Swedish Energy Agency

National risk-preparedness plan for Sweden's electricity supply

In accordance with Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC

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Contents

General information

The Swedish Energy Agency (Energimyndigheten) is the Swedish competent authority pursuant to *Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC*[1], hereinafter referred to as the *Risk Preparedness Regulation.* The term *risk-preparedness plan* is the term used by the European Commission in the English version of the Risk Preparedness Regulation. As competent authority, the Swedish Energy Agency is responsible for preparing this plan.

The background is the increasingly interconnected electricity markets and systems, which mean that managing electricity crises can no longer be considered a purely national task. There are also sector connections towards, for example, gas and district heating. In order to ensure a common strategy for electricity crisis prevention and management in the region, the competent authorities of each Member State shall draw up a risk-preparedness plan. The regulation requires Member States to cooperate, at regional level and, where applicable, bilaterally, in a spirit of solidarity. Furthermore, the Risk Preparedness Regulation contains rules for how the transmission system operator, in Sweden Svenska kraftnät, and electricity market operators should proceed in the event of an electricity crisis.

Member States belonging to the same region are Sweden, Denmark, and Finland. Region is defined herein as the group of Member States whose transmission system operators share the same regional coordination centre. In addition to these countries, Lithuania, Poland, and Germany are also Member States directly connected to Sweden and with which Sweden shall thus share risk-preparedness plans. Norway is not a Member State of the EU but is also directly connected to Sweden and is included in the Nordic RCC.

This document follows the template set out in the Annex to the Risk Preparedness Regulation.

[1] *Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC*, OJ L 158, 14.6.2019, CELEX number: 32019R0941.

1 Summary of the electricity crisis scenarios

Below is a summary of the most relevant electricity crisis scenarios. They are developed to form the basis for measures outlined in the risk-preparedness plan. The electricity crisis scenarios have been developed jointly by the Swedish Energy Agency (Energimyndigheten) and Svenska kraftnät.
It is a selection that accounts for the most relevant electricity crisis scenarios that risk causing spillover effects to our neighboring countries and meet the requirements set out in the regulation. A more comprehensive and non-confidential report has been presented to several public authorities and specifically designated distribution system operators as well as to one electricity market operator.[2]

The Regulation provides that electricity crisis scenarios shall be established on the basis of at least the following risks.

- Rare and extreme natural disasters
- Risk of accidents going beyond the N-1 security criteria and exceptional unforeseen events[3]
- Consequential hazards including the consequences of malicious attacks and of fuel shortages

1.1 Overall risks associated with electricity supply

There are different types of situations that can arise in the electrical system that are different in character and thus require different management measures. The three types of situations - *electric power shortage, energy shortage,* and *power outage* - are described below.

This is an open publicized risk-preparedness plan and the Swedish Energy Agency has deliberately chosen not to describe sensitive information.

Electric power shortage

There must always be a balance between how much electricity is produced and how much electricity is used. If the demand for electricity were to be greater than what is currently possible to produce, or import, this would lead to an electric power shortage. The price on the electricity market is determined based on supply and demand and indicates the risk

[2] *Redovisning av elkrisscenarier i enlighet med förordning om riskberedskap inom elsektorn* (Report on electricity crisis scenarios in accordance with regulation on risk-preparedness in the electricity sector) (2019/941), Swedish Energy Agency, registration number 2020-001296.
[3] *Europaparlamentets och rådets förordning (EU) 2019/941 av den 5 juni 2019 om riskberedskap inom elsektorn och om upphävande av direktiv 2005/89/EG, Artikel 5. 2*

of a power shortage. The market is therefore the main tool for maintaining balance between supply and demand. As power shortages could lead to serious consequences in society, there are prepared measures to both prevent and mitigate the consequences of an electricity power shortage. Svenska kraftnät is responsible for balancing electricity production and consumption in real time and uses various processes and tools to ensure that the supply of electricity is always in balance with consumption.

Energy shortage

Energy shortage can occur in a long-term situation where the total supply is not expected to correspond to the overall need for electrical energy over time. This can be caused by a combination of low levels in hydro reservoirs, stationary nuclear reactors, and disturbances om interconnections to neighbouring countries. An energy shortage that the market fails to manage, and which society fails to prevent, likely will lead to power shortage.

Power outage

Local power outages where a small number of consumers are affected are common and can occur all year round. Local power outages can occur during, for example, storms or heavy snow fall. Strong winds that topple trees or break large branches that fall over power lines or construction work that causes excavation damage to cables can also cause power outages. In summer, the most common cause of disruption is lightning striking power lines or other technical equipment.

1.2 The most relevant electricity crisis scenarios

Below are brief descriptions of relevant risks associated with electricity supply that may cause power outage, electric power shortage, and energy shortage, and thus more comprehensive national disturbances that potentially affect neighbouring countries. The scenarios have been selected in accordance with the methodology described in Article 5 of the Risk-Preparedness Regulation.[4] For a selection of the scenarios, analyzes and assessments have been carried out in accordance with the method and are briefly reported in tabular form below.

Heat wave

A very high temperature that lasts for several days or weeks can lead to impaired transmission capacity of lines as the transfer capacity of the line decreases at higher temperatures. This could lead to major local problems in supplying communities with electricity. At persistent high temperatures, there is a risk that materials and components in the

[4] Methodology for Identifying Regiona Electricity Crisis Scenarios, in accordance with article 5 of Regulation (EU) 2019/941 of the European Parliament and of the council on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC

electrical system will be used to the breaking point, which may lead to local power outages.

Nuclear power is an important source of electricity generation and reliability. An increased temperature of the cooling water necessary to cool the reactors at the nuclear power plants may impair the ability to produce the required power. Other sources of production such as combined power and heat generation and gas turbines could also be affected by high temperatures.

Dry period

Sweden's electricity supply is dependent on reliable hydropower, both as an energy source and for balancing consumption and production to maintain operational security. An extreme dry period in which most hydropower stations have low levels in the dams can lead to large production losses. A severe dry season is likely to affect our neighbouring countries to a similar extent.

Forest fire

Sweden is an oblong country with several transmission lines connecting the country from north to south. Forest and ground fires can be caused by lightning but also human activities such as sparks from forestry work, grilling or arson. Fires can quickly spread to large areas with the wind and become very difficult to control and fight. A forest fire can affect several transmission lines over the same period of time, thereby impairing transmission capacity within the country but also affecting foreign connections.

Presumption of scenario	*Season:* Summer *Description:* Forest fire in SE2 within an inappropriate area limiting the transmission capacity between SE2 and SE3. Low demand for electricity. *Impact:* Limited transmission capacity from northern to southern Sweden affects the power supply in southern Sweden and the possibility to export.
Likelihood	Unlikely
EENS[5]	Critical
LOLE[6]	Critical

[5] Expected energy not served
[6] Lost of load expectation

Cross-border dependency	Minor

Extremely cold weather

Svenska kraftnät carries out annual analyses of the power balance where last year's analysis shows that there is an import dependency during peak demand in a normal winter that becomes even greater in the event of more extreme cold.[7] The ability to manage severe power shortages through imports via interconnections may be limited if similar weather condition prevails in our neighbouring countries. If the power balance cannot be ensured, the risk increases that manual load shedding must be used.

Presumption of scenario	*Season: Winter* *Description:* An increase in consumption due to very cold weather (20 years winter for a week) could generate power shortages in southern Sweden (SE3, SE4) if there are not enough import opportunities from other countries. *Impact*: Risk for manual load shedding in the southern parts of Sweden.
Likelihood	Unlikely
EENS	Critical
LOLE	Major
Cross-border dependency	Major

Solar storm

Solar storms are powerful bursts of energy on the Sun consisting of radiation or charged particles. When solar storms are directed at Earth, they can affect the ionosphere and disrupt the radio waves and satellite signals that are supposed to either bounce off the ionosphere or pass through. The currents formed by the electric field can cause disturbances, among other things, in the electricity grid, electronic communication and electricity supply for train traffic, and cause corrosion in pipelines.

[7] *Kraftbalansen på den svenska elmarknaden, rapport 2025, A report to the Ministry of Infrastructure*, Svenska kraftnät, case number 2025/2726.

The majority of solar storms that hit Earth are manageable. But society's vulnerability to solar storms increases as development progresses and as dependence on, for example, electricity and electronics becomes greater.[8]

Presumption of scenario	*Season:* Independent *Description:* Disturbances, among other things, in the electricity grid, in signaling systems and electricity supply for train traffic and cause corrosion in pipelines *Impact*: Reduced transmission capacity between northern and southern Sweden. Statistics indicate limited impact
Likelihood	Unlikely
EENS	Insignificant
LOLE	Insignificant
Cross-border dependency	Minor

Fuel shortage

Sweden has no significant dependence on fossil fuels for its national electricity supply. However, there is an indirect dependency in that Sweden is dependent on electricity imports at peak load situations from countries that use fossil fuels for their power production.

Gas: The gas is mainly piped from Denmark to the West Sweden natural gas network and distributed mainly to households and industrial companies, transport and CHP plants. Given the limited storage capacity for natural gas within Sweden, the country will be dependent on storage capacity in other countries. The use of natural gas in Sweden for electricity generation is very limited and an interruption of gas to Sweden will not cause a cross-border electricity crisis.

[8] Solstormar (mcf.se)

Combined heat and power (CHP): The most common are biofuel made from forest residue, such as branches, tops and stumps. This may also be household or industrial residue - that is, waste that has not been recycled in any other way. Before March 2022, Sweden imported a small share of Russian and Belarusian pellets and wood chips, but that has now been replaced with domestic production and imports from other countries.

Oil: The trade embargo on Russian oil has an effect on global trade. For Sweden, however, the effect has been limited as other players have been able to replace the supplies. Oil and fuel in the electricity supply are mainly used for power reserves, disturbance reserve and local reserve power.

Nuclear fuel: See below.

Lack of nuclear power production

Sweden is a long country with a lot of hydropower in the north, nuclear power in the south and a growing share of wind- and solar power. The number of nuclear power plants in Sweden has decreased over the past decade, and thus also important capabilities for stabilizing and balancing the electricity grid. Synchronous generation such as nuclear power has capabilities that help balance electrical system variables such as reactive power and voltage. The challenges exist throughout the year and not least during the summer months when several nuclear power plants are taken out of operation for revision when the demand for electricity output is low. If nuclear power production decreases without other support services being available elsewhere, it may in the long run affect the transmission possibilities within Sweden and thus also the foreign connections.

Nuclear fuel: Three different companies operate nuclear power plants in Sweden, and they have taken measures not to be dependent on Russian uranium and nuclear fuel. They are not planning any new purchases from Russia. The decision is not considered to affect the operation of the facilities. The owners of Swedish nuclear power plants have a purchasing strategy of being independent of individual countries and suppliers and have alternative suppliers of nuclear fuel. The companies purchase the uranium from Australia, Canada and Kazakhstan as well as the nuclear fuel from Westinghouse in Västerås and from France's Framatome.

Presumption of scenario	*Season: Winter* *Description:* Lack of nuclear fuel, which affects 50% of Sweden's nuclear power plants. Neighboring countries may also have similar challenges. The southern parts of Sweden (SE3, SE4) have an import need. *Impact*: Limited impact on fossil

	fuels. Biggest impact in winter during peak hours when southern Sweden is dependent on imports.
Likelihood	Unlikely
EENS	Major
LOLE	Major
Cross-border dependency	Major

Difficulty in planning renewable electricity generation (dunkelflaute)

If available power production is not controllable when demand is low, the electricity system risks having a surplus of electricity when demand is low, while at the same time there is a risk that a deficit will arise if there is no wind or if the sun does not shine at high load, which is known as Dunkelflaute[9]. In an electricity system with weather-dependent electricity production, the requirement for accurate production forecasts becomes even more significant. If assessments of available production are incorrect, there is a risk that there will be a large need for up- or down-regulation in operation.

Rapid changes and movement of power can lead to overloaded lines and protective equipment that automatically disconnects lines or production sources. Unplanned and uncontrolled load shedding can lead to cascade effects and cause widespread power outages.

Presumption of scenario	*Season:* Winter *Description:* Dunkelflaute affects Sweden and to some extent also our neighboring countries. Very low contribution from wind and sun. *Impact*: The situation in southern Sweden is getting more difficult, but the impact is marginal.
Likelihood	Unlikely
EENS	Critical
LOLE	Major

[9] Longer periods during the day with weather without sunshine or wind, which results in neither solar panels nor wind turbines generating electricity.

Cross-border dependency	Major

Physical attack on critical infrastructure

During the war against Ukraine, Russia has directed massive attacks against the Ukrainian energy infrastructure. The attacks have caused extensive damage to the power system, affected the electricity supply and caused severe strain on the Ukrainian society and population. In addition, the extensive attacks have put the actors in the power system under great pressure.[10]

Protecting a nation's entire power system against physical attack is very difficult in practice. The facilities are numerous and spread over large geographical areas and with lines laid in both air, ground and water.

Strong protection and redundant production facilities and power grids, as well as a well-developed repair readiness are important robustness-enhancing measures. Damaged plants can take a long time to repair, up to several months or years for some plant parts.

Unauthorized action by personnel

Personnel with access to critical control systems are a potential threat to destabilize the power system. It could happen through an insider attack, hostage-taking of personnel or through threats and blackmail of key personnel.

Political malicious acts

If a neighboring country chooses to end or limit trade in electricity due to political decisions, it can have extensive impact on trade and electricity flows. Depending on the extent of the restriction and the situation, national measures may need to be taken to balance the power requirement.

Cyberattack

The deteriorating security situation in the world has increased the need for improved protection against cyberattacks. This is a threat to Sweden's security and integrity but also, by extension, to the country's prosperity. Cyberattacks on energy infrastructure are a reality and more and more actors are acquiring an offensive cyber capability that Sweden needs to protect itself against. A cyberattack can affect one or more available production sources, consumers, and transmission systems. The functioning of the markets can also stop working, directly because the necessary systems lose functionality but also indirectly because the necessary information cannot reach stakeholders.

[10] Russian attacks on the Ukrainian power system (foi.se)

Parallel events

The most relevant electricity crisis scenarios listed above can potentially occur during the same time period and thus cause an even worse crisis to deal with. For example, a storm or forest fire may occur at the same time as a pandemic or a cyberattack during an ongoing electricity shortage.

2 Roles and responsibilities of the competent authority

When implementing the Risk Preparedness Regulation in Sweden, the ambition was to maintain the relevant authorities' current responsibilities and roles to the extent possible. The authorities primarily affected by the Risk Preparedness Regulation are the Swedish Energy Agency as the competent authority for electricity,[11] Svenska kraftnät as transmission system operator and electricity preparedness authority[12], the Swedish Energy Markets Inspectorate as national regulatory authority[13] and the Swedish Radiation Safety Authority with responsibility in nuclear safety[14]. The Swedish Energy Agency primarily regards the role of competent authority for electricity as a comprehensive and coordinating role, where other actors (specifically Svenska kraftnät), have operational roles and direct responsibilities that they retain. However, the Risk Preparedness Regulation entails increased demands for coordination, collaboration, and further clarification of the division of responsibilities and roles between the Swedish Energy Agency and Svenska kraftnät.

The main task of the Swedish Energy Agency as the competent authority for the application of the Risk Preparedness Regulation is, *inter alia*, to act as a national contact point and coordinator vis-à-vis the EU and the competent authorities of other EU countries.

2.1 Background description of existing roles and responsibilities

This section describes the roles and responsibilities of the relevant authorities in matters relating to the electricity supply in Sweden at a general level.

The Swedish Energy Agency, Svenska kraftnät, the Swedish Radiation Safety Authority and the Swedish Energy Markets Inspectorate are designated as particularly responsible for emergency preparedness and as designated authorities responsible for taking measures before and in case of heightened state of alert in their respective areas of activity.[15]

In October 2024, the Swedish Government stated in its defence policy bill, which was submitted to the Riksdag, that it proposed strong reinforcements on the total defence, which includes a comprehensive investment in civil defence. The resilience of, *inter alia*, energy supply

[11] Ordinance (SFS 2025:784) with instructions for the Swedish Energy Agency, Section 18 (5).
[12] Ordinance (SFS 2025:782) with instructions for Affärsverket svenska kraftnät, Sections 10.
[13] Ordinance (SFS 2016:742) with instructions for the Swedish Energy Markets Inspectorate, Section 3.
[14] Om myndigheten - Strålsäkerhetsmyndigheten
[15] According to Ordinance (SFS 2022:524, Section 10) on state authorities preparedness.

needs to be increased and measures should be taken, according to the Government, to ensure a satisfactory level of preparedness.[16]

Role and responsibilities of the Swedish Energy Agency

The Swedish Energy Agency shall monitor, analyze and promote the transition to a fossil-free energy system. The agency shall also promote a secure energy supply and monitor and analyze that it remains secure.[17] The Swedish Energy Agency is leading society's transition to a sustainable energy system, based on the three pillars of energy policy - security of supply, competitiveness, and ecological sustainability - as well as the other two dimensions of sustainable development (social and economic sustainability). These pillars, together with the energy and climate policy objectives in Sweden and the EU, form the basis for the Agency's activities. The regulation (2022:524) on the preparedness of government agencies states that the Swedish Energy Agency is the preparedness authority and the authority responsible for the energy sector.[18] The Swedish Energy Agency is responsible for planning, coordinating, and, to the extent prescribed by the Government, carrying out rationing and other regulations regarding the use of energy.[19] The Swedish Energy Agency has taken certain preparatory measures in the event of energy shortage and possible Government decisions on demand restraint measures and rationing of electricity. The Swedish Energy Agency has, together with other actors, developed *Styrel* (steering of electricity), which is a method of planning so that essential consumers can be prioritised in case of load shedding due to electric power shortage. *Styrel* can be summarised as the planning process during which national authorities, county administrative boards, municipalities, private actors, and network operators collaborate to develop the basis for prioritising essential consumers in the event of manual load shedding (MLS). The purpose of *Styrel* planning is to mitigate the societal consequences that arise if MLS needs to be resorted to during an electric power shortage. In other words, the Swedish Energy Agency has the overall responsibility for *Styrel* planning. The Swedish Energy Agency is responsible for issuing regulations on the *Styrel* method[20] [21] and for initiating the planning process every four years.

Related roles as competent and regulatory authority

In addition to the role of competent authority for the Risk Preparedness Regulation, the Swedish Energy Agency has roles related to security of supply, emergency preparedness, and heightened alert. The Swedish Energy Agency is the competent authority[22] pursuant to the Security of gas supply

[16] Nytt totalförsvarsbeslut för ett starkare Sverige - Regeringen.se
[17] SFS 2025:784, Section 1.
[18] SFS 2025:784 Section 8.
[19] SFS 2025:784, Section 9.
[20] Ordinance (SFS 2011:931) on planning for prioritisation of essential consumers, Section 4.
[21] See further, Styrel, prioritering av elanvändare See also the Styrel Ordinance (SFS 2011:931) and the Swedish Energy Agency's Styrel regulation (STEMFS2013:4).
[22] SFS 2014:520, Section 2, point 2.

regulation[23] and the regulation on cybersecurity of cross-border electricity flows (NCCS)[24] and is the regulatory authority[25]for, and responsible for, Sweden's fuel preparedness[26]. The Swedish Energy Agency is also the regulatory authority for the energy sector according to the Act implementing the NIS2 Directive, SFS 2025:1506 Cybersecurity law[27] with the associated regulation.

On 1 April 2019, the Safety Protection Act (2018:585) entered into force and from 1 December 2021, the Swedish Energy Agency became the supervisory authority in the energy sector for individual operators in district heating, natural gas, oil and fuel supply.[28]

The Swedish Energy Agency also works with advice and knowledge support in case of disturbances in energy supply as well as guidance on auxiliary power aimed at essential consumers, geographical area managers, individuals, and households, etc.[29] [30]

Sector-responsible authority

In the resumed total defense planning, the Swedish Energy Agency is since 1 October 2022 the sector-responsible authority for the preparedness sector Energy supply.

The task involves strengthening the coordination between the Swedish Energy Agency, Swedish TSO, the Radiation Safety Authority and the Energy Markets Inspectorate in order to secure the most important social functions and strengthen society's resilience.[31]

Role and responsibilities of Svenska kraftnät

Svenska kraftnät is the system operator for the transmission system and shall, in a commercial manner, manage, operate and develop Sweden's electricity transmission network so that it meets the national needs for electricity transmission in the short and long term and, together with other parts of the national electricity system, meets the requirements for

[23] *Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010*, OJ L 280, 28.10.2017, CELEX number 32017R1938
[24] COMMISSION DELEGATED REGULATION (EU) 2024/1366 of 11 March 2024 supplementing Regulation (EU) 2019/943 of the European Parliament and of the Council by establishing a network code on sector-specific rules for cybersecurity aspects of cross-border electricity flows
[25] Ordinance (SFS 2012:873) on emergency storage of oil, Section 2.
[26] *Council Directive 2009/119/EC of 14 September 2009 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products*, OJ L 265, 9.10.2009, CELEX number 32009LO119, and shall comply with Sweden's reporting obligation in accordance with Chapter V.
[27] National legislation implementing the NIS2 Directive, DIRECTIVE (EU) 2022/2555 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive)
[28] Nyheter i säkerhetsskyddslagen – Energimyndigheten tillsynsmyndighet inom energisektorn
[29] Offentlig sektor, 2025-01-10.
[30] El-, gas- eller fjärrvärmeavbrott
[31] Förordning (2022:524) om statliga myndigheters beredskap

security of supply and otherwise meets the requirements set within the EU's internal market for electricity.[32]

Svenska kraftnät's control rooms are staffed 24 hours a day, all year round. In the control room, there is constant monitoring of the balance and security of the electricity system to maintaining the energy balance. Furthermore, Svenska kraftnät has an ongoing responsibility to maintain the transmission network to ensure reliability and to make the necessary investments and expansion of the infrastructure in the system to secure the electricity supply as society's electricity needs increase and production changes. Svenska kraftnät is the supervisory guidance authority for dam safety and the regulatory authority for the security of the electricity supply. As a regulatory authority for the security of the electricity supply[33], Svenska kraftnät issues regulations[34], supervises the protective security work of operators, and performs record checks for certain operators within electricity supply.

Svenska kraftnät allocates capacity for electricity trade between electricity areas and countries and is tasked with proposing rules and designing agreements and routines for electricity trade within the country, between the Nordic and Baltic countries and with the continent. The EU Commission establishes regulations with requirements for how the electricity market within the Union should function, and Svenska kraftnät works together with other TSO.s in Europe to implement these.[35]

Electricity Preparedness Authority

Svenska kraftnät is the electricity preparedness authority with the task of ensuring that the Swedish electricity supply is prepared for events such as war, acts of terrorism, and earthquakes. These are disturbances outside the responsibilities of individual electricity undertakings. Svenska kraftnät also issues regulations and general advice on electricity preparedness aimed at electricity undertakings.[36] Actors in the electricity sector have, *inter alia,* an obligation to inform Svenska kraftnät if there is a disturbance in the electricity supply that can cause severe societal challenges[37]. Svenska kraftnät is primarily responsible for the disturbances that affect large areas. Svenska kraftnät is working on preventing such disturbances and to be able to manage them if they should occur. Svenska kraftnät also ensures that measures are implemented to increase preparedness in technology, communication, and physical protection. In doing so, Svenska kraftnät coordinates preparedness measures at both regional and national level.[38]

[32] SFS 2025:782, Section 3.
[33] Protective Security Ordinance (SFS 2021:955), 8 kap. 1 §
[34] Affärsverket Svenska kraftnäts föreskrifter och allmänna råd om säkerhetsskydd, SvKFS 2022:1.
[35] Internationellt samarbete | Svenska kraftnät, 2025-01-10.
[36] Elberedskap | Svenska kraftnät, 2025-01-10.
[37] Electrical Preparedness Act (1997:288), Section 9a.
[38] Elberedskap | Svenska kraftnät, 2025-01-10.

In war or when the government decides otherwise, the authority shall meet society's need for electricity by planning, managing and coordinating the electricity supply resources. The task shall be carried out in collaboration with the relevant sector-responsible authorities, the county administrative boards responsible for the civil area, the Civil Protection and Emergency Preparedness Agency, the Armed Forces and other authorities within the energy supply emergency sector. If electricity consumption regulation is introduced, the authority shall be responsible, to the extent prescribed by the government, for long-term planning and targeting of electricity production.[39]

Svenska kraftnät offers training and conducts preparatory exercises together with the electricity industry and offer training in crisis management, repair readiness, and various tools used in a crisis.[40]

Role and responsibilities of the Swedish Energy Markets Inspectorate

The Energy Markets Inspectorate (Ei) is an expert and supervisory authority in the energy field. The Ei mission is to work for well-functioning energy markets and supervises and develops the rules in the electricity, district heating, district cooling and natural gas markets at a national, Nordic and European level. The regulatory authorities of the Nordic capacity calculation region, Ei in Sweden, and the Finnish, Norwegian and Danish energy authorities examine and decide in a coordinated manner on the methodologies and conditions of the transmission system operators and the nominated electricity market operators with regard to regional methodologies and conditions. Ei is thus the supervisory authority to ensure that Svenska kraftnät complies with the electricity market regulations with regard to a large number of EU rules. The Energy Markets Inspectorate's assessment and supervision include, for example, Svenska kraftnät's compliance with the EU regulations System Operation (SO) and Emergency Restauration (ER), which regulate the operation of the electricity system and the management of disturbances and grid breakdowns.

Ei decides on permits for nominated electricity market operators to operate in Sweden. In Swedish bidding zones, Nord Pool Spot and Epex Spot currently have the right to offer their services on the day-ahead and intraday market. With regard to practices and conditions common to all EU countries, the supervision of system operators and NEMOs is coordinated with other regulatory authorities in the EU. The Nordic supervisory authorities also coordinate supervisory activities regarding regional methods and conditions that apply in the Nordic capacity calculation area. The supervision of the Nordic RCC is coordinated between Ei and the other Nordic supervisory authorities.

[39] SFS 2025:782 11 §

[40] Utbildning och övning | Svenska kraftnät, 2025-01-10.

The Ei is a member of the supervisory board of the EU authority ACER. In this role, Ei takes a position on the decisions, opinions and recommendations made by ACER. This applies, for example, to the methods and conditions for the day-before, intraday, and the balancing market, which apply to all Member States of the EU.

The Ei submits proposals to the Government regarding the reliability standard for Sweden. Such a mechanism is a prerequisite for Sweden to be able to have a capacity mechanism in the form of a strategic reserve.

The Ei is tasked with monitoring and analysing developments in the energy markets, and submitting proposals for changes in regulations, or other measures, to promote the functioning of the markets.

In addition to the supervision that takes place in coordination with other energy regulatory authorities in the EU and regionally, the Energy Markets Inspectorate has the task of ensuring that market participants comply with national laws and regulations in the energy market area. The area of regulation includes, among other things, the review of the electricity supply quality of the distribution companies, the monitoring of the cross-border trade in electricity and gas, and the review of the revenue frameworks of the electricity network companies and gas companies. [41]

The Ei examines and issues decisions on electricity network concessions for electricity networks at regional and national level. As regards transmission connections between Sweden and other countries, the matter is being prepared by Ei, while decisions are being made by the Government. The Energy Markets Inspectorate may also in certain cases grant exemptions from the requirement for a network concession.

The Ei works to strengthen the position of customers and secure society's needs for functioning energy distribution and trade.

Preparedness authority

Since 1 October 2022, the Ei has been a preparedness authority and works together with the other preparedness authorities in the energy supply sector for good preparedness.

Role and responsibilities of the Swedish Radiation Safety Authority

The Radiation Safety Authority has overall responsibility in the areas of radiation protection, nuclear safety and nuclear non-proliferation. The authority operates within the framework of the laws and regulations that regulate the work of creating a radiation-safe society. The authority works with:

[41] Uppdrag och styrning - Energimarknadsinspektionen, 2025-11-12.

- issues of protection human health and the environment against the harmful effects of ionizing and non-ionizing radiation,

- issues about safety and physical protection in nuclear technology and other activities involving radiation

- as well as issues of nuclear non-proliferation.

Preparedness authority

The Radiation Safety Authority is part of two preparedness sectors, Energy Supply and Rescue Service and Protection of the Civilian Population. The Radiation Safety Authority has a special mission in connection with radiological emergencies that can lead to damage to people and the environment. [42]

2.2 Fundamental principles of emergency preparedness

Swedish emergency preparedness aims to protect the life and health of the population, the functionality of society, and the capability to uphold Sweden's fundamental values such as democracy, the rule of law, and human rights and freedoms. The normal day-to-day activities of society are expected to prevent and deal with minor accidents and minor disturbances, while serious events or crises may require reinforcement by additional resources. There are three fundamental principles within Swedish emergency preparedness.

- ***The principle of responsibility***: the actor responsible for an activity in normal situations also has corresponding responsibilities in the event of disturbances in society. Actors have a responsibility to act even in uncertain situations and shall support and interact with other relevant actors.

- ***The principle of proximity***: societal disturbances should be dealt with where they occur and by those most affected and responsible.

- ***The principle of equality***: actors shall not make greater changes to the organisation than the situation requires. Activities during societal disturbances shall function as under normal conditions, to the extent possible.[43]

The starting point for all emergency preparedness and crisis management in Sweden is therefore operational responsibility, i.e., operational crisis management should be carried out by the relevant actors in accordance with the principle of responsibility. If necessary, they may receive support from the Swedish Civil Defence and Resilience Agency (MCF), which has specific competence in crisis management, contingency,

[42] Myndighetens ansvar inom beredskap - Strålsäkerhetsmyndigheten 2025-01-10.
[43] Det civila beredskapssystemet, 2026-01-07.

coordination, communication, etc. To some extent, support can also be obtained from the Swedish Armed Forces. Emergency management and crisis management are exercised based on relevant competence, expertise, and experience, as well as existing collaboration and established networks. The Government rules the kingdom and the Swedish public authorities are under the Government's control. Thus, the political leadership is ultimately responsible and must make the political considerations and judgments – based, *inter alia*, on the expertise and data of the substantive authorities – at national and strategic level and in order to achieve coordination.

2.3 Existing national duty of reporting in the event of a crisis

As mentioned above, the Swedish Energy Agency, Svenska kraftnät, the Swedish Energy Markets Inspectorate and the Swedish Radiation Safety Authority are designated preparedness authorities and have, together with some 50 other public authorities, a special responsibility for planning for and taking measures to deal with severe societal disturbances and situations before and during crisis and heightened alert.[44] Ordinance (2022:524) on authorities preparedness in which the authorities responsible for preparedness are identified, aims to ensure that authorities, through their activities, reduce society's vulnerability and continually increase the ability to handle their tasks during peacetime crisis situations and before and at times of heightened alert.

The Swedish Energy Agency is the sector-responsible authority for energy supply and must lead the work of coordinating measures before and during peacetime crisis situations and heightened alert. The Swedish Energy Agency must also drive the work within the energy sector, support the preparedness authorities and work to ensure that tasks and roles within the energy sector are clarified.[45] Furthermore, the preparedness authorities must cooperate in the event of a crisis and keep the government informed about the development of events, the state of affairs, the expected development, available resources and measures taken and planned. [46] In such a situation, the Government and the Swedish Civil Defence and Resilience Agency, upon request, must also receive the information needed to compile a situational picture.

2.4 Responsibility in case of early warning and electricity crisis

In a situation where Svenska kraftnät or the Swedish Energy Agency have become aware of the risk of extensive power outages, power shortages, or electricity shortages that are likely to *affect neighbouring countries* and thus may lead to a more extensive electricity crisis according to the Risk

[44] Ordinance (SFS 2022:524) on state authotity Preparedness, 20 §, and Ordinance on Total Defence and Heightened Alert (SFS 2015:1053), Sections 2, 4.
[45] SFS 2022:524, 24§.
[46] SFS 2022:524, 22§.

Preparedness Regulation, the authorities shall consult and follow procedures according to Chapter 3 below.

An electricity crisis as defined in the EU Regulation on risk-preparedness in the electricity sector is *a present or imminent situation in which there is a significant electricity shortage or in which it is impossible to supply electricity to customers*.[47]

The Swedish Energy Agency definition of an electricity crises is:

"An electricity crisis should be seen as a disruption of the supply of electricity to customers that leads to the assessment that people's lives and health, society's functionality or economic values are being threatened in the long term. A disruption can occur, among other things, when the demand for electricity is greater than the supply in the electricity market or when the transmission of electricity is not possible or severely limited."

An early warning shall be issued if an assessment of seasonality or any other qualified source provides concrete, serious, and reliable information indicating that the event is likely to result in a significant deterioration of the electricity supply and is likely to lead to an electricity crisis.

The Swedish Energy Agency shall be able to issue an early warning and announce that there is an electricity crisis in accordance with the Risk Preparedness Regulation. Svenska kraftnät shall provide the Swedish Energy Agency with all necessary information in accordance with the Regulation, Chapter 4, Article 14. The assessment of whether there is an early warning or electricity emergency is made following consultation between the Swedish Energy Agency and Svenska kraftnät. One reason for this procedure is that Svenska kraftnät has real-time access to reliable up-to-date information about the electricity supply and any disturbances and will thus be among the first to be able to determine whether an electricity crisis has occurred or may occur. Responsible national authorities implement measures according to their respective areas of responsibility.

Svenska kraftnät shall also, in accordance with Article 107 of the SO[48], carry out adequacy analyses to ensure that the electricity system has sufficient resources to meet demand. If the analysis indicates a risk of power shortage, the Energy Market Inspectorate (Ei) shall be notified. Svenska kraftnät shall provide the Energy Market Inspectorate with an

[47] Regulation (EU) 2019/941, Chapter I Art. 2 (9).
[48] COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

analysis of the reasons for the lack of adequacy and propose restrictive measures.

3 Procedures and measures in the event of an electricity crisis

3.1 National procedures and measures

In the event of an electricity crisis, interruption of the electricity supply, or in situations where the electricity supply is affected, the Swedish Energy Agency will use the systems, equipment, and functions that the Swedish Energy Agency normally uses in communication with others. Virtually all means of communication, e-mail, mobile telephony, ordinary telephony, and fax are directly or indirectly dependent on electricity for their functionality. This means that if an electricity crisis occurs, society's capability to communicate will be severely limited and will only function for the time any auxiliary power is available. The Swedish Energy Agency has auxiliary power in place for maintaining its own operations.

At the national level, there are further reinforcements in communication between preparedness authorities in the energy supply sector. Similar reinforcements exist between Svenska kraftnät and the other transmission system operators (TSOs) in the region.

Additional agreed alternative communication channels that are not dependent on electricity are available for use.

3.1 a) Procedures in the event of early warning or electricity crisis

In the event of early warning

Where a seasonal adequacy assessment or other qualified source provides concrete, serious, and reliable information that an electricity crisis may occur and that an early warning may be issued, the following procedures should be followed.

- If Svenska kraftnät has information that an electricity crisis may occur, Svenska kraftnät shall initiate a consultation with the Swedish Energy Agency to analyse the causes and proposals for measures as well as the need to issue an early warning of an electricity crisis. The Energy Markets Inspectorate should also be notified in accordance with Article 107 of the System Operation Regulations (SO).

- If the Swedish Energy Agency has information that an electricity crisis may occur, the Swedish Energy Agency shall initiate a consultation with Svenska kraftnät on the need to issue an early warning of an electricity crisis.

- During the consultation, the parties shall provide each other with information relevant to the assessment of whether Sweden should issue an early warning.

- If the Swedish Energy Agency deems that Sweden should issue an early warning, the Swedish Energy Agency shall decide on and issue an early warning without undue delay nationally and to competent authorities as well as the Commission.[49]

- Prior to the publication of information to the public and the market, the Swedish Energy Agency and Svenska kraftnät should consult on common messaging and ensure that the parties disclose information at a jointly determined time.

In the event of an electricity crisis

If Sweden is faced with an electricity crisis, the following procedures shall be followed.

- If Svenska kraftnät has information that there is an electricity crisis, Svenska kraftnät shall initiate a consultation with the Swedish Energy Agency on the need to declare an electricity crisis.

- If the Swedish Energy Agency has information that there is an electricity crisis, the Swedish Energy Agency shall initiate a consultation with Svenska kraftnät on the need to declare an electricity crisis.

- During the consultation, the parties shall provide one another with information relevant to the assessment of whether Sweden should declare an electricity crisis.

- If, following consultation with Svenska kraftnät, the Swedish Energy Agency determines that there is an electricity crisis, the Swedish Energy Agency shall decide on and declare an electricity crisis[50, 51]. The *National crisis coordinator*[52] are available at the Swedish Energy Agency and are activated in the event of an electricity crisis.

[49] The competent authorities of Finland and Denmark, located in the same region, and the competent authorities of Poland, Lithuania, and Germany, which constitute directly connected Member States, and the European Commission shall be notified of the existence of an early warning without undue delay.
[50] The competent authorities of Finland and Denmark, located in the same region, and the competent authorities of Poland, Lithuania, and Germany, which constitute directly connected Member States, and the European Commission shall be notified of the existence of an electricity crisis without undue delay.
[51] Regulation (EU) 2019/941, Chapter III, Art. 14 2.
[52] Regulation (EU) 2019/941, Chapter II Art. 11 (1d).

- Prior to the publication of information to the public and the market, the Swedish Energy Agency and Svenska kraftnät should consult on common messaging and ensure that the parties disclose information at a jointly determined time.

Contact list

In the event of an electricity crisis, contact details of each actor listed in Appendix 1 to the risk-preparedness plan are used.

Management of market intelligence information

The basis for and information on a declaration of an early warning or electricity crisis are considered to potentially have market-influencing effects. Each actor is therefore responsible for ensuring that documentation that may contain market intelligence information is handled in accordance with internal information security procedures and in accordance with applicable regulatory framework for management of market intelligence information. The Swedish Energy Agency and Svenska kraftnät shall ensure that declarations are made in a coordinated and synchronised manner.

The Transparency Regulation[53] requires transmission system operators to publish information on network availability, capacity for cross-border interconnections and production, load, and interruption on the network. The Energy Markets Inspectorate, which is the supervisory authority, checks that the transmission system operator complies with the Regulation and that other market participants covered by the Regulation publish the information in accordance with the Regulation.[54]

The REMIT framework contains rules on inside information and prohibitions on insider dealing or market manipulation that electricity market participants, including the transmission system operator, must follow.[55]

Request to provide additional information

If the European Commission, the Electricity Coordination Group, the competent authorities of the region[56], or the competent authorities of a directly connected Member State[57], want more information on the announced electricity crisis, the National Crisis Coordinator of the Swedish Energy Agency is responsible for responding to such a request. The same applies if the request has been received by the Swedish Energy Agency from the Government Offices of Sweden or MCF. Before further information is disclosed, the Swedish Energy Agency should consult with Svenska kraftnät and ensure that the information is correct.

[53] Regulation (EU) 543/2013
[54] Transparensförordningen - Energimarknadsinspektionen
[55] REGULATION (EU) No 1227/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2011on wholesale energy market integrity and transparency
[56] EU Member States in the Nordic countries, Denmark and Finland
[57] EU Member States Poland, Germany, and Lithuania

Answers and information should also be communicated to the communication functions of Svenska kraftnät and the Swedish Energy Agency.

If the request for further information following the announcement is received from the market, distribution system operators (DSOs), trade associations, electricity and natural gas undertakings, TSOs in Denmark, Finland, or Norway, and relates to areas of activity normally falling within the remit of Svenska kraftnät, Svenska kraftnät is responsible for providing further information without undue delay. The same applies if such a request has been received by Svenska kraftnät from the Government Offices of Sweden or MCF.

If there are questions about how the regulations that are within the Energy Markets Inspectorate's supervisory are to be interpreted and applied, these are answered by the Energy Markets Inspectorate.

3.1 b) Preventive and preparatory measures

Continuity work

Svenska kraftnät conducts continuity work in accordance with Swedish standards in the field (Societal Security - Business continuity management system, SS-EN ISO 22301:2014). The goal of continuity management involves planning, establishing, implementing, applying, monitoring, maintaining, and constantly improving the continuity of critical operations. The work with continuity shall be a natural part of Svenska kraftnät's operations and continuity aspects must be considered when making decisions. Continuity management contributes to creating a reliable and robust transmission network with high security of supply, good electricity preparedness, and a secure electricity supply in society.

National risk and vulnerability analysis for the electricity sector

Svenska kraftnät analyses threats, risks, and vulnerabilities within their own area of responsibility and prepare a national risk and vulnerability analysis for the electricity sector (production, distribution, and trade in electricity) pursuant to the Electrical Preparedness Act (SFS 1997:288). These two aspects are compiled in a comprehensive risk and vulnerability analysis.[58] This means that companies in the electricity sector must also carry out risk and vulnerability analyses. It is an important tool to increase the capability to prevent, resist, and manage disruptions to one's own operations and thus make Sweden's electricity supply more robust. The analyses shall identify and document hazards and critical dependencies that may affect the security of the operations. The work shall also include an assessment of how vulnerable the operations are to

[58] *Risk and vulnerability analysis for 2024, Summary*, Svenska kraftnät. svenska-kraftnat-risk-och-sarbarhetsanalys2024.pdf.pdf, 2025-01-10 - based on the requirements set out in the Power Contingency Act (SFS 1997:288) and Power Contingency Ordinance (SFS 1997:294) and Svenska kraftnät's regulations and guidelines on electrical preparedness (SvKFS 2013:2) and in Ordinance (SFS 2022:524) on authorities preparedness.

these hazards and proposed measures. Information must be provided to Svenska kraftnät upon request.[59]

The Swedish Energy Agency, the Swedish Radiation Safety Authority, the Swedish market inspectorate and other public authorities also report such national risk and vulnerability analyses, based on their respective areas of responsibility and activity.[60]

Risks and vulnerabilities related to climate changes are detailed in the climate and vulnerability analyses by the Swedish Energy Agency and Svenska kraftnät in accordance with Ordinance (2018:1428) on Agencies Climate Change Adaptation.[61]

According to the Electricity Act (SFS 1997:857) and the Swedish Energy Markets Inspectorate's regulations and general advice (EIFS 2013:3) on risk and vulnerability analyses and action plans regarding security of supply in the network, the network operators must identify hazards and estimate risks in their network and draw up an action plan. By identifying hazards, estimating risks and vulnerability, and identifying and prioritising measures that reduce risk and vulnerability, network operators can plan their improvement measures. A report of the action plan, which shall be based on a risk and vulnerability analysis and action plan not older than one year, is submitted annually to the Swedish Energy Markets Inspectorate.[62]

Electrical Preparedness Act

The Electrical Preparedness Act (SFS 1997:288) regulates the obligations of electricity companies to take measures to secure society's electricity supply needs in the event of severe stress and heightened preparedness. The obligations set out in the Act apply to companies engaged in the production of electricity, the transmission of electricity, and trade in electricity. The scope of the law includes measures linked to heightened preparedness but also to prevent, withstand, and manage serious peacetime crises. Svenska kraftnät has developed regulations on electricity preparedness, Affärsverket Svenska kraftnät's Regulations and General Advice on Electricity Preparedness, (SvKFS 2023:1), which entered into force on 20 December 2023. The regulation includes detailed provisions on the obligations set out in the Act.

[59] Risk- och sårbarhetsanalys | Svenska kraftnät, 2025-01-10.
[60] Risker och sårbarheter, Energimyndigheten 2025-01-10, risk--och-sarbarhetsbedomning-2024.pdf (SSM), 2025-01-10 in accordance with the requirements of Ordinance (SFS 2022:524) on designated Authorities Preparedness.
[61] Förordning (2018:1428) om myndigheters klimatanpassningsarbete Svensk författningssamling 2018:2018:1428 - Riksdagen
[62] Applies to all network concession holders for line with a voltage of less than 220kV.

Regulatory compliance supervision

The Swedish Energy Markets Inspectorate supervises that Svenska kraftnät and the electricity market operators as well as other electricity market participants fulfil their obligations in the electricity market in accordance with both EU and national regulations. Regular supervision ensures that electricity market participants fulfil their tasks and will result in that the electricity market being more robust and more resilient to different types of disturbances.

Demand restraint measures

If an electrical energy shortage occurs in one or more bidding areas in Sweden, the demand for electricity will drive up the price of electricity. In the event of a higher electricity price, the affected bidding areas will import electricity as the price signal causes electricity to flow from low-price to high-price bidding areas, provided that there is capacity in the electricity grid. Since the Swedish electricity grid is connected to the market with other countries in the EU, we will also import electricity. The price of electricity will therefore increase significantly as the shortage becomes clearer, which in itself will dampen demand.

In order to avert an energy shortage situation that the market is unable to cope with, the Swedish Government may decide to reduce the national electricity consumption. The Swedish Energy Agency has a prepared information campaign about saving electricity that can be aimed at all households and a prepared measure in the form of national authorities being asked to take measures to reduce their electricity consumption.[63] [64]

To avert a situation of electrical energy shortage that the market is unable to handle, the Swedish government can decide on rationing to curb electricity consumption in the country.

Reserves

Svenska Kraftnät must have access to various services and measures to balance and manage disturbances in the power system. This is achieved by purchasing different types of reserves from the electricity market.[65]

In order for Svenska kraftnät to be able to ensure a reliable power system, the ability to quickly handle overloads as a result of disturbances is also needed. For this, it is important to have access to strategically placed overload management, i.e. rerouting of flows to relieve limited grid components. Svenska kraftnät procures congestion reserves for a five-year period.

[63] *Framtagning av informationskampanj elenergibrist*, Swedish Energy Agency, registration number 2012-001325.
[64] Spara energi - enkla tips 2023-06-14
[65] Om olika reserver | Svenska kraftnät 2025-01-10

On very cold winter days, there may be temporary situations where electricity consumption appears to exceed the production of electricity. Svenska kraftnät can procure a strategic reserve[66] that can be activated when the market's resources to balance the system are not sufficient.[67] In practice, this means that Svenska kraftnät, with the support of the Regulation (2025:835) on a capacity mechanism for the electricity market, enters into agreements with capacity providers.[68] The introduction and design of a capacity mechanism is regulated in Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity.[69] For example, strategic reserve is only applied if the Member State has a identified resource adequacy problem.[70] In addition, the Member State applying a capacity mechanism must have a decided reliability standard. In November 2022, the government decided on a reliability standard for Sweden of 1 hour per year, based on the Energy Markets Inspectorate's proposal.[71] A capacity mechanism requires city aid approval from the European Commission. The Government has decided to introduce a capacity mechanism for the electricity market in the form of a strategic reserve after the Swedish application for state aid support was approved by the European Commission in 2025.[72] For the period January 15 to March 15, 2026, Svenska kraftnät has signed an agreement for a strategic reserve with two different electricity producers for a total of 350 MW.[73]

System defence plan, restoration plan, and test plan

In accordance with Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation SO)[74] and Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration[75], Svenska kraftnät shall develop a system defence plan, restoration plan, and a test plan[76].

The system protection plan shall specify the conditions for activation and describe the measures to be taken by Svenska kraftnät, distribution system operators and significant grid users. The plan shall include a list of high-priority network users and the conditions for their disconnection, as well

[66] A strategic reserve is a form of capability mechanism.
[67] Strategisk reserv | Svenska kraftnät 2025-12-19
[68] Förordning (2025:835) om en kapacitetsmekanism för elmarknaden, 3 §
[69] *Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity*, OJ L 158, 14.06.2019, CELEX number: 32019R0943
[70] *Regulation (EU) 2019/943, chapter IV article 20.*
[71] Regeringen beslutar om en tillförlitlighetsnorm för Sverige - Regeringen.se 2025-12-21
[72] Införande av en kapacitetsmekanism för elmarknaden i form av en strategisk reserv - Regeringen.se
[73] Svenska kraftnät tecknar avtal om en strategisk reserv | Svenska kraftnät
[74] COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, Celexnummer: 32017R1485.
[75] *Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration,* OJ L 312, 28.11.2017. CELEX number: 32017R219.
[76] See Svenska kraftnät's test plan in accordance with Commission Regulation (EU) 2017/2196. 2023-12-15, ärendenummer 2020/2098.

as deadlines for each action. It shall include both automatic and manual measures covering frequency and voltage stability as well as power.

The restoration plan shall set out the activation conditions and measures for the actors concerned, correspondingly. It shall include measures for re-energizing, frequency deviation management and resynchronisation. The plan must also identify energy sources that are necessary for energising and have the ability to black start the grid, house load operation and island operation.

The test plan shall, in accordance with Article 43.2 of the ER, identify the equipment and resources that are included in the system protection plan and the restoration plan and that must be tested. It is the Energy Market Inspectorate, in its role as national supervisory authority, that has the task of ensuring that the actors concerned fulfill their obligations according to the regulations. The Energy Market Inspectorate approved Svenska kraftnät's test plan in April 2024.[77]

The regulatory framework aims to ensure that extensive disturbances and breakdowns in the electrical system are avoided and to enable an efficient and rapid restoration of the electricity system in the event of a major disturbance.

The day-ahead trading and intraday market

Detailed rules for trading the day before and intraday are found in the CACM Regulation[78] and in the methods and conditions decided on the basis of the CACM Regulation, for example, there is a so-called market coupling plan and an algorithmic method that governs how trading works. These and other methodologies thus regulate how transmission system and market operators should interact with each other in the context of so-called market coupling. The main rule is that the entire EU is market-linked. However, there are also different types of regional methods in the event that problems arise in linking all bidding zones to the market with the aim of increasing the robustness of the system.

In 2018, the Swedish Energy Markets Inspectorate approved Nord Pool and EPEX Spot's proposal for an alternative method as a back-up, which was prepared jointly by the nominated electricity market operators in the EU.[79] For the day-ahead market, the method means, among other things, that there must be a back-up coordinator who can take over the coordinator's role when he or she is unable to fulfil his or her duties. The method also concerns alternative communication channels to the market coupling function and requirements for certain specified exercises and tests.

[77] 2023-104470-beslut-provningsplan.pdf
[78] COMMISSION REGULATION (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management Celex: 32015R1222
[79] CACM-Artikel-36-Förslag-backup-metod.pdf (ei.se)

Article 44 of the CACM also requires transmission system operators to jointly develop fallback procedures to ensure capacity allocation in the event that the single day-ahead coupling is unable to produce results. Back-up procedures are activated when it is clear that the common day-ahead coupling, including the alternative procedures above, cannot produce any results, and disconnects the different capacity calculation regions, either fully or partially.

In 2018, the Energy Markets Inspectorate approved the TSOs' proposal for the establishment of fallback procedures in the Nordic capacity calculation region, together with the other Nordic supervisory authorities.[80] According to the methodology, fallback procedures are to be carried out by a designated fallback coordinator, who rotates between the electricity exchanges operating in each bidding zone in the Nordic region and is the coordinator and back-up coordinator for the regular market coupling. The fallback procedures consist of two steps, step two is applied only in case the fallback coordinator fails to achieve results through step one. In step 1, the capacity of interconnectors to and from the Nordic region[81] is set at zero and net positions and clearing prices are calculated for each bidding zone in the Nordic region. In cases where the reserve coordinator is unable to calculate net positions and clearing prices for each bidding zone, step 2 means that these should instead follow from a reference date.

The ER Regulation states that a TSO may temporarily suspend one or more market activities if the transmission system of the TSO is subject to network failure or other strained situations. Article 35(1) of the ER provides:

- the transmission system is affected by a network failure, or
- the TSO has exhausted all possibilities available in the market and continued market activities in combination with emergency state would exacerbate one or more of the conditions referred to in Article 18(3) of the SO,
- continued market activities would significantly reduce the efficiency of the process of reconstruction to normal or enhanced operational state, or
- tools and means of communication necessary for transmission system operators to facilitate market activities are not available (Article 35(1)).

[80] All TSOs' of the Nordic Capacity Calculation Region amended Proposal for fallback procedures
[81] Alternatively Nordic and Baltic states

In the above-mentioned situations, market activities may be temporarily suspended, e.g. the market activities that may be suspended are the activity of providing cross-zonal capacity for capacity allocation at the corresponding bidding zone boundary for each market time unit where it is expected that the transmission system will not be restored to a normal operating state or an enhanced operating state. In addition, for example, other relevant market activities the suspension of which is deemed necessary to maintain and/or rebuild the system (Article 35(2)).

It is the transmission system operator, i.e. Svenska kraftnät, that prepares a proposal for rules concerning the temporary suspension and resumption of market activities. This proposal shall be subject to approval by the supervisory authority, i.e. Ei, unless the rules are defined in the national law of the Member State. In 2018, Svenska kraftnät submitted a proposal that no market activities should be temporarily interrupted and no alternative rules have been proposed, Ei has approved this.

Supporting measures

By supporting Elsamverkan (disruption preparedness for local and regional network disruptions) and through the development and management of a web-based national tool, used to facilitate cooperation between distribution operators during disturbances within Sweden, Svenska kraftnät has initiated cooperation and coordination between actors within the area of responsibility with respect to the planning and preparation for crisis management and such work during crises. Through reporting, it is possible for electricity cooperation management to get an overview of the disturbance situation and they can cooperate with distribution operators in an efficient manner.[82]

Svenska kraftnät can convey resources such as backup materials and communication equipment stored in stockpiles, but also repair personnel. The Swedish Armed Forces' resources can also be used.

In the event of an electricity crisis, procedures and measures may arise that directly or indirectly affect electrical safety. The Swedish National Electricity Safety Board can assist with risk analyses and proposed solutions.

Security of supply and functional requirements

According to the Electricity Act, the transmission network is defined as a technically and operationally coherent power grid with a voltage of 220 kV or more, spans several regions in Sweden and connect the national network to networks in other countries. Svenska kraftnät is the only transmission system operator in Sweden and disturbances on the transmission grid that cause disruptions in the electricity supply are uncommon. Svenska kraftnät is currently strengthening the Swedish transmission grid with new lines and

[82] Elsamverkan och Susie | Svenska kraftnät (svk.se), 2021-01-14.

stations to connect new wind power, remove restrictions in the network and to meet society's high demands for safe electricity supply.[83]

Svenska kraftnät has a system development plan for 2022-2031[84], which describe how they ensure that the transmission network is cost-effective, operationally reliable and ready to handle new challenges.

Regional and local networks refer to networks with network concession for line or area with a voltage below 220 kV. Network operators with network concessions for line or area annually report data to the Swedish Energy Markets Inspectorate on outages and other information linked to the security of supply. The purpose of the reporting by network operators is, on the one hand, to form a basis for the Swedish Energy Markets Inspectorate's oversight of the security of supply in networks and, on the other hand, to form the basis for the quality adjustment included in the calculation of the revenue frameworks of network operators.

The Electricity Act (SFS 1997:857) imposes a functional requirement that an outage may not exceed 24 hours. However, the functional requirement does not apply if the outage was due to a hindrance beyond the control of the network owner.

The Swedish Energy Markets Inspectorate's regulations and general advice on requirements to be met for the transmission of electricity to be of good quality (EIFS 2023:3) sets out requirements that must be met in order for the transmission of electricity to a customer to be considered of good quality. The regulation specifies requirements for the quality of the voltage but also requirements for the security of supply. The requirements state that transmission line corridors above 25kV must be tree-safe in order to prevent falling trees and branches from causing power outages. Furthermore, there are requirements for the number of disruptions and a special functional requirement for load levels above 2 megawatts.

Information campaigns

In order to facilitate preparations in society that prevent and mitigate the consequences of disturbances and disruptions in electricity supply, the Swedish Energy Agency has prepared information materials and information campaigns aimed at the public. These information campaigns contain information, advice and tips to different target groups on how to prepare for a situation where a longer outage occurs.[85] The Swedish Civil Defence and Resilience Agency (MCF) also provides guidance on how private individuals should strengthen their home preparedness.[86] The purpose of the information is both to reduce the vulnerability of the individual to disruptions in the electricity supply and to reduce the need for societal emergency relief efforts

[83] Transmissionsnätsprojekt | Svenska kraftnät (svk.se), 2025-01-10.
[84] Systemutvecklingsplan 2022–2031
[85] Elavbrott, 2025-01-10.
[86] Grunder i hemberedskap | MCF, 2025-12-10.

so that available societal resources have the greatest possible benefit to society. One expected effect of information campaigns of this type is, for example, that the individual's preparations help reduce the need for warming cabins in the event of a longer electricity supply outage during winter, as the individuals themselves can prepare to meet their needs for a longer period of time. Furthermore, the Swedish Energy Agency, together with other authorities, provides advice and information on issues related to auxiliary power[87] and supports local and regional authorities with knowledge based information in order to improve local emergency preparedness in the event of disturbances and disruptions in energy supply.

Sweden's total defence is to be strengthened and there are decided starting points for the years 2025-2030.[88] Civilian activities must have the ability to maintain the important societal functions for at least two weeks, primarily with their own resources, for example during the initial phase of a war. The capability means that those who carry out socially important activities, regardless of whether they are under public or private auspices, despite very strained conditions and great uncertainties, must ensure this through, for example, prepared plans, procurement and storage of supplies and goods, securing staff and other concrete measures.

3.1 c) Measures to mitigate electricity crises

Import

In accordance with the electricity market regulation, the transmission system operator shall not limit the amount of interconnection capacity to be made available to market participants in order to resolve congestion within its own bidding zone or as a means of managing flows resulting from internal bidding zone transactions. The net transmission capacity shall be at least 70 % of the transmission capacity while respecting the operational security limits.[89]

Before Svenska kraftnät reaches the stage of having to interrupt the transmission of electricity, all available bids in the spot market for electricity[90] have been used and the possibility of importing power from neighbouring countries has both been investigated and implemented.[91]

If there is a risk of a power shortage, Svenska kraftnät has the right, according to Article 21 of the ER, to request assistance with active power to remedy the shortage. Svenska kraftnät may order generation facilities

[87] Reservkraft, 2025-01-10.
[88] Dokument, 2025-12-10.
[89] Regulation (EU) 2019/943 Articel 16 8
[90] Spot market for electricity refers to the marketplace for electricity trading where mainly generators sell electricity to supply undertakings, which in turn sell it to consumers. The majority of hourly trading takes place at Nord-pool, the Nordic electricity exchange. On the Stockholm Stock Exchange Nasdaq OMX, there is also long-term trading for electricity Export och import av el - så funkar det | Svenska kraftnät, 2025-01-10.
[91] (ASP (agreed supported power) and possible EPC (emergency power).

to maximise the input of power, provided that it is not already activated via the balancing market and within its technical limitations. Other countries are also obliged to assist with active power as long as they do not risk emergency operation or black-out.

Power reserve

Svenska kraftnät has access to various services and measures to balance and manage disturbances in the power system. This is done by purchasing different types of reserves from electricity market.[92]

The strategic reserve that Svenska kraftnät procures in accordance with the Ordinance (2025:835) on a capacity mechanism for the electricity market is only activated if Svenska kraftnät assesses that it is likely that the balancing resources will be exhausted in order to establish an equilibrium between supply and demand for electricity. The assessment is made on an ongoing basis.

Svenska kraftnät's overload management ensures operational reliability in the event of disturbances. If electricity production is lost or there is a fault in the transmission network's lines, there will be disruptions in the operation of the electricity system. If the bids on the balancing market are not enough to fix the disturbance, Svenska kraftnät activates the overload resource and gets the system back in balance. The overload management currently consists of an installed capacity of 1,300 MW in the SE3 and SE4 bidding areas. The resources, which include 20 gas turbines in 10 different plants, are particularly important in high-load areas or in operations that risk overloading the grid. The resources must be able to be activated within 15 minutes and enable the electricity system to quickly return to balance in the event of disturbances, such as production losses or faults in the transmission grid's lines.[93]

According to Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration, a transmission system operator (TSO) may, under certain specific conditions, interrupt market activities[94]. The regulatory authority approves the circumstances in which TSO may interrupt market measures in the Member State concerned. In accordance with Svenska kraftnät's proposal that Svenska Kraftnät does not intend to discontinue market activities, has the Energy Markets Inspectorate approved the rule to never interrupt any market activities when the system is outside normal operation.[95]

[92] Om olika reserver | Svenska kraftnät 2025-01-10.
[93] Överbelastningshantering | Svenska kraftnät 2025-01-10.
[94] Regulation (EU) 2017/2196, Art. 36 p. 2, Art. 39 p. 1 para. 2.
[95] ER-Artikel-4.2-a-Ei-beslut-2018-102598.pdf

Consumption-reducing measures

In order to avert a situation of electricity shortages that the market cannot handle, the Swedish government can decide to moderate electricity consumption in the country. The Energy Agency has a prepared information campaign that can be directed to all households about saving electricity and a prepared measure in the form of giving state authorities to take measures to reduce their electricity consumption. [96] [97] If this should not be enough, the government can decide on rationing of electricity.[98]

Production regulation

Svenska kraftnät is permitted, pursuant to Chapter 8, Section 2 of the Electricity Act, to the extent necessary for the exercise of their system responsibility, to order electricity producers to increase or decrease the production of electricity.

Alternatively, if system responsibility cannot be exercised through such measures mentioned above, Svenska kraftnät may order distribution companies to limit or suspend the transmission of electricity to end users. The limitation and suspension of transmission shall, to the extent covered by system responsibility, be carried out in such a way as to give priority to essential consumers.[99]

In war or when the government decides, it is Svenska kraftnät's task to, in cooperation with other total defense authorities in the energy supply sector, meet society's need for electricity by planning, leading and coordinating the resources of the electricity supply. When consumption regulation of electricity has been introduced, Svenska kraftnät must, to the extent prescribed by the government, be responsible for long-term planning and direction of electricity production. [100]

Measures that may affect greenhouse gas emissions

According to statistics for 2023, Sweden's total greenhouse gas emissions were 44.4 million tonnes of CO2 equivalent, of which electricity and district heating production accounted for 3.8 tonnes (i.e., 8.6% of total emissions). [101]

Emissions may increase if fossil fuel power generation increases in Sweden, e.g., if there is an increased need for planed production or rapid reserve production, but this will still be from relatively low emission levels.

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[96] *Framtagning av informationskampanj elenergibrist*, Energimyndigheten, diarienummer 2012-001325.
[97] Spara energi - enkla tips 2025-01-10
[98] Ransoneringslag (1978:268).
[99] Ellagen 8 kap 5§
[100] SFS 2025:782, 11 §.
[101] Sveriges utsläpp av växthusgaser (naturvardsverket.se)

The power reserve consists until 2025 of 562 MW of generation capacity in the form of condensing power that can be started up as needed to help maintain the power balance in times of stress. The power reserve was available during the period 16 November-15 March, as it is mainly during very cold winter days that situations may temporarily arise where electricity consumption exceeds available generation and electricity imports. During the winter of 2023/2024, the power reserve was ordered to 2-hour standby 11 times and ordered to minimum operation[102] 4 times. For the period January 15 to March 15, 2026, Svenska kraftnät has signed an agreement for a strategic reserve with two different electricity producers for a total of 350 MW.[103]

The overload management can be activated by the Swedish transmission system operator Svenska Kraftnät when the volumes of manual reserves are insufficient to restore the automatically activated reserves. The overload management consists mainly of 22 gas turbines procured in the SE3 and SE4 electricity areas with a total installed capacity of approx. 1393 MW.[104] The disturbance reserve had 25 starts in 2024.

3.1 d) Framework for Manual Load Shedding (MLS)

Manual Load Shedding

Should the strategic reserve capacity[105] prove insufficient, Svenska kraftnät may, as a last resort, order manual load shedding under Regulation (EU) 2017/2196 on establishing a network code on electricity emergency and restoration, and, at national level, the Electricity Act (SFS 1997:857) to maintain the power balance in the electricity system. In this case, distribution system operators must disconnect certain parts of the load on very short notice in order to maintain the balance in the electrical system as a whole and to control the consequences of disturbances and to prevent possible spill-over effects in the event of errors.

In order for vital societal functions to continue operating to the extent possible, Sweden has, with the support of Ordinance (SFS 2011:931) on planning for prioritisation of essential consumers, the *Styrel* Regulation, drawn up planning documentation for the desired prioritisation of disconnecting consumers in the event of electric power shortages. The method is called *Styrel*. The planning documentation shall, 'to the extent that system responsibility permits', be considered by Svenska kraftnät in a situation where transmission needs to be restricted or interrupted.[106]

[102] Minimum operation means that the plant is operating at minimum power (40MW per block). This is to be able to increase production quickly if necessary
[103] Svenska kraftnät tecknar avtal om en strategisk reserv | Svenska kraftnät
[104] Upphandlingen av resurser för överbelastningshantering i transmissionsnätet är avslutad | Svenska kraftnät 2025-01-10.
[105] Effektreserv | Svenska kraftnät (svk.se) 2025-01-10.
[106] Electricity Act (SFS 1997:857) Chapter 8, Section 2, Regulation (1994:1806) on system responsibility for transmission Section 15 c.

MLS is a final resort when dealing with a power shortage situation in a controlled manner.

Manual Load Shedding procedure

Thus far, MLS has so far never been used, but have on a couple of occasions been close to being activated. There are essentially two different types of situations where the need for MLS may arise, expected or unexpected. One expected situation can be that production resources are stretched while consumption is high. Svenska kraftnät can here, given the normal variations in consumption, identify that a consumption peak is to be expected during, for example, the following morning. The unexpected situation occurs suddenly or, for example, when multiple independent errors occur at the same time.

If a situation arises where MLS may be used, personnel in Svenska kraftnät's control room must quickly identify that the situation can only be solved through MLS. Svenska kraftnät assesses the extent of the need for MLS and locates the geographical route. Svenska kraftnät then communicates what power volume needs to be disconnected to specially designated distribution operators that have staffed control rooms around the clock. The disconnection shall, unless otherwise stated, take place within 15 minutes of the order from Svenska kraftnät.[107]

The role of distribution system operators in Manual load shedding

The role of distribution system operators in the case of manual disconnection and connection of electricity consumption is regulated in Svenska kraftnät's regulations and general advice on equipment for load shedding (SvKFS 2021:1). The regulations require distribution operators to be prepared for and have the necessary equipment to be able to manually disconnect or connect electricity consumption at the order of Svenska kraftnät. Disconnection shall be possible to a degree of at least 50 % of the current load. A plan shall be drawn up by each respective network operator for this purpose, and special order routes shall be drawn up. Disconnection and connection shall, where possible, consider prioritised consumers.[108]

The designated distribution operators can disconnect their own network and forward the order to any underlying distribution operators. Disconnection is done either by the control room staff systematically remotely operating switches to disconnect loads, or by initiating automatic pre-programmed sequences. Forwarding the order takes time, especially when many underlying distribution operators are involved. In the case of urgency, it is likely that the own network is responsible for most of the disconnection, and that the priority made of the underlying

[107] *Föreskrift om ändring i Affärsverket svenska kraftnäts föreskrifter och allmänna råd (SvKFS 2001:1) om utrustning för förbrukningsfrånkoppling,* SvKFS 2012:1, Section 2 g.
[108] SvKFS 2021:1, 2 §.

distribution operators can be used for load redistribution when the emergency situation has been resolved.

Procedure for connecting after MLS

When Svenska kraftnät deems it possible to connect loads, Svenska kraftnät notifies the specially designated distribution operators. This, too, concerns specific power volumes, and could take place in several steps as the situation improves. The net power output may only increase again following notification from Svenska kraftnät. Before then, it is possible, and may be relevant, to redistribute which parts of the network are disconnected. Connection shall also consider prioritised end users.

Svenska kraftnät's duty of reporting in case of interruption of transmission

If Svenska kraftnät has ordered and implemented the interruption of transmission, Svenska kraftnät shall submit a report of the incident to the Swedish Energy Markets Inspectorate within 30 days.[109]

Styrel

As mentioned above, the Swedish Energy Agency has, together with other actors, developed *Styrel*, which is a method of planning so that essential consumers can be prioritized in the event of disconnection. *Styrel* can be summarised as the planning process during which national authorities, county administrative boards, municipalities, private actors, and network operators collaborate to develop the basis for prioritising essential consumers in case of MLS. The purpose of *Styrel* planning is to mitigate the societal consequences in a situation where MLS must be resorted to in the event of an electric power shortage. The Swedish Energy Agency, pursuant to Ordinance (SFS 2011:931), the *Styrel* Ordinance has issued a regulation on the method for the development of the priority base through the Swedish Energy Agency's regulation on planning for the prioritisation of essential consumers (STEMFS 2013:4).

According to the regulation (STEMFS 2013:4), county administrative boards, participating national authorities, network concession holders, and municipalities must plan for prioritising essential consumers according to the method set out in the regulation.[110] The regulation states that an essential service is an activity of such importance that the loss or serious disturbance of the activity would entail great risks or danger to the life and health of the population, the functionality of society, or the fundamental values of society.[111] The essential consumers identified in the planning documentation shall, if possible, be taken into account by Svenska kraftnät in case of MLS. When identifying and prioritizing

[109] Regulation (EU) 2017/2196, Chapter IV, Art. 37 (6).
[110] SFS 2011:931, Section 3.
[111] *The Swedish Energy Agency's regulation on planning for prioritisation of essential consumers* (STEMFS 2013:4), Section 2.

essential users, no account is taken of the user's power consumption or whether they have their own backup power. The Styrel process is normally repeated every four years and leads to network operators receiving data showing an order of priority of lines out of substations (typically 10-20 kV). The planning documentation is used by the network company to create its plan for MLS.

Priority classes within Styrel

When compiling the planning documentation for *Styrel*, the vital societal functions identified shall be divided into one of eight priority classes.[112] These are listed below in descending order of priority:

1. Consumers who even in the short term (hours) are of great importance to life and health.

2. Consumers who even in the short term (hours) are of great importance to societal functionality.

3. Consumers who in the longer term (days) are of great importance to life and health.

4. Consumers who in the longer term (days) are of great importance to societal functionality.

5. Consumers who represent major economic interests.

6. Consumers who are of major importance to the environment.

7. Consumers who are of major importance to social and cultural interests.

8. Other consumers.

3.1 e) Mechanisms used to inform the public about the electricity crisis

Svenska kraftnät´s mechanism used to inform the public about an electricity crises.

In a situation where Svenska kraftnät has gained knowledge of the risk of power outage, electric power shortage, or energy shortage likely to have effects in neighbouring countries and thus lead to a more extensive electricity crisis, Svenska kraftnät is responsible for informing the Swedish Energy Agency and the public about the risk of an electricity crisis or that there is an existing electricity crisis. When formulating external communication, Svenska kraftnät uses the current situational

[112] SFS 2011:931, Section 5.

picture's direction and overall message as a basis. In the external messages, Svenska kraftnät ensures that the priority order people, environment, property, economy is clear. Through the external information, Svenska kraftnät can, using consistent messaging, convey a picture of the situation and what measures are being taken. External information is important for answering questions from the public, industry, other stakeholders, public authorities, and the media.

Svenska kraftnät's mechanisms

- Continuously updating the website www.svk.se, possibly activating and managing crisis website depending on the degree of crisis. Considering the need for information in English at www.svk.se.

- Updating and responding to social media posts, such as *Facebook, X*, and *LinkedIn* based on agreed handling.

- Providing the switchboard and reception with information to answer questions from external visitors and callers.

- Handling the media proactively and reactively, issuing press releases, and arranging a press conference if necessary.

- Updating Svenska kraftnät's pages on Krisinformation.se if necessary.

- If necessary, issuing an IPA (important public announcement) via Sveriges Radio. [113]

- Ensuring that external actors have correct and up-to-date information when cooperating with them.

- Keeping in touch with MCF's network of information officers and communication departments of the parties we cooperate with.

The communication department at Svenska kraftnät is responsible for all press contacts and for appointing spokespersons. All requests from journalists regarding statements about Svenska kraftnät's assessment are handled by the press office.[114] Svenska kraftnät's press and communication preparedness is staffed around the clock and the press office is available for support and advice if necessary. Press releases are designed by the Communications unit at Svenska kraftnät in collaboration with the accountable manager or representative appointed by the

[113] See further information under the heading *National mechanisms used to inform the public about crisis*, p. 32
[114] See Annex 1 Contact details.

accountable manager such as project manager, purchaser, or responsible administrator.

The Swedish Energy Agency's mechanisms used to inform the public about an electricity crisis

As the administrative authority responsible for energy supply and consumption matters and as the competent authority for the Risk Preparedness Regulation, the Swedish Energy Agency is responsible for informing the public and society in the event of a situation involving issuing an early warning or electricity crisis.

The mechanisms of the Swedish Energy Agency

- Prepared web pages on the Swedish Energy Agency's website www.energimyndigheten.se, which can be quickly activated to inform about an electricity crisis. The web pages contain general information and enable rapid publication on the authority's website in the event of an early warning of an electricity crisis or an electricity crisis. When an incident occurs, the website can be activated and information that has been consulted between the communications functions of Svenska kraftnät and the Swedish Energy Agency can be published quickly. Essential information will also be published in English. Furthermore, links to www.svk.se, krisinformation.se, dinsäkerhet.se, or other relevant sources of information may be added to the website.

- The Swedish Energy Agency may share published information from the website www.energimyndigheten.se in other media channels such as *Facebook, X, and LinkedIn*.

- The Swedish Civil Defence and Resilience Agency should be informed of the situation at an early stage and be provided with information that can be published on krisinformation.se. Other public authorities such as the Swedish National Electricity Safety Board, the Swedish Energy Markets Inspectorate, and the Swedish Radiation Safety Authority should also be informed to help disseminate the information.

Communication challenges

The Swedish Energy Agency's capability to continuously provide the public with updated information about early warning of an electricity crisis, electricity crisis, or situation updates is only deemed possible as long as the Swedish Energy Agency has access to electricity supply and operation of its own communications. In the event of a complete loss of electricity, information to the public will not be possible to maintain through websites and social media except possibly for a very limited period of time. In the event of temporary loss of electricity supply or in

the event of an electricity crisis, the public's access to information is likely to be very limited. The extent to which communications functions will continue to be available is also affected by the preparations for auxiliary power and manual connection/disconnection that have been made at regional and local level. In this context, the individual's own preparations will also have a major impact on the individual's ability to access information communicated through power-dependent media, such as access to their own auxiliary power, backup batteries, battery-powered radio and so on.

National mechanisms used to inform the public about an electricity crisis

If severe incidents and disruptions to critical infrastructure occur, the IPA (important public announcement) system can be used. IPA is broadcast via radio (Sveriges Radio P4), TV, krisinformation.se, via web, apps (Facebook, X, LinkedIn, and Instagram), but can also be used for very serious events through an outdoor warning system. In order to have a mandate to request an IPA, the person requesting to issue the message must be authorised to do so. In the case of power outages, Svenska kraftnät and the major electricity distributors are authorised to request the IPA. For extraordinary events, the Government through the Government Offices of Sweden, all designated authorities and municipalities and county councils are authorised to make such requests.[115] Anyone who is authorised and who wishes to have an IPA message broadcast must contact their regional emergency centre, which forwards the request to the broadcasting management at Sveriges Radio, which ensures that Sweden's radio channels broadcast the message and that the message is sent to participating broadcasters.[116] When an authority requests an IPA via SOS Alarm, Sveriges Radio's broadcasting management formulates the message as the broadcast medium requires a different way of expression. The IPA is also just the first message, which cuts off radio broadcasts, adds a crawl message to the TV screen, adds a banner on sites, sends text messages to phones, etc. The public authority requesting an IPA must continuously deliver information to the public through Sveriges Radio's broadcasting management throughout the event. Both SOS Alarm and Sveriges Radio have been assigned Rakel to always be available to broadcast an IPA if requested by a public authority.

If an early warning of an electricity crisis is issued, links with information from Svenska kraftnät, the Swedish Energy Agency or other relevant actors can be communicated via the website krisinformation.se, operated by MCF. [117]

[115] Requesting an IPA (mcf.se), 2021-01-14.
[116] VMA (mcf.se) 2021-01-14
[117] Important public announcement, IPA - Krisinformation.se, For public authorities and other actors -Krisinformation.se, 2021-01-14.

The public can also obtain information about ongoing crises by calling 113 13 or visiting the municipalities' websites. For those who need additional support for information, text/videotelephony or Teletal are available.[118]

The Swedish Energy Agency can conduct a national collaboration conference for specially designated electricity network companies and major producers, as well as authorities and industry associations to inform why the early warning is issued. Swedish Civil Defence and Resilience Agency can be helpful to organise invitations to a collaboration conference with authorities and Svenska kraftnät with electricity network companies and producers.

3.2 Regional and bilateral procedures and measures

3.2 a) Agreed cooperation mechanisms within the region

Nordic collaborations

As mentioned above, the Swedish crisis management system has three basic principles: the principle of responsibility, the principle of equality, and the principle of proximity. The person responsible for an activity under normal conditions shall also be responsible in a crisis situation. These are the common principles on which Nordic co-operation is based.

The prerequisites for properly managing crises in a complex system, such as a power system, are based on well-established procedures and processes. The technical fact that the synchronous area covers not only Sweden, but also the Nordic countries, creates an additional complexity that needs to be addressed. Although many measures are local in nature, it is necessary to coordinate so that nothing unexpected happens or incorrect measures are taken.

In order to create the right conditions for ongoing operational work, a number of activities are carried out jointly with the other Nordic system operators such as:

- development of procedures
- joint exercises
- exchange of information for decision support
- incident follow-up
- Nordic groups for management, development and decisions

The Nordic Operational Coordination Centre (N-RCS)[119] performs a number of tasks in support of planning of and operation.

[118] Important telephone numbers -Krisinformation.se, 2021-01-14.
[119] Forside - Nordic Regional Coordination Centre 2025-01-10

3.2 b) Regional and bilateral measures

Both within Nordic cooperation and with other connected countries, there are agreed measures to be taken in case of an emergency. For the Nordic countries, this is regulated in the so-called Nordic SOA (System Operation Agreement). For other accession countries, this is regulated in separate bilateral SOAs. The bilateral agreements concluded must relate to the Nordic SOA.

Depending on the nature of the emergency, there are different response mechanisms that are activated in order to return to normal operating mode. The TSO, or country, where an emergency occurs covers the cost of, for example, the use of emergency power from a remedying party. The cost regulation is also agreed in each respective SOA. These include electricity balancing agreements[120] and Chapter 3.2 describes how energy exchanged between TSOs should be priced. In addition, there is an agreement on Capacity Allocation and Capacity Management[121] which describes in chapter 6 how costs are to be allocated and which calculation methods are to be used. The Swedish Energy Markets Inspectorate is the supervisory authority for compliance with regulations EU 2017/2195[122] and 2015/1222[123].

In Sweden, the transmission system operator is Svenska kraftnät, i.e. a state-owned enterprise, which means that the state ultimately guarantees the authority's payments.

For further and more detailed information, please refer to published material of the European Network of Transmission System Operators (ENTSO-E).[124]

3.2 c) Cooperation and support mechanisms

Nordic cooperation in electrical risk preparedness takes place in addition to the ongoing and operational cooperation between Nordic system operators mentioned above, including in the Nordic cooperation forums NordAM (Nordic Asset Management Forum) and NordBER, an electricity preparedness network for all Nordic energy and electricity preparedness authorities and system operators[125]. Within the Nordic co-operation NordAM, the Nordic system operators have concluded mutual assistance

[120] Microsoft Word - Nordic SOA_Annex EB (entsoe.eu)
[121] Nordic System Operation Agreement (SOA) - Annex Capacity Allocation & Capacity Management (CACM) (entsoe.eu)
[122] COMMISSION REGULATION (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing, celex 32017R2195
[123] COMMISSION REGULATION (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management, celex:32015R1222
[124] https://www.entsoe.eu/publications/system-operations-reports/#nordic
[125] Letter of Intent was signed in 2010 between the Nordic energy and electricity preparedness authorities and the system operators regarding the Nordic Contingency Planning and Crisis Management Forum, i.e. NordBER (Swedish Energy Agency's reference number 60-10-00478).

agreements in the event of major operational disruptions, which means that repair resources can be called off.

NordBER is a cooperation for electricity preparedness in the Nordic region. The aim of the cooperation is to exchange information and experiences and to increase the conditions for the coordination of joint projects and activities relevant to the preparedness and crisis management of electricity supply.

Nordic cooperation can also be mentioned briefly. In April 2009, Nordic Ministers responsible for civil protection and preparedness met at Haga Palace in Stockholm to deliberate on how to strengthen their cooperation with the vision of deepening and broadening the Nordic cooperation within civil protection and preparedness. The first Haga Declaration (Haga I) was adopted. Four years later, in 2013, the second Haga Declaration (Haga II) was adopted under Swedish presidency. The declaration embraces a common vision: A robust Nordic region without borders. The vision aims for a society with decreasing vulnerability while strengthening the capability of handling serious accidents and crises and restoring functionality. The new and altered threat landscape has shown that the work on civil protection and preparedness cannot be considered solely from a national perspective; it also requires cross-border cooperation. The ability to help one another across borders in cases of serious incidents is of great importance.[126]

A letter of intent between Sweden and Finland on closer cooperation in the field of civil preparedness and rescue services was signed on 10 February 2021 by the Swedish Minister for Home Affairs and the Finnish Minister of the Interior. The aim is to improve the countries' resilience capabilities and to promote common interests in the field of crisis preparedness. The cooperation is based on the need to strengthen the capability to prevent and manage risks, vulnerabilities, and threats in both the short and long term. The wide range of stresses means that preparedness must be built for different types of accidents and crises and, ultimately, war. Closer cooperation also creates better conditions for mutually providing and receiving bilateral support efficiently, including host nation support.[127]

The chairmanship of these meetings alternates between the Nordic countries. During the period 2022-2024, the collaboration has been focused on measures following lessons learned from Covid-19, climate change and host country support. The directors-general agreed in January 2023 to expand their cooperation with new concrete activities.[128] They

[126] Nordiskt samarbete 2025-01-10
[127] https://www.regeringen.se/overenskommelser-och-avtal/2021/02/avsiktsforklaring-mellan-sverige-och-finland-rorande-fordjupat-samarbete-inom-krisberedskap-civilt-forsvar-och-raddningstjanst/ 2025-01-10
[128] kobenhavn-erklaringen.pdf

agreed to establish a Nordic secretariat to drive and promote initiatives and monitor and ensure a united and coordinated Nordic work. Initially, the Secretariat will develop a plan for both short-term and long-term activities.

4 Crisis coordinator

The National Crisis Coordinator[129] at the Swedish Energy Agency is responsible for the Swedish Energy Agency proclaiming an electricity crisis and act as a national contact point in accordance with Regulation (EU) 2019/941, Chapter IV Art. 14.

In the event of an electricity crisis, the national crisis coordinator shall without undue delay notify the competent authorities of Member States within the same region, the competent authorities of directly connected Member States and the Commission.[130]

[129] Crisis Coordinator is defined in Article 2(13) as a person, a group of persons, a team composed of the relevant national electricity crisis managers or an institution tasked with acting as a contact point and coordinating the information flow during an electricity crisis.
[130] The competent authorities of Finland and Denmark, located in the same region, and the competent authorities of Poland, Lithuania, and Germany, which constitute directly connected Member States, and the European Commission shall be notified of the existence of an electricity crisis without undue delay.

5 Stakeholder consultation

The first risk preparedness plan according to EU 2019/941 was reported in 2021 and consultation was carried out through a written referral procedure according to the list below. For the 2025 update, oral and written consultations were carried out primarily with Svenska kraftnät, the Energy Market Inspectorate, the Radiation Safety Authority and the industry organization Energiföretagen Sverige.

Numerous qualified proposals for improvements were received and have entailed some change to the risk-preparedness plan. Other proposals require more extensive investigative work and are governed by work carried out within the framework of other EU regulations and network codes outside the responsibility and control of the competent authority.

a) Relevant electricity and natural gas undertakings, including relevant producers or their trade bodies

The trade bodies Swedish Gas Association (Energigas Sverige) and Swedenergy (Energiföretagen Sverige). The three largest electricity producers in Sweden: Vattenfall, Sydkraft, and Fortum.

b) Relevant organisations representing the interests of non-industrial electricity customers

The Swedish Association of Local Authorities and Regions (SKR) and the Swedish Consumer Energy Markets Bureau (konsumenternas Energimarknadsbyrå).

c) Relevant organisations representing the interests of industrial electricity customers

Confederation of Swedish Enterprise (Svenskt näringsliv)

d) Authorities

The Swedish Energy Markets, the National Electrical Safety Board, the Swedish Radiation Safety Authority, and the Swedish Civil Defence and Resilience Agency.

e) Transmission system operators

The drafting of this plan has been carried out through close collaboration between the competent authority (The Swedish Energy Agency) and the transmission network operator Svenska kraftnät.

f) Relevant distribution system operators

Nine electricity distribution companies[131] specifically designated by Svenska kraftnät in case of MLS.

[131] Vattenfall, Elevio, Eon, Göteborg Energi, Jämtkraft, Mälarenergi, Skellefteå kraft, Tekniska verken, and Umeå Elnät

6 Emergency tests

a) Timetable and implementation

Every two years, regional and, where appropriate, national real-time response simulations[132] for electricity crises shall be carried out. The Swedish Energy Agency shall, before such simulations, consult with Svenska kraftnät and the competent authorities in Denmark, Finland, and Norway on the planning and implementation of such tests. Prior to implementation, Svenska kraftnät shall likewise consult with TSOs in Denmark, Finland and Norway and, if necessary, relevant DSOs and other electricity supply operators in Sweden.

Svenska kraftnät conducts training and exercises for different purposes and for different target groups, both internally for their own operations staff and for external participants.[133]

b) Procedure for carrying out tests

When simulating real-time responses to electricity crises, the agreed mechanisms listed under 3.1 a) shall be followed.

The first simulation exercise within NordBer was carried out on 5 October 2022 and aimed primarily to test the communication paths between competent authorities but also nationally between competent authorities and TSOs.

The second exercise was conducted on December 12, 2024 as a table top exercise with competent authorities and transmission system operators from the Nordic countries. Each country reported relevant electricity crisis scenarios according to EU 2019/941 and measures to handle them. An established contact lists between actors were updated.

The Energy Agency's energy crisis managers receive ongoing training to be able to act in accordance with the risk-preparedness plan.

[132] Real-time simulations refer to emergency drills where the information flow schedule is tested and functional tests of communications are performed.
[133] Utbildning och övning | Svenska kraftnät 2025-01-10.