Energimarknadsinspektionen
Swedish Energy Markets Inspectorate

Ei R2022:07

Sweden's electricity and natural gas market, 2021

The Swedish Energy Markets Inspectorate (Ei) is an authority assigned the task of working to maintain well-functioning energy markets.

The overall objective of our work is for Sweden to have well-functioning distribution and trading of electricity, district heating, and natural gas. We shall also address the concerns of customers and strengthen their position in the markets.

In concrete terms, this means that we supervise the compliance of companies with the regulatory frameworks. We are also responsible for drawing up the rules of the game and for informing customers about their implementation. We regulate the terms and conditions for the monopoly companies that operate the electricity networks and the natural gas networks, and we supervise the companies in the competitive energy markets.

The energy markets need rules of the game – we make sure they are followed.

The Swedish Energy Markets Inspectorate
Box 155, SE-631 03 Eskilstuna, Sweden
The Swedish Energy Markets Inspectorate (Ei) R2022:07
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Photos: © Bildarkivet (electric cable) / © Johnér, Hans Berggren (Öresund bridge) / © Johnér, PhotoAlto (boy with tablet)

This report is available at www.ei.se

Foreword

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 markets. The purpose of this report is to describe the development of the electricity and natural gas market in 2021.

According to Ei's instruction, the authority must perform tasks pursuant to Directive (EU) 2019/944 of the European Parliament and of the Council on 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 Directives. This report involves regulation issues, competition issues, and issues relating to security of supply.

The report has the content that is agreed on by 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 CEER website, the Council of European Energy Regulators: www.ceer.eu. The structure of the report reflects CEER's advice on the structure and relevant indicators, but there is no one-to-one similarity, the similarity is clarified in the table of corresponding sections, Appendix 1.

Eskilstuna, June 2022

Caroline Törnqvist
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Contents

Summary

The Swedish electricity and natural gas markets are part of the integrated European markets for energy and the trading is open to competition. The electricity and natural gas network activities are regulated monopolies, as it would be inappropriate, both economically and environmentally, to build parallel networks throughout the entire country.

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

The electricity market

The Swedish electricity network

The Swedish 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. The electricity network is made up of 584,000 kilometres of cabling, of which approximately 421,000 kilometres is buried and 163,000 kilometres is overhead.

The state enterprise, Svenska kraftnät, is responsible for managing and developing the Swedish transmission network. Svenska kraftnät is also responsible for maintaining the power balance in the short term as well as operational reliability in the Swedish electricity network. Svenska kraftnät is certified as transmission system operator (TSO) by the Swedish Energy Markets Inspectorate (Ei). In its capacity as a regulatory authority, Ei is tasked with reviewing several aspects of Svenska kraftnät's activities.

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 networks are operated as regulated Monopolies where Ei reviews the revenues of the network operators and assesses whether they are

reasonable. Between 2020 and 2021, the charges on average decreased by 0.8 per cent for apartment customers, by 2.4 per cent for house customers with 16 A fuse protection, and by 2.8 per cent for house customers with 20 A fuse protection. In monetary terms in Sweden, this is equivalent to an annual decrease of SEK 14, SEK 84, and SEK 201 respectively.

Ei decides how much the electricity utilities are allowed to take from their customers over a four-year period by establishing what are known as revenue frameworks. In 2021, a new act was also introduced on special scope for investment to increase electricity network capacity (SFS 2021:311) whereby network companies can apply for special scope for investment.

Wholesale market for electricity

During the second half of 2021, electricity prices were historically high. This is primarily due to a large increase in the world market prices for natural gas. Even though Sweden does not produce electricity from natural gas, Swedish electricity prices are affected due to the electricity market in Europe being integrated. Other factors have also been important for pricing. 2021 was a year of little wind, which has restricted the production of wind power, and it has also been very dry, which has affected the price of hydropower. On average over the year, the electricity price in bidding area SE4 was 80.53 euro/MWh, and in bidding area SE1 it was 42.56 euro/MWh, in comparison with the average price for the previous year when in SE4 it was 21.19 euro/MWh and in SE1 it was 14.39 euro/MWh. However, it should be mentioned that 2020 was a year of uncommonly low electricity prices due to weather conditions and reduced demand due to the pandemic.

Nord Pool's day-ahead market is the trading platform for the majority of the physical electricity trading in the Nordic region and the Baltic States. In 2021, Nordic stakeholders traded approximately 671 TWh on Nord Pool's day-ahead market and approximately 47 TWh on EPEX spot. Some of the trading also takes place via bilateral contracts and on the intraday market.

Total consumption of electricity, including transmission losses, was 140 TWh in 2021. In 2021, Sweden's electricity production was 165.5 TWh, which is equivalent to 3.7 per cent more than the previous year. The main increase in production has come about from cogeneration and nuclear power. The installed capacity of wind power has continued to increase but this has not had an impact in the form of increased production because there has been less wind in 2021 than in 2020.

Retail market for electricity

In 2021 there were approximately 140 electricity suppliers on elpriskollen.se, Ei's price comparison website. At the close of the year, the three largest electricity

suppliers had a collective market share of approximately 45 per cent counted in number of customers, which is an equivalent market share to the previous year.

In 2021, the largest part of the total cost of electricity for consumers – 43 per cent – was made up of electricity supply.

The cost for tax and VAT amounted to approximately 39 per cent, while the cost of transmission amounted to 18 per cent.

The most common electricity supply contract in Sweden during the year was the variable price electricity supply contract. The long-term trend is that more and more people are abandoning fixed contract types and so-called designated contracts (the type of contract for people who do not choose an electricity supplier) in favour of variable price contracts, but this trend is considered to have slowed down slightly during 2021. By December 2021, 52.8 per cent of Swedish household customers had taken out variable price contracts, which represents a decrease of 0.2 percentage points compared with December 2020. Approximately one third 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 western Swedish natural gas network consists of 600 kilometres of transmission pipeline and around 3000 kilometres of distribution pipeline. The natural gas network is connected to the Danish transmission network via an interconnection in Dragör, and in Sweden the network extends along the west coast from Trelleborg to Stenungssund, with a route eastward to Jönköping.

There is an urban gas network and a vehicle gas network in the Stockholm region that each account for approximately 500 km and 40 km of pipeline respectively. In addition, there are also a number of small gas networks around Sweden. The small networks are primarily used for transporting vehicle gas-type biogas from production plants to fuelling stations. One thing the gas network in Stockholm and the small local gas networks around the country have in common is the fact that they are not connected to a transmission network.

Ei is the regulatory authority for the networks covered by the provisions of the Natural Gas Act (2005:403), which are the western Swedish gas network and the gas network in Stockholm. 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

directly into the transmission network. Another two biogas producers are connected to the urban and vehicle gas network in the Stockholm region.

Ei sets the revenue framework for the gas network companies, which extends over a four-year period, in a similar way to the rules on the electricity market. This framework defines an upper limit for the total revenues that companies are allowed to charge for their natural gas activities.

Wholesale market for natural gas

In 2021, 8.7 TWh of natural gas was used in the western Swedish natural gas network. The Swedish natural gas market is closely linked with the Danish market due to the design of the western Swedish network. During 2021, natural gas prices doubled several times on the world market, which was also reflected in the Danish-Swedish market. At the start of the year, the gas price was around 20 euro/MWh, and then increased to around 80 euro/MWh in September. The gas price peaked on 21 December at 180 euro/MWh.

Since 2020, natural gas has mainly been traded on the European Energy Exchange (EEX), into which the earlier Danish trading platform, ETF PEGAS, was integrated. Competition, price development, and transparency in the Swedish natural gas market are largely dependent on developments in Denmark.

Retail market for natural gas

The western Swedish natural gas network has around 34,000 household customers and approximately 4,800 other customers, such as major industries. The Stockholm urban gas network and vehicle gas network have around 58,000 customers, of which most are household customers.

There were a total of seven stakeholders that offered gas supply contracts to end customers at the close of 2021, six of which are in the western Swedish natural gas network, and one of which is in the City of Stockholm urban and vehicle gas network.

Consumer protection and disputes

Ei checks that companies in the electricity and natural gas market comply with national legislation and the EU's regulatory framework for the internal market for electricity and gas.

The regulations that Ei monitors include rules on the level of quality customers should receive in their electricity supplies, since deficient quality of supply causes substantial inconvenience to customers and leads to high costs for society. Disruptions cost the Swedish society around SEK 1 billion each year. Shortcomings in power supply quality in the electricity network may also give rise to major costs.

An effective electricity supply is extremely important to the function and development of society.

Consumers have the opportunity to report any company that fails to comply with the provisions of the Electricity Act (1997:857) and the Natural Gas Act. As the authority responsible for supervision, Ei can then examine whether the company has breached its statutory obligations. During 2021, Ei had over 1,500 instances of contact with consumers. Consumers that contact Ei usually have queries or complaints about the electricity network or electricity supply.

Ei offers a comparison website for electricity contracts, elpriskollen.se, in order to strengthen the position of consumers in the electricity market. The website offers consumers the opportunity to compare prices and terms and conditions for the most common contracts from all electricity suppliers. The option of comparing prices and other factors that may influence the choice of electricity trading company is a prerequisite for active customers.

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

The electricity markets

1 The electricity markets

Approximately one third of Sweden's energy consumption is supplied from electricity, and in pace with the climate transition, electricity consumption is expected to increase in order to compensate for the reduced use of fossil fuels[1]. In order to manage the climate transition and the increased demand for electricity, carbon dioxide-free electricity generation will need to be increased and new networks built while customers need to be more flexible in their use of electricity. We will therefore also need a greater degree of flexibility in the electricity networks to manage more varying energy flows over time.

In well-functioning electricity and gas markets there are correct price signals that inform market stakeholders where new investment is needed most. Such an efficient electricity market is therefore key to the prospects for society and consumers to be supplied with electricity without unnecessarily high costs.

The Swedish Energy Markets Inspectorate (Ei) works to achieve well-functioning electricity and gas markets where the stakeholders follow the rules that facilitate a safe, efficient, flexible and integrated electricity system. Ei's tasks include to exercise supervision over companies in order to ensure that they meet their obligations in accordance with both national and EU legislation. Ei's tasks therefore include to supervise the conduct of electricity network operators, stakeholders in the wholesale market, and electricity suppliers in relation to the end-customers.

Ei operates in partnership with other European regulatory authorities in ACER (Agency for the Cooperation of Energy Regulators) and CEER (Council of European Energy Regulators). Ei also operates in partnership with the other Nordic regulatory authorities in NordREG and with the regulatory authorities in the capacity calculation regions[2] in which Sweden is included, i.e. the capacity calculation area consisting of the Nordic region, Baltic region and Hansa region. The aim of the cross-border cooperation is to coordinate the rapid transposition of European legislation and to identify areas that need to be developed.

In 2018, the EU Parliament and the European Council decided on a package of rules to enable the EU to meet its commitments in the Paris Agreement and position the EU as a leader in the transition to clean energy. This is called the Clean Energy Package and contains new rules for the electricity market within the EU, including the Directive (EU) 2019/944 of the European Parliament and of the

[1] The electrified society of the future. Analysis for a sustainable electrification, ER 2021:28
[2] Capacity calculation region: the geographic area where coordinated capacity calculation is applied.

Council of 5 June 2019 on common rules for the internal market in electricity and amending Directive 2012/27/EU (electricity market directive) and Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (electricity market regulation). Since Ei is a national regulatory authority, its responsibilities include tasks specified in the electricity market regulation and the electricity market directive.

In addition to the electricity market regulation and the electricity market directive, how the electricity markets should be organised is regulated in a number of Commission regulations, that are directly applicable in Sweden.

Type	Abbreviation	Full name	Area of interest
Connection regulation	RfG (Requirements for Generators)	Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators	Connection of production plants
Connection regulation	DCC (Demand Connection Code)	Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection	Connection of consumers
Connection regulation	HVDC (High Voltage Direct Current)	Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules	Connection of high voltage direct current systems and direct Current-connected power park modules (e.g. wind farms).
Market regulation	CACM (Capacity Allocation and Congestion Management)	European Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management	Single day-ahead market and intraday market with capacity allocation for a functioning market coupling. Correct division of bidding areas, etc.
Market regulation	FCA (Forward Capacity Allocation)	Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation	Price hedging options and forward transmission capacity allocation between bidding areas.
Market regulation	EB (Electricity Balancing)	Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing	Well-functioning and integrated balancing market.
Operational regulation	SO (System Operation)	Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	Operation of electricity transmission system, reliability of supply and frequency containment.
Operational regulation	ER (Emergency Restoration)	Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration	The handling by the transmission network companies of emergency state, blackout state, and restoration.

Ei also works with market surveillance. Surveillance of the energy markets creates confidence and good conditions for correct pricing. Ei conducts supervision in accordance with Commission Regulation (EU) 1227/2011 on wholesale energy market integrity and transparency (REMIT). REMIT forbids insider trading and

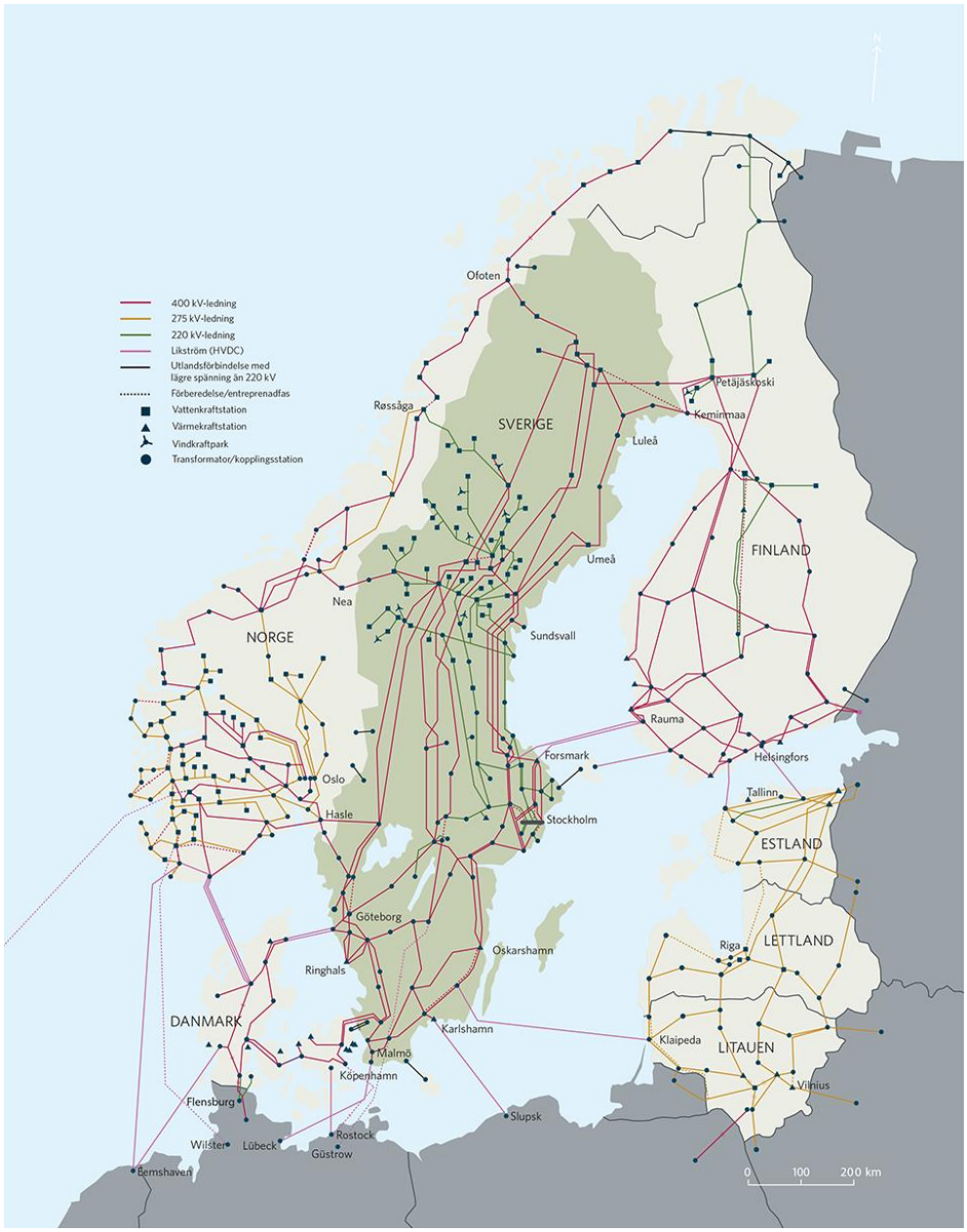
market manipulation in the European wholesale energy markets, and requires market stakeholders to immediately publish insider information. Ei conducts supervision in accordance with Commission Regulation (EU) 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and on amendments to Annex 1 of Regulation (EC) 714/2009 of the European Parliament and of the Council (Transparency Regulation).

1.1 The electricity network

The Swedish electricity network is made up of 584,000 kilometres of cabling, of which approximately 421,000 kilometres is buried and 163,000 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.

Sweden's transmission network is directly interconnected with Denmark, Norway, Finland, Germany, Poland and Lithuania, and, in principle, indirectly with the whole of Europe. The Swedish transmission network for electricity consists of approximately 16,000 km of power lines, over 175 transformer and switching substations, as well as international connections with both alternating and direct current.

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



Source: Svenska kraftnät

1.1.1 Bidding areas

Sweden is one of a few EU countries that, since 2011, have been divided into four so-called bidding areas, SE1, SE2, SE3 and SE4. The division is based on where in the transmission network the largest restrictions of transmission capacity were located at the time. The power system is in a constant state of change and a European review of the division of the bidding areas within the EU was started in 2020 in accordance with the electricity market regulation. The transmission network operator in Sweden, the state enterprise, Svenska kraftnät, has the responsibility to present proposals for the review as well as to investigate and analyse alternative divisions. The final decision about which divisions should be

analysed will be taken by ACER during 2022. Following an analysis of the different divisions, there may be a question of a possible change in the Swedish bidding areas.

1.1.2 Role of the network companies

Transmission network operator

Svenska kraftnät, which operates and administers the Swedish transmission network, is also the authority that acts as the transmission system operator[3] for the Swedish transmission system. Svenska kraftnät's task is to manage, operate and develop a cost-effective, reliable and eco-friendly power transmission system in a commercial way. It must also provide transmission capacity and, in its capacity as a regulatory authority, Ei has been tasked with monitoring and ensuring that Svenska kraftnät complies with the rules for transmission network operators in the internal electricity market.[4]

In accordance with the electricity market directive, the transmission system operators (TSOs) must be certified; this is covered by detailed rules in national legislation[5]. In July 2012, Ei decided to certify Svenska kraftnät as transmission system operator for the Swedish transmission network for electricity. 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.

Distribution networks

The Swedish regional and local networks are operated by a large number of electricity network operators where each electricity network operator has a local monopoly, i.e. sole rights to distribute electricity. Ei decides on sole rights in the form of a permit (network concession). In order to ensure that the electricity network operators with sole rights do not exploit their monopoly position, Ei decides on company revenues through the revenue cap, see section 1.1.7 The electricity network charge and revenue cap for electricity network operators. It is also possible to apply to Ei for examination of the charges for connection to the electricity network.

Legal, accounting and functional unbundling of electricity companies

Since the electricity network operators are operated as regulated monopolies, while electricity suppliers and electricity production operate in a market open to

[3] Svenska kraftnät is the transmission system operator (TSO) in accordance with the Electricity Act and therefore has the overall responsibility that electrical installations cooperate reliably so that balance between production and consumption of electricity within all or parts of the country is maintained in the short term.

[4] There is no independent system operator in Sweden. This is why the provisions specifically addressing supervision of independent system operators is not applicable to Ei.

[5] The Act (2011:710) on the certification of transmission network companies for electricity includes provisions on the certification of transmission network companies. Act (2022:596).

competition, it is important that these activities are separated when they are part of the same group. In order to prevent cross-subsidisation,[6] network activities in Sweden must not be operated by the same legal entity as the entity producing or trading in electricity. This means that electricity network activities must be legally separated from companies producing or trading in electricity. However, an electricity utility may produce electricity if this is intended to cover network losses, or to replace loss of electricity in the event of a power outage. Financial reporting of network activities must also be separate from all other activities and therefore be separated in the accounts from other activities that may be operated by the same legal entity as the network activities.

In addition to this, there is a requirement for certain electricity utilities to be functionally separate from companies that produce or trade in electricity.[7] Functional unbundling means, among other things, that someone who is a board member, managing director or company signatory in a legal entity that operates network activities may not at the same time be a board member, managing director or company signatory in a legal entity producing or trading in electricity. The functional unbundling is applicable to the companies that operate network activities and form part of a group where the overall electricity network has at least 100,000 electricity consumers, which only applies to seven of Sweden's 170-plus electricity network operators.

In accordance with the Electricity Act, [8] all companies that operate network activities and form part of a group producing or trading in electricity must draw up a monitoring plan. The companies must publish a report on an annual basis 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 unduly favour any market stakeholder. The monitoring plan must specify what measures the company intends to implement in order to counteract discriminatory behaviour in respect of other market stakeholders.

1.1.3 Expansion of the electricity network

The Swedish transmission network is undergoing a period of extensive expansion. The network is being reinforced in order to facilitate new electricity production, extend market integration with the surrounding world, and assist in the creation of a joint European electricity market. At the same time, there is a significant need for new investment and reinvestment.

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[6] When companies make strategic use of revenues from one part of the activity to finance another part of the activity.
[7] In accordance with Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.
[8] 1997:857, Chapter 3, section 17.

During 2021, Svenska kraftnät published an updated system development plan[9] for the period 2022 to 2031. Among other things, it describes Svenska kraftnät's network development plan that includes a range of planned network investments. Examples of these include the West Coast programme that consists of several projects aimed at eliminating bottlenecks on the west coast, and the North-South programme that consists of around 50 projects aimed at increasing the capacity between bidding areas SE2 and SE3 up to 2040. In addition, there is a wide range of projects concerning new connections, system reinforcements and reinvestments in the main transmission network.

South-West Link

One of the larger projects that has been ongoing with a view to increasing capacity and reliability in the Nordic power system is the South-West Link. The purpose of this cable is to reduce the transmission restrictions from the Mälardalen region to southern Sweden. The South-West Link 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 project was completed in July 2021 when the second part of the South-West Link entered into service, a two-times 600 MW DC connection between Bankeryd and Hurva that strengthens the transmission capacity between bidding areas SE3 and SE4.

Other projects in Sweden

Svenska kraftnät has also renewed the power line between Hurva and Sege, which contributes to increased capacity in the Malmö region. The connection is also important to the use of the South-West Link and Baltic Cable connections.[10]

Besides the South-West Link, 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 planned 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][11] project, which is planned 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 around fifty projects.

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[9] System Development Plan 2022–2031 – Towards a doubled use of electricity | Svenska kraftnät (svk.se)

[10] Baltic Cable is a connection between bidding area SE4 and Lithuania.

[11] Stockholms Ström | (stockholmsstrom.net)

Projects of common interest

One important issue for the Member States is to increase reliabilityof supply, and security for electricity and gas within the EU. To achieve this, a number of infrastructure 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 projectowners with the opportunity to apply for special EU funding in order to facilitate financing. For the 2021–2027 period, there is an amount of EUR 42.3 billion available in what is known as the CEF fund,[12] and project owners can apply for this. These projects must help to integrate the market and increase competition, lead to greater security of supply, and reduce carbon dioxide emissions.

Ei has a number of assignments according to the regulatory framework, including to participate in the evaluation of the projects that apply to become PCI projects, to report on the progress of the projects, and to make decisions on how the costs should be distributed between the participating countries, known as: Cross-Border Cost Allocation (CBCA).

Sweden currently has two PCI projects for electricity, one of which is the 400 kV power line between Ekhyddan, Nybro and Hemsjö, which is provisionally expected to enter into service in 2025. This project aims to increase the reliability of the transmission networks and the regional networks, and to safeguard the electricity supply to the NordBalt DC link between Sweden and Lithuania. The project also helps to increase the transmission capacity between the Swedish bidding areas SE3 and SE4 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.

The second PCI project for electricity is a 400-kV cable from Messaure in the northern part of Sweden to Keminmaa in Finland. This project is being planned by Svenska kraftnät, together with the Finnish transmission network operator Fingrid, and it is planned to enter into service by the end of 2025.[13] The planned power line between Sweden and Finland is intended to result in great benefits for the entire Nordic electricity market, increase reliability of supply in Finland, further integrate Sweden into the Nordic electricity system, and meet future needs for reliable electricity supplies. The proposal for the expansion consists of an approximately 180-kilometre route between the Messaure power plant in Jokkmokk municipality and the Finnish border on the Torne River near Risudden, Övertorneå

[12] Connecting Europe Facility.
[13] https://www.svk.se/utveckling-av-kraftsystemet/transmissionsnatet/transmissionsnatsprojekt/aurora-line/

municipality. In total, the length of the complete overhead power line is estimated to be 380 kilometres, and it will run parallel to the existing transmission network cable on the same route.

1.1.4 Cross-border issues and transmission restrictions

According to the EU's regulatory framework, a transmission network operator has an obligation to transmit electricity on equal conditions, and the transmission to and from neighbouring countries must not be restricted in order to prioritise domestic customers. The Swedish transmission network largely manages to transmit electricity within Sweden and to our neighbouring countries, even though there are sometimes transmission restrictions in the electricity network.

Remedial action available to Svenska kraftnät in order to manage transmission restrictions consists of countertrading or rerouting. This means that Svenska kraftnät pays for increased electricity production in the shortfall area and the equivalent amount of reduced electricity production in the surplus area. The costs for these measures increase the costs for Svenska kraftnät, thereby signalling that the network needs to be reinforced. One prerequisite for being able to countertrade is that there are production resources available in the shortfall area in question.

70 per cent rule

The electricity market regulation sets a requirement that at least 70 per cent of the capacity of the restricting point should be available for trading between bidding areas. The transmission system operator for transmission systems in Sweden, Svenska kraftnät, may therefore not restrict the transmission capacity that must be made available for trading between bidding areas. This is a prerequisite for the efficient functioning of the integrated European market.

In the event of congestion problems in the network, the congestion must be remedied using measures such as countertrading and rerouting so that the transmission capacity of the restricting point is not below the 70 per cent limit.

However, if necessary, for reasons of operational reliability, the regulatory authority (Ei) may allow exemptions from the requirement that 70 per cent of transmission capacity should be kept available. Exemptions can be granted for a maximum of one year at a time, or up to a maximum of two years if the scope for the exemption decreases significantly after the first year.

Due to problems with east-west flows, as well as the west coast section, as described below for both, Svenska kraftnät therefore applied for exemptions from the 70 per cent rule in 2020 and 2021, which were partly granted by Ei.

East-west flow

Sweden has the role of transit country within the Nordic region and is interconnected with Norway, Finland and Denmark, as well as with the neighbouring countries of Poland, Germany and Lithuania. The transmission network is primarily built for flows from the north to the south of Sweden. In 2021, Ei requested information from Svenska kraftnät on the cross-border transmission in the transmission network[14].

However, in 2021, the east-west flow of electricity through the transmission network increased, primarily in bidding area SE3[15]. The flow has arisen as a result of the Nordic electricity system undergoing several changes. For example, two of the reactors at the Ringhals nuclear power plant were decommissioned in 2020 and 2021. At the end of 2020, the interconnection between Norway (bidding area NO2) and Germany/Luxembourg entered into operation. During the latter part of 2021, an interconnection between Norway (bidding area NO2) and the United Kingdom entered into service. The events contribute to a higher energy flow from east to west. As the network is not fully adapted to large flows in this direction, Svenska kraftnät has taken measures to avoid congestion in the electricity network, which has resulted in transmission restrictions, among other things.

In 2021, Svenska kraftnät applied for exemptions[16] from the so-called 70 per cent rule for the transmission power lines affected by the east-west flow. In its decision during 2022, Ei's assessment was that Svenska kraftnät should be granted exemption from the 70 per cent rule for the east-west flow, i.e. for bidding areas FI-SE3, as well as for SE3-DK1 and SE3-NO1. The issue was examined by ACER as the Danish and Finnish regulatory authorities opposed an exemption.

West coast section

The west coast section is a cross section in the Swedish transmission network located in Western Sweden in bidding area SE3, and it consists of a number of critical power-line segments[17] that, in certain flow situations in the Nordic network, affect the amount of transmission capacity that can be allocated to the market.

According to information from Svenska kraftnät, congestion problems in the west coast section arise during periods of northward flows in the Swedish transmission

[14] Ei's case number: 2021-100460
[15] Ei's case number: 2021-102559
[16] Ei's case number: 2021-102881
[17] The term "kritiska linjesegment" ("critical line segments") refers to the English term "critical network elements with contingencies (CNEC)". This is also in conformity with the Swedish translation of the electricity market regulation. An alternative Swedish translation used by Svenska kraftnät, among others, translates as "critical network elements".

network. The general maximum capacity of approximately 2,300 MW is then not sufficient to handle the northward flow.

To manage congestion, Svenska kraftnät must use remedial action in the first instance, such as countertrading and rerouting. When these measures are insufficient for being able to operate the network within the safety limits, Svenska kraftnät has restricted the allocated capacity. Svenska kraftnät was therefore granted exemptions from the 70 per cent rule for six different interconnections (SE3–NO1, DK1–SE3, DK2–SE4, DE/LU–SE4, PL–SE4 and LT–SE4) for 2020 and 2021 in order to maintain operational reliability. The occurrence of such situations when restrictions have been needed has been calculated using the method recommended by ACER[18], and the results show that the restrictions decreased significantly during 2020. Situations with high flows in the west coast section have been very rarely evident during 2021. Ei has assessed that there is no justification for exemption from the 70% rule for 2022[19].

1.1.5 The capacity challenge in the electricity network

Energy transition, urbanisation, and an ageing network infrastructure have led to a strained capacity situation in parts of Sweden's electricity network. This has meant that network companies in several regions have had to decline new connections to the local electricity network. The restricts both growth and the transition to a more sustainable society. In 2020, tasked by the Government, Ei published the report entitled *The Capacity Challenge in the Electricity Networks*[20]. In the report, Ei presents an action plan with measures to remedy the capacity shortage in the electricity networks in both the short and the long term.

Smart electricity networks

To make the transition of the energy system possible, the electricity networks need the functionality required for electricity transmission in the new energy system. The term "smart electricity networks" is often used as a collective term to describe the electricity network of the future. The term deals with new technology, new services, and new prerequisites for regulation and market design with the aim of making the energy transition possible. The concept of smart electricity networks is not a purpose in itself but should be viewed as a tool for creating beneficial effects for electricity customers and for society as a whole. Smart electricity networks can contribute to the integration of renewable energy, increased energy efficiency, and a more resilient and reliable electricity network.

[18] ACER and NRA's practical note MACZT - Copy.docx (europa.eu)
[19] ACER has to determine whether Svenska kraftnät should be granted exemption from the 70-per cent rule - The Swedish Energy Markets Inspectorate (ei.se)
[20] The Capacity Challenge in the Electricity Networks (EiR2020:06).

In accordance with Article 59.1 of the Electricity Market Directive, Ei shall monitor and evaluate the development of smart electricity networks based on a limited set of indicators. In 2021, Ei published the report entitled Indicators for the Development of Smart Electricity Networks[21] in which Ei presented a number of selected indicators to explain the development of smart electricity networks in Sweden.

In 2021, Ei presented the report entitled Evaluation of Costs and Benefits in Smart Electricity Networks[22]. In the report, on assignment from the Government, Ei develops both strategic and operational approaches to the work with smart electricity networks. Ei uses the report to present an evaluation of the socio-economic costs and benefits of smart electricity networks in comparison with other alternatives. The evaluation includes various scenarios of the composition of electricity production in the Nordic electricity power system as well as an increased electrification in society.

Network development plans

In accordance with Article 32.3 of the Electricity Market Directive, the development of the distribution system shall be based on a transparent network development plan. The purpose of the network development plan is to create transparency when it comes to the flexibility services needed in the medium and long term, and to outline the planned investments over the next 5-10 years, with particular emphasis on the main distribution infrastructure required to connect new production capacity and new consumers, including charging stations for electric vehicles.

All regional and local network operators must therefore draw up network development plans to be submitted to Ei. Transmission network operators are also obliged to draw up an investment plan to be submitted to Ei[23]. This means that regional and local network operators may need to coordinate network expansion with other network operators and with Svenska kraftnät to a greater extent than is currently the case. Network development at all network levels will therefore in future be characterised by greater transparency and a holistic approach. Network operators also need to consult with system users affected about the scenarios that form the basis for forecasts of increased consumption and production, etc.

In accordance with the electricity market directive, network development plans should not only include forecasts for investment in infrastructure but also create transparency with regard to the future needs of the network operators for

[21] Indicators for the Development of Smart Electricity Networks (EiR2021:07).
[22] Evaluation of Costs and Benefits in Smart Electricity Networks (EiR2021:06).
[23] Govt. bill 2021/22:153.

resources that can be used as an alternative to an expansion of the electricity network, such as flexibility services, for example.

The rules on network development plans enter into force in Sweden during July 2022. Ei has received authorisation to issue regulations on what information the plans should include, how the consultation should take place, as well as how the network development plans should be reported to the agency and be made public. Ei has started work on the regulations.

Demand side flexibility

In a future electricity market with a higher share of variable electricity production, it will be important to make use of all flexibility resources in the electricity system. One such flexibility resource is the opportunity for customers to vary their consumption over time, so-called demand side flexibility. In order to achieve demand side flexibility, electricity customers need to change their consumption of electricity on the basis of different signals. For example, signals can be sent to customers to reduce their electricity consumption when the electricity network is heavily congested, or to increase their consumption when the electricity price is low, such as in the event of good availability of electricity production from wind power. Demand side flexibility facilitates a more efficient use of resources and can facilitate frequency containment in the electricity system. Demand side flexibility can also contribute in the event of power shortage situations and local network problems.

In accordance with the Electricity Act (1997:857), electricity network operators may not impose requirements or other conditions that make it difficult for the market's stakeholders to provide services for demand side flexibility, unless the conditions can be justified taking into account a safe, reliable and efficient operation of the electricity network.

Ei has an overall responsibility to promote demand side flexibility in the electricity market in Sweden. On an annual basis, Ei must compile and publish the technical requirements and other conditions in place for the provision of services in the form of changed electricity consumption. As in investigations of previous years, the investigation for 2021 indicates that electricity network operators do not impose technical requirements and conditions that are not justified by a safe, reliable and efficient operation of the electricity network.

1.1.6 Reliability of supply and outages

Rules for 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 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.

In addition to the functional requirement included in the Electricity Act, Ei has drawn up regulations on which 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 supply quality requirements were issued in mid-2011. In 2013, these regulations were supplemented with guidelines concerning the number of outages at customer level.

An electricity consumer affected by outages in the electricity supply for at least 12 hours is entitled to compensation from the electricity utility to which the supply is connected – known as outage compensation. This requirement is applicable to outages that fall within the extensive liability of the electricity network operator[24]. This compensation is defined by a template and must be paid automatically. Ei has issued regulations on how an electricity utility should notify its customers of the rules relating to compensation for outages. The Electricity Act also contains provisions on the entitlement to damages from electricity utilities in the event of injury or damage to property or assets.

Ei assesses reliability of supply in the electricity network on the basis of outage reporting

An effective electricity supply is extremely important to the function and development of society. Since 2011, the electricity utilities have provided detailed annual reports containing data on outages at customer level, both for short and long-term outages. On the basis of this information, Ei measures and analyses reliability of supply in the Swedish electricity networks, which is largely achieved by developing a range of indicators. Electricity utilities must also report long-term and extensive power outages to Ei on an ongoing basis.

One of the purposes of the reports is also to allow Ei to assess quality of supply in the electricity networks and to intervene if measures taken by the electricity network operators are inadequate. The assessment of the quality of supply is also of significance for the size of the revenue framework. The principle is that shortcomings in quality reduce the size of the revenue cap. Read about the revenue

[24] 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.

cap in 1.1.7 The electricity network charge and revenue cap for electricity network operators.

Table 1 shows power outages in local networks during 2003–2020. These figures indicate average values per customer and are divided into unannounced and announced outages. Announced outages are outages of which customers were notified in plenty of time prior to the outage. These outages may be justified for reasons relating to operation or electrical safety, such as due to repairs and preventive maintenance with a view to maintaining good operating reliability and security of supply. According to the Electricity Act, the announced outage must not continue for a longer time than required by the activity.

Table 1 Power outages in local networks due to faults in the local network in question, average values per customer[25]

Year	SAIFI, announced outages (outages/year)	SAIFI, unannounced outages (outages/year)	SAIDI, announced outages (minutes/year)	SAIDI, unannounced outages (minutes/year)
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
2017	0,14	0,82	16	52
2018	0,13	1,01	15	73
2019	0,15	0,96	17	120
2020	0,17	0,83	17	65

Statistics for 2021 will be completed in summer 2022. Source: Ei

On average, rural electricity networks are affected by more outages and longer outage periods than electricity networks in urban districts. 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 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. With regard to overhead cables, insulated cables are more robust than uninsulated cables. Approximately 99 per cent of local networks' total cable length in the low-voltage network is insulated. At medium

[25] 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)).

and high-voltage level in the local networks, around 82 per cent of cables are insulated.[26]

1.1.7 The electricity network charge and revenue cap for electricity network operators

As mentioned above, electricity network operators have a monopoly to operate electricity networks and are therefore not subject to competition. In order to ensure that network operators do not exploit their position and impose unreasonably high charges on their customers, Ei exercises supervision over the electricity network operators.

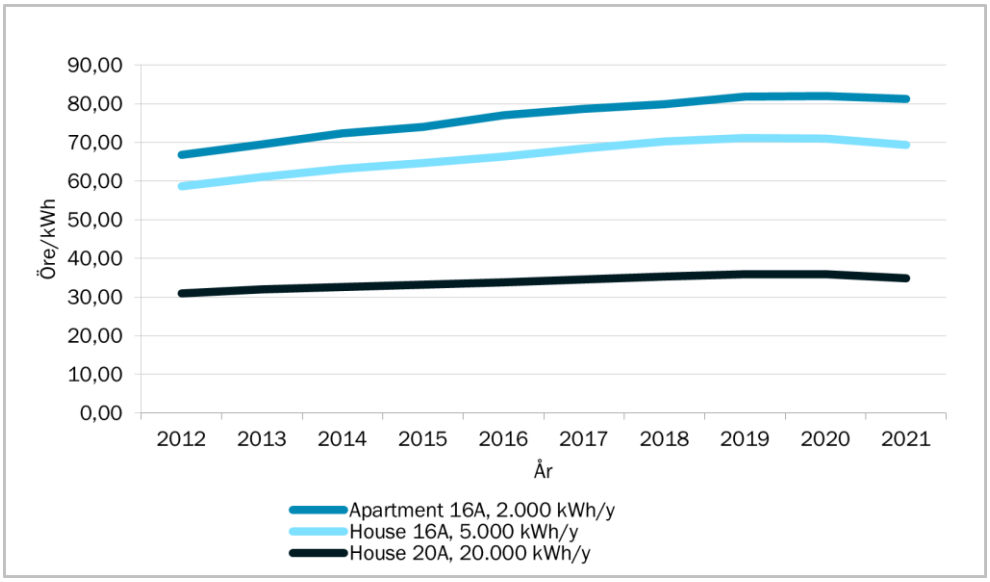
Electricity network charges

In accordance with the Electricity Act, the electricity network charges that every customer pays must be objective and non-discriminatory, as well as be compatible with an efficient use of the electricity network. Objectivity means that the total charges imposed by the operator for one customer category must reflect the costs that the network operator has for that particular category. Therefore, companies are allowed to have different charges for different customer categories, such as customers living in houses and customers living in apartments. Non-discriminatory means that companies must not favour one customer category at the expense of another customer category. 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. Ei collects data from companies for 15 different typical customer groups to allow it to compare the electricity network operators.

Figure 2 shows how the network charges for different household customer types have developed over the past few years. Between 2020 and 2021, the charges on average decreased by 0.8 per cent for apartment customers, by 2.4 per cent for house customers with 16 A fuse protection, and by 2.8 per cent for house customers with 20 A fuse protection. In monetary terms in Sweden, this is equivalent to a decrease of SEK 14, SEK 84, and SEK 201 respectively over the year.

[26] These figures relate to 2020. Statistics for 2021 will be completed in autumn 2022.

Figure 2. Actual development of network charges for household customers[27]



Source: Ei

Customers with low electricity consumption generally have fewer alternatives available to them than customers with high electricity consumption. Most electricity utilities offer only one type of charge, 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.

An alternative to the single tariff is some form of time-differentiated tariff where the customer pays different amounts per kilowatt hour depending on when during the 24-hour day or year the consumption takes place. A number of electricity network operators have also introduced output-based tariffs for household customers. Both of these tariffs involve a smaller, fixed charge linked to the rating of the fuse protection, which determines the maximum power takeoff. In addition, the time-of-use tariff also contains a charge per kilowatt hour – a so-called variable price that is based on how much electricity is consumed. This variable price can vary between the 24 hours of the day and/or between seasons. For its part, an output-based tariff is instead based on power output, it includes a charge that is imposed for the power output used by the customer. This output price can be based on the household's previously measured maximum hourly or part-hourly outputs[28]. However, the charge for power output can also be time-differentiated as with the time-of-use tariff and vary in size between different times of the 24-hour day and/or the year.

In 2018, Ei received authorisation to prescribe how the tariffs should be structured. Since then, a project has been under way at the authority to design network tariffs

[27] Average value calculated at 2021 price level, not weighted.
[28] More information on tariffs is available in the memorandum entitled Electricity network tariffs for efficient network usage – Principal choices for designing network tariffs (Ei PM2020:06).

that promote efficient network usage. The new regulations were decided on in March 2022, and shell enter into force in 2027.

The new regulations state that the network tariffs must contain four appropriately-priced components in order for them to be considered to promote efficient network usage. The first component, the energy charge, must be imposed as a charge per kilowatt hour and be based on the marginal costs of electricity transmission. It may also vary over time depending on how the costs in the network vary. The second component is the charge for power output, which must be based on the forward-looking costs and imposed as a charge on measured power output (SEK/kW). In accordance with the regulation, charge for power output must be time-differentiated, that is, vary in some way over the 24-hour day and/or the year. The third component is the customer-specific charge, and it must equate to the costs that the network operator incurs for a specific customer or customer group, in the form of metering, reporting and similar. This charge is imposed as a fixed charge. The fourth and final component is a tariff component that must equate to the other costs of the activity that are not already covered by other components (so-called residual costs). This component must be charged to the customers as a subscription charge, either as a hedging subscription or as a power subscription. As far as possible, customers should perceive this cost as also being fixed.

Ei's decision on revenues from electricity network charges for distribution companies.

The revenues of electricity network operators have been determined by means of Ei establishing a framework in advance for the revenues of every network operator for a period of four years. This is known as a revenue cap. After the regulatory period, Ei checks the revenue cap for the companies in order to determine whether they have operated within the revenue cap decided in advance.

The purpose of the revenue frameworks is that electricity utility operations should be conducted efficiently at low cost and that the utilities receive a reasonable return. They aim to ensure that customers pay reasonable prices for the transmission of electricity. The revenue frameworks should help to provide customers with good long-term reliability of supply, while safeguarding the Swedish electricity supply. Electricity utilities should also be given stable, long-term conditions for running network operations.

The revenue frameworks should, as previously reported, 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 network operations 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 information for calculating the revenue framework is provided in the revenue framework regulation[29].

Among other things, the revenue cap regulation states that the age of the systems must be taken into account when assessing the company's capital costs. The economic lifespan, the depreciation period, of the systems is also specified. As a direct consequence of the Energy Efficiency Directive,[30] a provision has also been introduced in the Electricity Act stipulating that in the assessment of the revenue framework, Ei shall also take into consideration the extent to which the network operations are run in a way that is in conformity with or contributes to an efficient utilisation of the electricity network. Ei has also issued regulations providing more detailed rules on assessment of quality, efficiency and costs, including how the age of systems is to be determined.[31]

If an electricity utility's revenues deviate from the revenue framework, this will impact on the revenue framework for the subsequent regulatory period. If the company's revenues have been lower than permitted by the cap, this means that the revenue cap for the forthcoming period will be increased by an equivalent amount. If the network operator has exceeded the cap instead, the revenue cap for the forthcoming period is reduced. An overcharging supplement will also be added if the cap has been exceeded by more than 5 percent, further reducing the revenue cap. The Electricity Act also includes rules on reassessment of the revenue caps during and after the regulatory period.

Revenue cap for Svenska kraftnät

Svenska kraftnät's revenue framework is decided in advance for a regulatory period. From 2012, and up to and including 2015, Svenska kraftnät had regulatory periods of one calendar year. From and including 2016, Svenska kraftnät has a regulatory period of four years, i.e. the same period as other electricity utilities.

The various elements of the revenue framework

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

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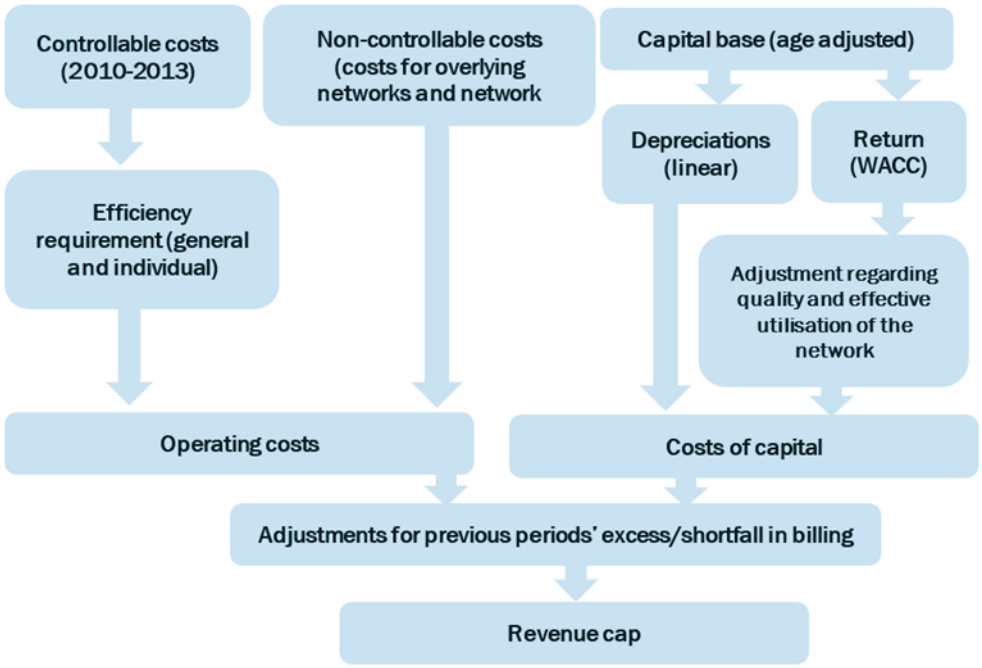
[29] Regulation (2018:1520) on revenue frameworks for electricity utilities.
[30] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.
[31] The Swedish Energy Markets Inspectorate's regulations (EIFS 2019:4) on what is meant by quality in the network activities and what is meant by efficient utilisation of the electricity network when establishing a revenue cap, and the Swedish Energy Markets Inspectorate's regulations (EIFS 2019:2) on the calculation of the revenue cap for electricity network operators.

Capital cost is the cost of using capital. The capital base forms the foundation for calculating 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.[32] When calculating capital costs, Ei takes into account investments made during the regulatory period in question.

Figure 3. Elements in the revenue framework for electricity



The size of 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 interruptions to transmission. Network losses and load on the network are crucial in the assessment of efficiency. Taken together, these incentives may not increase or decrease the regulatory rate of return by more than one third per year.

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.

[32] In court proceedings, Ei has acknowledged a cost of capital of 2.35 per cent for the 2020–2023 regulatory period.

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 historical costs of the companies as the starting point in order to establish the costs that can be influenced for the regulatory period. The regulation includes a streamlining requirement so that customers will benefit from anticipated productivity improvements. The streamlining requirement means an annual reduction of between 1 and 1.82 per cent in the costs that can be influenced, depending on the efficiency of the companies.

During April 2021, the Government decided on the Act (2021:311) on special scope for investment to increase electricity network capacity. The purpose of the act is to create special driving forces for electricity network operators to make investments that increase the capacity of the electricity network. In practice, the law means that the companies with unused scope for investment remaining from the regulatory period can be allowed to use this scope to compensate for investments made during the 2020–2023 regulatory period. However, the requirement is that the companies apply for authorisation to use this scope.

By the end of 2021, around 60 applications had been received for special scope for investment and Ei has decided on the applications on an ongoing basis. The total amounts that the companies can apply for is around SEK 35 billion at 2018 price levels, before deductions and adjustments. The amounts resulting from the decisions are preliminary and may increase the revenue caps for the companies during 2020–2031. The companies can also apply for special scope for investment for the next regulatory period, 2024–2027.

Proposals for changes in the law regarding incentives for streamlining of total capital

In 2020, Ei submitted a proposal for an amendment to the Electricity Act that would make it possible to introduce incentives in the regulation to guide network operators towards solutions other than traditional network investments when justified, in order to achieve cost-effectiveness in network activities over the long term. The aim of the amendment was to provide the network operators with an incentive to take measures to streamline the cost base throughout the network activities, both capital costs and running costs, not just costs that can be influenced, which is currently the case. The proposal was under consultation with the Government Offices during the previous year.

However, current uncertainty surrounding the legal conditions for the regulation (read more about this below in the section *Court proceedings during the regulatory periods)* means that the opportunities to introduce the proposal are unclear for the time being. By contrast, the current regulation provides scope to make other adjustments in the model that is used to calculate the efficiency of the electricity network operators. Since the network operators have different conditions, due to

geographical and demographic differences, among other things, the cost for operating the activities may vary despite the networks having similar capacity. It is important that the streamlining requirement is based on as accurate a model as possible in order that regulation should incentivise cost-effective networks and not guide in an undesirable direction. There is therefore a need to continuously evaluate and develop this model from this point forward. Among other things, Ei has ordered a consultancy study to be ready by the start of 2022.

Court proceedings during the regulatory periods

In 2019, Ei made 179 decisions on revenue caps ahead of the regulatory period of 2020–2023. Approximately 120 decisions were appealed to the Administrative Court. Company appeals primarily concern whether Ei may impose the revenue cap regulation, which is described in brief above, when establishing the revenue caps for the electricity network operators, or whether the provisions on the cost of capital in the revenue cap regulation contravene the Electricity Act or the electricity market directive and should therefore not be used by Ei. This issue is of significance for large parts of the calculation of the revenue caps. At the end of February 2021, the Administrative Court announced that the provisions on the cost of capital in the revenue cap regulation may not be used and referred the cases back to Ei. Ei appealed against the judgements of the Administrative Court to the Administrative Court of Appeal in Jönköping.

In June 2022, the Administrative Court of Appeal in Jönköping delivered judgements in the cases concerning the revenue caps for the electricity network operators for the period of 2020–2023[33]. The judgements of the Administrative Court of Appeal mean that the revenue cap regulation and previous court rulings shall not be applied for the calculation of the rate of return for the electricity network operators. Instead, Ei must determine the rate of return on the basis of the caps established by the EU legal framework. The judgements emphasise Ei's role as independent regulatory authority with exclusive competence. If the judgements are not appealed then they mean that Ei must now re-establish revenue caps for the 2020–2023 regulatory period based on the objectives and criteria of the electricity market directive.

Requested and decided revenue caps

The level of the revenue caps in Table 2 shows the revenue caps that the electricity network operators have applied for, the revenue caps decided upon by Ei, and the revenue caps established after the judicial proceedings for the regulatory periods of 2012–2015 and 2016–2019.[34] In comparisons between the different regulatory

[33] Case: 1103--1222-21. National provisions for calculating the rate of return for the electricity network operators are contrary to European Union law - Administrative Court of Appeal in Jönköping (domstol.se)

[34] Svenska kraftnät's revenue framework is not included in the table.

periods, it must be noted that the amounts for the regulatory periods are specified in price levels for different years.

Table 2. Revenue frameworks

Revenue caps, SEK billion	Requested amounts	Frameworks decided upon	Frameworks after the review by the court
2012–2015 (price level for 2010)	183	160[35]	196[36]
2016–2019 (price level for 2014)	176	164[37]	173[38]
2020–2023 (price level for 2018)	-[39]	168	-[40]

Source: Ei

1.2 Wholesale market for electricity

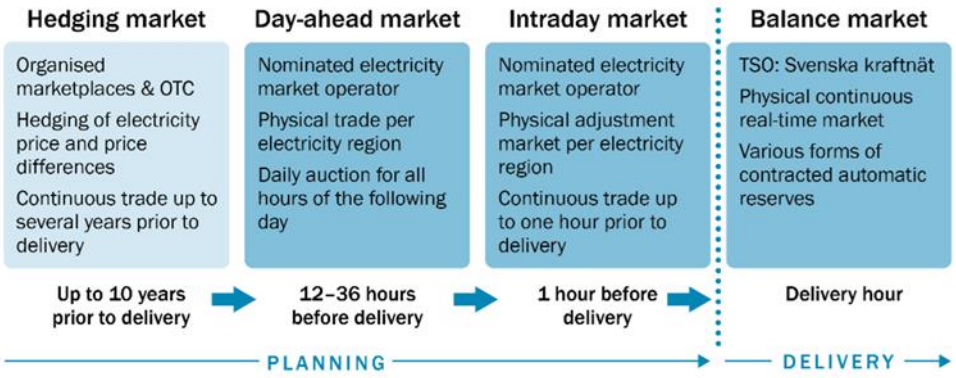
The electricity price varies each hour with supply and demand. The electricity market is special in that the same amount of electricity must be produced as is consumed at each point in time in order for the system to be in balance and for the operation to be reliable. To manage this, the market has been divided into four different submarkets.

1.2.1 The electricity trading system

The electricity trading system can be divided into four submarkets in which electricity trading takes place at different points in time in relation to supply: the hedging market, the day-ahead market, the intradaymarket, and finally the balancing market, see Figure 4.

[35] In the court proceedings, Ei acknowledged the change in some parts in the transition method used. Among other things, the consequence was that the revenue caps were then raised from approximately SEK 150 billion to SEK 160 billion.
[36] After reconciling the information, and at the 2014 price level, the SEK 196 billion is equivalent to approximately SEK 201 billion.
[37] Ei conceded to a changed cost of capital from 4.53 to 4.56 per cent in the court action, and the revenue frameworks then increased from 163 to 164 billion.
[38] On application by the companies for a correction of the capital base, Ei reconsidered a number of revenue frameworks during the regulatory period of 2016-2019. The reconsidered revenue frameworks led to the revenue frameworks increasing from 172 billion to 173 billion.
[39] From and including the regulatory period of 2020–2023, companies do not apply for amounts. All companies are allocated a revenue cap based on what the calculation allows, and Ei adjusts the calculation to the period based on the actual conditions.
[40] Since the court proceedings continued to June 2022, it has not yet been possible to identify a cap. If the judgements are not appealed then Ei must re-establish revenue caps for the 2020–2023 regulatory period based on the objectives and criteria of the electricity market directive.

Figure 4. The electricity trading system



Source: Ei (OTC = over the counter, bilateral trade)

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

The day-ahead market, the intraday market, the balancing market, and the hedging market are governed by the EU's regulatory framework. The day-ahead market and the intraday market are regulated in CACM, while the balancing market and the hedging market are governed by rules in EB and FCA respectively.

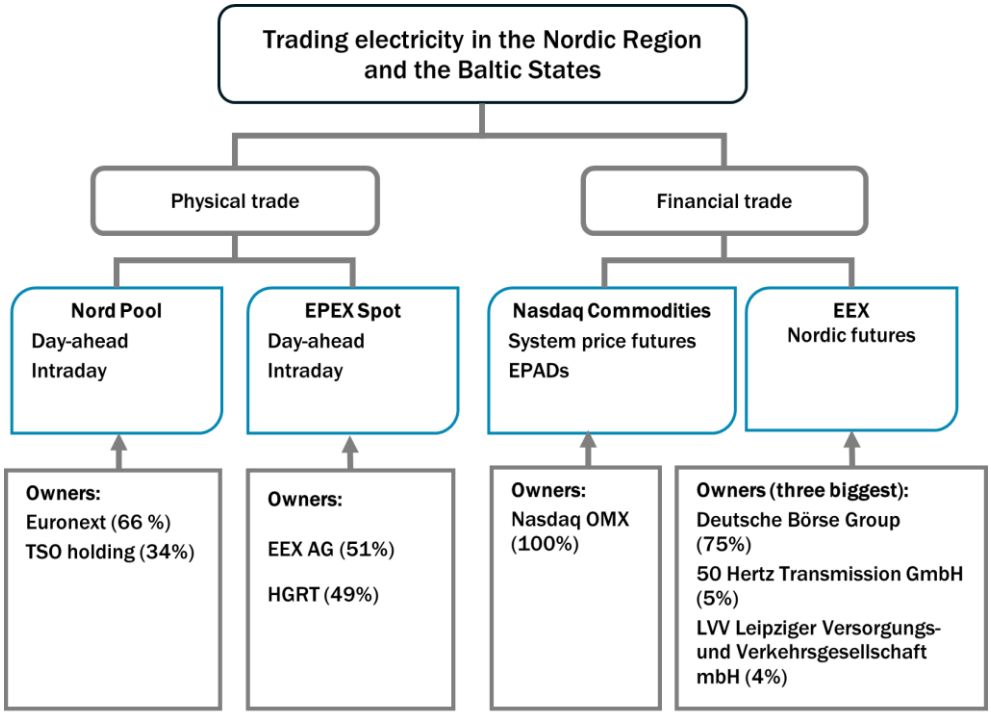
Trading platforms for electricity

According to CACM, electricity exchanges require a permit to operate as an electricity exchange in a bidding area. Nord Pool and EPEX Spot have been authorised to act as nominated electricity market operators (NEMO) and are allowed to operate as electricity exchanges for the day-ahead market and the intraday market in Sweden. Nasdaq Spot has been authorised to operate as electricity exchange for the day-ahead market. In the current situation, only Nord Pool and EPEX Spot have established activities.

Nord Pool's day-ahead market is the trading platform for the majority of the physical electricity trading in the Nordic region and the Baltic States. In 2021, Nordic stakeholders traded approximately 671 TWh on Nord Pool's day-ahead market, and approximately 47 TWh on EPEX Spot. The majority of all electricity traded in the Nordic region is traded on the day-ahead market.

For Sweden and the Nordic region, both Nasdaq Commodities and EEX arrange trading in and settlement of financial contracts. See below for more information under the heading: Hedging market.

Figure 5. Trading platforms for electricity in the Nordic-Baltic market



Source: Nord Pool[41], EPEX Spot, Nasdaq Commodities and EEX

The hedging market

There are several ways in which stakeholders can manage the variation in price in the electricity market. In the Nordic region, the main method is to use combinations of different financial contracts for hedging, and in the rest of the EU the main method is to use long-term transmission rights.

The hedging market is governed by the rules in the FCA regulation. The objective of the rules is to ensure that market stakeholders have sufficient opportunity to manage the financial risks in the electricity markets.

Hedging is most common in Sweden and the rest of the Nordic region whereby stakeholders trade in system price contracts, which, in some cases, are combined with EPAD contracts (Electricity Price Area Differentials). A system price contract is tied to the system price[42] as settlement price. The price risk that remains, that is, the difference between the price in one specific bidding area and the system price, is hedged using EPAD contracts.

In Sweden, hedging contracts can be traded bilaterally, via brokers or on trading platforms. For the Nordic region, both Nasdaq Commodities and EEX arrange

[41] The Nordic system operators, together with the Lithuanian operator (Litgrid), own a total of 34% of Nord Pool through a joint holding company, TSO holding.
[42] *System price* is the price that would prevail in the Nordic-Baltic trading area if there were no transmission restrictions.

trading in and settlement of financial contracts. Contracts traded bilaterally are generally settled in a clearing house[43]. Settlement means that the parties have the clearing house as a counterparty. In this way, the clearing house takes over the counterparty risk. As things stand at present, it is possible to hedge production or consumption for several years ahead. Trading takes place constantlyand is priced according to pay-as-bid pricing[44]. 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. The design of the day-ahead market is governed by the CACM regulation. The purpose of CACM is to facilitate a common internal market for electricity within the EU. CACM contains provisions that, among other things, regulate to achieve a coordinated calculation and allocation of available transmission capacity to the market. It shall also ensure that the bidding areas within the EU are established correctly, that nominated electricity market operators (NEMOs) within the EU can compete with each other on equal terms and conditions, as well as that the costs arising in connection with the development and operation of the market coupling are distributed between the stakeholders and Member States affected in a reasonable way.

When trading on the European day-ahead markets, stakeholders submit their buy and sell bids to the electricity exchange by 12:00. 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 exchanges add together all the bids hour-by-hour in a buy stage and in 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 higher bids are accepted as required. The nominated electricity market operators must publish the prices for the following 24-hour day by 13:00.

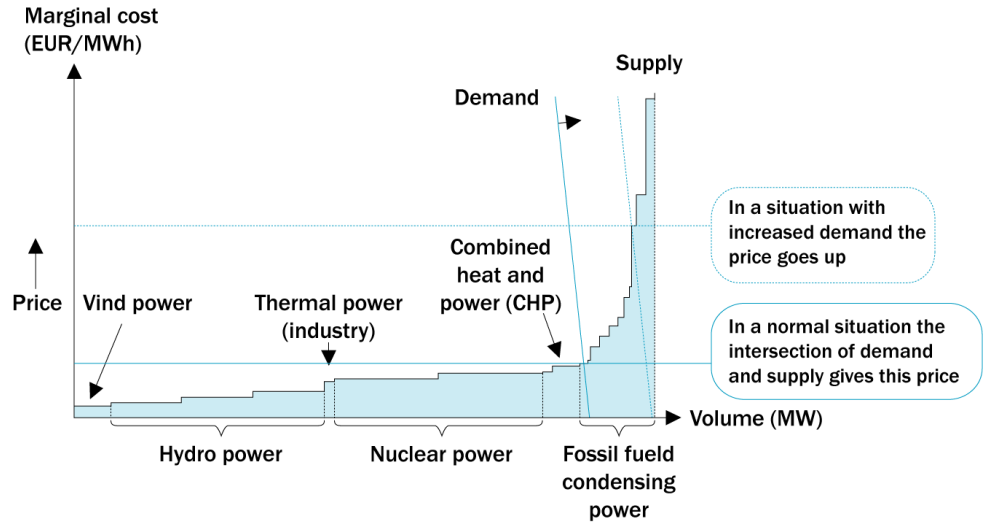
Marginal pricing is applied on the day-ahead market, which means that all accepted stakeholders are able to trade at the established market price, regardless

[43] Clearing house: stakeholders that act as neutral intermediary in bilateral trading in financial products.
[44] *Pay-as-bid* pricing means that the buy and sell bids accepted are settled at the price submitted by the stakeholder in the market.

of their initial bids. There is no distinction made between the different production technologies. Hence the bids compete on equal terms regardless of the type of production offered on the market.

Figure 6 is a basic diagram showing the price formation on the spot market and the order in which various types of power 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 will 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. Price formation in Sweden



Source Ei

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

Most NEMOs in Europe currently work in partnership in order to calculate market prices and volumes of trade for day-ahead trade, this is called market coupling. The rules for market coupling have been proposed by NEMOs and approved by ACER and the regulatory authorities affected. In order to calculate a supply-demand equilibrium point, where supply and demand meet, account needs to be

taken of supply and demand for each bidding area throughout the EU's integrated electricity market, as well as what opportunities exist for electricity transmission between bidding areas. The calculation method, price coupling algorithm, used by the electricity exchanges, is developed jointly by the electricity exchanges and the exchanges take it in turn to establish the market coupling. The way in which the algorithm works is public and can be read on the website of each electricity exchange. 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 are 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.

Trading on the day-ahead market accounts for much of the physical trade and price formation in the Nordic Region and thus Sweden. This market is therefore deemed to be key to stakeholders' earning capacity.

The key to a functioning market coupling is that available transmission capacities in the electricity network are calculated and allocated in an efficient way. The method currently in use in Sweden and the Nordic region for capacity calculation calculates the net transmission capacity (NTC). The calculation is made based on a forecast of the future flows in the transmission network and how much transmission an interconnection can handle within the framework of operational reliability. The transmission network operator makes the forecast and the capacity calculation. During 2023, the Nordic transmission network operators intend to change to a new method that is flow-based. In the flow-based method, the calculation will be made via a regional coordination centre (RCC). Using a common grid model (CGM), among other things, the flow-based method will allow better consideration to be given to the system as a whole, and thereby develop a more accurate forecast that maximises the total transmission capacity that can be allocated to the market in the region. The Nordic transmission network operators worked on preparing the introduction of the flow-based method during 2021.

The intraday market

The design of the intraday market is regulated exactly as the day-ahead market by Commission regulation CACM. The intraday market is an adjustment market that 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, that is, the companies that have undertaken to accept the financial risk for imbalances in the market, even

though being a balance provider is not a requirement to be allowed to participate in the intraday market.

Trading on the intraday market opens at 14:00 on 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 volumes that are traded on the trading platforms offering the intraday market in the Nordic region are small in comparison with the day-ahead market. The intraday market has a greater part to play on other European trading platforms than in the Nordic region as many stakeholders conduct more of their trade there.

It is also of key importance for the intraday market that capacities in the electricity network are calculated and allocated in an efficient way so that, in turn, the market coupling will be efficient. In Sweden and the rest of the Nordic region, the NTC method is currently also used for the intraday market. There will also be a changeover to the flow-based method for capacity calculation in the intraday market.

The balancing market

The electricity system needs to be in balance at each point in time by being supplied with the same amount of electricity that is consumed. In Sweden, Svenska kraftnät is responsible for maintaining the balance in the electricity system. To a great extent, this balance is achieved by the stakeholders fulfilling their buy and sell contracts from the physical trade, as described above, but imbalance on a minute and second level as well as unforeseen events mean that there needs to be the opportunity to balance the electricity system within the hour, in real time. Balance services are used for this purpose, consisting of production or consumption. The balance services are purchased by Svenska kraftnät and the services can be offered against remuneration by electricity producers or electricity users.

A change in the Swedish balancing market is currently under way due to adaptation to the EB regulation that entered into force on 18 December 2017. EB established the frameworks for a common and well-functioning European balancing market. In general, the balance market currently works as follows:

The balance services consist of products procured by Svenska kraftnät in two submarkets, the automatic and manual reserve markets. Certain requirements need to be met by stakeholder facilities in order for them to be able to offer services in the two markets. It must be possible to activate the automatic reserves within a couple of minutes in order to keep the system in balance. The stakeholders who

offer the automatic reserves receive a payment according to pay-as-bid pricing during procurement in order for them to be available with their capacity during the operating hour, this is called capacity payment. Certain automatic products also receive remuneration for the energy supplied, but often the volume of energy is small.

The manual reserves have a slower minimum activation time of 15 minutes and are traded on the Nordic regulating power market. 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. This means that the lowest bids are activated first, and all activated bids are given the same price as the highest activated bid. Stakeholders therefore have an incentive to offer their production at a flexible cost/alternative cost, in exactly the same way as on the day-ahead market. This results in good conditions for a cost-effective allocation of balance resources.

Sometimes there are transmission restrictions in the electricity network, and sometimes it may take time before a regulating object is fully activated. In which case, deviations from the ”lowest bid first” principle will then be necessary, and this procedure is known as special regulation. Bids called off under the special regulation will not be price-setting on the regulating power market and are settled according to pay-as-bid pricing.

The prices for upward and downward regulation are used in the subsequent balance settlement, when the balance provider has to pay, or receive payment, for the imbalances they have had. There is a common settlement function for Sweden, Finland and Norway. However, each national system operator retains responsibility. During 2021, a single price was introduced in the balance settlement, which means that balance providers encounter the same imbalance price regardless of the direction of their imbalance in relation to the system's total imbalance. Previously, there were two prices, depending on the direction of the imbalance.

In recent years, Ei and other regulatory authorities affected decided on a number of new methods and terms and conditions for the balancing market in accordance with EU rules.[45] The Nordic transmission system operators also have an ongoing project entitled "Nordic Balancing Model" that is designed to implement the new methods and conditions, but also other changes to the Nordic balancing market.

[45] A complete list of the methods and terms and conditions decided upon is available at www.ei.se.

These new methods and conditions will be implemented in the coming years and will fundamentally change the current Swedish balancing market.

1.2.2 Development of the wholesale market for electricity

Ei works actively with the development of the wholesale market for electricity in Sweden and the Nordic region and regularly submits proposals for changes in various reports. Among other things, this includes work to increase the integration of the European electricity market. Ei works together with other European regulatory authorities by actively participating in various working groups within ACER and CEER. Ei works actively with wholesale market issues in collaboration with other Nordic regulatory authorities in the cooperation body NordREG (Nordic Energy Regulators), as well as with other regulatory authorities in the capacity calculation regions in which Ei is a member.

Improvements in the electricity market model

During 2020, in accordance with Article 20.3 of the Electricity Market Regulation, Ei drew up an implementation plan[46] for Sweden. In the implementation plan, Ei has identified three main improvement areas: the balancing market, instruments, and demand side flexibility. There are currently conditions in the balancing market that constitute barriers to entry and barriers to effective pricing. This makes it difficult for innovative products and services, such as energy stores and demand side flexibility, to enter the market. In addition, it is important that both existing and new national instruments are appropriately designed and do not unnecessarily affect the function of the electricity market. In order to improve the function of the electricity market, there is also a need for continued active work on removing obstacles to demand side flexibility.

Opportunity for hedging against risks

The FCA regulation[47] (EU's regulation on establishing a guideline on forward capacity allocation (FCA)) shall ensure that the market's stakeholders have adequate opportunity to manage financial risks, and requires that an evaluation of risk hedging opportunities is carried out every four years. In 2021, Ei evaluated the risk hedging options[48], and ordered a consultation report[49] to investigate alternatives to improve risk hedging opportunities in Sweden.

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[46] Implementation plan with schedule to improve the function of the electricity market - Ei R2020:09 - Swedish Energy Markets Inspectorate

[47] Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation.

[48] Evaluation of risk hedging opportunities in the Swedish electricity market – for consultation in accordance with the FCA regulation (2021)

[49] Measures to improve risk hedging opportunities on the electricity market in Sweden - a report to the Swedish energy markets inspectorate (2022)

Ei assesses that the liquidity in the risk hedging market has deteriorated since the previous evaluation in 2017, but does not reach the conclusion that the risk hedging opportunities are inadequate. In accordance with the FCA regulation, action needs to be taken if any of the Member States on one side of a border consider that the risk hedging opportunities are inadequate. Dialogue with the regulatory authorities in the countries bordered by Sweden will continue during 2022.

Demand side flexibility and flexibility markets

Demand side flexibility is highlighted in the electricity market directive as an important tool to meet the future challenges in the electricity system. At Ei, we have an advancement assignment in our instructions relating in particular to demand side flexibility, and during 2021 we followed, for example, the developments in the local markets with regard to demand side flexibility. Among other things, Ei ordered a consultancy study[50] in order to compile knowledge about the design of local markets in Sweden in terms of flexibility.

Aggregators are important facilitators for demand side flexibility. An aggregator is a specific stakeholder in the electricity market that compiles a range of flexible resources and then packages them into larger units, which in turn can be sold on the electricity market. In order to ensure that aggregators should participate in the market in an efficient way, and on equal terms as other stakeholders, the EU has decided on certain common rules for how aggregators should be able to act in the electricity market.

According to the electricity market directive, an aggregator should, in a non-discriminatory way, have access to all markets without needing consent from a customer's existing electricity supplier or other market stakeholder, i.e. that the aggregator should be able to act independently. A customer should therefore be able to choose an aggregator, independently from his/her existing electricity supplier. The directive also requires that an aggregator should assume financial responsibility for its imbalances, i.e. for the imbalances that the aggregator may cause to other stakeholders in the market.

During the spring of 2021, Ei submitted the report *Independent aggregators – Proposals for new rules for the implementation of the electricity market directive*[51] to the Government with recommendations on how the EU's regulatory framework on independent aggregation should be implemented in Sweden. The report contains proposals to make it possible for aggregators to act independently, at the same

[50] Consultancy study on local flexibility markets - Swedish Energy Markets Inspectorate (ei.se) (2022)
[51] (Ei R2021:03)

time as they assume financial responsibility for the imbalances they may cause in the system.

Continued efforts to increase European harmonisation

Ei works actively to implement various parts of the Clean Energy Package that promotes the integrated European electricity market. Ei works within ACER and CEER, the European cooperation organisations for regulatory authorities, as well as the Nordic cooperation body NordREG, in order to ensure that EU regulations are interpreted in a harmonised way, so that the objectives of the Clean Energy Package can be met. Ei is also positive to and supportive of the internal regulations and praxis in the Nordic countries being developed towards further harmonisation.

1.2.3 Price development and transmission restrictions

Sweden is divided into submarkets, known as bidding areas (these are also known as spot price regions or bidding zones), see Figure 7. The prices in the individual areas are determined by production and consumption within each area as well as by power transmission to and from adjacent areas. Two bidding areas between which it is not possible to transfer all of the power requested will have different prices. Read more about transmission restrictions under section 1.1.4 Cross-border issues and transmission restrictions.

Many factors affect the price of electricity, which often varies hour by hour depending on supply and demand in the system.

Figure 7. The Nordic-Baltic bidding areas

Källa: Ei

High electricity prices during the second half of 2021

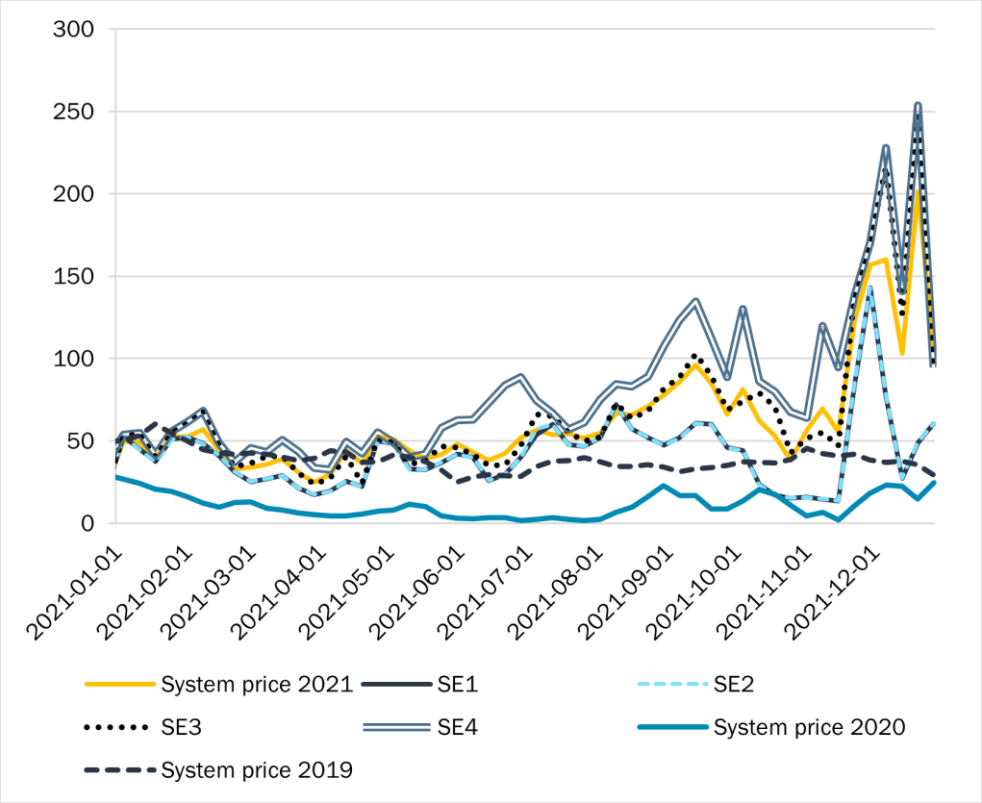
During 2021, electricity prices increased compared with the previous year in all Swedish bidding areas, especially during the second half of the year, and in particular at the end of the year. During 2021, the system price was, on average, 62 euro/MWh[52].

[52] To convert to SEK/kWh, which is the usual unit specified on electricity bills, the rule of thumb is that 1 euro/MWh is equivalent to approximately SEK 0.01 per kWh. During 2021, on average, 1 euro was traded for SEK 10.49, which means that euro/MWh is equivalent to SEK 0.01049 per kWh

Table 3. Mean annual price as well as highest and lowest mean daily price for each bidding area, as well as system price EUR/MWh (date)

	System price	SE1	SE2	SE3	SE4
2021	62,32	42,56	42,56	66,01	80,52
2020	10,93	14,39	14,39	21,19	21,19
2019	38,94	37,94	37,94	38,36	39,80
2018	43,99	44,23	44,23	44,54	46,36
Max 2021	309,78 (2021-12-21)	233,69 (2021-11-29)	233,69 (2021-11-29)	413,48 (2021-12-06)	413,48 (2021-12-06)
Min 2021	5,77 (2021-04-05)	6,93 (2021-04-05)	6,93 (2021-04-05)	7,10 (2021-04-05)	7,10 (2021-04-05)

Figure 8. Mean daily prices per week on the day-ahead market EUR/MWh



Source: SKM Syspower

As shown byFigure 8, the spot prices have been unusually high during the second half of 2021, especially in southern Sweden, and even volatile. It is important to note that the hourly-based price varies much more than is shown by Figure 8.

Electricity prices have been high and not just in Sweden. Throughout Europe, electricity prices have been high during 2021, and according to ACER[53], the primary explanation for the high electricity prices is the increase in the price of natural gas. The price of gas increased from being around 20 euro/MWh at the start of the year to 80 euro/MWh at the end of September, and peaked on 21 December

[53] ACER, High Energy Prices October 2021.

when the gas price amounted to 180 euro/MWh. 21 December was also the day when the mean daily price for electricity was at its highest in SE3 and SE4.

Weather conditions have also had an impact on pricing. Throughout the Nordic region, reservoirs were at low levels during 2021, and, at the same time, wind power production was restricted by limited wind. These factors have pushed up the price of electricity. In addition, economic activity is now recovering after the COVID-19 pandemic, which has increased the demand for electricity.[54]

Price differences and restricted transmission between bidding areas.

Two adjacent bidding areas between which there are no transmission restrictions will have the same price and form one price area. When there are no transmission restrictions between two adjacent bidding areas, they have the same price and form one price area. It is not uncommon for all of Sweden's for bidding areas to form a joint price area, particularly during lower demand hours. It is also common for price areas to extend across country borders where interconnections exist.

When there is insufficient transmission capacity between electricity regions, the prices in the regions will differ. The transmission of electricity from a low-price area to a high-price area results in a surplus at the electricity exchange that accrues to Svenska kraftnät, so-called capacity revenues that are sometimes also known as bottleneck revenues. These are earmarked for reinforcements in the transmission network in order to increase the transmission capacity and level out prices in the long term.

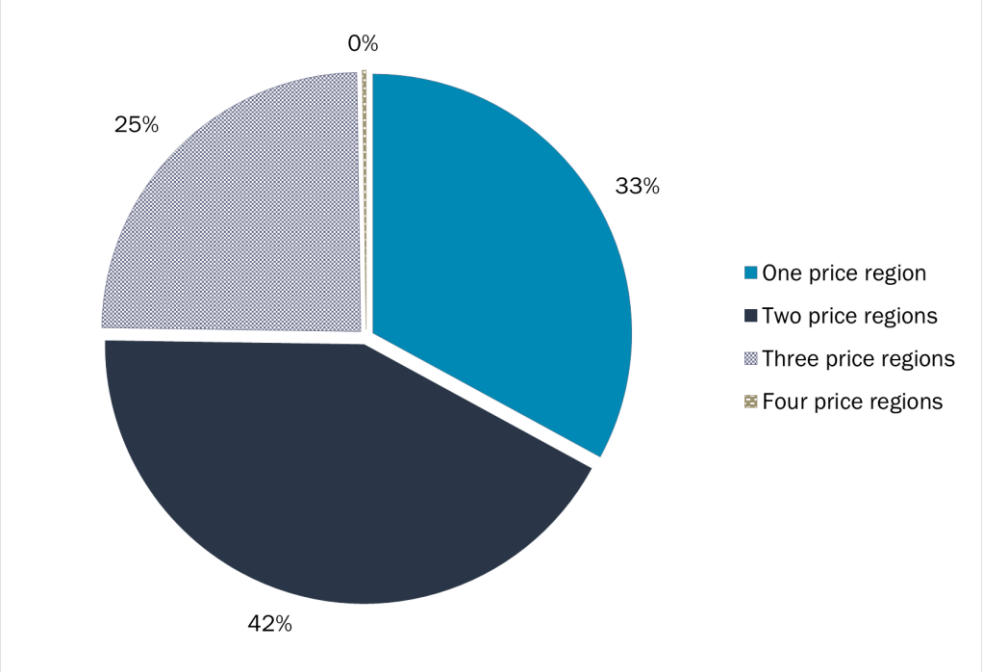
The major differences in price between the north and south of Sweden during 2021 have been due to insufficient capacity for the transmission of requested capacity from SE1 and SE2 to SE3 and SE4. In SE3 and SE4, the demand has increased due to the return after the pandemic as well as increased electrification. Cold weather in December also had an impact. On the supply side, the closure of Ringhals 1 and 2, together with limited wind, meant that southern Sweden requested more electricity from northern Sweden. SE3 and SE4 are also interconnected with the rest of Europe through various interconnections, and due to the high gas prices and the unfavourable weather conditions, the demand from the continent has meant that southern Sweden has requested more electricity from northern Sweden than usual. In these conditions, existing power lines have not always had the transmission capacity to supply the amount of electricity requested, resulting in price differences. The rules for market coupling and pricing follow the EU rules in the Commission's CACM regulation and are therefore not decided on by Sweden.

[54] ACER, High Energy Prices October 2021.

Sweden has been divided into several different price areas more often in 2021.

During 2021, Sweden's four bidding areas formed one common price area for 33 per cent of the time, see Figure 9 below. The country was divided into two different price areas for 42 per cent of the time, and there were price differences between northern and southern Sweden for the majority of the time. Either when SE1 and SE2 formed one price area together, and SE3 and SE4 had a common price, or when SE1, SE2 and SE3 formed one price area together, and SE4 had a different price.

Figure 9. Proportion of the time in 2021 when Sweden was divided into 1–4 price regions



Source: SKM

1.2.4 Production and consumption

Electricity production and electricity consumption

In 2021, Sweden's electricity production was 165.5 TWh, which was to 3.7 per cent more than during the previous year. The main increase in production has come about from cogeneration and nuclear power, see Table 4. During 2021, Sweden had approximately the same net export of electricity as the previous year, 25.6 MWh. The installed wind power capacity has continued to increase (see section 1.4.1 Monitoring of electricity production capacity) but this has not materialised in increased production since there has been less wind in 2021 than in 2020. Table 4 below gives a summary of Sweden's energy balance during 2017–2021.

Table 4. Sweden's electricity balance 2017-2021, TWh (% of total production within the country), negative values indicate export.

	2017	2018	2019	2020	2021
Total production	159,3	158,5	164,9	159,6	165,5
Wind power	17,5 (11 %)	16,6 (10 %)	19,9 (12 %)	27,6 (17 %)	27,4 (17 %)
Solar power	0,2 (0,1 %)	0,4 (0,2 %)	0,7 (0,4 %)	1,0 (0,6 %)	1,2 (1 %)
Hydropower	63,9 (40 %)	61,0 (38 %)	64,6 (39 %)	71,2 (45 %)	70,6 (43 %)
Nuclear power	63,0 (40 %)	65,8 (42 %)	64,3 (39 %)	47,3 (30 %)	51,0 (31 %)
Cogeneration	14,9 (9 %)	15,0 (9 %)	15,6 (9 %)	12,7 (8 %)	15,5 (9 %)
Electricity consumption in Sweden	140,4	141,3	138,7	134,6	140,0
Network losses	11,1	11,0	8,7	9,3	9,9
Net yields	-19,0	-17,2	-26,2	-25,0	-25,6

Source: Swedish Energy Agency and Statistics Sweden

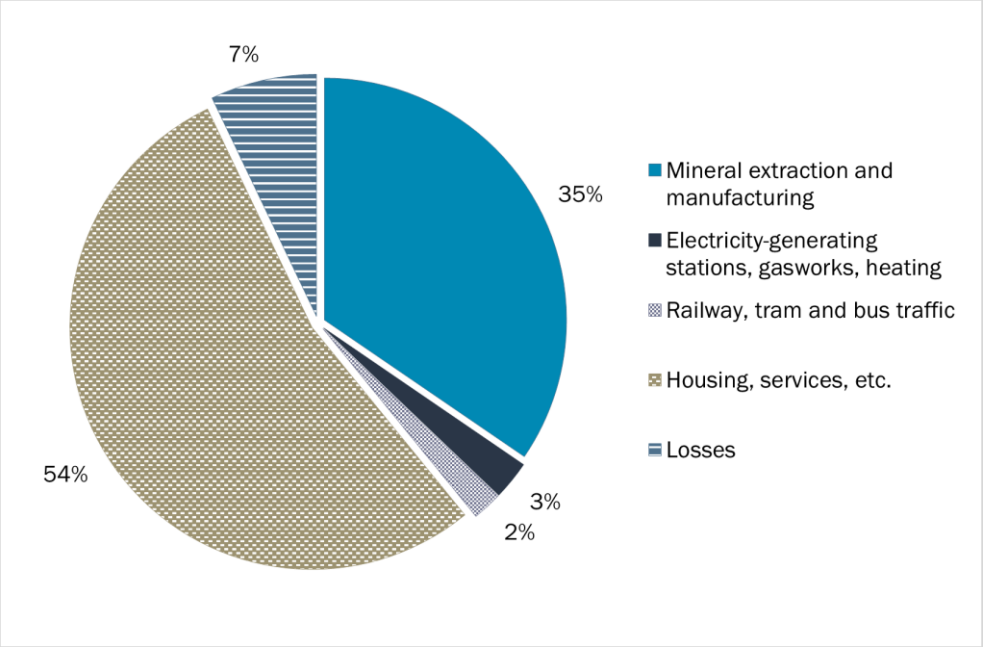
Total consumption of electricity in Sweden, including transmission losses, was 140 TWh in 2021, which represents an increase of 4 per cent compared with 2020. The increase can be partly explained by cold weather at the end of the year as well as that there was unusually low consumption during 2020 due to weather conditions and lower economic activity in connection with the pandemic, among other things.

Over half of the electricity, 75,3 TWh, was used in the housing and services sector, etc[55]. In 2021, industry's electricity consumption amounted to more than 48.3 TWh and accounted for approximately 35 per cent of the total electricity consumption.

Figure 10 below shows electricity consumption divided according to sector.

[55] Source Statistics Sweden, the category for Housing and Services, etc., is a residual item in the calculation of electricity consumption per sector. Therefore, the electricity consumption that does not fall into one of the other categories has been included here.

Figure 10. Electricity consumption for 2021, by consumption area



Source: Statistics Sweden

The highest electricity consumption in 2021 occurred between 08:00 and 09:00 on 10 February, when consumption amounted to 25,660 MW. This is 1,330 MW less than Sweden's highest electricity consumption to date, which was noted on 5 February 2001, when consumption amounted to 27,000 MW.

Competition in the wholesale market

Swedish electricity production is dominated by a small number of major stakeholders. Vattenfall alone accounts for over 38 per cent of production, and together, the three largest stakeholders (Vattenfall, Fortum and Uniper[56]) account for just over 67 per cent.[57] The three biggest stakeholders 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.

[56] Fortum has owned 76.1% of Uniper's shares since 31 December 2020.
[57] Source: Swedenergy

Ei's report from 2014 on the division of electricity regions indicated that the conditions for competition in the wholesale market were good.[58] In all material respects, Ei's assessment of the conditions described also applied for 2021.

The price was unchanged for large parts of the year in several of Sweden's bidding areas, and Ei's analysis is that there are no individual stakeholders that can exercise market power in the day-ahead market and intraday market. During periods with transmission restrictions when the bidding areas become their own price areas, individual stakeholders in the northernmost bidding area SE1 and individual stakeholders in the southernmost bidding area SE4 may have a position that gives the opportunity to exercise market power[59] in a submarket. In bidding area SE1, there is one producer whose production dominates the area. However, to a very large extent, bidding areas SE1 and SE2 form one single price area, which limits the opportunity for an individual stakeholder to exercise market power. In electricity region SE4, with only one large producer, the situation is similar. However, Ei is of the opinion that the competitive situation is acceptable since bidding area SE4 frequently forms one single price area with adjacent Swedish and Danish bidding areas, reducing the market power of individual stakeholders on the day-ahead market and the intraday market.

1.2.5 Ei works to promote competition in the wholesale market for electricity.

A number of authorities and organisations are cooperating in the monitoring of the Swedish and Nordic electricity market with a view to using various measures to create an effective electricity market and to prevent the exercising of market power.

Responsibilities relating to the monitoring of the electricity market

Ei is the national energy regulatory authority in Sweden. Besides exercising supervision, Ei constantly monitors and analyses development on the electricity and gas markets and submits proposals for amendments to regulatory frameworks or other measures in order to promote the function of the markets.

Trading and company activities in the trading platforms operated by Nord Pool, EEX and Nasdaq Commodities are subject to monitoring by Ei, among others. Ei monitors that the stakeholders that are authorised and are NEMOs in the Swedish bidding areas comply with the rules that apply to nominated electricity market operators. The Nord Pool trading platform, which is based in Norway, is also

[58] Evaluation of the effects of division into bidding areas (Ei R2014:08).
[59] Market power can be described as a stakeholder's ability to influence the prices at which a product is traded on the market. The ultimate form of market power prevails when one stakeholder has a monopoly position and is therefore alone in a certain market and can act without competition from other stakeholders.

monitored by the Norwegian Water Resources and Energy Directorate (NVE) and the Financial Supervisory Authority of Norway.

The Financial Supervisory Authority supervises the Swedish stakeholders operating on the financial electricity market with the permission of the authority. 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 (2008:579). 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 concentrations between undertakings. The Swedish Competition Authority also provides proposals for rule changes and other measures to eliminate existing barriers to competition.

Monitoring of the Swedish markets in accordance with REMIT and the transparency regulation

The REMIT regulation facilitates a coherent monitoring of the increasingly integrated European electricity and gas markets. Ei has procedures that are applied every day within the framework of its market surveillance work.[60]

In accordance with REMIT, all trading in wholesale energy products that takes place both bilaterally and on electricity exchanges must be reported to ACER by the market stakeholders. Ei has entered into agreement with ACER to have access to stakeholder trading data. Exactly how the trading should be reported is regulated in the implementing acts[61]. Ei charges a fee to registered market stakeholders in order to finance its monitoring of trading in wholesale energy products.

Ei also conducts market surveillance in accordance with the transparency regulation, whose purpose is to increase transparency in the energy markets by ensuring that information from market stakeholders reaches everyone affected in an effective way. Information to be reported according to the regulation includes physical restrictions in the networks, production and consumption, among other things. This information is collated in a transparency platform run by the European Network of Transmission System Operators for Electricity, ENTSO-E[62], and can be

[60] Market monitoring and surveillance 2021 (Ei PM2022:02).
[61] 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.
[62] European Network of Transmission System Operators – Electricity.

accessed by the general public. Ei's role is to ensure that there is compliance with the Transparency Regulation in Sweden.

Ei performs a regular review of the information published by stakeholders via market releases on inaccessibility in production, consumption, and transmission. During 2021, Ei made a more detailed review of 43 market releases. These were divided between ten different stakeholders. In 42 of the cases, Ei requested additional submissions from the stakeholders with regard to what action had been taken to ensure that they have the necessary procedures in place to provide information to the market. During 2021, the supervision did not result in any notifications to companies of further action.[63]

Marketplace regulatory frameworks and market surveillance

All stakeholders in Nord Pool, EPEX Spot 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. Nord Pool, EPEX Spot and Nasdaq Commodities have internal market surveillance functions where trade is monitored constantly.[64] The functions for market monitoring and surveillance at Nord Pool, EPEX Spot, and Nasdaq Commodities also contribute to Ei's work, since any infringements of the regulations must be reported to Ei.

Measures to reduce risks of joint ownership in nuclear power

In various contexts, the Swedish Competition Authority has drawn attention to the general risks for unauthorised cooperation through common ownership of electricity production resources. In 2011, and with the support of Ei, the owners of nuclear power plants adopted a common industry code of ethical conduct for the exchange of information between the companies. Independent observers are members of the boards where the nuclear power companies are jointly owned by several power producers. The board members have a special duty to monitor the industry code of ethical conduct. Ei's task is to nominate one observer per board of directors. Every year, Ei publishes a monitoring report from each board of directors, including any comments from the observer.

1.3 Retail market for electricity

The Swedish retail market for electricity has been open to competition since 1996, and the prices are set by the stakeholders in the market. There are approximately

[63] Market monitoring and surveillance 2021 (Ei PM2022:02).
[64] This must be done in accordance with Article 15 of Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency.

5.5 million electricity customers in Sweden, approximately 4.7 million of which are household customers.

Ei has been tasked with the assignment to strengthen the position of electricity customers by, among other things, facilitating active choices through easily-accessible information. Ei shall also promote consumer rights in collaboration with the Swedish Consumer Agency. The cooperation with the Swedish Consumer Agency shall address issues that affect customers, among other things.

1.3.1 Monitoring of price development, transparency and competition in the retail market for electricity.

Elpriskollen

Ei runs elpriskollen.se, Sweden's only independent price comparison site for electricity contracts. According to Ei's regulation[65], electricity suppliers that offer electricity contracts to electricity consumers with an annual consumption of up to 100,000 kWh are obliged to report the most common contract types to the elpriskollen.se price comparison website. Elpriskollen is run by Ei and allows comparisons to be made between different electricity trading companies and their current offers.

During 2021, Ei drew up a proposal for how the website could be developed to be more user-friendly for visitors. The proposal shall be implemented during 2022 with the objective of launching a new comparison website by the end of the year. It has also been possible to compare corporate contracts on elpriskollen.se since March 2021.

Many electricity suppliers – but some only operate locally

There are approximately 140 electricity suppliers on elpriskollen.se. Some electricity suppliers only offer contracts in certain bidding areas, and several smaller local electricity suppliers have chosen to only operate in their local area. An individual customer does not, therefore, have the opportunity to choose between all of the electricity suppliers in Sweden.

At the close of 2021, the three largest electricity suppliers had a collective market share of almost 45 per cent[66] counted in number of customers, which is relatively unchanged from 2020.

[65] The Swedish Energy Markets Inspectorate's Regulations and General Advice (EIFS 2020:4) on the obligation of electricity suppliers to provide information on prices and terms and conditions of supply applicable to electricity consumers.
[66] Source: Swedenergy The number of outtake points is based on data from 2020.

Stable customer activity

In total, 10.6 per cent of customers switched between electricity suppliers in 2021, which is approximately the same as in 2019 and 2020.

The number of renegotiated contracts has remained relatively unchanged over the past decade. A total of 20.1 per cent[67] of all household customers resubscribed to their electricity supply contracts in 2021. Another trend that has been evident for several years now is that most contracts are renegotiated during the autumn and winter months. In 2021, the month with the most renegotiated electricity contracts was December.

However, supplier switches and renegotiated electricity contracts do not provide a complete overview of the extent of customer activity in a market. Customers can be active by choosing not to switch their electricity contracts as they consider whether they have an electricity supplier, a good price, or good contract terms and conditions. Customers may also be of the opinion that the cost of their electricity accounts for such a small proportion of their overall household expenses that they have decided to be less active and not actively seek to reduce the cost of their electricity.

The wholesale market affects the prices to end customers

The biggest element of the price of electricity consists of the cost incurred by electricity suppliers to buy the electricity required to cover the consumption by customers. The electricity is purchased on an electricity exchange or via bilateral agreements with producers. For variable price electricity contracts, the electricity supplier uses the spot price (the price on the day-ahead market) as the starting point, adjusted for the customer's takeoff profile, while fixed price contracts are based on the cost incurred by electricity suppliers when buying electricity on futures adjusted for the customer's takeoff profile. In the case of fixed-price contracts, a cost for area hedging with EPAD contracts is also sometimes included. Read more about hedging in the section 1.2.1 The electricity trading system. In addition to the purchase price of electricity, there are costs for electricity certificates, origin marking, administration, and VAT, among other things.

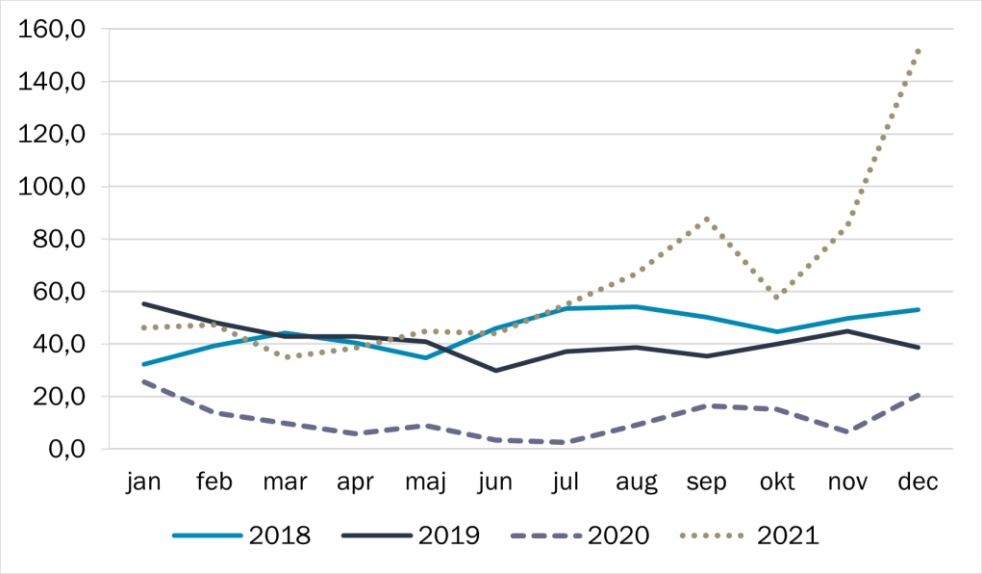
Link between spot prices and prices to end-customers

The spot prices from the latter part of 2021 stand out as unusually high compared with the previous year, in particular in southern Sweden. In 2021, the system price was generally higher than for 2020 when electricity prices were unusually low. The highest listing was for December, when the system price was SEK 1.514 per kWh. The average system price in 2021 was SEK 0.633 per kWh, which can be compared with the 2020 average of SEK 0.114 per kWh, and SEK 0.412 per kWh in 2019: see

[67] Source: Statistics Sweden.

Figure 11. Read more about price development in the wholesale market for electricity in section Development of the wholesale market for electricity 1.2.2.

Figure 11. System price Nord Pool, SEK per kWh average per month



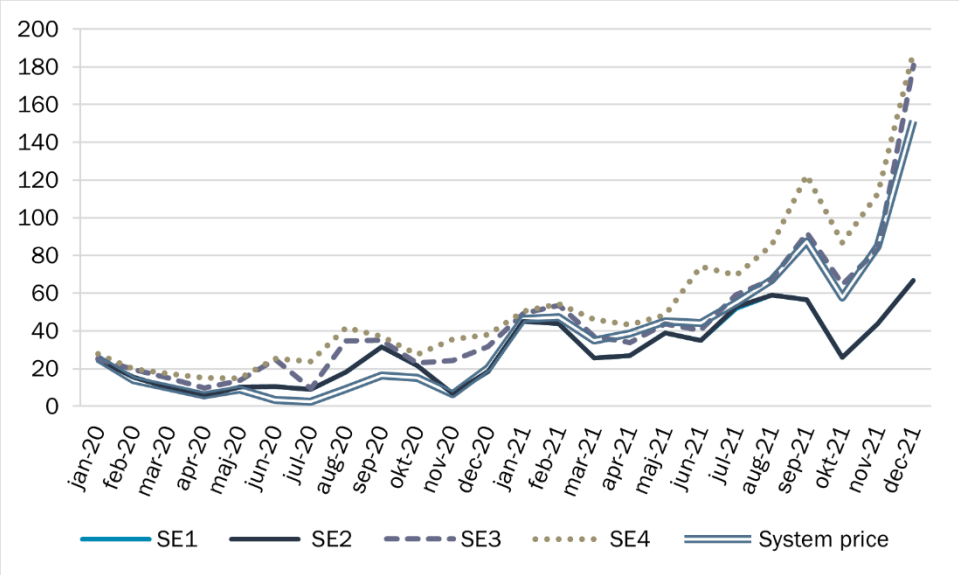
Source: Nord Pool

The price differences between bidding areas

The price differences between different bidding areas were greater during most months of the year than the year before. On average, the difference between bidding area SE4 and SE1 was SEK 0.385 per kWh in 2021, which can be compared with 2020, when the difference on average was SEK 0.119 per kWh. The difference between bidding areas SE4 and SE3 was, on average, SEK 0.147 per kWh in 2021, which can be compared with SEK 0.048 per kWh on average during 2020.

The largest price difference between bidding areas was in the month of December, when bidding area SE4 had a spot price that was on average SEK 1.207 higher than in bidding area SE1, see Figure 12. The prices in bidding areas SE1 and SE2 were almost the same and therefore combine to form a trend with two colours. The smallest difference was in January when there was a difference in price of SEK 0.052 between bidding areas SE4 and SE1.

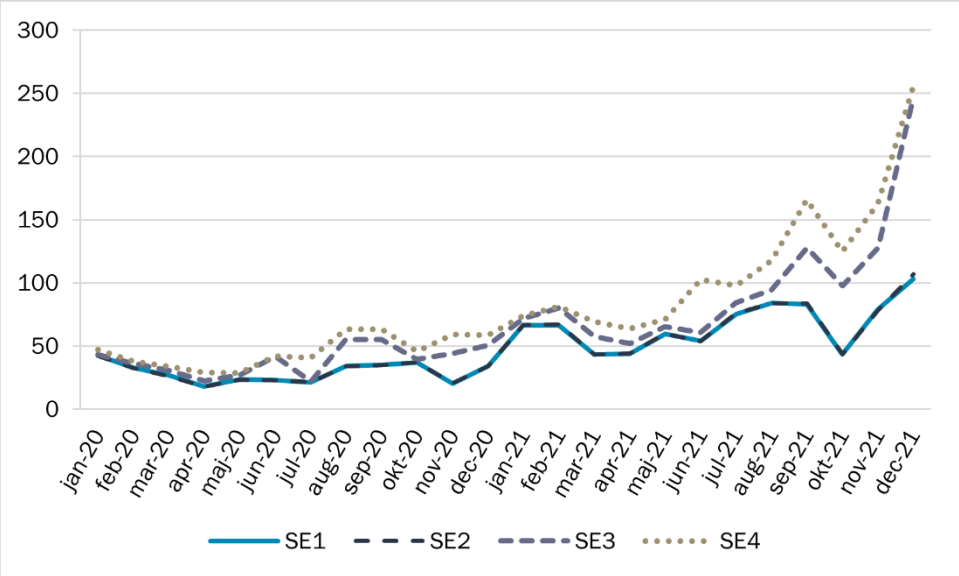
Figure 12. Spot price per bidding area plus system price 2020–2021, SEK per kWh



Source: Nord Pool

Figure 13 indicates that prices to end-customers in the various bidding areas follow the spot prices in each respective bidding area. The price differences in the prices to end customers with variable price contracts[68] between the four bidding areas were slightly larger in 2021 than in 2020. The prices in bidding areas SE1 and SE2 again form a trend with two colours.

Figure 13. Electricity trade price for variable price contracts for a typical customer (20,000 kWh per year), SEK per kWh

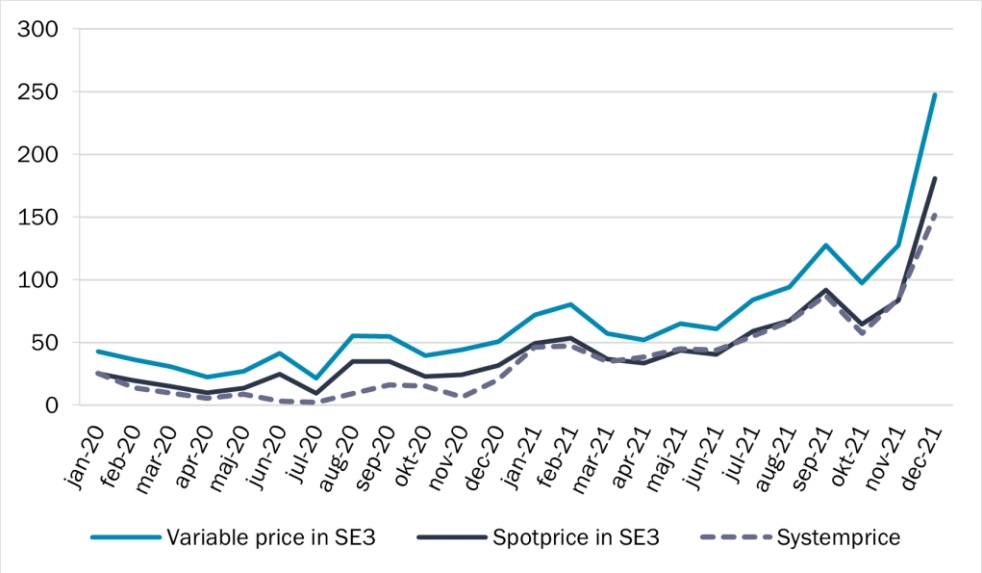


Source: Ei

[68] The price stated here is an average of all contracts with variable price ongoing that are offered on Elpriskollen on the 15th of the respective month.

Figure 14 shows variable prices for a household customer in bidding area SE3 in relation to spot price and system price.

Figure 14. 1 Variable price for a typical customer 20,000 kWh/year in SE3 in relation to spot price and system price, SEK per kWh

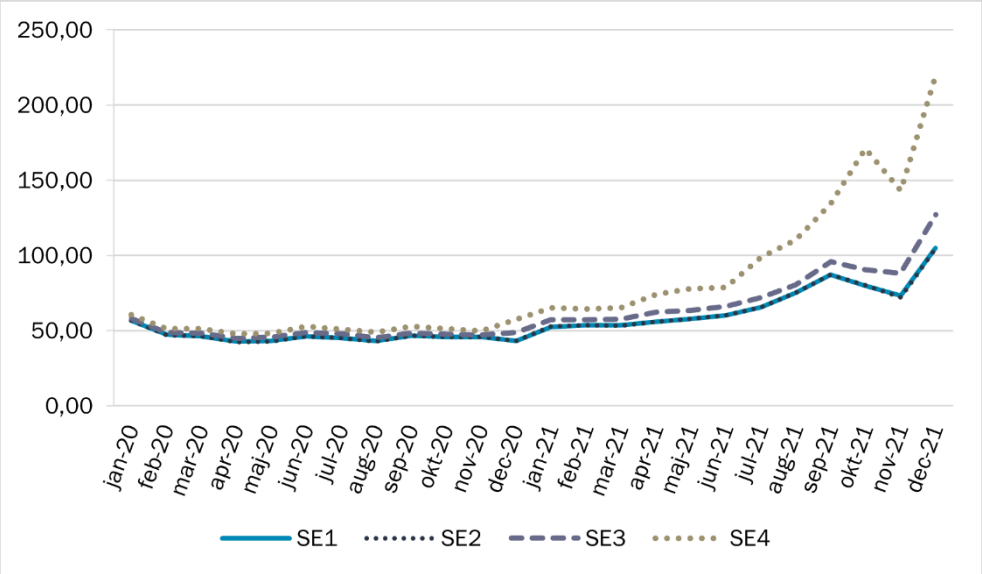


Source: Ei, Nord Pool

Differences between bidding areas are also evident for fixed price contracts with a one-year tie-in period. Prices were consistently highest in SE4 throughout 2021. The differences increased every month during the second half of the year, apart from November. On average during the year, fixed price contracts with a one-year tie-in period were SEK 0.402 more expensive in SE4 than in SE1. The largest difference can be seen in December when the cost of a fixed price contract in SE4 was SEK 1.142 more per kWh than the equivalent contract in SE1. The largest difference between fixed price contracts with a one-year tie-in period in SE3 and SE1 was also in December. The difference was then SEK 0.221 per kWh, see Figure 15. The fixed prices are what customers were offered for taking out contracts for that month, while the variable price is what the variable price customers paid.

The price for fixed price contracts is based on the cost of the futures contracts and hedging contracts purchased by the electricity supplier for each respective bidding area. The price of these is in turn determined by the expected future electricity price. There is a greater need for hedging in bidding areas where prices change a lot, which results in increased costs for the electricity suppliers, and thereby a higher price for the electricity that they can offer to end-customers. There are also some electricity suppliers that are only active in northern or southern Sweden, and their surcharges and costs can vary, which has an impact on the price of electricity that they offer to the customers.

Figure 15. **Electricity trade price for fixed price 1 year for a typical customer, 20,000 kWh per year, SEK per kWh**

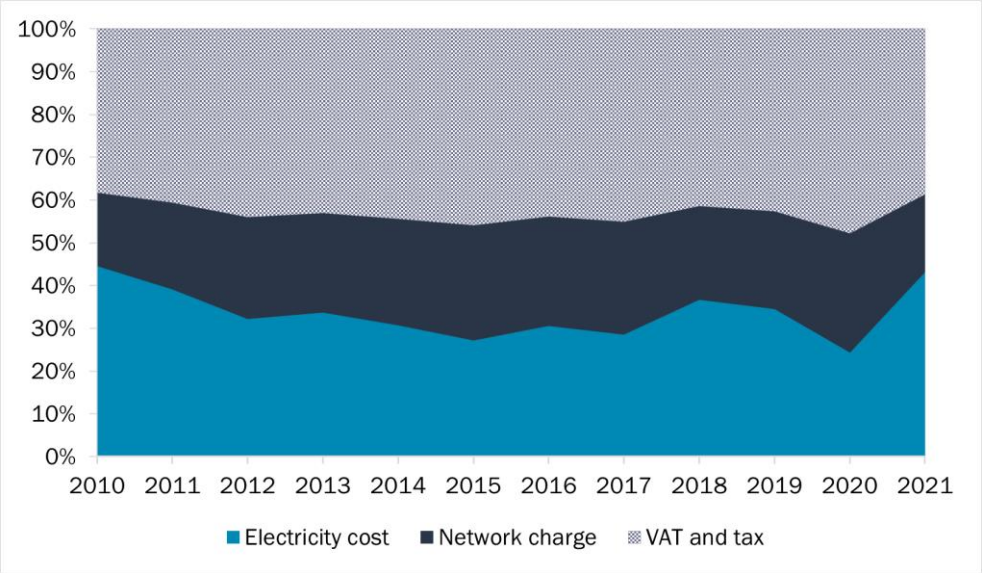


Source: Ei

Electricity supply constitutes the largest part 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. Explanations for this are that the network charges and electricity trade price levels have varied, while energy tax has changed, seeFigure 16. Energy tax is shown on and paid through the electricity network invoice, and was SEK 0.356 per kWh during 2021. Most municipalities in bidding areas SE1 and SE2 have reduced energy tax and during 2021 the energy tax in these municipalities was SEK 0.264 per kWh. In 2021, the largest part of the cost of electricity – 43 per cent – consisted of the electricity trade price. VAT and tax accounted for 39 per cent of the electricity consumer's total cost for electricity, while the cost for network transmission accounted for 18 per cent, see Figure 16. The high electricity prices during the second half of 2021 were one reason for the increase in the proportion of the electricity trade price from 2020, when the electricity price was historically low.

Figure 16. Distribution of the cost of electricity for an electricity consumer using 20,000 kWh per year.



Source: Ei, Statistics Sweden

Total electricity cost for a consumer

The total electricity cost for 2021 for an apartment customer with an annual consumption of 2,000 kWh per year and with a variable price contract totalled approximately SEK 5,300, see Table 5. For a house customer using 20,000 kWh per year and with a variable price contract, the cost of electricity in 2021 amounted to approximately SEK 38,100: see Table 6.The prices are average prices and consumption is weighted according to consumption patterns for different months.

Table 5. Total annual cost 2021, variable price, apartment customer in bidding area SE3 2,000 kWh

	SEK
Electricity trading	1 914
VAT	478
Electricity trading, incl. VAT	**2 392**
Electricity network	1 624
Tax	712
VAT	584
Total	**5 312**

Source: Ei, Statistics Sweden

Table 6 Total annual cost 2021, variable price, house customer in bidding area SE3 20,000 kWh

	SEK
Electricity trading	16 435
VAT	4 109
Electricity trading, incl. VAT	**20 544**
Electricity network	6 964
Tax	7 120
VAT	3 521
Total	**38 149**

Source: Ei, Statistics Sweden

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 2021 averaged between SEK 4,400 and SEK 5,800, depending on the month of the year in which the customer took out the contract: see Table 7. For a house customer using 20,000 kWh per year, the total annual cost amounted to between SEK 29,000 and SEK 43,000 in 2021 instead: see Table 8.

Table 7. Total annual cost 2021, fixed price 1 year, apartment customer in bidding area SE3

Total electricity cost at fixed price 1 year, apartment customer 2,000 kWh	**SEK**
Electricity trading	1,156–2,267
VAT	289–567
Electricity trading, incl. VAT	**1,445–2,833**
Electricity network	1 624
Tax	712
VAT	584
Total	**4,365–5,756**

Source: Ei, Statistics Sweden

Table 8. Total annual cost 2021, fixed price 1 year, house customer in bidding area SE3

Total electricity cost at fixed price 1 year, house customer 20,000 kWh	**SEK**
Electricity trading	9,147–20,346
VAT	2,287–5,086
Electricity trading, incl. VAT	**11,434–25,432**
Electricity network	6 964
Tax	7 120
VAT	3 521
Total	**29,039–43,037**

Source: Ei, Statistics Sweden

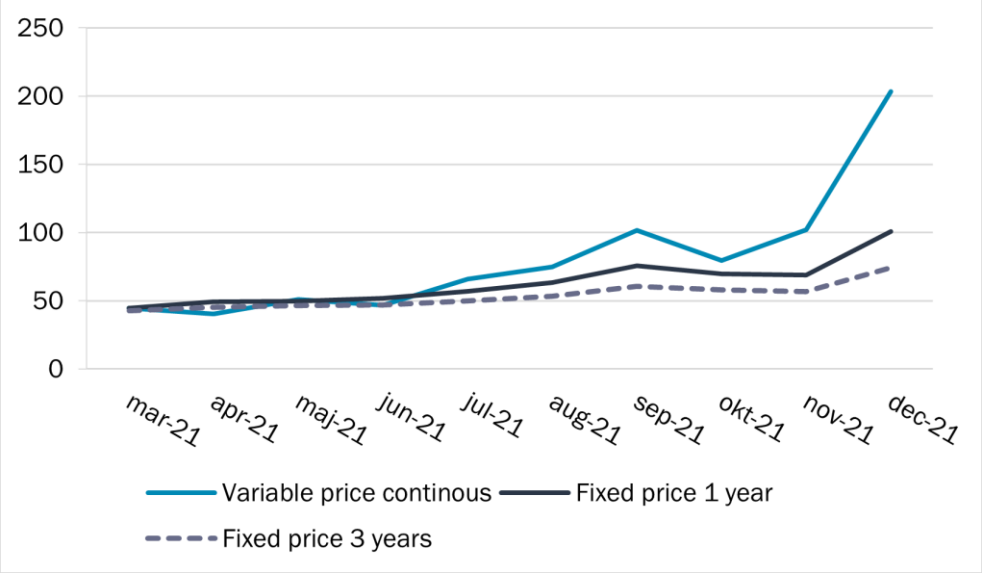
Price difference between electricity suppliers

Ei has concluded that an apartment customer in bidding area SE3 can save SEK 418 per year by switching from an average-priced variable contract to one of the market's ten lowest-price variable contracts.[69]

Prices for companies

Since March 2021, electricity suppliers have also been reporting electricity contracts to Ei that are offered to corporate customers with an annual consumption of up to 100,000 kWh. An increase in prices during the second half of 2021 can also be seen on the corporate side, see Figure 17. The increase is greatest for variable price contracts.

Figure 17 Average prices during 2021 for contract types variable price ongoing and fixed price of 1 and 3 years for a corporate customer with a consumption of 99,999 kWh per year in bidding area SE3.[70]



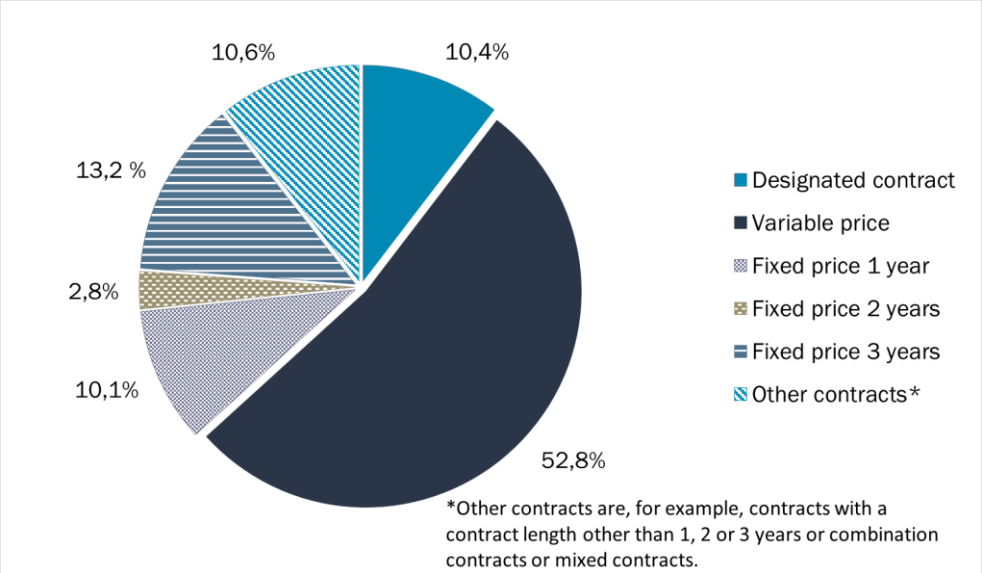
Source: Ei

Variable price still most common

A trend that has continued for a number of years is that more customers[71] are choosing variable contract types. However, during 2021 the trend seems to have slowed down, probably due in part to the high electricity prices in effect at the end of the year. By December 2021, 52.8 per cent of Swedish customers had taken out variable price contracts, which represents a decrease of 0.2 percentage points compared with December 2020. Over one quarter of customers had a fixed price contract with a tie-in period of one, two or three years, see Figure 18.

[69] Price calculations from Elpriskollen with price information from 2021.
[70] The prices are exclusive of VAT.
[71] Both household customers and corporate customers are included here.

Figure 18. Distribution of customers[72] by contract type, December 2021, per cent



Source: Statistics Sweden

Customers with designated contracts

Customers in the Swedish electricity market have the option of choosing an electricity supplier they prefer. This means that stakeholders are operating in a free market in competition against other companies, with free pricing. If the customer does not make an active choice then the electricity network operator is obliged to designate an electricity supplier for the customer. The price for designated contracts is often higher than the prices for other types of contract.

There may be various explanations as to why customers remain with designated contracts despite the often high prices. The customers may be unaware that they have a contract type that is more expensive than other contract types, and that they can easily switch to another, cheaper contract. During various regulatory initiatives, Ei has noted that information to the designated contract customers is lacking. Customers may also consider the cost of electricity to be such a small element of their overall household finances that they are not bothered about switching. Some of the designated electricity suppliers allocate customers to their normal variable contracts. In these cases, the electricity supplier's customers do not pay more just because they did not choose an electricity contract themselves.

The proportion of customers with designated contracts has increased by 0.2 percentage points, from 10.2 to 10.4 per cent, since December 2020.

[72] Both household customers and corporate customers are included here.

1.3.2 International work

Work to strengthen customers in the Nordic region

Ei has played an active part throughout the year, among other things, chairing meetings of the NordREG retail market group[73]. The work of the retail market group aims to strengthen the position of customers in the Nordic retail markets for electricity.

In 2021, the group initiated a survey of the unfair commercial practices in the electricity markets in Denmark, Finland, Norway and Sweden. Unfair commercial practices represent a problem in all markets in the Nordic region, and NordREG wishes to share experiences, including measures to counteract unfair commercial practices. A report will be published during 2022.

In November, the group hosted the NordREG Retail Market Monitoring Workshop for the fourth time with the objective to exchange knowledge and experiences within the regulatory area, and to identify areas for cooperation, for exchange of information, as well as those in need of further development with respect to the regulatory framework.

Ei's involvement in the work towards well-functioning retail markets in Europe

Ei is a member of CEER (Council of European Energy Regulators), and participates in the Customer and Retail Markets Working Group (CRM WG) for issues concerning retail markets. During the year, CEER has agreed on common positions for how it wants the European electricity and gas markets to develop in the coming years and has published several reports.

Ei has actively participated in the work on the annual report on customer protection published by CEER in conjunction with ACER, EU's Agency for the Cooperation of Energy Regulators. The report, which was published at the end of 2021, is entitled *Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2020 - Energy Retail Markets and Consumer Protection Volume*.

Ei has also led the Retail Market Roadmap Work Stream (RMR WS) working group that has developed a roadmap towards well-functioning retail markets for electricity and gas in all member countries by 2025. The work is based on a handbook published by CEER in 2017, which describes how each regulatory authority can use 25 measurable criteria to determine for itself how well its own retail market is working. In 2021, RMR WS drew up a report providing examples of the work by individual countries based on the handbook in order to improve the

[73] Retail Market Working Group.

ways in which their markets work. The name of the report is *CEER Roadmap to 2025 Well-Functioning Retail Energy Markets 2020 Self-Assessment Status Report*.

1.4 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 in-feed and takeoff in the electricity system, has never needed to be applied.

1.4.1 Monitoring of electricity production capacity

Contribution of renewable production

In Sweden, investments in new electricity production capacity are taking place on essentially 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 (1998:808) and the Planning and Building Act (2010:900).

Renewable power such as hydropower, wind power and solar power currently makes up more than 75 per cent of the total installed output power. These types of power also made the greatest contribution to the installed output power during 2021. Table 9 shows the installed power output, by production type, excluding cogeneration.

Table 9 Installed output power at Sweden's power stations 2014–2021, MW.

Types of power	2014	2015	2016	2017	2018	2019	2020	2021
Nuclear power	9 528	9 714	9 076	8 586	8 614	7 725	6 871	6 882
Hydropower	16 155	16 184	16 181	16 301	16 315	16 328	16 334	16 286
Wind power	5 420	6 029	6 495	6 691	7 406	8 980	10 017	12 074
Solar power	79	126	185	254	435	690	1 090	1 593

Source: Swedenergy

1.4.2 Measures for handling demand peaks or supply deficits

Svenska kraftnät is responsible for ensuring that a strategic reserve (the so-called power reserve) is available throughout the winter, between 15 November and 15 March.[74] Svenska kraftnät procures the reserve by entering into agreements with electricity producers and electricity consumers, so that they set production capacity or consumption reduction according to Svenska kraftnät's requirements. Both procurement procedures require the resource/plant should be available in bidding

[74] According to the Act (2003:436) on power reserve.

areas SE3 or SE4. The power reserve price is set to the ceiling price of 3,000 euro/MWh when the power reserve production element is activated.

By law, the power reserve is applicable until 15 March 2025. The law has been extended, most lately in 2016[75]. Currently, 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, among other things, the guidelines devised jointly by the Nordic transmission system operators and transmission network company.[76]

Resource adequacy and reliability standard for Sweden

Among other things, the electricity market regulation contains rules for how resource adequacy in the electricity market – i.e. the measure of the extent to which production resources and other supply of energy are in a position to meet the expected demand – should be calculated and assessed within the EU. These rules state that Member States with resource adequacy problems should, in the first instance, achieve resource adequacy through well-functioning markets. The Member States must therefore firstly develop their electricity markets in order to remove national obstacles that counteract the development of well-functioning markets, and review whether the interconnections with neighbouring countries can be increased. It is permitted for a country to implement support measures in the form of capacity mechanisms[77] in order to achieve resource adequacy only in certain circumstances and for a limited period of time.

In accordance with the electricity market regulation, the countries that use or intend to use capacity mechanisms must have a reliability standard. A reliability standard must specify the necessary level of security of supply for the Member State in a transparent way. The reliability standard must be expressed through the key performance indicators of expected energy not served (EENS) and loss of load expectation (LOLE). In accordance with the electricity market regulation, the European Union's Agency for the Cooperation of Energy Regulators (ACER) must decide on a method for calculating the reliability standard. Such a decision was taken by ACER during 2020. ACER's method means that the reliability standard is equivalent to a calculated LOLE value, while EENS is calculated indirectly. In turn, LOLE is calculated according to two key performance indicators, value of lost load (VoLL) and cost of new entry (CONE). The resources referred to are production, storage, and demand side flexibility or equivalent. The data and assumptions that

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[75] SFS (2016:422).

[76] Nordel: "Guidelines for implementation of transitional peak load arrangements" (2009)

77 Capacity mechanism: a measure that involves compensation for resources in the electricity system so that they are kept available in order to, when necessary, facilitate the production of electricity or reduce electricity consumption, and thereby ensure a required level of resource adequacy

will form the basis for the calculation of VoLL and CONE are also specified in ACER's method.

In January 2021, Ei decided that, for Sweden, VoLL should amount to 7 869 EUR/MWh at 2020's price level. In addition, Ei calculated fixed and variable CONE for eleven different reference technologies. The eleven reference technologies include one storage technology and four demand side flexibility technologies, and the remaining six are production technologies.

Following the calculation of CONE for all reference technologies, the technologies are given different LOLE values, and the reference technology that sets the value for the reliability standard in Sweden when applying ACER's method is the reference technology of demand side flexibility from heating housing, i.e. the technology designated as demand side flexibility, household heating, in the report. This means that the use of this reference technology is the cheapest method of managing the largest potential power shortages (loss of load) in Sweden during the next five years. In Ei's analysis, the largest potential power shortage in Sweden is expected to be 1,750 MW, based on data from Svenska kraftnät. The power shortage of 1,750 MW is calculated by Svenska kraftnät according to a method resembling the ERAA method, which is the resource adequacy analysis method that ACER decided on and shall be used to evaluate the resource adequacy of a Member State. Svenska kraftnät's value of 1,750 MW may be assumed to be the value that best estimates the largest potential power shortage in Sweden in the current situation.

Based on the method decided on by ACER, Ei's decision that VoLL should amount to 7,869 EUR/MWh, that the reference technology that specifies the LOLE value is the reference technology designated as demand side flexibility, household heating, and that the largest potential power shortage in Sweden is assumed to be 1,750 MW, Ei proposed that the reliability standard for Sweden should amount to 0.99 hours per year. A reliability standard of 0.99 hours per year is equivalent to a reliability target where production and import of electricity should be able to meet the entire expected consumption need 99.989 per cent of the time.

In addition, Ei proposed that the reliability standard of 0.99 hours should apply for the period 2021-2026, i.e. a five-year period. Ei has chosen a five-year period since a calculation for a longer period of time increases the uncertainties in the calculation. In addition to the fact that ACER's method to calculate the reliability standard is new, the electricity market is currently under great pressure to change, and a longer time horizon is therefore assessed as being not able to produce reliable

results. A five-year period coincides with the frequency with which the regulatory authorities must review and calculate the key performance indicator of VoLL.[78]

[78] Ei's proposal for reliability standard for Sweden, Ei R2021:05.

The natural gas market

2 The natural gas market

Natural gas was only introduced in Sweden in 1985 and currently accounts for three per cent of Sweden's total energy consumption. Gas is primarily used as process fuel and raw material in industry, for cogeneration and district heating production, and as vehicle fuel, as well as in households that use gas for heating and cooking.

In Sweden, the gas is distributed through a large natural gas network along the west coast, a smaller gas network in Stockholm, a number of small gas networks, as well as via refuelling stations and LNG[79] terminals. Only the west coast gas network and the gas network in Stockholm are subject to the Natural Gas Act (2005:403) and therefore also Ei's supervision.

Sweden does not have its own natural gas production but is dependent on imports via a pipeline from Denmark and on LNG that is transported by ship. However, Sweden has a certain amount of its own biogas production that can be upgraded for mixing with natural gas in the network.

Ei is a regulatory authority according to the Natural Gas Act[80], and it is therefore tasked with ensuring compliance with the same. According to EIA's instruction, the authority is tasked with monitoring and analysing development in the natural gas market and submitting proposals for amendments to regulatory frameworks, or other measures, in order to promote the function of the market. The instruction also states that Ei should act to promote effective competition in the natural gas market.

According to the Natural Gas Act[81], Ei may issue injunctions as necessary in order to ensure compliance with the regulations and conditions subject to supervision. Penalties may be applied in respect of such injunctions. The Act[82] also stipulates that the regulatory authority has the right to request and receive the information and view the documents it needs in order to carry out supervision.

Ei's instruction also states that the authority, within its area of responsibility, must perform tasks pursuant to Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in

[79] Liquefied Natural Gas (LNG)
[80] Natural Gas Act (2005:403), Chap. 1 section 9.
[81] Natural Gas Act 2005:403, Chapter 10, section 3.
[82] Natural Gas Act 2005:403, Chapter 10, section 2.

natural gas and repealing Directive 2003/55/EC (Internal Market in Natural Gas Directive). According to the Internal Market in Natural Gas Directive and national provisions, the national regulatory authority must comply with and implement the legally binding and relevant decisions made by the ACER and the European Commission.

In addition to the Natural Gas Act there are five EU regulations in the field of gas that are both market-related and network-related.

Type	Abbreviation	Full name	Area of interest
Market regulation	TAR	COMMISSION REGULATION (EU) No 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas	Harmonisation of transmission tariff structures for gas
Market regulation	BAL	Commission Regulation (EU) No 312/2014 of 26 March 2014 establishing a Network Code on Gas Balancing of Transmission Networks.	Gas balancing of transmission networks
Market regulation	CAM	COMMISSION REGULATION (EU) No 984/2013 of 14 October 2013 establishing a Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems and supplementing Regulation (EC) No 715/2009 of the European Parliament and of the Council	Capacity Allocation Mechanisms in Gas Transmission Systems
Market regulation	CMP	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	Congestion management
Operational regulation	IO	COMMISSION REGULATION (EU) 2015/703 of 30 April 2015 establishing a network code on interoperability and data exchange rules	Interoperability and data exchange

It is primarily the EU regulations for tariffs (TAR) and balancing (BAL) that affect Sweden. CAM, CMP and IO largely deal with requirements for interconnection points (points between two transmission systems), of which there are none in Sweden. For this reason, many of the rules are not applicable to Sweden. Together with the other European regulatory authorities, and within the framework for the work carried out by ACER, Ei has participated in the dialogue for the design of these EU regulations. The regulatory authorities support ACER in discussions with the Commission and ENTSO-G[83].

[83] The European cooperation body for gas network operators.

2.1 The gas network

The natural gas network is divided into four different operations: 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 and consists of approximately 600 kilometres of transmission pipeline and approximately 3,000 kilometres of distribution pipeline. The network extends from Trelleborg in the south to Stenungssund in the north, and a short distance eastward in Småland, see Figure 19. 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.

Figure 19 Transmission pipelines in the western Swedish natural gas network

Source: Ei

There is also an urban gas network and a vehicle gas network in the Stockholm region that are both owned by Gasnätet Stockholm AB, which is responsible for development, operation and maintenance of the networks. The urban gas network consists of approximately 500 kilometres of pipeline and covers large parts of the city of Stockholm, along with Solna and Sundbyberg. The production and in-feed 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 primarily used for transporting vehicle gas-type biogas from production plants to fuelling stations. One thing the gas network in Stockholm and the small local gas networks all over Sweden have in common is the fact that they are not 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 and the European regulatory framework. 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.

2.1.1 The role of the gas network companies

Certification of system operators

According to the Internal Market in Gas Directive[84] and national rules, the transmission system operators[85] must be certified. In July 2012, Ei certified Swedegas AB as transmission system operator. This certification will remain valid until further notice, but the decision may be reviewed by Ei if the transmission system operator fails to meet the requirements for certification.

Swedegas, together with its sister company Weum, has, since January 2020, been part of Nordion Energi, which is owned by European Diversified Infrastructure (EDIF II). EDIF II is in turn managed by First State Investment.

Functional unbundling of natural gas companies

What is known as functional unbundling between companies is required with a view to preventing cross-subsidisation between companies running different types of natural gas operation. This means that companies that perform natural gas transmission, gasification or storage operations must not trade in it. 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.

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[84] 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.

[85] The term "transmission system operator" is synonymous with "transmission network company".

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 [86]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.

2.1.2 Technical function of the gas network

The western Swedish natural gas network comprises a number of different network types. The largest pipelines that transport the gas under high pressure are the transmission pipelines. Pressure reduction is then carried out in metering and regulating stations before the local distribution network transports the gas to consumers. In Sweden, the transmission network is owned and operated by Swedegas, which is also responsible for system balance. A small number of very large consumers are connected directly to the transmission network.

Biogas in the natural gas network

The natural gas and biogas markets in Sweden are integrated to a certain extent since the natural gas network can also be used to distribute biogas. Currently, approximately 30 per cent[87] of the gas in western Swedish gas network is biogas. Biogas that is upgraded to natural gas quality can be introduced to the natural gas network in most cases, with no technical impact on natural gas users. 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. The largest proportion of biogas in the network is imported via Denmark.

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 in the electricity market, as Swedegas both owns the supply network and is responsible for short-term balancing of the in-feed and out-feed of gas.

To guarantee balancing, Swedegas concludes balance contracts with gas market stakeholders known as balance administrators. These balance administrators take on financial responsibility for ensuring that end-user consumption is matched by

[86] Natural Gas Act 2005:403, Chapter 3, section 9.
[87] Source: Swedegas.

the supply. The western Swedish natural gas network offers major opportunities 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 winter's day without jeopardising the technical function of the network.

The system balance administrator must not conclude balance administration contracts with individual balance administrators until the contract terms have been approved by Ei. In accordance with the Natural Gas Act, Ei must review the contract terms so that they meet the requirements to be objective and non-discriminatory. The latest balance administration contract was approved by Ei at the end of 2021 due to changes in the contract terms linked to the future connection to Baltic Pipe, which, according to the estimated schedule, should be put into service on 1 October 2022 (read more about Baltic Pipe in section Cross-border issues 2.1.4). The balancing markets for Sweden and Denmark have been integrated since 1 April 2019. The purpose of the common balancing zone is to increase the efficiency of cross-border trade between the Swedish and Danish markets, as well as to harmonise balancing procedures.

Quality control of the natural gas network

Ei draws up regulations and general advice (so-called measurement regulations) containing provisions for management post-holders that relate to the metering and reporting of gas supplies. The gas utilities are responsible for ensuring that operation and maintenance of their plants shall be safe, reliable and efficient so that they meet reasonable requirements in terms of the transmission, storage and gasification of gas in the long term.

The network owner collects measurements from boundary points, out-take points and in-feed points. These measurements are then reported on to the gas supplier, balance provider, and system balance provider. The measurements form a basis for settlement of in-feed and out-take energy quantities.

Gas charges are based on energy supplied. To calculate the energy quantity, the volume of the gas in cubic metres (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 a 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 or not 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. So in other words, the energy content of the gas per volume unit is higher for a plant that has equipment that can make use of the energy in the flue gases.

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. However, this obligation does not apply if the pipeline does not have sufficient capacity. When a request for connection is submitted, the owner of the natural gas pipeline must submit written information on the charge and other terms and conditions for the connection within a reasonable time.

Connection to a storage facility and 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 is obliged to accept, on reasonable terms, natural gas on behalf of another party for storage or gasification. This obligation does not apply if the facility does not have sufficient capacity. When a request for in-feed is submitted, the owner of the storage facility or gasification facility must submit written information on the charge and other terms for the in-feed within a reasonable time.

Examination of terms for connection to a natural gas facility

The methods for formulating of contracts for 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.

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.[88] Owners must compile a crisis action plan and ensure that this plan is distributed within their own organisations, as well as compliance with the plan. Owners must also notify the authorities and other relevant stakeholders about their plans.

2.1.3 Network charges for connection and transmission

Gas network charges

Gas network companies' revenues are regulated in a similar way as with the rules in the electricity market. This means that revenues are regulated in advance in a revenue framework extending over a four-year period. The revenue cap defines an upper limit for the total revenues that companies are allowed to receive from their network activities. The purpose of the regulation of the revenue cap is that the activities of the gas network companies should be conducted efficiently at low costs, and that the gas network companies receive a reasonable return, and that customers pay a fair price for the network service. Ei inspects the gas utilities and

[88] Regulations are outlined in the Swedish Energy Agency's regulations and general guidelines (STEMFS 2016:1) on the security of natural gas supply.

approves the revenue framework for the utilities. 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.

The revenue cap consists of capital costs, running costs that can be influenced, and running costs that cannot be influenced. The revenue cap must be calculated so that it covers reasonable costs, and since gas network companies have a monopoly, there are no market mechanisms to encourage streamlining. The regulation of revenues therefore needs to contain a streamlining requirement in order that increases in costs cannot be passed on to customers. Ei's assessment is that a general streamlining requirement should be used and has calculated the costs that can be influenced for the period 2019–2022 with an annual streamlining requirement of 1 per cent.

Ei sets a revenue cap for each gas network company's natural gas activities prior to each regulatory period. Since it is not possible to know all of the information prior to the start of the regulatory period, such as what investments the gas network companies will make during the regulatory period, Ei bases its decisions prior to the regulatory period on forecasts by the companies. The forecasts are reconciled against the actual outcome following the end of the regulatory period in a reconciliation decision. Ei then decides the actual revenue cap for the gas network company for the regulatory period. This decided revenue cap is then compared in a separate decision with the revenues accruing from what the gas network companies charged to their customers during the regulatory period in question, in a so-called deviation decision. Any undercharging or overcharging increases or decreases the gas network company's revenue cap for the following regulatory period. This means that Ei notifies at least three decisions for each period: decision prior to the regulatory period; decision after the regulatory period; and a deviation decision. Reassessment of a revenue cap may also take place during the regulatory period, under certain conditions.

When devising charges for the transmission of natural gas (network tariffs), 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. Ei's supervision in accordance with the Natural Gas Act is also applicable to tariffs for access to gasification facilities.

Ei's supervision of the methods that form a basis for the devising of tariffs aims to ensure that they are objective and non-discriminatory in accordance with the requirements of the Natural Gas Act. An appeal against Ei's decision must be submitted within three weeks by the party to which the decision relates. The case is examined by a general administrative court.

Prior to the regulatory period of 2019–2022, the companies applied for revenue frameworks totalling SEK 6.41 billion at the 2017 price level. During 2019, Ei decided on revenue caps of approximately SEK 6 billion. Six out of nine companies appealed against the decision to the Administrative Court in Linköping. In its judgement of 17 May 2019 (case no. 7369-18), the court upheld the appeal that the regulatory depreciation period should be 90 years for distribution pipelines and 40 years for metering and regulating stations for both transmission and distribution when calculating the revenue framework for the regulatory period of 2019–2022. The decisions were referred back to Ei, and in February 2020, based on the stipulations set out in the Administrative Court's judgement, Ei established the revenue caps for the companies at approximately SEK 6.05 billion.[89]

According to the Swedish Natural Gas Act,[90] gas utilities are obliged to prepare separate financial accounts for their transmission, distribution, storage and gasification activities in the form of an annual report. These annual reports 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 sheet for each accounting entity. This report forms a basis for further supervision.

Review of the regulation of revenues for gas network companies

On 17 December 2020, the Government tasked Ei with the review of the regulation of the revenues of gas network companies. The assignment stated that the rules should be harmonised to a greater extent with a regulation of revenues equivalent to that for electricity network activities. The assignment also included taking into account that the return on the capital used in the activities should be determined using methods that are widely accepted and transparent for the stakeholders, and that take the necessary account of the conditions in the capital market, while also taking into account the interests of the gas network customers. The assignment should be reported to the Government on 13 April 2021. Due to the present legal situation (read more about the legal situation that also affects the regulation of the gas network in section 1.1.3), Ei considers that it is not appropriate to propose new rules laid down by law or regulation for the regulation of the revenue cap for natural gas.

2.1.4 Cross-border issues

Ei operates in partnership with other European regulatory authorities within ACER and CEER. Discussions are also held on a continuous basis with the Danish

[89] A more detailed account of the court proceedings with regard to the revenue caps for the gas network companies can be read in the previous annual report: Ei R2021:08, Sweden's electricity and natural gas market, 2020.
[90] Natural Gas Act 2005:403, Chapter 3, section 3.

regulatory authority on how the collective market can be developed, and in what way security of supply can be improved in the Danish-Swedish area.

The aim of the cross-border cooperation is to coordinate a rapid transposition of European legislation and to identify areas that need to be developed. Through the cooperation body ACER, Ei has participated in the work to implement the European regulatory frameworks for the internal market for natural gas, among other things.

Capacity Allocation Mechanisms in Gas Transmission Systems

The Commission's regulation for capacity allocation mechanisms in gas transmission systems, also known as CAM, entered into force in 2017. The aim of CAM is to contribute to the flexible use of existing transmission systems to allow gas to be transported from areas where the price is lower to areas where the price is higher.

Both CAM and CMP (access to natural gas transmission networks) relate to rules in interconnection points. Since there are no such points in Sweden, Ei does not exercise supervision in accordance with the regulations, nor does it implement any measures as a result of the regulations. The rules in CAM and CMP have an impact on the Swedish stakeholders that trade in gas within the EU and transport gas from other countries within the EU to Denmark, and out from Denmark to Sweden.

Ei therefore monitors their application by participating in ACER's working groups.

Interoperability and data exchange

The Commission's regulation containing rules for interoperability and data exchange (IO) entered into force in 2015. The aim of the IO regulation is to promote and facilitate trading in gas and the transmission of gas within the EU through harmonised rules for the operational management of the gas network and the data exchange between the transmission network companies. The IO rules shall be implemented by Swedegas.

Ei exercises supervision of compliance with the provisions in the IO regulation. Ei monitors the application of IO by participating in ACER's working groups.

Baltic Pipe

Baltic Pipe is a pipeline that creates a new connection for gas supplies from Norway to Denmark and Poland, as well as to end users in Central and Eastern Europe. Among other things, Baltic Pipe contributes to security of supply of gas and reduces dependence on Russian gas.

The integration of the Swedish-Danish gas market with Baltic Pipe is expected by 1 October 2022. Baltic Pipe results in an increased amount of gas in the system, which has an influence on both volume and flexibility. Against this background, the existing balance model has had to be reviewed. The most significant change in the balance model means balance reconciliations every hour of the 24-hour day for gas. The revisions in the balance model involve amendments in the balance responsibility agreement that concern the relationship between Swedegas and the Swedish gas stakeholders. Ei approved these proposed amendments on 1 December 2021 and the amendments entered into force on 1 October 2022.

2.2 Wholesale market for natural gas

Natural gas covers some 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. The Swedish natural gas market is closely interlinked with 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 (from Dragør). The natural gas consumed in Sweden has therefore historically mainly come from the Danish gas fields in the North Sea. The Danish gas platform has been undergoing renovation since 2019 and is expected to be completed in 2023. As a result of this, during 2021, the natural gas flowed via the European gas network and consisted of piped imports from Russia, Norway, Algeria and the United Kingdom, among others. There are also gas imports in the form of liquefied natural gas (LNG) via ship from the USA, Russia and Qatar, among others. The system is also supplied with the production of biogas and natural gas from the Netherlands, Germany and Denmark, among others.

The Swedish natural gas market is closely linked with the Danish market due to the design of the Swedish network. The balance administrators in the Swedish natural gas system are also active on the Danish gas market. Since 2020, natural gas has mainly been traded on the European Energy Exchange (EEX), into which the trading platform PEGAS[91] was integrated. Competition, price development, and transparency in the Swedish natural gas market are largely dependent on developments in Denmark.

[91] Pan-European Gas Cooperation (PEGAS)

There is technical capacity to transport approximately 32 TWh of natural gas annually from Denmark to Sweden via the pipeline from Dragør. Table 10 below shows energy consumption and the total import capacity of natural gas in Sweden during 2008–2020.

Table 10 Transmission of natural gas in the western Swedish natural gas network 2016–2021[92]

Year	Total energy consumption (TWh)	Import capacity, total (TWh)
2016	10,6	22
2017	8,7	22
2018	9,2	22
2019	9,0	32
2020	8,1	32
2021	8,7	32

Source: Energinet and Swedegas

Natural gas in Sweden is mainly used by industry and at CHP plants, while only a few per cent is used by households. There is therefore a strong link between the weather – particularly in winter – and natural gas consumption in Sweden. Natural gas consumption during 2021 increased by 0.6 TWh compared with 2020.

Trading in natural gas

A stakeholder can use EEX to purchase gas on the same day as delivery, the day ahead, before the weekend, and before the next month, as well as in futures contracts with delivery up to 6 years in the future. All trade takes place with physical supply and stakeholders must have contracts with the Danish transmission network operator, Energinet.

The balancing of gas takes place in the common balancing zone in Sweden and Denmark and is managed by the so-called Balancing Area Manager (BAM), which uses the Danish virtual trading point ETF in order to manage the balancing of the gas market. BAM is administered jointly by Energinet and Swedegas.

Stakeholders need to book capacity in Dragør if they want to transport natural gas to Sweden. The transmission capacity is auctioned off at Energinet's regular capacity auctions. In order to be able to transport gas from Denmark to Sweden, balance providers must also be registered as shippers with Energinet. As things stand at present in terms of consumption, there is no risk of transmission bottleneck problems due to low consumption in relation to the transmission

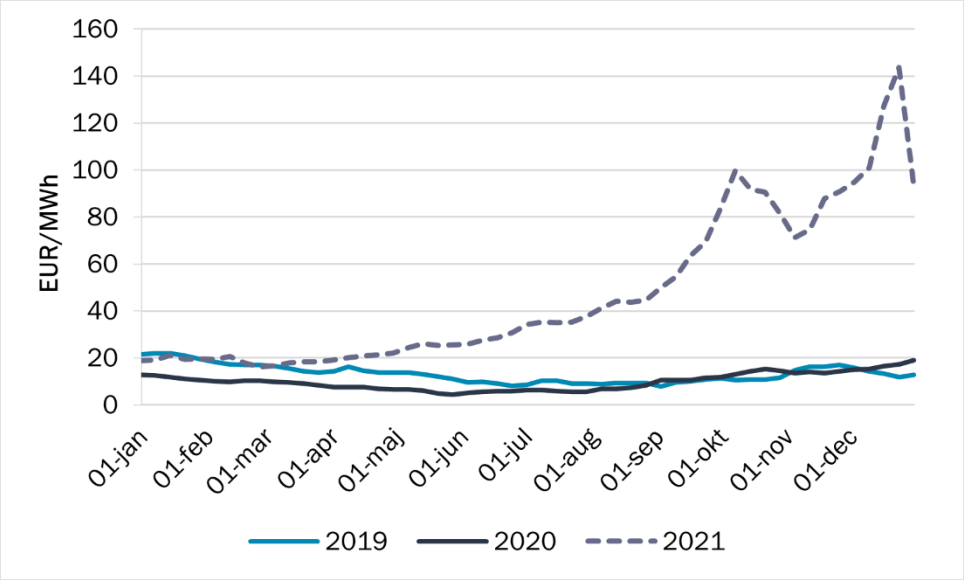
[92] As a result of Sweden changing over to a common balancing zone together with Denmark, there was an increase in pressure in 2019. There is no longer any pressure regulation between the countries, after which, Sweden now has the full pressure that exists in Denmark. This explains the higher import capacity on the Swedish side, while energy consumption is basically unchanged.

capacity of the system. When it has arrived in Sweden, the gas can be sold on to consumers, such as industries and gas distributors.

Price development in the gas market in 2021

Gas prices were historically high in the second half of 2021. In September, the price of gas reached the highest levels since the financial crisis of 2008, and the trend continued during the autumn and winter. Gas prices reached their highest peak on 21 December at 180 euro/MWh.

Figure 20. Spot price on the Danish-Swedish gas market, average per week for 2019–2021. EUR/MWh



Source: SKM Syspower

The increase in the gas price is due to a significant increase in global demand for natural gas that has not been followed by an equivalent increase in supply. The increase in global demand for natural gas has been driven by the economic recovery after the easing of restrictions linked to the COVID-19 pandemic, but also by certain weather conditions. Demand for LNG has increased, especially in Southeast Asia and South America, where LNG is traded at higher prices than in Europe, which has pushed up prices. In Asia, the increased demand for is driven by increased storage ahead of winter and by the ongoing changeover in fuel[93] from coal to gas. In South America, among other things, low water levels in reservoirs have resulted in an increased demand for gas for electricity production. In Europe, the gas storages have had a low fill level after the cold winter of 2020/2021, and limited supplies of gas from Russia have meant that the storages have not been filled to normal levels either. At the end of September, the fill level of the European

[93] Gas is considered less harmful to the climate and the environment than coal, which means that in several countries there is an ongoing transition from coal-fired energy to more gas-fired energy as an environmental and climate measure.

gas stocks was 73 per cent, which is low in relation to the previous year when the fill level was normally above 90 per cent.

The restriction in supply within Europe is due, among other things, to Russia not having increased its deliveries in pace with the increased demand. The domestic production of gas has fallen in Europe, which is due to ageing gas fields, various policy instruments to reduce the use of fossil energy, and the postponement of maintenance and audits because of the pandemic, among other things[94].

Measures for covering demand peaks or supply deficits

Consumption peaks and shortages of supply from the balance providers are handled by the balancing scope available in the transmission network 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.

Monitoring the balance between supply and demand

Although security of supply has been good historically, 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 vulnerable to external interruptions in the short term, particularly with regard to production stoppages in the Danish natural gas fields.

The Swedish Energy Agency is a regulatory authority according to the Act on a secure natural gas supply (2012:273). In accordance with the requirements of the natural gas supply regulation[95], a national preventive action plan and a national crisis plan for safeguarding the supply of natural gas[96] was published in 2019.

Expected future demand and supplies, plus input capacity

The current level of demand for gas looks set to continue in the future. In view of the war in Ukraine, the European Commission launched a new energy plan in 2022, REPower EU. REPower EU consists of three parts that affect the gas market:

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[94] ACER, High Energy Prices October 2021.
[95] Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC
[96] National crisis plan for Sweden's natural gas supply – in accordance with Regulation (EU) 2017/1938 of the European Parliament and of the Council.

1. Save energy, for which, among other things, the Commission proposes to increase the energy efficiency target in the Energy Efficiency Directive.
2. Reduce dependence on Russian natural gas, which currently accounts for 40 per cent of EU gas imports, through more LNG terminals, among other things, in order to import more liquefied natural gas.
3. Increase the level of development in terms of renewable energy production, in order to promote climate-friendly solutions as well as hydrogen technology.

Gas prices are predicted to continue to be volatile, which creates challenges with regard to holding stocks. High prices and uncertainty in the market create a reluctance of the stakeholders to hold gas stocks, which in turn leads to a problem for security of supply. For this reason, the European Commission has submitted a proposal for amendments to the Gas Supply Regulation where requirements are set for gas stock levels starting in the winter of 2022/2023 in order to ensure the security of supply in the EU.

The Danish gas field Tyra has been shut down for maintenance and is expected to be in operation again by the summer of 2023, which will improve the conditions for the supply of natural gas.

In December 2021, the European Commission launched a gas market package, which consists of directives and regulations. The new gas market package reflects the heightened ambition of the European Union's green deal and is part of the work to achieve the goal of climate neutrality in 2050. The intention of the proposed amendments is to contribute to the harmonisation of the gas regulations with the existing regulations for the EU's electricity market. The amendments are also consistent with the development that has taken place in the second and third energy market packages. With the proposed rules, the Commission's intention is to also enhance the opportunities for customers to make renewable and sustainable choices. Among other things, this is facilitated by customers being provided with basic information about their energy consumption and its origin, which improves their ability to make active choices. Many of the new rules consist of proposals for new regulation with regard to hydrogen plants and an emerging hydrogen market.

2.3 Retail market for natural gas

The Swedish retail market for gas is open to competition and the prices are set by the stakeholders in the market. The western Swedish natural gas network has approximately 34,000 household customers[97] as well as larger customers, such as major industries and CHP plants. The Stockholm urban gas network and vehicle

[97] Source: Swedegas.

gas network have approximately 58,000 customers, of which most are household customers.

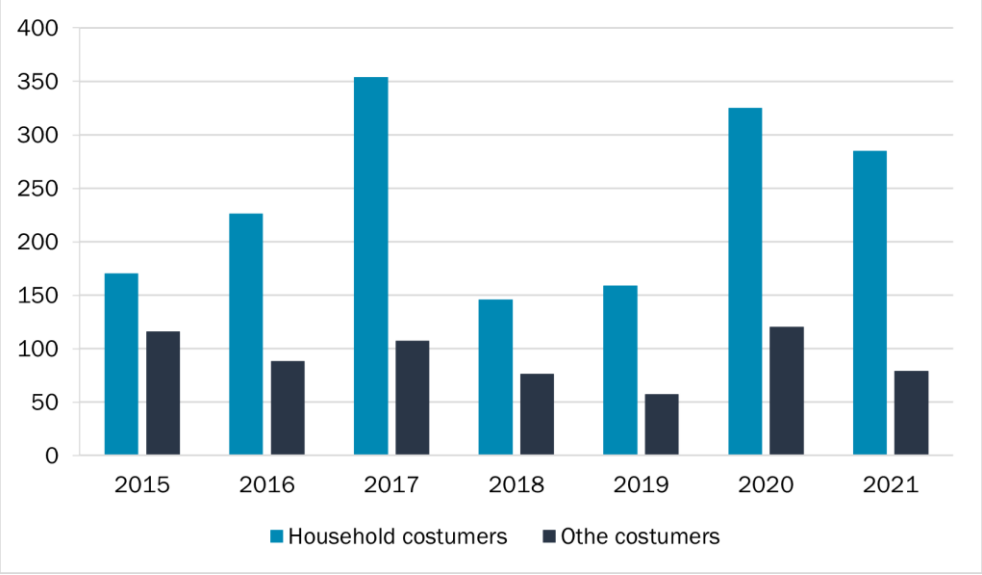
There were a total of seven stakeholders[98] in the Swedish retail market for natural gas at the end of 2021, six of which are in the western Swedish natural gas network, and one is in the City of Stockholm urban and vehicle gas network.

Ei has been tasked with the assignment to strengthen the position of natural gas customers by, among other things, facilitating active choices through easily-accessible information. Ei shall also promote consumer rights in collaboration with the Swedish Consumer Agency. The cooperation with the Swedish Consumer Agency shall address issues that affect customers, among other things.

2.3.1 Monitoring of price development, transparency and competition in the retail market for gas

The gas trading market is open to competition, and customers in the western Swedish network are free to switch supplier. However, this is not possible in Stockholm as it only has one active supplier. Statistics on supplier-switching for natural gas are shown in Figure 21. Ei receives questions and complaints from consumers about gas trading and gas networks, normally only a couple per area per year.

Figure 21. Number of changes of supplier for natural gas 2015 - 2021



Source Statistics Sweden

[98] ApportGas, Eon Försäljning Sweden AB, Göteborg Energi, Kraftringen Energi AB, Varberg Energi, Öresundskraft, Stockholm Gas. Source: Swedish Consumer Energy Markets Bureau.

The development of natural gas prices in the retail market

As can be seen in Table 11 and Table 12, prices for natural gas have generally increased between 2018 and the first half of 2020, to then appear to decrease slightly. The decrease may be due, for example, to the effects of the pandemic and hot weather. The second half of 2021 saw unusually high gas prices, which is also reflected in end-customer prices for gas. Read more about gas prices in section 2.2 Wholesale market for natural gas.

Table 11. Prices in SEK per kWh for natural gas for household customers 2018–2021[99], 5,500 - <55,000 MWh annual consumption

	Trade price	Network price	Total
2018 Jan–Jun	38,40	27,26	117,17
2018 Jul–Dec	45,43	26,90	125,51
2019 Jan–Jun	42,54	27,93	123,92
2019 Jul–Dec	41,22	22,17	115,07
2020 Jan–Jun	48,52	29,69	134,13
2020 Jul–Dec	44,65	31,19	131,16
2021 Jan–Jun	44,04	27,68	126,38
2021 Jul–Dec	72,89	33,94	170,26

Table 12. Prices in SEK per kWh for natural gas for household customers 2018 - 2021[100], <5,000 MWh annual consumption

	Trade price	Network price	Total
2018 Jan–Jun	42,92	49,36	150,45
2018 Jul–Dec	46,66	73,54	185,35
2019 Jan–Jun	49,90	80,73	199,12
2019 Jul–Dec	46,68	62,01	171,70
2020 Jan–Jun	51,52	67,11	184,64
2020 Jul–Dec	46,68	71,71	184,34
2021 Jan–Jun	44,42	77,53	189,16
2021 Jul–Dec	71,08	139,64	300,12

Source: Statistics Sweden

[99] The table shows the average total price paid for natural gas by household customers, per half year. The total price includes natural gas, networks, energy and carbon dioxide tax, and VAT. In comparisons with previous years, please note that Statistics Sweden has implemented major methodological changes meaning that the whole time series has been revised.

[100] The table shows the average total price paid for natural gas by household customers, per half year. The total price includes natural gas, networks, energy and carbon dioxide tax, and VAT. In comparisons with previous years, please note that Statistics Sweden has implemented major methodological changes meaning that the whole time series has been revised.

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 natural gas suppliers in Sweden. Read more about the Swedish Consumer Energy Markets Bureau in section 3.1.6 Swedish Consumer Energy Markets Bureau as a national point of contact. The website also includes information on how to switch between gas suppliers, as well as information about the various expenditure items in the gas price.

Consumer protection

3 Consumer protection

3.1 Customer information, complaints handling and consumer advice

3.1.1 Elpriskollen

Ei offers a price comparison website, elpriskollen.se, to strengthen the position of consumers in the electricity market, allowing consumers to compare the prices and terms of the most common contracts from all electricity suppliers.

The option of comparing prices and other factors that may influence the choice of electricity trading company is a prerequisite for active customers. This is why 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. In 2021, the number of unique visitors was more than 305,000.

Ei also carries out regular checks of the reported prices and associated terms and conditions in order to ensure that electricity suppliers are reporting correct information. In 2021, Ei checked electricity supplier prices and contract terms and conditions. Electricity suppliers have been encouraged to rectify any shortcomings detected, and they have done so in all cases. In 2021, Ei initiated a review of hourly rate contracts reported to Elpriskollen. Out of a total of 62 electricity suppliers that offered hourly rate contracts during the year, 30 were reviewed during the supervisory initiative. The results and analysis of the review are set for publication during 2022. All electricity suppliers who deal with consumers are obliged to report prices and terms and conditions for such contracts included in Ei's regulations on reporting[101] (which is the vast majority of electricity contracts, such as variable and fixed contracts, and so-called mixed contracts). Electricity suppliers that do not report a contract covered by the reporting obligation, and new electricity suppliers unaware of their obligations, are contacted by Ei, and Ei requests that they start reporting in accordance with the regulations and the handbook.

3.1.2 Consumer Contact and Kundo

Ei has the Consumer Contact function to provide a single point of contact for customer queries and complaints. All queries and complaints from consumers that are submitted in writing to Ei are referred to Consumer Contact. Ei also answers queries and complaints from economic operators. In addition to responding to

[101] EIFS 2013:8.

queries and receiving complaints relating to energy market stakeholders, Consumer Contact can also use this as a basis for drawing up decision data for rule development and supervision for the different departments within Ei.

Consumer Contact accepts queries and complaints by email, forms on Ei's website, telephone, and via the web-based query forum Kundo. Consumers can ask their questions to Kundo or look for answers to previously asked questions directly via the Web. The aim is for this method to maintain a high service level, with short response times and relevant answers for consumers.

Ei has an in-depth cooperation with the Swedish Consumer Energy Markets Bureau with regard to handling queries and complaints. Consumers with queries outside of Ei's areas of responsibility are referred to the bureau. This applies to contractual queries where Ei lacks the authority to act in the case. The Swedish Consumer Energy Markets Bureau also answers some of the questions asked to Kundo.

During 2021, Ei had 1,550 instances of contact with consumers. These instances of contact were divided between the areas of electricity networks, electricity supply, and elpriskollen.se, but also for district heating, gas networks, and gas supply. Consumer contacts are sorted into queries or complaints. A query is when the customer wants to know about something; and a complaint is when the customer expresses dissatisfaction. In 2021, there were a few more complaints than queries. Most queries and complaints are about electricity networks and electricity supply. The instances of consumer contact regarding electricity network charges may, for example, concern an increase in these charges, the level they are set at, the difference in charges between different network areas, or the various elements of the charges such as the variable element, the fixed element, or the charge for power output. Consumer contacts about electricity supply are usually about unfair commercial practices, which sometimes occur in outreach sales, electricity price levels, and contract terms, such as unfair contract terms or lack of information about the contract terms.

The contacts with customers mean that Ei can concentrate its supervision and its work on rule development to areas where they are most useful.

3.1.3 Reports to Ei

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

3.1.4 Work to counteract unfair commercial practices

Through its many consumer contacts, among other things, Ei has drawn attention to dubious commercial practices that certain companies in the electricity supply market use and in different ways complicate the situation for customers. For example, it may concern electricity suppliers that apply unreasonable contract terms or carry out a change of electricity supplier without the consumer's approval. In 2021, Ei therefore initiated a project to develop proposals for action in order to counteract unfair commercial practices in the electricity supply market. The work was carried out in cooperation with market stakeholders and other authorities. The project resulted in a report with proposals for action that was published at the start of 2022[102].

3.1.5 Help to vulnerable customers

The Swedish definition of vulnerable customers is outlined in Ei's instructions, which state "vulnerable customers are individuals who are permanently incapable of paying for the electricity or natural gas transmitted or supplied to them for purposes that fall outside business activity". In 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 manage their electricity and natural gas supply.

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 network or natural gas network due to failure to pay or any other significant breach of contract. These provisions mean that any company disconnecting such consumers must first follow a specific statutory procedure. Among other things, this includes the consumer's right to correct information from the company and giving the consumer the opportunity to remedy the situation without being - disconnected; and the company must send a message to social services in the municipality in which the consumer lives before disconnection can take place.

3.1.6 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 2021. This is an independent bureau providing information and guidance to consumers on issues relating to the electricity market and the natural gas market. Advice to consumers is free-of-charge. An agreement is 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 market and the natural gas market. By these means, the requirements for this are met in accordance with

[102] Unfair commercial practices in the electricity supply market – A report with proposals for action (EiR2022:02).

the EU's Internal Market in Electricity and Gas Directive. In 2021, the bureau's website had over one million unique visits, which was a considerable increase in comparison with 2020 when 655,000 unique visits were registered. Consumers can contact the Swedish Consumer Energy Markets Bureau via telephone and email, and approximately 3,900 cases were answered during the year, which was a small increase compare with 2020. Most complaints were about electricity supply and the majority in this area concerned unfair commercial practices. These may be a question of misleading marketing, fraudulent invoices, or threats of disconnection, for example. Small businesses accounted for approximately 12 per cent of contacts in 2021, which is a decrease of 10 percentage points from the year before.[103]

In the event of a large number of and recurring complaints, the Swedish Consumer Energy Markets Bureau sends reports to the companies concerned and, in some cases, has held dialogue meetings. When there are reasons for doing so, the bureau informs consumers of the possibility to report the case to the regulatory authority or to request adjudication of the dispute with the National Board for Consumer Complaints (ARN).[104]

The Swedish Consumer Energy Markets Bureau publishes quarterly complaint information about individual electricity suppliers.[105] The purpose is to show which electricity suppliers are subject to the most complaints, and to give advice to customers who have or want to sign a contract with one of the companies. The bureau also describes the type of problems that customers encounter with these electricity suppliers. The number of complaints must have exceeded a set minimum level in order for the electricity suppliers to be included in the complaint information. The bureau first checks whether there are any grounds for the complaints before publishing complaint information about an electricity supplier.

The Swedish Consumer Energy Markets Bureau has also continued to report summaries of consumer problems on the energy markets to authorities and companies throughout the year. These efforts have created opportunities for companies to take 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.

3.1.7 Other consumer advice

Among other authorities, the Swedish Consumer Agency in particular is responsible for consumers in the electricity and natural gasmarket. Among other

[103] The Swedish Consumer Energy Markets Bureau. Annual Report 2021.
[104] The Swedish Consumer Energy Markets Bureau. Annual Report 2020.
[105] www.energimarknadsbyran.se/el/dina-avtal-och-kostnader/valja-elavtal/klagomalsinformation/ Retrieved in April 2022.

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].[106] Hallå konsument covers the energy markets and includes all consumer markets as well. Consumers can consult Hallå konsument with questions relating to purchases, contractual terms, and complaints.

Several authorities, including Ei, are responsible for cooperating with the Swedish Consumer Agency in the development of Hallå konsument. The Swedish Consumer 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 in the electricity and natural gas market also have the opportunity to consult their local municipality for advice on various issues. Among other things, consumer advisers there offer advice before consumers sign contracts, as well as advising on disputes. Budget and debt advisers are able to offer advice and support if people have payment problems, while energy and climate advisers are able to offer analysis of energy consumption and advice when choosing a new form of heating. Another advisory function is the Swedish Energy Agency's *Solelportalen* (Solar Electricity Portal). There, consumers can find information about solar cells and make calculations prior to the decision to purchase solar cells for their houses.

3.2. Dispute resolution

On their websites and invoices to consumers, electricity trading companies, electricity utilities, gas trading companies and gas utilities must provide clear information on consumer rights, how consumers can go about submitting complaints, and who consumers can consult for information or dispute resolution.

Consumers can consult the Swedish Consumer Energy Markets Bureau or their municipal consumer adviser for information and guidance.

3.2.1. Ei adjudicates on some dispute issues

Ei makes sure that companies in the electricity market and the natural gas market operate in compliance with legislation, and for some cases has a dispute resolution function for disputes between a consumer and a company. This relates to disputes on issues relating to the obligation for electricity network operators to connect a

[106] www.hallakonsument.se

facility to the electricity network, the cost of metering and calculating electricity, remuneration on electricity in-feed, and network tariffs for smaller production facilities.

According to the provisions of the Electricity Act, the connection charge must be reasonable.[107] If a consumer feels that the cost is too high, he/she can consult Ei, who will then adjudicate on this. 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. Requesting Ei adjudication and appealing against Ei's decisions are free of charge.

3.2.2. Dispute resolution support at the National Board for Consumer Complaints (ARN)

Consumers in the electricity and natural gas market can report disputes with suppliers to the National Board for Consumer Complaints (ARN). Reports of this kind are considered to be quick and simple, but are nevertheless a legally secure alternative to going to court. ARN is a state authority that examines disputes between customers and suppliers in the electricity and natural gas market, among others, 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 the National Board for Consumer Complaints (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 of a value above the limits of SEK 500, SEK 1,000 or SEK 2,000, depending on what the report relates to.

Consumers usually have to wait for about 6 months for ARN decisions on cases. Consumers can also consult an ordinary court of law in order to resolve a dispute with an electricity or natural gas company. A trader only has the option of an ordinary court of law for dispute resolution, which involves certain risks, as it can become a costly process.

[107] Electricity Act 1997:857, Chapter 4 section 9.

Appendix 1

Table of corresponding sections

Section/subsection in CEER's Advice Document	Section/subsection in this report
1 Foreword	Foreword
2 Main developments in the gas and electricity markets	Summary
2.1 Evaluation of the market development and regulation	Summary
2.2 Report on the implementation of the Clean Energy Package	1 The electricity markets
3 The electricity market	1 The electricity market
Network regulation and technical functioning	1.1 The electricity network
3.2 Competition and market functioning	1.2 and 1.3
3.2.1 Wholesale markets	1.2 Wholesale markets for electricity
3.2.2 Retail market	1.3 Retail market for electricity 3 Consumer protection
4 The Gas market	2 The natural gas market
4.1 Network regulation	2.1 The gas network
4.2 Competition and market functioning	2.2. and 2.3
4.2.1 Wholesale markets	2.2 Wholesale market for natural gas
4.2.2 Retail market	2.3 Retail market for natural gas 3 Consumer protection
4.3 Security of supply	2.2.1 Monitoring of price development, transparency, and competition

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