for a number of years as part of the cooperation organisation NordREG, working towards a harmonised Nordic electricity market. There is also enormous political will and support for the concept of creating a collective Nordic electricity market. A Nordic end-customer market will be based on a model centring on electricity suppliers, making it easier to be a customer on the electricity market in that electricity suppliers will become the central point of contact for customers. This model also aims to make it easier for electricity suppliers to be active in multiple countries, thereby promoting competition.

When creating a collective market, formulation of market rules is a key issue. To achieve a collective end-customer market, it is important for the market to be sufficiently harmonised to minimise obstacles in the form of adaptation costs and increased transaction costs for the electricity suppliers and energy service companies wishing to operate in multiple Nordic countries. Work on a collective Nordic balance settlement is taking place as part of the creation of a Nordic end-customer market.

NordREG states that the key processes involving switching of electricity suppliers, the transfer process, metering, invoicing and information management via data hubs have already been harmonised at a Nordic level and are currently being implemented in the Nordic countries. NordREG is maintaining constant information exchange with regard to the implementation of these processes.

Ei has played an active part in operations throughout the year, among other things chairing meetings of the NordREG end-customer market group[63]. In 2017, the group focused on the European Commission's new legislative proposal *Clean Energy for All Europeans*, which has been submitted to the European Parliament and Council of Ministers for preparation. The purpose of this proposal is to make the EU a leader in the world's conversion to clean energy.

An internal workshop was organised that focused on supervision of end-customer market stakeholders as a continuation of the group's work in 2016 on investigating the options for extended cooperation and information exchange between the Nordic countries with regard to supervision. This workshop resulted in greater awareness of the Nordic regulatory authorities' monitoring and criteria for prosecution and also considered collective challenges of relevance to end-customer issues.

Ei's involvement in promotion of effective end-customer markets in Europe

Over the year, Ei has played an active part in the work of the Council of European Energy Regulators (CEER) with regard to development of the end-customer market for electricity and gas in Europe. Among other things, Ei chaired meetings of the Retail Market Task Force in CEER.

[63] Retail Market Working Group

On the end-customer side of things, Ei has been involved in four main areas: effective end-customer markets, barriers to entry for new market stakeholders, data management and reinforcing the position of consumers on the market.

As regards consumers' position on the market, Ei has assisted in the production of a report entitled *CEER Report on Smart Technology Development*, which will be published in June 2018. This report describes how new smart technology such as self-produced electricity, battery storage and electric vehicles with associated infrastructure affect the role of consumers on the energy market.

The CEER end-customer market group has also been working on the Commission's new legislative proposal, *Clean Energy for All Europeans*, throughout the year.

Development project with elpriskollen.se

Ei runs elpriskollen.se, Sweden's only independent price comparison site for electricity contracts. Over the year, Ei has devised proposals for development points and improvements in order to extend the functionality of Elpriskollen and enhance its user-friendliness. Introduction of hourly contracts and electricity trading companies' prices for self-produced input electricity are examples of the proposals devised.

These proposals are a continuation of the development work that took place in 2016. The design of the website was updated at that time. The online service used by electricity suppliers to report their prices and contract terms was also updated, providing a more modern and user-friendly interface.

Assignments relating to a service hub and a model centring on electricity suppliers

In 2015, Ei and Swedish system operator Svenska kraftnät were commissioned by the government to continue working on the issue of introducing a central information management model, known as a service hub. As part of this assignment, Ei has worked in close cooperation with Svenska kraftnät, which in turn has been commissioned by the government to develop and run the electricity market hub. Ei's assignment involved carrying on work on previous proposals for introduction of a model centring on electricity suppliers.

In June 2017, Ei reported on the assignment to the government in the form of its report *Ny modell för elmarknaden [New model for the electricity market] (Ei R2017:05)*. This report presents proposals for legislative amendments in order to introduce a new market model where an electricity market hub constitutes a hub for information exchange between electricity market stakeholders.

Electricity meter performance requirements

In December 2016, Ei was commissioned by the government to devise proposals for the constitutional amendments required to regulate electricity meter performance requirements. Ei submitted the report *Funktionskrav på elmätare – författningsförslag [Electricity meter performance requirements – constitutional amendments] (Ei R2017:08)* to the Ministry of the Environment and Energy on 1 November 2017.

Electricity meters are key to the function of the market. They are also important in the development of smart electricity networks. For electricity utilities, smart meters

pave the way for more efficient network operation, reduced energy consumption and enhanced opportunities for integration of microproduction. Smart electricity meters are also important as a way of giving customers access to more detailed information about their electricity consumption.

In its report, Ei proposes seven performance requirements that electricity meters must meet. These performance requirements include the units that meters must be able to measure, a customer interface for meters, an option for utilities to read meters and alter meter settings remotely, metering of energy per hour and conversion to 15 minutes, enabling and disabling customers' systems remotely, and recording of power outages at the meter. Ei also proposes that the performance requirements should be regulated in the Regulation (1999:716) on the metering, calculation and reporting of transmitted electricity. Another proposal is for Ei to produce regulations relating to the performance requirements. It is proposed that the performance requirements should be applicable to all low-voltage customers, representing the vast majority of electricity meters in Sweden. It is proposed that meters used by high-voltage customers should not be subject to the performance requirements.

1.4 Recommendations for electricity trading prices, investigations and actions for promoting competition

Several authorities and public bodies collaborate in the monitoring of the Swedish and Nordic electricity market with the purpose to create an effective electricity market and prevent the practice of market power.

1.4.1 Responsibilities relating to the monitoring of the electricity market

Besides its role as a regulatory authority, Ei constantly monitors and analyses development on the electricity markets and submits proposals for amendments to regulatory frameworks or other actions in order to promote the function of the markets. The instruction for Ei also states that the authority should act to promote effective competition on the electricity market. Ei compiled a report in 2015, and another in 2017 describing the problems involved in restrictions on foreign links between the Nordic region and Germany: see the paragraph entitled Investigation of transmission restrictions between the Nordic region and Germany in section 1.3.

The Financial Supervisory Authority supervises the Swedish stakeholders operating on the financial electricity market with the permission of the authority. Monitoring of trade and companies' actions takes place on the Nord Pool, EEX and Nasdaq Commodities marketplaces. Nord Pool, which is based in Norway, is monitored by the Norwegian Water Resources and Energy Directorate (NVE) and the Financial Supervisory Authority of Norway.

The Swedish Competition Authority monitors companies on the Swedish electricity market to ensure that they do not breach bans on anti-competitive cooperation and misuse of dominant position in accordance with the Treaty on the Functioning of the European Union (the EUF Treaty) and the Competition Act[64]. The Competition Act also bans anti-competitive public sales activities. The Swedish Competition Authority can actively intervene to prevent the above restrictions of competition on its own initiative or after receiving reports from companies and the general public. The Competition Act also includes rules on control of corporate concentrations. The Swedish Competition Authority also provides proposals for rule changes and other measures to eliminate existing obstacles to competition.

Monitoring of the Swedish markets in accordance with REMIT

The Regulation on Wholesale Energy Market Integrity and Transparency (REMIT)[65] came into force in 2011, facilitating coherent monitoring of the increasingly integrated European electricity and gas markets. Ei's responsibility and ongoing efforts to monitor the Swedish markets have increased as a consequence of this. Ei has procedures that are applied every day to its market monitoring work.

All trade in wholesale energy products that takes place, both via the exchange and bilaterally, must be reported to ACER. All trades taking place on electricity and gas

[64] Competition Act (2008:579)

[65] This abbreviation has been devised from the name of the regulation. In Swedish, the regulation is called "Europaparlamentets och Rådets förordning (EU) nr 1227/2011 av den 25 oktober 2011 om integritet och öppenhet på grossistmarknaderna för energi".

exchanges must be reported to ACER. This gives Ei the opportunity to review transaction data for both the physical and financial trade in wholesale energy products. Monitoring is funded by a charge imposed by Ei on registered market stakeholders. Exactly what types of contract are to be reported, and how, is regulated in the implementing acts[66].

Marketplace regulatory frameworks and market monitoring

All stakeholders on Nord Pool and Nasdaq Commodities must comply with special regulatory frameworks for trading on their respective trading platforms. These regulations relate in particular to the handling of information that affects prices, known as insider information, and price manipulation. Both Nord Pool and Nasdaq Commodities have internal market monitoring functions where trade is monitored constantly.[67] The market monitoring functions at Nord Pool and Nasdaq Commodities are also important to Ei's work, as they have to report any infringements to Ei's market monitoring team.

Measures to reduce risks of joint ownership in nuclear power

The Swedish Competition Authority has noted in a variety of contexts the general risks inherent in joint ownership of electricity production resources, and the government has taken the initiative to resolve the issue. Following a proposal from Ei, the owners of nuclear power plants have adopted joint industry rules for information exchange between companies. Independent observers sit on the boards of the nuclear power companies, specifically for the purposes of monitoring the industry rules. Ei nominates the observers and publishes reports from each company every year, including any comments from the observers.[68]

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[66] Commission Implementing Regulation (EU) No 1348/2014 of 17 December 2014 on data reporting implementing Article 8(2) and Article 8(6) of Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency

[67] This must be done in accordance with article 15 of Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency

[68] Forsmarks kraftgrupp AB:
http://ei.se/Documents/Publikationer/arsrapporter/karnkraftforetag/2015/Arsrapport_Code_of_Conduct_Forsmarks_Kraftgrupp_AB_2015.pdf
Ringhals AB:
http://ei.se/Documents/Publikationer/arsrapporter/karnkraftforetag/2015/Arsrapport_Code_of_Conduct_Ringhals_AB_2015.pdf
OKG Aktiebolag:
http://ei.se/Documents/Publikationer/arsrapporter/karnkraftforetag/2015/Arsrapport_Code_of_Conduct_2015_Oskarshamn_AB.pdf

1.5 Security of supply, electricity

Security of supply in the Swedish electricity system is generally good. Manual disconnection of certain electricity consumers, which is the method to be used by Svenska kraftnät according to the Electricity Act when there is no other way of achieving balance between input and output in the electricity system, has never been needed.

1.5.1 Monitoring the balance between supply and demand

Greatest contribution of renewable power

In Sweden, investments in new electricity production capacity are essentially taking place on market-based grounds. Permits from Ei are not required for the construction of new electricity production plants in Sweden. That said, permits are required in accordance with both the Environmental Code[69] and the Planning and Building Act[70].

Renewable power such as hydropower and wind power makes up more than 65 per cent of the total installed output power. These types of power also made the greatest contribution to the installed output power from previous years. Output linked with nuclear power saw the greatest loss.

Table 8 shows the installed output power, by production type.

Table 8 Installed output power at Sweden's power stations on 31 December 2017, MW

	2012	2013	2014	2015	2016	2017[71]
Nuclear	9 363	9 531	9 528	9 714	9 076	8 625
Fossil	4 636	4 635	4 866	4 501	4 443	4 443
Renewable	23 354	24 107	25 155	25 758	26 485	26 675
- Hydro	16 203	16 150	16 155	16 184	16 181	16 181
- Biofuels	3 036	3 080	3 082	2 978	3 146	3 146
- Wind	3 745	4 470	5 420	6 029	6 520	6 710
- Waste	346	364	419	441	453	453
- Solar	24	43	79	126	185	185
Total	37 353	38 273	39 549	39 973	40 004	39 743

Source of comparative figures (2012–2016): Swedenergy

1.5.2 Monitoring of investments in production capacity with regard to security of supply

Plans for extensive reinforcement of the Swedish transmission network

The Swedish transmission network is undergoing a period of significant expansion. The network is being reinforced to allow for new electricity production, to further market integration with the surrounding world and to contribute in the

[69] Environmental Code (1998:808)
[70] Planning and Building Act (2010:900)
[71] Data for nuclear power has been taken from Montel Power News (data from December 2017). Data for wind power has come from the Swedish Energy Agency. Fossil power, Hydropower, Biofuels, Waste and Solar power have been assumed.

creation of a joint European electricity market. At the same time there is a significant need for reinvestment.

One of the larger ongoing projects to increase capacity and reliability in the Nordic power system is Sydvästlänken. The purpose of this power line is to reduce the transmission restrictions between the central and southern Sweden. Sydvästlänken is being constructed in two parts, with a hub at Jönköping. From the hub, there will be a link heading south to Skåne, while the other will head north to Hallsberg. The entire Sydvästlänken is expected to be fully operational by mid-2018, and at that time it is estimated to increase the electricity transmission capacity between central and southern Sweden by up to 25 per cent.

Besides Sydvästlänken, a number of projects are in progress to reinforce the electricity networks in the metropolitan regions and transmission capacity between the Swedish electricity regions. One such project is Svenska kraftnät's designed cable between Skogssäter (Trollhättan) and Stenkullen (Lerum), which will help to secure the electricity supply in Västra Götaland. Another is the Stockholm Ström [Stockholm Power] project, which aims to reinforce and renew the electricity network in the Stockholm region in order to meet future needs for secure electricity supplies. Svenska kraftnät has been working together with regional and local network owners Vattenfall and Ellevio to propose an entirely new structure for the region's electricity networks, and this is now being implemented in about fifty projects.

1.5.3 Measures for handling demand peaks or supply deficits

Svenska kraftnät is responsible for ensuring that a strategic power reserve is available during the winter, between 15 November and 15 March.[72] The power reserve is created by Svenska kraftnät procuring and concluding contracts with electricity producers and electricity consumers, indicating that they will make production capacity or the opportunity for consumption reduction available to Svenska kraftnät. Both procurement procedures require the resource/plant to be available in electricity region 3 or electricity region 4. When the power reserve production element is activated on Nord Pool the power reserve price is set to the ceiling price of EUR 3,000 per MWh.

By law, the power reserve is applicable until 15 March 2025. This Act has been extended a number of times, most recently in 2016[73]. Nowadays, only Fingrid in Finland and Svenska kraftnät in Sweden procure power reserves prior to cold winters in the Nordic region. The handling of power reserves is based on the guidelines devised jointly by the Nordic transmission network companies that act as system operators.[74]

[72] According to the Act (2003:436) on power reserve
[73] SFS (2016:422)
[74] "Guidelines for implementation of transitional peak load arrangements"

2 The natural gas market

Natural gas was introduced to Sweden in 1985 by expansion of the Danish natural gas system to southern Sweden via a pipeline from Dragør, near Copenhagen, to Klagshamn, on the outskirts of Malmö.

On 1 July 2007, trade in natural gas in the Swedish system was opened for competition. The network operation is a regulated monopoly.

2.1 The gas network

Natural gas was introduced in Sweden 1985. The western Swedish natural gas network consists of about 600 km of transmission pipeline and about 3000 km of distribution pipeline. The natural gas network is divided into four different operational areas: transmission, distribution, gasification and storage. The gas is transported long distances under high pressure in transmission pipelines. Pressure reduction is then carried out in metering and regulating stations before the local distribution network transports the gas to consumers.

The western Swedish natural gas system is small compared with most other natural gas networks in Europe. The network extends from Trelleborg in the south to Stenungssund in the north, with a branch east towards Jönköping. Just over 30 of the 290 municipalities in Sweden have access to natural gas. Gas is brought into Sweden via a pipeline from Dragør in Denmark.

The western Swedish natural gas network comprises a number of different network types. In line with the terminology used for the major continental natural gas networks, the biggest pipelines that transport the gas under high pressure are known as transmission pipelines. These pipelines have enough capacity to transmit very large quantities of gas. In Sweden, the transmission network is owned and operated by Swedegas, which is also responsible for system balance. A few very large consumers are connected directly to the transmission network.

There is also an urban and vehicle gas network in the Stockholm region which is owned by Gasnätet Stockholm AB, which is responsible for development, operation and maintenance of the network. The urban and vehicle gas networks comprise around 500 kilometres and 40 kilometres of pipeline respectively. The urban gas network covers large parts of the city of Stockholm, along with Solna and Sundbyberg. The production and infeed of gas to the urban gas network primarily takes place from a gasification facility in Stockholm to which both biogas and LNG, liquefied natural gas, are supplied. At this facility, LNG is vaporised to make natural gas, which is then mixed with air to turn it into the urban gas suitable for the customer appliances used in the urban gas network. This gas is distributed via pipelines that are pressurised at special regulating stations all over the city. The vehicle gas network, 40 kilometres long, links biogas suppliers' production plants for gas in Stockholm with bus depots for fuelling buses and fuelling stations for vehicle gas.

There are also a number of small local gas networks around Sweden. Many of the small local networks are used primarily for transporting vehicle gas-type biogas from production plants to fuelling stations.

Neither the gas network in Stockholm nor the small local gas networks are connected to a transmission network. The western Swedish gas network and the gas network in Stockholm are the networks covered by the provisions of the Natural Gas Act[75]. According to the Natural Gas Act, natural gas also includes biogas insofar as it is technically possible to use this gas in a natural gas system.

[75] Natural Gas Act (2005:403)

Figure 24 Transmission pipelines in the western Swedish natural gas network

Source: Ei

Biogas in the natural gas network

The natural gas and biogas markets in Sweden are integrated to an extent as the natural gas network can be used to distribute biogas. In most cases, biogas that is upgraded to natural gas quality can be introduced to the natural gas network without any technical consequences for natural gas users. If problems occur, these are generally due to the fact that the chemical composition does not correspond to traditional natural gas. There are currently nine biogas producers connected to the western Swedish natural gas system, where two of the producers have connections to allow for input into the transmission network. Two biogas producers are connected to the Gasnätet Stockholm AB's network as well.

To facilitate joint distribution of natural gas and biogas in a single network new tax rules were introduced in 2011. Essentially, these new rules meant that the contractual supply was separated from the physical supply. According to a previous regulatory framework, all customers on one and the same network received the same amount of biogas regardless of the contract that formed a basis for the supply. The altered regulations mean that a biogas producer can conclude a supply contract with a consumer for 100 per cent biogas, even if the consumer receives a mixture of biogas and natural gas in practice. This concept resembles the electricity market's system of origin marking, where electricity consumers can purchase electricity produced by wind power no matter what their location on the network.

2.1.1 Functional distinction of natural gas companies

In order to prevent cross-subsidisation between companies operating different types of natural gas activities, functional distinction is required. This means that

companies that perform natural gas transmission, gasification or storage operations must not trade it. The rules on unbundling mean that companies that previously traded natural gas and also transmitted it, for instance, had to be divided into two separate elements. The board members, CEO or company signatories of any company that is in possession of pipelines in a Swedish natural gas system must not simultaneously hold any of these roles in a company that trades in natural gas. However, Swedish legislation does not state that gas utility companies are not allowed to form part of a group that produces or trades in natural gas.

All companies running natural gas transmission operations and that form part of the same group as a company that produces or trades in natural gas must compile a monitoring plan [76]in accordance with the Natural Gas Act. The purpose of the monitoring plan is to ensure that companies operate objectively and do not unduly favour any market stakeholder. The monitoring plan must specify what measures are to be implemented by the company to counteract discriminatory behaviour in respect of other market stakeholders. They must also publish an annual report describing the measures they have implemented.

In 2017, Ei began planned supervision of the unbundling rules. Among other things, Ei examines how the Customer Service, Finance and IT functions have been distributed between the lines of business within a utility, or between companies if a group is involved. This supervision began with a pilot study of three electricity utilities and one natural gas company in the autumn of 2017. A further review will be taking place in spring 2018, when decisions will be made as a result of the supervision.

Certification of transmission system operators

According to the EU's Internal Market in Gas Directive,[77] transmission system operators[78] must be certified. Ei made the decision to certify Swedegas AB as a system operator in July 2012. This certification will remain valid until further notice, but the decision may be reviewed by Ei if the system operator fails to meet the requirements for certification.

Between 2010 and 2015, Swedegas was owned by EQT, a venture capital company. A change of ownership was announced in 2015, where Spanish Enágas and Belgian Fluxys became new owners. The new owners were already transmission network operators in countries such as Spain, Belgium, Germany and Switzerland.

2.1.2 Technical function of the natural gas network

Balancing natural gas

In its capacity as a transmission network operator, Swedegas owns the western Swedish natural gas network and is responsible for its operation and maintenance. This role is comparable to the role played by Svenska kraftnät on the electricity market, as they both own the supply network and are responsible for short-term balancing of the infeed and outfeed of electricity/gas. On 1 June 2013, the

[76] 2005:403 Chap. 3 section 9

[77] Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas Article 10.

[78] The term 'transmission system operator' is synonymous with 'transmission network operator'.

government appointed Swedegas as the system balance authority for the western Swedish natural gas network, a role previously held by Svenska kraftnät.

To guarantee balancing, Swedegas enters balance contracts with gas market stakeholders known as balance administrators. These balance administrators take on financial responsibility for ensuring that end-users' consumption is matched by the supply. The western Swedish natural gas network offers ample possibilities for storage of gas in the pipelines, known as linepack, thereby facilitating balancing. Short-term imbalances may constitute as much as 25 per cent of consumption on a typical winter's day without jeopardising the technical function of the network.

The system balancing administrator must not enter balance contracts with individual gas balancing operators without approval by Ei of the contract's terms and conditions.

Quality control of the natural gas network

The gas network companies are responsible for ensuring that operation and maintenance of their facilities are secure, reliable and efficient so that they meet reasonable requirements in terms of the transmission, storage and gasification of gas in the long term.

The western Swedish natural gas network is primarily made up of steel pipelines. The function of the system is checked regularly, and defective or end-of-life equipment is replaced. Operators estimate pipelines to have an anticipated service life of at least 40 years, while some equipment for monitoring, control and regulation is expected to have a service life of 5–20 years.

The pipes in the transmission network are approved for a pressure of 80 bar, and Swedegas has selected a minimum operating pressure of 45 bar. The transmission pipelines transmit the natural gas to the distribution networks. These are connected to the transmission network by a metering and regulating station. The gas flow is measured at the metering and regulating station, and its pressure is reduced. The distribution networks transport the gas from the transmission network out to smaller industries for the most part, and to regulating stations where the pressure is reduced still further before the gas is distributed to end-customers, such as customers using stoves, or gas boilers for heating purposes.

Most of the distribution pipelines are made of polyethylene. Steel pipelines are used in certain cases when gas is transmitted to customers who need a gas pressure greater than 4 bar. Guidelines for distribution network implementation, operation, repair, maintenance, etc. for a maximum pressure of 4 bar are coordinated in the energy gas standards devised by the Swedish Gas Association.

The network owner collects measurements from border, outtake and infeed points. These measurements are then reported on to the gas supplier, balance administrator and system balance administrator. The measurements form a basis for settlement of infeed and outtake energy quantities.

Billing for gas is based on the delivered energy. To calculate the energy quantity, the volume of the gas in m^3 is multiplied by the energy content of the gas per volume unit in kWh/m^3. The energy content per volume unit is generally known as

the calorific value, and in the Swedish system one calorific value is used for the entire system. The calorific value can be stated as either an upper or lower calorific value, depending on whether the products of combustion – the flue gases in the case of natural gas – have been cooled to the same temperature as the gas before combustion began. Thus, for a facility that has equipment capable of utilising the energy of the flue gases, the energy content of the gas per volume unit is higher.

Connection to a natural gas pipeline

The owner of a natural gas pipeline is obliged, on reasonable terms, to connect it to natural gas pipelines, storage facilities and gasification facilities owned by others. When requested to make a connection, the owner of the pipeline must, within a reasonable time, provide written information about the fee and other terms and conditions for the connection. This responsibility does not apply if the pipeline lacks the necessary capacity.

Connection to a storage facility and a gasification facility

The owner of a facility or pipeline for storage of natural gas, or of a gasification facility connected to the Swedish natural gas system must accept, on reasonable terms, natural gas owned by another party for storage or gasification. When requested to accept the input of gas, an owner of a storage or gasification facility must, within a reasonable time, provide written information about the fee and other terms and conditions for the input. This responsibility does not apply if the facility lacks the necessary capacity.

Examination of terms for connection to a natural gas facility

The methods for establishing contracts on connection to various types of natural gas facility are approved by Ei before being put into use. The terms specified in the connection contracts must also be approved before being put into use by the owners of natural gas facilities.

2.1.3 Network charges for connection and transmission

Review of gas network charges

Ei supervises gas network companies and approve the methods used by the companies to calculate their network charges. Supervision of the utilities' tariffs includes the companies that are connected to the Swedish natural gas system according to the terms of the Natural Gas Act. Until the end of 2014, these reviews were made retrospectively, but since January 2015 the revenues of network companies have been regulated in a similar way to the rules defined for the electricity market. This means that revenue is regulated in advance in a revenue framework extending over a four-year period. This framework defines an upper limit for the total revenue that companies are allowed to receive from their natural gas activities.

When devising charges for the transmission of natural gas, companies must in particular observe the number of connected customers, customers' geographical locations, the amount of transmitted energy, subscription costs for overhead lines, reliability of supply and pipeline pressure. As a consequence of the Internal Market in Gas Directive[79], an amendment came into force in 2012 which means that

[79] Article 41.6 a.

Ei's supervision in accordance with the Natural Gas Act is also applicable to tariffs for access to gasification facilities. Access tariffs may not be applied until Ei has approved the methods used to calculate the tariffs.

Ei's supervision of the methods determining tariffs is intended to ensure that they are objective and non-discriminatory in accordance with the requirements of the Swedish Natural Gas Act. An appeal against Ei's decision on supervision may be submitted within three weeks by the party to which the decision relates. Appeals are considered by the administrative court.

Prior to the regulatory period in 2015–2018, these companies submitted applications in June 2014 for revenue frameworks totalling SEK 7.3 billion. Ei made decisions on revenue frameworks amounting to almost SEK 6 billion in October 2014. Four out of nine natural gas stakeholders appealed Ei's decisions to the Administrative Court in Linköping. The Administrative Court issued its rulings in February 2016. The court mainly supported Ei's decision regarding companies' revenues. However, the court ruled against Ei with regards to depreciation periods and some aspects of the discount rate. Ei is of the opinion that the revenue frameworks, with application of the verdicts of the Administrative Court, are at a level that gives companies the opportunity to impose unreasonably high charges on their customers. Both Ei and the companies appealed against the verdicts to the Administrative Court of Appeal in Jönköping in 2016. In December 2016, the Administrative Court of Appeal issued its decision to reject Ei's request that a specialised economist be consulted in the matter. The Administrative Court of Appeal in Jönköping gave its verdict in November 2017, establishing longer depreciation periods for the transmission network company and a higher return for the gas utilities that appealed, compared with the decisions made by Ei. Ei appealed against the verdicts to the Supreme Administrative Court in December 2017. In April 2018, the Supreme Administrative Court announced that Ei did not have review dispensation, which means that the verdicts of the Administrative Court of Appeal stand.

According to the Swedish Natural Gas Act,[80] gas network companies are required to prepare separate financial accounts for their transmission, distribution, storage and gasification operations in the form of an annual report. This annual report must be submitted to Ei no later than seven months after the end of the fiscal year, and they must include a complete income statement and balance sheets for each reporting unit. This annual report forms the basis of further supervision.

Regulated access to storage and gasification facilities

Parties who own storage facilities or have the capacity to store natural gas in a pipeline are obliged to store natural gas on behalf of other parties, on reasonable terms. Likewise, parties who is in possession of a gasification facility are obliged to feed natural gas into a natural gas pipeline. These obligations are void if there is no capacity in the storage or pipeline facility.

2.1.4 Cross-border issues

Ei conducts cross-border cooperation in a number of international cooperation organisations. Although there is no formalised cooperation with other Nordic

[80] 2005:403 Chap. 3 section 3

regulatory authorities regarding the gas sector, there is a continuous dialogue with the Danish regulatory authority on how the collective market can be developed and how security of supply can be improved. Ei also works in cooperation with European regulatory authorities in Germany, the Netherlands, Belgium, Luxembourg, France, Spain, the United Kingdom and Ireland.

This cooperation is intended to facilitate swift incorporation of European legislation. Ei has contributed – via the cooperation organisation ACER – in the production of framework guidelines for the devising of European regulatory frameworks for the internal market for natural gas and submitted a statement on EU regulations to ENTSOG[81].

In 2017, the Danish regulatory authority (DERA) and Ei jointly published an evaluation of the Danish-Swedish gas network. This evaluation was based on the Gas Target Model devised by ACER. It comprises two phases. The first phase evaluates how well the wholesale market for gas is working in its current form and in the short term. The second phase evaluates any reforms in order to link the domestic market with adjacent markets with a view to achieving a more effective market, if this is considered necessary after the first phase.

This evaluation shows that the Danish-Swedish gas market does not meet all the criteria for an effective market. Market stakeholders need to have sufficient products and liquidity on the wholesale market to be able to manage risks effectively. Above all, these needs are not being met.

Projects of common interest

See section 1.1.4 for an introduction on projects of common interest.

The LNG terminal [82] at the Port of Gothenburg is currently the only PCI project for gas in Sweden. This terminal is expected to be completed and operational in 2018–2019 and will primarily facilitate shipping, industry and heavy transport on land by providing better access to natural gas. The terminal's total capacity will be about 30,000 m^3. In the long term it may also be used to feed natural gas into the western Swedish natural gas network.

2.1.5 Compliance with the Natural Gas Act

Ei is a regulatory authority according to the Swedish Natural Gas Act[83], and it is therefore tasked with ensuring compliance with the Act. Ei also monitors compliance with the Regulation[84] on conditions for access to the natural gas

[81] European Network of Transmission System Operators for Gas. ENTSOG is a cooperation organisation for European companies that are system operators for gas.
[82] An LNG terminal is a facility for the receiving and distribution of natural gas in liquid form, frequently transported by sea, road or rail. LNG terminals can also be connected to natural gas networks.
[83] Natural Gas Act (2005:403), Chap. 1 section 9.
[84] Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005.

networks. Ei's are instructed to fulfil its tasks, within its responsibilities, that follow from the Internal Market in Gas Directive[85].

Under the Internal Market in Natural Gas Directive, the national regulatory authority must comply with and implement the legally binding and relevant decisions taken by ACER and the European Commission. No specific legislation is required for this to be applicable in Sweden, as the provision is of advisory nature. Which decisions are binding and relevant must be indicated by other provisions, such as an EU regulation. To allow for Ei to comply with the Commission's decisions, provisions have been introduced to the Swedish Natural Gas Act[86] and the Act on certification of certain natural gas companies[87]. These provisions mean that when Ei makes decisions that are affected by the Internal Market in Natural Gas Directive, Article 43, the authority has to state that these decisions may be altered or annulled at the request of the European Commission.

According to the Swedish Natural Gas Act[88], Ei may issue injunctions as are necessary to ensure compliance with the regulations and conditions within the scope of its supervision. Such injunctions may be associated with fines. The Act[89] also specifies that Ei is entitled to request and receive such information, and persue such documents as it needs in order to carry out supervision. The supervisory authority may also issue injunctions that are necessary to ensure compliance with the regulations and conditions within the scope of its supervision.

[85] Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC.
[86] 2005:403 10 Chap. section 1 a.
[87] Act (2011:711) on certification of certain natural gas companies, Chap. 3 section 4 and Chap. 4 section 3.
[88] 2005:403 10 Chap. section 3.
[89] 2005:403 10 Chap. section 2.

2.2 Wholesale market for natural gas

Natural gas covers about 2 per cent of Sweden's total energy needs, making it a relatively small source of energy. However, in municipalities where the natural gas network is well developed, it represents approximately 20 percent of final energy use, which is in line with the average in the rest of Europe. The Swedish natural gas market is closely linked to the Danish market.

2.2.1 Monitoring of price development, transparency and competition

Sweden does not produce any natural gas of its own; instead the supply comes from Denmark via a pipeline beneath Öresund (Dragør). The natural gas consumed in Sweden mainly comes from the Danish gas fields in the North Sea.

Due to the design of its network, the Swedish natural gas market is closely linked to the Danish market. The balance operators in the Swedish natural gas system are also active on the Danish gas market, particularly on the Gaspoint Nordic gas exchange, which has been part of the pan-European gas exchange PEGAS since 24 November 2016.[90] This is why competition, pricing and transparency are largely dependent on development in Denmark.

There is enough capacity to transport approximately 22 TWh of natural gas annually using the existing transmission pipeline between Malmö and Gothenburg. By using compressors to raise the operating pressure, this capacity can be increased to over 30 TWh/year.

Table 9 Transmission of natural gas, 2017[91]

	Total energy consumption (TWh)	Production	Import capacity, total (TWh)
2008	10.3	0	15
2009	13.9	0	15
2010	18.7	0	22
2011	15.0	0	22
2012	12.9	0	22
2013	12.3	0	22
2014	10.4	0	22
2015	10.4	0	22
2016	10.6	0	22
2017	8.7	0	22

Source: Swedegas

Natural gas in Sweden is mainly used by industry and at combined hear and power plants, while only a few percent is used by households. There is a strong link between the weather – particularly in winter – and natural gas consumption in Sweden. Natural gas consumption fell by 1.9 TWh compared with 2016. This reduction is due to a combination of a warmer winter and the fact that one major consumer was only operational in the first quarter of 2017, while cogeneration was not operating fully.

[90] http://www.gaspointnordic.com/1-news/successful-launch-of-danish-etf-contracts
[91] Expressed in upper calorific value.

Trading in natural gas

There is no financial trade on Gaspoint Nordic. Instead, all trade takes place with physical supply and stakeholders must have contracts with the Danish transmission network operator, Energinet.dk. On Gaspoint Nordic, an operator can trade gas for delivery during the day, the day before, prior to the weekend and prior to the next month. Energinet.dk uses Gaspoint Nordic's intraday trading to balance the Danish natural gas network.

The price on Gaspoint Nordic is set according to supply and demand and also forms the basis for the so-called balance base price used by Energinet.dk to offset imbalances between operators. Around twenty operators were active on Gaspoint Nordic in 2017.

Gaspoint Nordic's price index changed its name from the Gaspoint Nordic Spot index to the European Gas Spot Index on 5 September 2017.

An operator need to book capacity in the Dragør pipeline if they want to transport natural gas to Sweden. The transmission capacity is auctioned off at Energinet.dk's regular capacity auctions. Because of the low consumption in relation to the system's transmission capacity, there is no risk of transmission congestion with today’s levels of consumption. Once in Sweden, the gas is sold to users such as industries and gas distributors. As things stand at present, four Swedish balance administrators have contracts with transport stakeholders on the Danish market and can therefore reserve capacity from Energinet.dk.

2.3 The end-customer market

The final step in opening the natural gas retail market to competition took place in July 2007. Since then, all natural gas have been free to choose their natural gas supplier.

The western Swedish natural gas network has around 35,000 natural gas customers, of which around 30,200 are household customers and the rest are corporate customers. The City of Stockholm gas network has around 60,400 customers, of which around 2,400 are corporate customers and 13 are industries.

2.3.1 Monitoring of price development, transparency and market competition

A small market

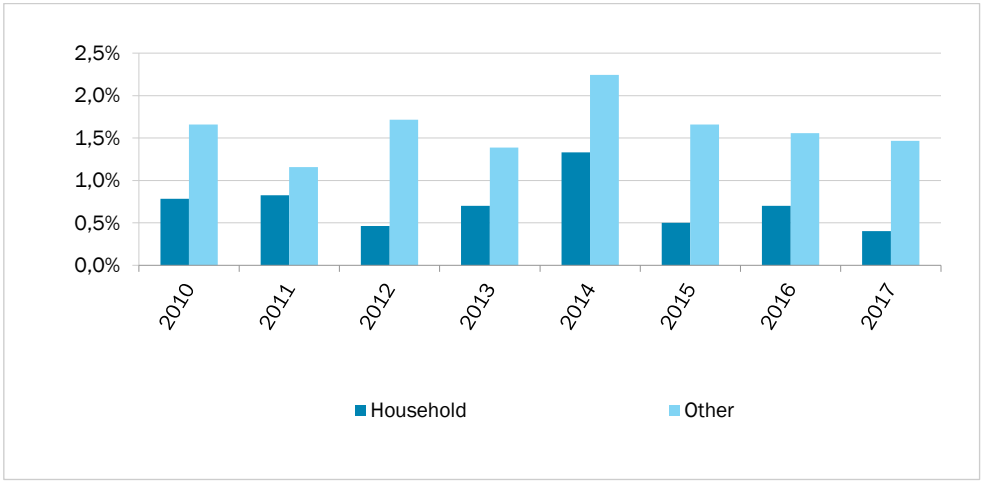
The western Swedish natural gas network has approximately 35,000 customers, the largest of which are major industries and cogeneration power plants, while approximately 30,200 are household customers[92]. The City of Stockholm urban and vehicle gas network has around 60,400 customers, of which around 2,400 are corporate customers and 13 are industries[93].

There were seven stakeholders[94] on the Swedish end-customer market for natural gas at the end of 2017, six of which are in the western Swedish natural gas network and one is in the City of Stockholm urban and vehicle gas network.

Low customer activity on the natural gas market

In 2017, consumers switched suppliers in the Swedish natural gas market on 461 occasions, where 354 of these were implemented by household customers and 107 by companies. This is equivalent to a total change frequency of 0.4 per cent for household customers and 1.5 per cent for corporate customers: see Figure 25.

Figure 25 Changes of natural gas supplier, %



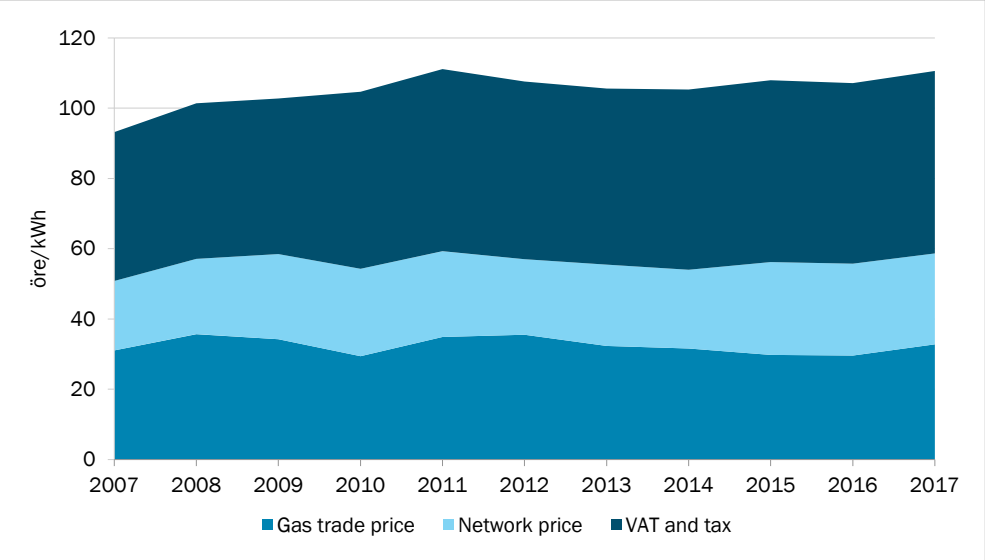
Source: Statistics Sweden

[92] Source: Energigas Sweden, www.energigas.se
[93] Source: Gasnätet Stockholm AB, www.gasnatetstockholm.se
[94] ApportGas, E.ON Försäljning Sweden AB, Göteborg Energi, Kraftringen Energi AB, Varberg Energi, Öresundskraft, Stockholm Gas Handel

Tax and VAT represent the greater part of the total cost of natural gas

Customers' overall gas costs have changed relatively little since deregulation took place in 2007. This is because the gas trading price has remained relatively constant at approximately SEK 0.30–0.35 per kWh. The network charge has also remained stable at approximately SEK 0.20–0.27 per kWh. Tax on natural gas, however, has increased by approximately SEK 0.09 since 2007: see Figure 26.

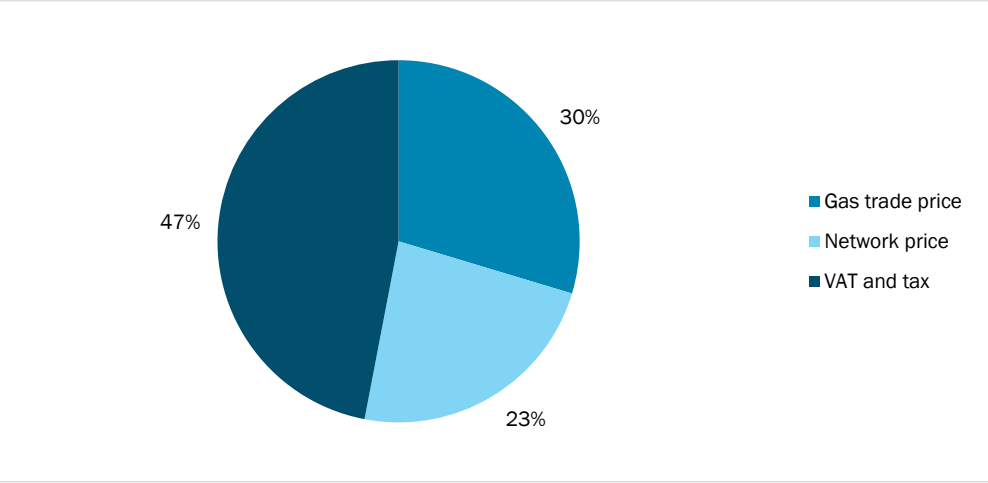
Figure 26 Actual change in the various expenditure items for households with gas heating[95]



Source: Statistics Sweden

The single biggest expenditure item in the total cost of gas for household customers is made up of VAT and energy tax. This is equivalent to 47 per cent of the total cost: see Figure 27.

Figure 27 Proportion of the total gas cost[96]



Source: Statistics Sweden

[95] Prices applicable to household customers consuming between 5,500 and 55,000 kWh per year (heating and household gas)

[96] Prices applicable to household customers consuming between 5,500 and 55,000 kWh per year (heating and household gas)

Easy to compare natural gas prices for households

The Swedish Consumer Energy Markets Bureau has been running the website gaspriskollen.se since 2014, where household customers can compare natural gas prices from all natural gas suppliers in Sweden. The website also includes information on how to switch gas supplier, as well as information about the various cost components in the gas price.

2.4 Recommendations for natural gas prices and for studies and measures to promoting competition

Ei cooperates with other government agencies to supervise the natural gas market to create a well-functioning natural gas market.

2.4.1 Ei monitors the natural gas market

According to Ei's instruction, the authority is tasked with monitoring and analysing development on the natural gas market and submitting proposals for changes to regulatory frameworks in order to promote the function of the market. The instruction also states that Ei should act to promote effective competition on the natural gas market.

Implementation of the balancing regulation

On 1 April 2015, Ei made a decision[97] to approve a Swedegas requests to be allowed to apply interim balancing measures. In the same decision, Ei established that Swedegas would send a report update to Ei every year up to and including 2019, when the balancing regulation[98] should be fully implemented.

Common balancing zone between Sweden and Denmark

In 2016, Swedegas began a pilot study with Energinet.dk, the Danish transmission operator, in order to increase harmonisation of the Swedish and Danish gas markets by creating a common balancing zone between Sweden and Denmark. Among other things, this project means that the valve in Dragør will be opened fully increasing the average pressure, flows will travel at the same pressure in both systems. The transmission tariffs on the border between Denmark and Sweden will be discontinued when the project is implemented. This may create a more liquid balancing market with greater security of supply; primarily on the Swedish side, where administration will become more efficient and competition will increase, benefiting end-customers.

This project is in line with the Gas Target Model, and the common balancing zone is expected to be commissioned on 1 April 2019. This project does not involve harmonisation of network tariffs.

2.4.2 Potential increase in competition on the natural gas market with construction of new LNG terminals

One problem for the Swedish market has involved the lack of alternatives for a natural gas supply, apart from the valve in Dragør. The construction of the new LNG terminal in Gothenburg is paving the way for a supply of gas from elsewhere for the Swedish natural gas network. However, the terminal will not be connected to the natural gas network initially, and it is unclear when this will be taking place.

[97] http://www.ei.se/Documents/Publikationer/beslut/Beslut%20Rapport%20om%20interimistiska%20åtgärder%20för%20den%20kortfristiga%20grossitsmarknade%20för%20gas.pdf

[98] EU regulation 312/2014 establishing a Network Code on Gas Balancing of Transmission Networks.

2.5 Security of supply, natural gas

Although security of supply historically has been high, the Swedish natural gas market can be said to be vulnerable in both the short and the long term. The situation whereby the country has a single point of supply, along with the fact that Sweden does not produce its own natural gas, makes the Swedish natural gas market sensitive to external disruptions in the short term, particularly with regard to production stops in the Danish natural gas fields. In the longer term, gas supplies from Denmark will decline as the natural gas fields there are gradually drained.

2.5.1 Monitoring the balance between supply and demand

The Swedish Energy Agency is the regulatory authority according to the Act on a secure natural gas supply[99]. In accordance with the requirements of the natural gas supply regulation[100], a national preventive action plan and a national crisis plan for safeguarding the supply of natural gas supply was published in 2012. The preventive action plan was updated in 2014 with an updated risk assessment.

2.5.2 Expected future demand and supplies, and added capacity

Swedegas has been working in cooperation with stakeholders in the Gävle region and agreed to examine the options for building a gas network between the Gävle area and Hofors. An initial study was carried out in 2014 in order to chart environmental benefit and market potential. A consultation meeting was also held in 2014 regarding a gas pipeline between Hofors, Sandviken and Gävle. A supplementary consultation also began in 2015, considering an alternative route between Norrsundet and Sandviken and a liquefied natural gas (LNG) terminal at the Port of Norrsundet.

In 2016, Swedegas AB submitted an application to Ei for a licence to construct and use an LNG terminal at the Port of Gothenburg, along with an application to construct and operate a natural gas pipeline for the transmission of natural gas from the LNG terminal to the natural gas transmission network. This operation will also involve bunkering of LNG for ships. In the first quarter of 2018, Swedegas AB has supplemented its licence application with an extension of the licence area to also include pipelines out to quay berths. This application is still being prepared at Ei.

2.5.3 Harmonised transmission tariff structures for gas

On 16 March 2017, the Commission issued Regulation (EU) 2017/460 establishing a network code on harmonised transmission tariff structures for gas. The purpose of this regulation is to use EU rules to assist with market integration and improved security of supply, and also to promote interlinking between the European gas networks. Among other things, this regulation specifies rules for transmission tariffs, application of a reference price methodology, requirements for consultation and publication. In Sweden, Swedegas – which owns and runs the Swedish gas transmission network – is affected by the regulation.

[99] Act (2012:273).
[100] (EU) 994/2010.

According to a decision made by Ei on 7 December 2017, Swedegas must implement and publish assessments of the cost distribution, implement consultations and submit consultation documents to ACER, as well as publish tariff information according to the regulation.

2.5.4 Measures for covering demand peaks or supply deficits

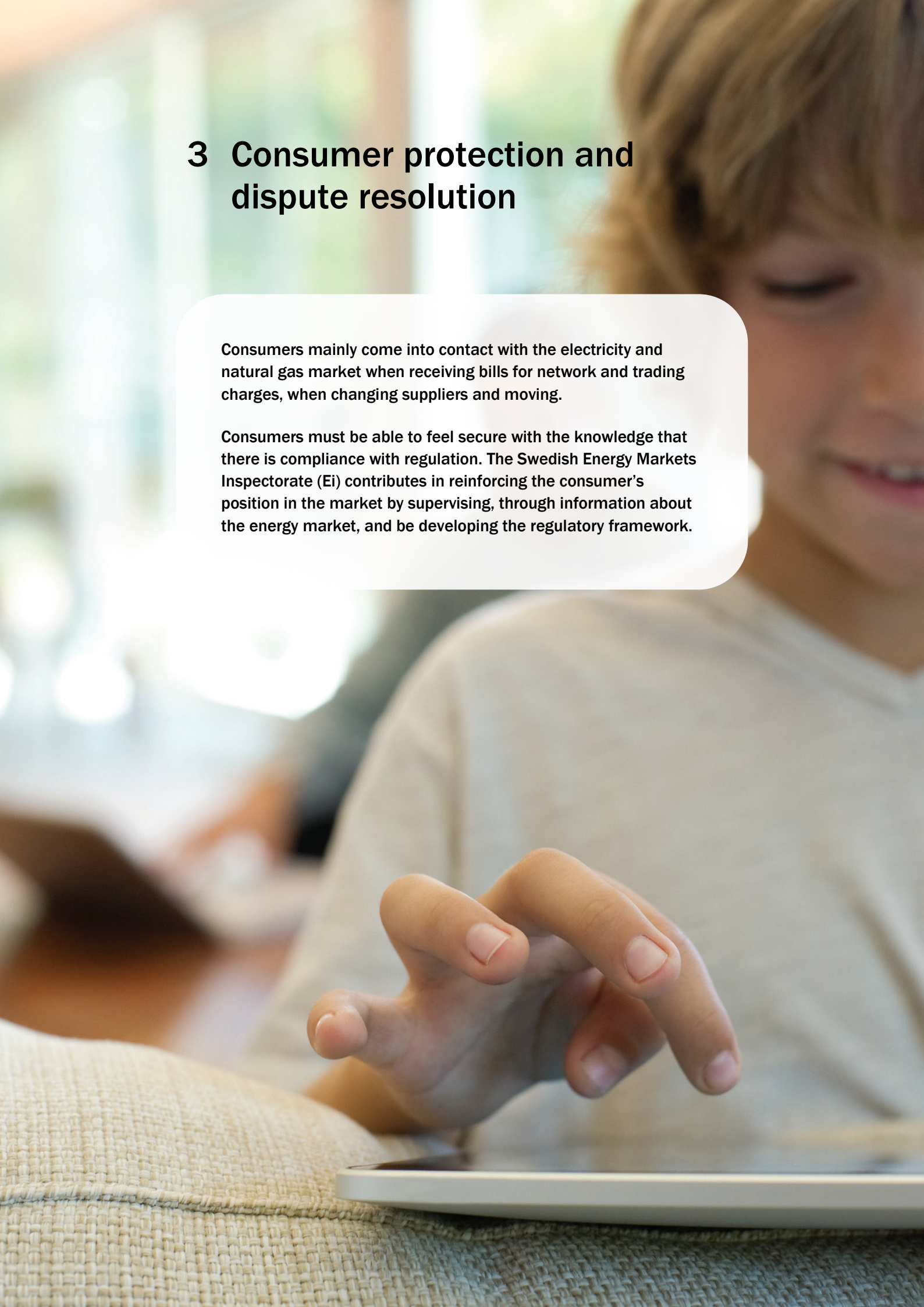
Consumption peaks and shortage of supply from the balance administrators are mitigated by the balancing scope permitted by pressure variations in the transmission pipelines, known as linepack. If measures beyond this are required, the system balance administrator uses market mechanisms as far as possible in order to deal with imbalances. The Swedish Energy Agency is able to order network owners to restrict or shut off natural gas transmission to industrial customers. If this is done, the supply to consumers must be secured.

Implementation of safety measures

Owners of natural gas pipelines, storage facilities or gasification facilities must plan for management of the operation and safety of their own facilities in a crisis.[101] Owners must compile a crisis action plan and ensure that this plan is distributed within their own organisation, and also compliance with the plan. Owners must also notify the authorities and other relevant stakeholders about their plans.

[101] Regulations are formulated in the Swedish Energy Agency's regulations and general recommendations on company planning and on the obligation to submit information about natural gas supply, STEMFS 2012:4.

3 Consumer protection and dispute resolution



Consumers mainly come into contact with the electricity and natural gas market when receiving bills for network and trading charges, when changing suppliers and moving.

Consumers must be able to feel secure with the knowledge that there is compliance with regulation. The Swedish Energy Markets Inspectorate (Ei) contributes in reinforcing the consumer's position in the market by supervising, through information about the energy market, and be developing the regulatory framework.

3.1 Consumer protection

As a consequence of EU's third energy package for the internal market in electricity and gas, a number of consumer provisions were implemented in the Swedish Electricity and Natural Gas Acts in 2011. As supervisory authority, Ei has to work together with other relevant government agencies to contribute to the implementation and effectiveness of consumer protection measures.

Ei further has to inform consumers in matters such as how to change electricity or natural gas suppliers, the cost of connecting to a network, and how they can report the chosen supplier or network company.

Ei's supervision of supply quality in electricity networks

Since 2010, Ei has access to detailed statistics on power outages for all electricity network customers in Sweden. This has increased opportunities to focus supervision on parts of the electricity networks that are most in need of improvement. A lack of supply quality causes substantial inconvenience to customers and leads to high costs for society. Disruptions cost society around SEK 1 billion each year. Shortcomings in power supply quality may also give rise to major costs. An effective electricity supply is crucial to the function and development of society.

For this reason, Ei carried out a supervisory review in 2016. This included reliability of supply, power supply quality and the quality of the information on power outages submitted to Ei each year by the electricity utilities. The objective of this supervision was to ensure that the network companies were implementing measures promoting supply quality in the electricity network in both the short and long term.

In its supervision, Ei worked on the basis of information from the annual report on outages. The utilities that reported outages lasting more than 24 hours or customers with more than 11 outages in 2014[102] or companies with indications of quality defects in their reporting of outages were selected for supervision. A total of 36 electricity utilities were selected for supervision. These 36 utilities in combination have a total of approx. 4,165,000 low-voltage customers, equivalent to around 77 per cent of all low-voltage customers in Sweden.

Those companies for which Ei found deficiencies in the quality of supply were ordered to present what actions they intended to apply in order to correct the deficiencies.

The supervisory project was completed in 2017 and described in the report *Tillsyn avseende leveranskvaliteten i elnäten [Supervision concerning supply quality in electricity networks] (Ei R2017:02)*. As a result of this project, a method was developed for implementing supervision of security of supply. Another supervision initiative began in 2017 with regard to data for 2016. This task involves 41 supervision assignments relating to a lack of supply quality. This supervision is expected to be completed in spring 2018.

Elpriskollen

[102] Rapport om leveranssäkerhet i Sveriges elnät 2014 [Report on security of supply in Sweden's electricity networks, 2014] (R2016:07)

Ei offers a price comparison website, elpriskollen.se, to reinforce consumers' position on the electricity market, allowing them to compare prices and terms on the most common contracts from all electricity trading companies.

The option of comparing prices and other factors that may influence the choice of electricity supplier is a prerequisite for active customers. Therefore, Ei is constantly working on developing and improving its price comparison website to make things easier for consumers and allow them to perform extended searches. Price comparisons can currently be performed in 13 languages. Elpriskollen.se was marketed on social media in 2017, increasing the number of unique visits from 63,000 (in 2015) to 116,000 (in 2017).

Ei also carries out regular checks of the reported prices and associated terms to ensure that electricity suppliers are reporting correct information. A number of checks of electricity suppliers' prices and contract terms have been carried out over the year. Electricity suppliers have been encouraged to rectify any shortcomings detected, and they have done so in all cases.

Consumer Contact and Kundo

Ei has set up a consumer contact function to provide a single location for customers' queries and complaints. All queries and complaints with consumer relevance that are submitted in writing to Ei are referred to Consumer Contact. Responses are also given to queries and complaints from businesses if they may be of relevance to consumers. Apart from responding to queries and receiving complaints relating to energy market stakeholders, this also creates a foundation for rule development and supervision for other Ei departments.

Consumer Contact accepts queries and complaints by email, telephone, social media and the web-based query forum Kundo. Kundo allows consumers to directly search the website, ask questions or look for answers to questions asked previously. The aim is for this method to maintain a high service level, providing consumers with short response times and relevant answers. Ei has also extended its cooperation with the Swedish Consumer Energy Markets Bureau in 2017 as regards dealing with queries and complaints on Kundo. Questions and queries outside Ei’s responsibilities are responded to by the Swedish Consumer Energy Markets Bureau.

Ei had approximately 1,600 instances of contact with consumers in 2017. This contact related to electricity networks, electricity supply, elpriskollen.se, district heating, gas networks and gas supply. More than half of all instances of contact involved queries, the rest were complaints. These instances of consumer contact may relate to electricity network charges, such as increasing the charges, the level they are at, the difference in charges between different areas or the various elements of the charges such as the variable element, the fixed element or the power output charge. Instances of consumer contact relating to electricity supply relate primarily to contract terms – unreasonable contract terms or a lack of information about the contract terms, for example – and dissatisfaction with outreach sales.

Reports to Ei

Besides asking questions about the energy markets, consumers also have the opportunity to report any company failing to comply with the provisions of the Electricity Act and the Natural Gas Act. As the authority responsible for supervision, Ei can then examine whether the company has breached its statutory obligation.

Ei received a total of 24 reports in 2017, fewer than the 35 submitted in 2016. Of these, 21 reports related to electricity utilities' obligations in accordance with the Electricity Act, and one report related to electricity suppliers' obligations in accordance with the same law. Two reports were submitted concerning gas utilities' obligations in accordance with the Natural Gas Act.

Amendments to the Electricity Act on assigned contracts

If consumers move to a new home without actively selecting an electricity supplier and electricity contract, they are assigned to an electricity supplier by the electricity utility. This often results in more expensive electricity supply contracts for consumers. On 1 April 2017, the Electricity Act was amended in respect of the information that all electricity customers (both consumers and businesses) must receive from the electricity utility and electricity supplier if assignment takes place. The purpose of the new rules is to reduce the number of customers with assigned electricity suppliers, ensure that customers with assigned contracts have reasonable terms, and increase activity on the electricity market.

In contracts between the electricity utility that assigned the customer and the assigned electricity supplier, the electricity supplier must undertake to supply electricity on reasonable terms to customers with assigned contracts. The electricity utility must notify the customer of which electricity supplier has been assigned, what assigning the contract means and the provisions of the Electricity Act with regard to switching electricity suppliers.

The assigned electricity supplier must notify the customer of the terms for the assigned contract, the date on which supply will commence and specify that the contract is an assigned contract. This must be done without delay when the contract is assigned. At least once per quarter, the assigned electricity supplier must also notify customers with assigned contracts of what other contract types are offered and the prices and terms for these contracts. The assigned electricity supplier must also notify customers in this case of where they can find information about prices and terms applied by other electricity suppliers.

Help to vulnerable customers

The Swedish definition of vulnerable customers can be found in Ei's instructions, which states "*vulnerable customers are persons who lack the ability to pay for the electricity or natural gas which is transmitted or delivered to them for purposes which fall outside of the scope of business activities*". On the Swedish electricity and natural gas market, this consumer category is protected by social legislation, ensuring that consumers have the right to financial assistance in order to maintain their supply of electricity and natural gas. Ei has previously estimated that approximately 20,000 consumers are covered by the Swedish definition of the term.

Both the Electricity Act and the Natural Gas Act also include provisions that protect consumers that are at risk of being disconnected from the electricity or natural gas network as a result of unpaid bills or other significant breaches of contract. These provisions mean that any company disconnecting such customers must first follow a specific statutory procedure. This includes the consumer's right to accurate information from the company, the opportunity for the consumer to rectify the situation without being disconnected, and also the company's obligation to give notice of the disconnection to the social services in the municipality where the consumer lives before any disconnection can proceed.

Swedish Consumer Energy Markets Bureau as a national point of contact

Ei has continued its work as one of the principals of the Swedish Consumer Energy Markets Bureau in 2017. The Swedish Consumer Energy Markets Bureau is an independent bureau providing information and guidance to consumers on issues relating to the electricity and natural gas market. Advice to consumers is free of charge. An agreement is already in place between Ei and the Swedish Consumer Energy Markets Bureau, which means that the bureau is the national point of contact for the electricity and natural gas market. This met the requirements for this according to the EU's Internal Market in Electricity and Gas Directive. The Energy Markets Bureau website was visited by approximately 65,000 consumers in 2017, compared with 50,000 visits in 2016. Around 1,600 consumers got in touch with the bureau directly by telephone and email. This is a slight increase on the previous year. The number of instances of direct contact involving complaints continue to increase in 2017: 900 of the 1,600 instances of contact involved complaints. As in previous years, most of the complaints related to electricity price contracts. Most of these complaints related to switching electricity suppliers, redemption fees, the right to withdraw and automatic extension of electricity price contracts. Many of the complaints in 2017 as well related to problems arising following outreach sales from electricity suppliers.

The Energy Markets Bureau has also continued reporting summaries of consumer problems on the energy markets to authorities and companies throughout the year. These efforts have created opportunities for companies to undertake action to reduce complaints. For Ei, this – together with the authority's own summaries of consumer complaints – means that it has been possible to implement supervisory initiatives in areas where they will be of most benefit.

Other consumer advice

In particular, the Swedish Consumer Agency is responsible for consumers on the electricity and natural gas market. Among other things, the Swedish Consumer Agency reviews whether companies have used misleading or aggressive marketing, applied unreasonable contract terms or provided inadequate price information.

The Swedish Consumer Agency runs a central consumer information service by the name of Hallå konsument [Hey consumer].[103] Hallå konsument covers the energy markets and includes all consumer markets as well. Consumers can consult

[103] www.hallakonsument.se

Hallå konsument with questions relating to purchases, contract terms and complaints.

Other authorities, including Ei, are responsible for cooperating with the Swedish Consumer Agency on development of Hallå konsument. The Energy Markets Bureau is responsible for answering questions referred from Hallå konsument, as well as for some of the information on the Hallå konsument website.

Consumers on the electricity and natural gas market also have the opportunity to consult their local municipality for advice on various issues. Consumer advisors there offer advice before consumers sign contracts, as well as advising on disputes. Budget and debt advisors are able to offer advice and support when consumers have payment problems, while energy and climate advisors are able to offer analysis of energy consumption and advice when choosing a new form of heating.

3.2 Dispute resolution

Electricity suppliers, electricity network companies, gas suppliers and gas network companies must provide clear information on their websites, and on the consumer invoices, about the consumers' rights as well as about how to submit a complaint and where to turn for more information or dispute settlement.

For information and guidance, consumers can contact the Consumer Energy Markets Bureau or a municipal consumer advisor.

Ei examines some disputes

Ei makes sure that companies on the electricity and natural gas markets operate in compliance with legislation, and in some cases it also helps to resolve disputes between consumers and companies. This concerns disputes relating to the obligation of electricity network companies to connect a facility to the electricity network, the cost of metering and calculating electricity, remuneration on electricity infeed and network tariffs for smaller production facilities.

According to the provisions of the Electricity Act, the connection charge must be reasonable[104]. If a consumer feels that the cost is too high, they can contact Ei for a review. If Ei concludes that the connection charge is too high, the electricity utility must pay the difference back to the consumer. It is possible to appeal against Ei's decision on a reasonable connection charge, and the courts have the final say. There is no cost involved in requesting a review by Ei or in appealing Ei's decision.

Dispute resolution support at the National Board for Consumer Complaints

Consumers on the electricity and natural gas market can report disputes with companies to the National Board for Consumer Complaints (ARN). Reports of this kind are quick and easy, but they are nevertheless a legally certain alternative to going to court. ARN is a state authority that examines disputes between customers and companies on the electricity and natural gas market and other markets free of charge. ARN does not perform its own investigation of what has happened; it is up to the parties to submit and present the information on which the board is being asked to make a decision. The board works on the basis of applicable legislation and legal practice when assessing disputes. In its decision, the board provides a proposal on how the dispute should be resolved. For consumers to be able to report a dispute to ARN, the company has to have rejected the consumer's claim or not responded at all to the consumer, the report must have been received no later than 6 months from the date on which the company refused the consumer's claim, and the claim must be above the limits of SEK 500, SEK 1,000 or SEK 2,000, depending on what the report relates to.

Consumers normally wait for about six months for a decision from ARN. Consumers can also consult a general court of law in order to resolve a dispute with an electricity or natural gas company.

[104] 1997:857 Chap. 4 section 9

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