



Risk-preparedness plan

pursuant to Article 10 of 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

Current as of: 5 January 2022

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The crisis coordinator acts both as a national crisis coordinator pursuant to Article 11 (1) (d) of Regulation (EU) 2019/941 and as a crisis coordinator for regional and bilateral measures pursuant to Article 12 (1) (a) of Regulation (EU) 2019/941.

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General information

Competent authority for the establishment of the risk-preparedness plan

The **Federal Ministry for Economic Affairs and Climate Action** (BMWi) acts as the competent authority pursuant to Article 3 of Regulation (EU) 2019/941.

Member States in the region

The Federal Republic of Germany is part of the Central Europe System Operation Region.¹

This region includes the following Member States:

- French Republic
- Kingdom of Belgium
- Kingdom of the Netherlands
- Federal Republic of Germany
- Grand Duchy of Luxembourg
- Republic of Poland
- Republic of Austria
- Hungary
- Czech Republic
- Slovak Republic
- Portuguese Republic
- Kingdom of Spain
- Italian Republic
- Romania
- Republic of Slovenia
- Republic of Croatia

1. Summary of electricity crisis scenarios

1.1 Regional electricity crisis scenarios

In accordance with Article 6 of Regulation (EU) 2019/941, the European Network of Transmission System Operators for Electricity (ENTSO-E) has identified a range of regional electricity crisis scenarios. Table 1 provides an overview of all 31 scenarios.

¹ Regulation (EU) 2019/941 does not establish any regions itself. According to Article 2 no. 16 of Regulation (EU) 2019/941, a region is a group of Member States whose transmission system operators share the same regional coordination centre as per Article 36 of Regulation (EU) 2019/943.

Article 3 (5) (d) of ACER Decision 10/2020 of 6 April 2020 on the definition of system operation regions establishes the 'Central Europe System Operation Region'.

Cf. https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Annexes%20to%20the%20DECISION%20OF%20THE%20AGENCY%20FOR%20THE%20C9/ACER%20Decision%2010-2020%20on%20SOR%20-%20Annex%20I.pdf.

Table 1: Overview of the regional electricity crisis scenarios according to ENTSO-E

Number	Regional electricity crisis scenario as referred to by ENTSO-E
1	Cyber attack – entities connected to power grid
2	Cyber attack – entities not connected to power grid
3	Physical attack – critical assets
4	Physical attack – control centres
5	Threat to key employees
6	Insider attack
7	Solar storm
8	Volcanic eruption
9	Storm
10	Cold spell
11	Precipitation and flooding
12	Winter incident
13	Fossil fuel shortage (incl. natural gas)
14	Nuclear fuel shortage
15	Local technical failure with regional importance
16	Multiple failures caused by extreme weather
17	Loss of ICT systems for real-time operation
18	Simultaneous multiple failures
19	Power system control mechanism complexity
20	Human error
21	Unwanted power flows
22	Serial equipment failure
23	Strike, riots, industrial action
24	Industrial/nuclear accident
25	Unforeseen interaction of energy market rules
26	Unusually big RES forecast errors
27	Pandemic
28	Heatwave
29	Dry period
30	Earthquake
31	Forest fire

Procedure for the identification of regional crisis scenarios

Electricity crises can have many diverse causes and differ significantly from one another in terms of chains of effect and concrete impact. They can occur either due to natural hazards or events or as a result of anthropogenic influences. Against this backdrop, Article 5 (2) of Regulation (EU) 2019/941 demands that the regional electricity crisis scenarios be identified on the basis of at least the following risks:

- natural hazards,
- accidental hazards going beyond the N-1 security criterion and exceptional contingencies,
- consequential hazards including the consequences of malicious attacks and of fuel shortages.

Regulation (EU) 2019/941 thus makes provisions as regards the selection of risks that have to be assessed in any case.

In addition, Articles 6 and 7 of Regulation (EU) 2019/941 describe the procedure for identifying regional and national crisis scenarios. First of all, ENTSO-E identifies regional electricity crisis scenarios. Afterwards, the competent authorities in the Member States go on to identify the most important national electricity crisis scenarios.

The designation of major regional crisis scenarios requires an assessment and, in particular, a prioritisation of the various scenarios. In line with Article 5 (1) of Regulation (EU) 2019/941, ENTSO-E has devised a methodology for identifying regional crisis scenarios. This methodology has been approved by the European Union Agency for the Cooperation of Energy Regulators (ACER) – in compliance with Article 5 (6) of Regulation (EU) 2019/941 – and made available to the public.²

On the basis of proposals submitted by European transmission system operators (TSOs), ENTSO-E has developed 31 regional electricity crisis scenarios as listed in Table 1. These 31 regional crisis scenarios are different in nature. Electricity crises may occur as a result of natural hazards or extreme weather events, violations of the N-1 security criterion in a given Member State, cyber attacks or physical attacks. Thus, the scenarios described by ENTSO-E cover a very large number of possible crisis events and causes.

The events described in these 31 scenarios have been assessed in terms of their impact within the ENTSO-E community. As part of this assessment, the likelihood of these events and the severity of their potential cross-border impact had to be estimated. The non-public report by ENTSO-E contains the underlying assumptions and provides a basis for the further specification of the relevant regional scenarios and identification of national electricity crisis scenarios.

² Cf. ACER Decision 07/2020 of 6 March 2020 on the methodology for identifying regional electricity crisis scenarios:
https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%2007-2020%20on%20regional%20electricity%20crisis%20scenarios%20methodology_RPR%20ART%205.pdf

1.2 National electricity crisis scenarios

The legislature has entrusted the Bundesnetzagentur (Federal Network Agency, BNetzA) with the identification of national crisis scenarios in line with Article 7 of Regulation (EU) 2019/941 in conjunction with section 54b (2) of the Energy Industry Act (Energiewirtschaftsgesetz - EnWG³). On the basis of the regional crisis scenarios, the BNetzA has identified the nine 'most important national crisis scenarios'.

- a) Cyber attack on facilities connected to the grid
- b) Heatwave; prolonged period (several days) of unusually high thermal stress
- c) Attack on and failure of critical infrastructure
- d) Attack on and failure of control centres
- e) In-house sabotage
- f) Drought; prolonged dry period
- g) Shortage of natural gas and/or coal
- h) Pandemic
- i) Forest fires

Procedure for the identification of national crisis scenarios

In accordance with Article 7 of Regulation (EU) 2019/941 on risk-preparedness in the electricity sector, the BMWi is the competent authority responsible for identifying the most important national electricity crisis scenarios. By virtue of section 54b of the Energy Industry Act, the legislature has passed this task to the BNetzA. On 7 January 2021, the BNetzA presented a list of electricity crisis scenarios it had identified as such. The BMWi approved the identification of national crisis scenarios in line with section 54b (4) sentence 2 of the Energy Industry Act.

As it elaborated the national crisis scenarios, the BNetzA was able to draw on the regional crisis scenarios identified by ENTSO-E. According to Article 7 (3) sentence 1 of Regulation (EU) 2019/941, the national electricity crisis scenarios must be consistent with the regional scenarios.

When identifying the national crisis scenarios, the BNetzA took into account the causes and chains of effect, the likelihood and potential destructiveness of the designated regional scenarios in terms of their significance for the Federal Republic of Germany. It based its assessments on the current electricity supply system of the Federal Republic of Germany. The BNetzA corroborated the assessments by the TSOs on possible causes, chains of effect and likelihood of scenarios in consultation with other specialist authorities and organisations.

In line with Article 7 (2) of Regulation (EU) 2019/941, a national consultation on the national crisis scenarios was conducted. It involved the TSOs as well as those producers, distribution system operators (DSOs) and associations (BDEW, VKU, BEE) that were deemed relevant. The consultation participants were given the opportunity to express their views on the BNetzA's approach to identifying national crisis scenarios, on the causes described, the chains of effect and the potential impact on the electrical energy supply system. Elaborating on the results of the consultation, the BNetzA made a number of clarifications. In line with Article 7 (1) of Regulation (EU) 2019/941, the identification of the national scenarios was completed within four months of the identification of the regional scenarios by ENTSO-E. As provided for by Article 7 (3) sentence 2 of Regulation (EU) 2019/941, Member States are to update the

³ Energy Industry Act of 7 July 2005 (Federal Law Gazette I, pp. 1970, 3621), as last amended by Article 84 of the Act of 10 August 2021 (Federal Law Gazette I, p. 3436).

national electricity crisis scenarios every four years unless circumstances warrant an earlier update.

In the following, the scenarios are outlined in brief.

a) Cyber attack on facilities connected to the grid

Description:

A cyber attack is an attack on IT security systems. It is understood as a (usually external) intervention in one or several other IT systems within or by means of cyberspace which is aimed at wreaking havoc on the IT security of those systems, in their entirety or in part, by using the means of information technology. In the electricity sector, a successful APT⁴ cyber attack on facilities connected to the grid can be an indirect cause of disruptions to power supply.

b) Heatwave

Description:

Heatwaves, i.e. prolonged periods of unusually high thermal stress (lasting for longer than 10 days), could have an impact on various power generation technologies.

c) Attack on and failure of critical infrastructure

Description:

Likewise, successful attacks on critical power supply infrastructures⁵ could lead to severe disruption and damage.

d) Attack on and failure of control centres

Description:

In a similar way, a physical attack on or failure of control centres and/or backup control centres of TSOs/DSOs or essential power stations might have serious consequences.

e) In-house sabotage

Description:

In-house sabotage constitutes another major national crisis scenario.

f) Drought

Description:

The adverse impact that droughts can have on power supply is largely due to low river levels.

⁴ In the field of cyber security, 'APT' (advanced persistent threat) typically refers to an attacker with professional resources, a high level of expertise, and ample time for the preparation of attacks.

⁵ The Federal Government's National Strategy to Protect Critical Infrastructures (KRITIS Strategy) provides a definition of the term 'critical infrastructures'. These are regarded as organisations or facilities which are of significance for society in general and whose failure or impairment would cause lasting bottlenecks in supply, substantial disruptions to public security or other dramatic consequences (cf. <https://www.bmi.bund.de/SharedDocs/downloads/DE/publikationen/themen/bevoelkerungsschutz/kritis.html>).

g) Shortage of natural gas and/or coal

Description:

In this scenario, power plants might have to be taken off the grid because of a shortage of natural gas and/or coal combined with high domestic demand for fuel and low stocks. Depending on the energy source, there can be different chains of effect.

h) Pandemic

Description:

The spread of infectious disease in the form of a pandemic or epidemic could lead to staff shortages across the sector, affecting power stations, system operators as well as related maintenance and other services.

i) Forest fires

Description:

A forest fire – or multiple forest fires – could wreak havoc on power grids or affect the operability of power stations, transmission or distribution networks. In particular, forest fires are likely to impact overhead powerlines, with the exact extent or severity of the potential damage being largely determined by site-specific characteristics. Overhead transmission lines might have to be switched off either due to direct damage or as a precautionary measure, which could lead to diminished control or transmission capacity or flexibility. The same is true for shutdowns due to firefighting operations below or in the proximity of powerlines.

2. Roles and responsibilities of the competent authority

2.1 Competent authority

The Federal Republic of Germany has designated the BMWi as the competent authority pursuant to section 54b (1) of the Energy Industry Act and in line with Article 3 of Regulation (EU) 2019/941.

As the competent authority, the BMWi performs the following tasks as per Regulation (EU) 2019/941:

- Cooperating with the competent authorities of other Member States (Article 3 (1) sentence 2 of Regulation (EU) 2019/941)
- Delegating operational tasks regarding risk-preparedness planning and risk management to other bodies and supervising those bodies with regard to the tasks delegated (Article 3 (3) of Regulation (EU) 2019/941)
- Ensuring that all relevant risks relating to security of electricity supply are assessed in accordance with the rules laid down in Regulation (EU) 2019/941 and in Chapter IV of Regulation (EU) 2019/943, including by cooperating to that end with TSOs, DSOs, regulatory authorities, ENTSO-E, regional coordination centres and, as required, other relevant stakeholders (Article 4 of Regulation (EU) 2019/941)
- Playing an active role in identifying the most relevant national crisis scenarios in consultation with the TSOs, the DSOs considered to be relevant, the relevant producers or their trade bodies, and the regulatory authority (Article 7 (1) and (2) of Regulation (EU) 2019/941)
- Establishing a risk-preparedness plan for the Federal Republic of Germany (Article 10 (1) of Regulation (EU) 2019/941)
- Taking immediate action in the case of an imminent electricity crisis by issuing an early warning to the European Commission, the competent authorities of the Member States within the same region and, where they are not in the same region, the competent authorities of the directly connected Member States; the warning should provide information on the causes of the possible electricity crisis, on measures planned or taken to prevent an electricity crisis, on the possible need for assistance from other Member States, and on the possible impacts of the measures on the internal electricity market (Article 14 (1) of Regulation (EU) 2019/941)
- Declaring an electricity crisis after consulting the TSOs concerned and informing the competent authorities of the Member States within the same region and, where they are not in the same region, the competent authorities of directly connected Member States, as well as the European Commission, without undue delay; the information should include the causes of the deterioration of the electricity supply situation, the reasons for declaring an electricity crisis, the measures planned or taken to mitigate it and the need for any assistance from other Member States (Article 14 (2) of Regulation (EU) 2019/941)
- Making adequate arrangements to inform relevant stakeholders in the Federal Republic of Germany of the application of any non-market-based measures by TSOs in the case of measures pursuant to section 13 (2) of the Energy Industry Act or any further measures as set out in Chapter 3.1 (Article 16 (2) sentence 4 of Regulation (EU) 2019/941)
- Providing the Electricity Coordination Group and the Commission with a timely ex post evaluation report regarding the electricity crisis after having consulted the

regulatory authority; the report should include at least all the information specified (Article 17 (1) and (2) of Regulation (EU) 2019/941)

- Presenting the results of the ex post evaluation at a meeting of the Electricity Coordination Group and considering those results when updating the risk-preparedness plan (Article 17 (4) of Regulation (EU) 2019/941)
- Section 54b (3) of the Energy Industry Act authorises the BMWi to assign further responsibilities to the BNetzA for the purpose of implementing Regulation (EU) 2019/941 by issuing a statutory instrument that does not require the approval of the Bundesrat.

2.2 Tasks delegated to the Bundesnetzagentur

The legislature has assigned a range of operational tasks to the Bundesnetzagentur as the regulatory authority in accordance with Article 3 (3) sentence 1 of Regulation (EU) 2019/941. The details of this delegation of tasks are specified in section 54b of the Energy Industry Act.

In line with section 54b (4) sentence 1 of the Energy Industry Act and thus in compliance with Article 3 (3) sentence 2 of Regulation (EU) 2019/941, the BNetzA performs the tasks delegated to it under the supervision of the BMWi.

Description of the tasks delegated to the Bundesnetzagentur:

- Section 54b (2) no. 2 Energy Industry Act: participation in the identification of regional electricity crisis scenarios pursuant to Article 6 of Regulation (EU) 2019/941
- Section 54b (2) no. 2 Energy Industry Act: identification of national electricity crisis scenarios pursuant to Article 7 of Regulation (EU) 2019/941

3. Procedures and measures in the event of an electricity crisis

Making reference to the relevant legal instruments, this chapter describes the existing procedures and measures aimed at preventing and managing electricity crises. As the energy transition advances and the decarbonisation of the electricity sector gains pace, these and other exogenous factors may lead to a need for revision as identified in the course of ongoing evaluations and adaptations, possibly resulting in periodic updates of the risk-preparedness plan.

3.1 National procedures and measures

a) Procedures in the event of an electricity crisis

An electricity crisis within the meaning of Regulation (EU) 2019/941 is characterised by the presence or imminence of the potential risk of a significant electricity shortage or an impossibility to supply electricity to customers⁶. The electricity crisis scenarios (cf. Chapter 1) describe events or situations that can result in such an electricity crisis.

Given that the focus of Regulation (EU) 2019/941 is on electricity crises that have a larger scale and impact⁷, a distinction is made here between procedures for impairments to the electricity supply and procedures in the case of ‘particularly severe’ impairments as set out by special provisions of German law (‘EnSiG⁸ case’).

According to sections 11 ff. of the Energy Industry Act, system responsibility lies with the transmission system operators. In the case of supply disruptions, many measures will therefore be activated or deployed by the TSOs which will not fall under the EnSiG case. In view of the mandate to ensure safe system operation in conjunction with the general possibility of enabling the prevention of damage only by swift action, a broad range of measures can be taken without prior official authorisation. In accordance with section 13 (7) of the Energy Industry Act, the directly affected parties and the regulatory authority must be informed without delay about the reasons for any adjustments and measures undertaken. On demand, the reasons presented must be backed up by evidence.

a.1) Procedure in the case of imminent impairments and severe impairments to the electricity supply, including the information flows

According to the provisions set out in Regulation (EU) 2017/1485⁹ (System Operation Guideline, SO GL) and Regulation (EU) 2017/2196¹⁰ (Network Code Emergency and Restoration, NC E&R), the TSOs are to ensure that electricity incidents can be dealt with effectively at operational level¹¹. This means that appropriate measures to enhance inherent system security can help to reduce the likelihood of an actual electricity crisis. The system defence plan laid out in Regulation (EU) 2017/2196 thus describes a basic level of robustness which has been or is being de facto implemented throughout Europe.

⁶ Cf. Recital 11 and the definition in Article 2 no. 9 of Regulation (EU) 2019/941.

⁷ Cf. Recital 5 of Regulation (EU) 2019/941.

⁸ Cf. Energy Security of Supply Act of 1975: http://www.gesetze-im-internet.de/ensig_1975/_1.html

⁹ Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

¹⁰ Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration

¹¹ Cf. Recital 5 of Regulation (EU) 2019/941.

System monitoring: The transmission system operators conduct continuous system monitoring and periodic analytical procedures regarding potential risks to technical grid and system security in order to be able to identify such risks in the first place. The scope of the monitoring extends both to technical properties (including voltage, electricity, frequency), cyberspace as well as weather conditions and other environmental influences.

This is helped by a continuous information sharing process via operational entities and periodic bodies among TSOs, DSOs, power plant operators and, as required by the situation, further market participants.

Also, specific provisions and procedures regarding ICT security are in place. In line with section 11 (1c) of the Energy Industry Act, companies playing an essential role in the electricity supply are obliged to report without delay to the Federal Office for Information Security (BSI) any disruptions which have resulted in a failure or a considerable impairment of the functioning of the energy supply system or the respective energy installation, as well as any substantial disruptions which result in a failure or a considerable impairment of the functioning of the energy supply system or the respective energy installation. Further to this, section 11 (1d) of the Energy Industry Act provides that operators of energy supply networks must actively deploy systems to detect attacks from May 2023 at the latest.

Evaluation and decision-making level: The transmission system operators conduct a continuous system evaluation regarding potential risks to grid and system stability as identifiable on the basis of system monitoring, design criteria and other data relating to plant management. In the case of a specific event or any signs indicative of a potential event, an exact analysis and observation of the situation allows for an assessment to be made and the necessary decisions to be prepared.

On the basis of this evaluation, the TSOs decide if any operational measures on their part are necessary or appropriate or if any other entities should take operational measures, in which case these are informed accordingly. Should the assessment reveal, however, that the security or reliability of the electricity supply system in the respective balancing zone is in jeopardy, resolute action is of the essence. According to section 13 (4) of the Energy Industry Act, a danger to the security or reliability of the electricity supply system in the respective balancing zone exists if local failures in the transmission system or short-term congestion in the system are feared or it is to be feared that the maintenance of frequency, voltage or stability cannot be ensured to the necessary extent by the operators of transmission systems.

Selection of measures: If a danger to the security or reliability of the electricity supply system within the meaning of section 13 (4) of the Energy Industry Act arises or is to be feared, the TSOs decide which operational measures should be taken to confront the danger. To this end, the TSOs can apply the measures laid out in the Energy Industry Act. In particular, these measures are specified in section 13 (1) sentence 1, section 13 (2) sentence 1, and section 13 (3) sentences 1 and 2 of the Energy Industry Act. They are divided into prevention, preparation and mitigation measures. Chapter 3.1.b provides a detailed description of the prevention and preparation measures. A description of the mitigation measures can be found in Chapter 3.1.c.

In accordance with section 13 (7) sentence 1 of the Energy Industry Act, the TSOs are obliged to inform the directly affected parties and the regulatory authority about the reasons for any adjustments and measures undertaken pursuant to section 13 (2) of the Energy Industry Act.

Should TSOs decide to take any measures under section 13 (2) sentence 1 of the Energy Industry Act, section 13 (2) sentence 2 of the Energy Industry Act provides that the relevant (downstream) DSOs and electricity traders, in particular, should be informed in advance – as far as possible – whenever a necessary adjustment, specifically of electricity feed-in and take-off, is being planned.

To understand the rules in force in the Federal Republic of Germany, it is important to note that the obligations for TSOs basically also apply to DSOs: According to section 14 (1) sentence 1 of the Energy Industry Act, sections 12, 13 to 13c and the ordinances enacted on the basis of section 13i (3) apply accordingly to operators of electricity distribution systems in the context of their distribution tasks to the extent that they are responsible for the security and reliability of the electricity supply in their system.

Information flows: The TSOs decide at their own discretion if, when and at which step of the procedure they will inform the BNetzA and the crisis coordinator (KKS). In addition, procedures are defined for an information and reporting system involving all operational bodies (TSOs, DSOs, power plant operators, electricity market participants, etc.) and the crisis coordinator. This also involves defining criteria and notifications. In the process, the crisis coordinator may choose to consult further experts.

In the case of an imminent or present severe impairment to the electricity supply, the TSOs report the incident without delay to the BNetzA and the crisis coordinator. On this basis, the crisis coordinator takes stock of the respective situation to determine the need for any further information sharing (e.g. further regular situation assessments, including as regards extent of damage, developments, trends or a foreseeable end to the imminent or present impairment to the electricity supply).

The crisis coordinator transmits all the pertinent information within the Federal Government – including, as required, to the crisis units within the Federal Government and to the Länder. The crisis coordinator also supports the Federal Government’s media liaison work in the event of an electricity crisis. Moreover, it may involve further stakeholders – beyond those mentioned above – in the information flows. In the case of a severe impairment to the electricity supply system, the crisis coordinator issues a recommendation within the competent authority (BMWi) as to whether an early warning to the neighbouring states and the European Commission pursuant to Article 14 (1) of Regulation (EU) 2019/941 should be issued, and whether an electricity crisis should be declared pursuant to Article 14 (2) of Regulation (EU) 2019/941. In doing so, the crisis coordinator fulfils the reporting obligations under Regulation (EU) 2019/941. It informs the European Commission and the affected Member States about the current situation and provides any other relevant information which may be necessary for prevention and/or mitigation efforts or concrete measures to be undertaken by other Member States. Conversely, the crisis coordinator also acts as the central reporting office for information from the European Commission and the competent authorities of other Member States, receiving early warnings as well as information about the declaration of electricity crises in other Member States and transmitting that information, as needed, to the relevant national bodies.

a.2) Procedure in the case of particularly severe impairments to the electricity supply (EnSiG case)

A particularly severe impairment to the electricity supply is characterised by a situation in which the satisfaction of ‘vital energy needs’ can no longer be guaranteed and counter-

measures must be taken to ensure those can be covered. In Germany, this eventuality is regulated by the special provisions laid down in the Energy Security of Supply Act (Energiesicherungsgesetz - EnSiG). As an instrument authorising the issuing of ordinances, the Act contains detailed authorisations to issue ordinances with a view to ensuring the satisfaction of vital energy needs in times of crisis. Since in principle it applies only to crisis or emergency situations, any legislation enacted on the basis of this Act constitutes emergency legislation.

In the event that a system operator with system responsibility is unable – even by resorting to emergency measures as per subsection (2) – to avert disruption to supply of vital needs within the meaning of section 1 of the Energy Security of Supply Act, it is obliged under section 13 (8) of the Energy Industry Act to inform the BNetzA without delay. In line with section 52 of the Energy Industry Act, this notification should at least contain information about

- the point in time,
- the expected duration,
- the extent and
- the cause of the supply disruption,

provided that the reporting TSO has access to such information.

On the basis of the assessment by the BNetzA, the TSOs and possibly further experts, the BMWi brings about a decision on the declaration of an electricity crisis by the Federal Government (cabinet decision) pursuant to the provisions of the Energy Security of Supply Act. When assessing the situation, the BMWi and the BNetzA primarily consider the following circumstances:

- the severity and extent of the disruption and impairment (to what degree is the population affected?),
- causes of the disruption and impairment,
- overview of counter-measures already taken by/still open to the German TSOs and major DSOs,
- an assessment of the need for power cut-offs,
- information on the situation and severity of the problem in other Member States,
- estimates of how long it will take before supply is resumed.

Should, as a result, an electricity crisis be declared, the Federal Government will declare by ordinance that the Energy Security of Supply Act – in conjunction with the Electricity Security Ordinance (EltSV¹²) – is to be applied. Following the declaration of an electricity crisis, the BNetzA becomes the federal load distributor (cf. section 4 (3) of the Energy Security of Supply Act). When this happens, the measures to be taken by the BNetzA derive from section 1 of the Electricity Security Ordinance in conjunction with section 4 (3) of the Energy Security of Supply Act. On this basis, the BNetzA can issue instructions to companies and consumers in order to safeguard a minimum level of electricity supply and to distribute the electricity generated (cf. Chapter 3.d). Its instructions to companies can also cover the storage, purchase and distribution of fuel and the maintenance of the means of production for the energy supply. Instructions to consumers can pertain to the allocation, receipt and use of electrical energy and the exclusion from the receipt of electrical energy. As far as is possible, the measures are oriented to maintaining a minimum level of energy supply. According to section 1 (1) sentence

¹² Ordinance to Ensure the Supply of Electricity in a Supply Crisis of 26 April 1982, as last amended by Article 7 of the Act of 26 July 2016.

2 of the Energy Security of Supply Act, 'vital' demand is also understood to mean the need to fulfil public tasks and international obligations.

b) Preventive and preparatory measures for regional and major national crisis scenarios

An integrated approach to risk and crisis management generally distinguishes between measures to

- prevent (crisis prevention),
- prepare for¹³,
- manage and
- restore and follow-up.

The main objective of preventive and preparatory measures is to increase the resilience and robustness of the overall system.

The following table lists the preventive and preparatory measures, assigns them to the respective regional and national crisis scenarios and gives a brief outline for each of them. Some of the measures are both preventive and preparatory in nature.

¹³ In line with the wording used in Regulation (EU) 2019/941, 'preparatory measures' are understood here to mean measures aimed at preparing for a potential crisis.

Table 2 Preventive and preparatory measures as assigned to regional and national crisis scenarios

Measure	Prevention	Response measures	National scenario no.
(1) Retention of reserve installations	x	X	a, b, c, f, g, h, i
(2) Maintenance of primary energy sources/fuel as reserves	x	x	f, g
(3) Needs-oriented grid expansion and grid expansion planning	X		f, g, i
(4) Monitoring and analysis processes	X		(RWC: a) b, f, g
(5) Rules on secure grid operation	X		a, e
(6) Development and expansion of risk and crisis management structures with regard to electricity supply	x	X	all
(7) Development and expansion of a special information security management system (ISMS) according to DIN EN ISO/IEC 27001	X		a, c, e
(8) Development and expansion of crisis management structures with regard to pandemic management	x	X	h
(9) Adaptation of installations and grids to changing climatic requirements and extreme weather events	x		b, f, g, i
(10) Security vetting of staff	X		a, c, d, e
(11) Prevention of forest fires	x	x	I
(12) Establishment of security plans by TSOs for the protection of critical installations pursuant to Directive 2008/114/EC on European critical infrastructures			

(1) Retention of reserve installations

The TSOs are maintaining a range of reserve installations.

- Pursuant to section 13d (1) of the Energy Industry Act, the TSOs are to maintain installations – as what is called the ‘grid reserve’ – for the purpose of ensuring the security and reliability of the electricity supply system particularly for the management of congestion in the system and for voltage stability and to ensure a possible restoration of supply. The grid reserve is made up of installations which are currently not in operation, but must be made operationally ready again upon the request of the TSOs, of installations designated as systemically relevant which have already been decommissioned by their operator, and of adequate installations in other European countries which have been secured on a contractual basis.
- Pursuant to section 13e (1) sentence 1 of the Energy Industry Act, the TSOs maintain reserve capacity in order to be able to request this ‘capacity reserve’ in the case of a danger to or disruption of the security or reliability of the electricity supply system and thus be able to offset deficits in systems adequacy in the German Grid Balancing Alliance (NRV).

- According to section 13f of the Energy Industry Act, the TSOs may designate certain gas-fired power stations as systemically relevant (wholly or partly) for the generation of electrical energy from gas. These installations – which are operated on the electricity market – are obliged to make use of any possibilities to switch fuel in order to secure their generation capacity. Should an emergency situation urgently necessitate the supply of natural gas, it is possible to take measures pursuant to section 16 (2a) of the Energy Industry Act.
- Section 13g of the Energy Industry Act provides that the lignite-fired power plants placed on security stand-by are available exclusively for demands made by the TSOs in accordance with section 1 (6) of the Electricity Security Ordinance until they are finally decommissioned. The operators of the power plants must be able to restore their installations to operation within the deadlines provided for in section 13g (3) of the Energy Industry Act.

(2) Maintenance of primary energy sources/fuel as reserves

Stockpiling certain primary energy sources can help to ensure the availability of emergency supplies, including the supply of electricity via back-up power systems and the supply of heat. For example, the Petroleum Stockholding Act provides that domestic stockpiles of oil and derived products such as petrol or diesel be maintained by the German National Petroleum Stockpiling Agency (EBV).

(3) Needs-oriented grid expansion and grid expansion planning

If grid expansion is to deliver a high level of security in grid operation, it requires timely and needs-oriented planning – at the level of both transmission and distribution networks – as well as timely implementation. Grid expansion planning helps to identify (potential) grid bottlenecks early on and provides a transparent process that makes it possible to counteract foreseeable bottlenecks through measures to optimise, reinforce and expand the grid. Thus, needs-oriented grid expansion and the underlying grid expansion planning measures provide for a crisis response that is both preventive and preparatory in nature.

(4) Monitoring and analysis processes

In order to be able to prevent crises, the first step is to identify and analyse (potential) risk factors and critical situations. This can be done on a permanent or on an ad hoc basis. A large number of processes involving a range of different stakeholders are available. In part, these processes are stipulated by law; to some degree, however, they are part of institutionalised or even certified concepts.

- According to section 11 (1e) sentence 1 of the Energy Industry Act, operators of electricity supply systems and energy installations considered critical infrastructure pursuant to the ordinance under section 10 (1) of the Act on the Federal Office for Information Security (BSI Act) must, for the first time on 1 May 2023 and every two years thereafter, provide evidence of the fulfilment of the operational requirements to the Federal Office for Information Security (BSI) in line with section 11 (1d) of the Energy Industry Act. The BSI must forward the submitted documents of evidence without delay to the BNetzA.
- In accordance with section 13 (9) sentence 1 of the Energy Industry Act, every transmission system operator must undertake an analysis of weak points every two years and take necessary measures on this basis in order to avoid serious disruptions

to supply. Pursuant to section 13 (9) sentence 3 of the Energy Industry Act, every transmission system operator must report by 31 August every two years to the BNetzA about the outcome of the analysis of weak points and the necessary measures.

- In line with section 14 (1) of the Energy Industry Act, distribution system operators are also in principle subject to the obligation to undertake an analysis of weak points pursuant to section 13 (9) of the Energy Industry Act and report to the competent regulatory authority about its outcome. Section 14 (1) sentence 2 of the Energy Industry Act stipulates, however, that section 13 (9) of the Energy Industry Act applies with the proviso that this analysis need not be conducted at regular intervals (every two years), but only upon the request of the competent regulatory authority.
- According to section 51 (1) and (3) of the Energy Industry Act, the BNetzA conducts continuous monitoring of the security of electricity supply in coordination with the BMWi. From 2021, the BNetzA will draw up a regular report (every two years) on these activities pursuant to section 63 (2) sentence 1 no. 2 of the Energy Industry Act. In accordance with section 51 (4b) sentence 1 of the Energy Industry Act, the monitoring is to be accompanied by an analysis as to the extent to which the security, reliability and efficiency of the electricity supply systems is ensured at present and will be ensured in the future, and as to whether any measures to ensure the security and reliability of the electricity supply system – in the short and in the longer term – as per section 12 (1) sentence 1 and (3) of the Energy Industry Act are necessary. On 31 December 2021 and every four years thereafter, the Federal Government will – in compliance with section 63 (2) sentence 7 of the Energy Industry Act – submit to the Bundestag its first set of recommendations for action based on the BNetzA's report.
- According to section 52 sentence 1 of the Energy Industry Act, operators of electricity supply systems must submit to the BNetzA an annual report on the interruptions in supply registered in their system during the preceding year. In line with section 52 sentence 3 of the Energy Industry Act, these reports should also provide information on the measures taken in response to the disruption in order to avoid supply disruptions in the future.
- Every year, the TSOs jointly conduct a range of analyses pursuant to section 3 (2) of the Grid Reserve Ordinance (NetzResV¹⁴). In essence, the focus of these investigations is on what is referred to as 'system analysis' (cf. section 3 (2) no. 2 of the Grid Reserve Ordinance). As a result, the TSOs are able to identify the scope of the grid reserve needed in the form of reserve capacity for the purpose of ensuring the security and reliability of the electricity supply system, particularly for the management of congestion in the system and for voltage stability. According to section 3 (2) sentence 3 of the Grid Reserve Ordinance, the BNetzA may also demand an additional 'long-term analysis' from the TSOs.
- Monitoring of fuel supplies and supply routes: Various power plants rely on being supplied with fuel – in the form of certain primary energy sources – via land or waterborne transport. In the event of imminent supply bottlenecks, a monitoring process is launched. In this way, the TSOs can continuously keep track of the fuel supplies and their expected availability at the level of the affected power plants and share the information with the BNetzA.

(5) Rules on secure grid operation

¹⁴ Ordinance Regulating the Procurement and Maintaining of Installations in the Grid Reserve of 27 June 2013.

In accordance with section 11 (1) sentence 1 of the Energy Industry Act, operators of electricity supply systems are obliged to operate a secure, reliable and efficient electricity supply system. Here, the TSOs and DSOs are responsible for secure grid operation in their respective grid areas, and give one another mutual support in case of need (cf. section 14 (1c) of the Energy Industry Act). Further to this, grid operation must be compliant with the EU provisions laid down in Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation¹⁵ (SO GL) and in Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration¹⁶ (NC E&R).

The most important operational measures to prevent impairments include, in this context:

- the monitoring of the equipment for the operation of the grid and its admissible limit values, as well as the collection, aggregation and exchange of related data,
- the controlling of the switching, the flow of power to stay within the limit values of the equipment, or the reactive power to maintain voltage,
- schedule management¹⁷,
- the management of transmission capacities and congestion in the system,
- the establishment of operational emergency and crisis management structures pursuant to Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration,
- the coordinated planning of operations and switch-offs for maintenance measures or measures to reinforce, optimise or expand the grid,
- compliance with grid connection rules on the part of generators and consumers, including compliance with the provisions of the RfG (Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators) and the DCC (Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection),
- a system defence plan pursuant to Articles 11 and 17 of Commission Regulation (EU) 2017/2196 (NC E&R),
- a restoration plan pursuant to Articles 23ff. of Commission Regulation (EU) 2017/2196 (NC E&R).

(6) Development and expansion of risk and crisis management structures with regard to electricity supply

¹⁵ Cf. COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1485>

¹⁶ Cf. COMMISSION REGULATION (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2196>

¹⁷ “Schedule management describes the process of settling energy supplies between balancing groups based on ¼-hour energy schedules. By no later than 2:30 p.m. each day, the balancing group manager provides the transmission system operator with binding notice of the intended energy supplies for the following day. The goal of schedule management is to achieve a consistent balance within the balancing group to ensure the volume of energy fed in matches the volume consumed at the same time.” (Source: website of TransnetBW GmbH, <https://www.transnetbw.com/en/energy-market/balancing-group-management/schedule-management>, last accessed on 23 November 2021, 16:12 hrs)

Germany's 'UP KRITIS'¹⁸ implementation plan is an institutionalised public-private cooperation scheme between operators of critical infrastructures, their associations and the competent state agencies. It also promotes the dialogue on current incidents and the establishment and expansion of crisis management structures. The members of UP KRITIS collaborate in a range of bodies to address technical and organisational aspects of crisis management from both sector-specific and cross-sectoral perspectives. This work is meant to increase preparedness and help to prevent security incidents and supply failures. In order to respond to current threats, members share information on the perceived threat, on fundamental technical issues and approaches to crisis management, and cooperate in reporting systems.

Specific guidelines and recommendations for action also help to develop and expand risk and crisis management structures. These include, in particular, recommendations for action on the issues of critical infrastructures protection and risk and crisis management in companies and authorities such as those issued by the Federal Office of Civil Protection and Disaster Assistance (BBK).

Crisis preparedness plans and crisis manuals, for example, provide guidance that is tailored to the needs of companies or authorities. Also, they usually contain a range of relevant crisis simulations.

The Federal Republic of Germany's LÜKEX Exercise (Inter-Länder and inter-ministerial crisis management exercise) offers a simulation framework in which the top crisis teams and crisis management structures at federal and Länder level, including critical infrastructures (KRITIS), can be trialled.

(7) Development, expansion and certification of a special information security management system (ISMS) according to DIN EN ISO/IEC 27001

The introduction of an information security management system (ISMS) pursuant to DIN EN ISO/IEC 27001 includes, among other things, the implementation of relevant provisions and requirements in the field of information security by means of 'IT security catalogues'. These IT security catalogues, which were developed by the Bundesnetzagentur in consultation with the Federal Office for Information Security (BSI), contain a list of security requirements based on international standards which are to be implemented and require documentation of compliance. The law provides for an IT security catalogue both for operators of energy supply systems – pursuant to section 11 (1a) of the Energy Industry Act – and for operators of energy installations classified as critical infrastructure pursuant to section 11 (1b) of the Energy Industry Act.

Another measure in this context is the creation of the necessary operational security environment, which entails keeping up to date with the state of the art. From 1 May 2023 at the latest, systems to detect attacks are to be deployed in line with section 11 (1d) of the Energy Industry Act which must be able to automatically – and continuously – detect and evaluate adequate features and parameters during ongoing operations. Furthermore, these systems should be able to identify and to prevent threats on a continuous basis. As per section 11 (1e) of the Energy Industry Act, the fulfilment of these requirements is subject to monitoring by the BSI and the BNetzA.

¹⁸ Further information on UP KRITIS is available – also in English – at: https://www.kritis.bund.de/SubSites/Kritis/EN/activities/national/cipimplementationplan/cipimplementationplan_node.html.

(8) Development and expansion of crisis management structures with regard to pandemic management

Specific guidelines and recommendations for action have also been developed with regard to the coronavirus pandemic – for example by the BBK, but also by industry associations.

One of the key instruments for crisis preparedness is the establishment of a pandemic preparedness plan that is tailored to the context of the company or government agency.

Such plans can comprise, among other things, special personnel-related measures such as workforce monitoring in energy companies (as regards sickness-related absences) or the application of certain shift schedules or hygiene rules (including the procurement or stockpiling of protective equipment, disinfectants, etc.). The aim of these measures is to avoid shortfall of the key staff needed to maintain operations. Pandemic preparedness plans may also include concepts for the switch from office attendance to remote work, including the necessary technical requirements (mobile devices, etc.). As part of government activities in response to pandemic-related crisis situations, it may be useful to monitor power plant audits during the pandemic also with regard to the deployment of foreign workers – these might be subject to particular immigration rules or quarantine requirements, for example.

(9) Precautionary adaptation of installations and grids to changing climatic requirements and extreme weather events

In the interest of risk and crisis preparedness – and irrespective of any specific crisis scenarios –, climatic changes and increasingly numerous extreme weather events (e.g. extreme and persistent heat or cold, severe winter weather, precipitation, flooding and flash floods, storms, etc.) necessitate adaptations to installations and grids as well as public infrastructure. This not only concerns specific technical requirements in the narrower sense – e.g. the temperature-related design parameters of parts of the grid – but also fundamental precautionary adaptations. The aim is to take precautionary action in the face of climatic developments and unforeseeable extreme weather events even before disaster strikes. A range of individual measures are possible here, e.g. reinforcing electrical circuits, technically adjusting the cooling options of power plants cooled by river water, lowering electricity consumption during heat-related high load periods, maintaining mobile defrosting halls for unloading railway carriages carrying coal supplies, using temperature-resistant materials (e.g. for overhead powerlines), and considering potential natural hazards during site planning (e.g. considering flood control aspects already at the level of spatial planning).

(10) Security vetting of staff

The Security Clearance Check Act (SÜG¹⁹) governs the preconditions and the procedure for the vetting of people entrusted with certain security-sensitive work (security vetting of new appointments, updates and repeat vetting of existing staff). According to the Act, security-sensitive work is carried out by people who are employed in a security-sensitive post within a facility which is vital to life or defence (cf. section 1 (2) of the Security Clearance Check Act, section 10 (1) no. 2 of the Ordinance Identifying the Areas in Public Agencies and Private Entities Relevant for Federal Security Checks, SÜFV²⁰). If a security risk is identified, the person may not be entrusted with security-sensitive work.

¹⁹ Act on the Prerequisites and the Procedure for Federal Security Clearance Checks and the Protection of Classified Material of 20 April 1994, as last amended by Article 4 of the Act of 5 July 2021.

²⁰ Ordinance Identifying the Areas in Public Agencies and Private Entities Relevant for Federal Security Checks in the version promulgated on 12 September 2007, as last amended by Article 5 of the Act of 23 June 2021.

(11) Prevention of forest fires

A large number of guidelines have been developed with a view to preventing forest fires. The vast majority of forest fires occur between April and August. Favourable conditions for these fires include high temperatures and decreasing precipitation during the spring, summer and autumn months. An important part of prevention is the analysis of the causes or origins of vegetation fires. Even if these are not always identifiable, they may in many cases be linked to intentional or negligent actions or human error (e.g. disposing of smouldering cigarettes at the wayside during droughts). In a majority of cases (~ 52%), it was impossible to identify the cause of the forest fires that occurred in 2020. Negligent or intentional actions (arson) were the cause of around 41% of the forest fires in 2020. Of these, about 57% were due to careless behaviour by forest visitors, campers or children. Commercial activities (agriculture, timber harvest, etc.) accounted for 27% of the cases due to negligence; natural causes (e.g. lightning) were only responsible for 2% of the fires²¹. In order to reduce the risk of forest fires – in particular human-caused fires due to negligence –, prevention efforts should therefore maintain a major focus on measures to educate and raise awareness among the population, including instructions on proper conduct in forest areas.

Possible preventive measures include:

- raising awareness of at-risk infrastructure among local fire brigades,
- fostering knowledge on strategies to fight vegetation fires,
- fostering knowledge on access routes and water intake points²²,
- monitoring the threat of forest fires,
- raising public awareness.

(12) Establishment of security plans by TSOs for the protection of critical installations

The TSOs generally take physical measures to protect their critical infrastructure (particularly measures to increase object security and installation resilience). Following a graduated concept, these measures take into account the protection categories of the respective installations. In coordination with the BMWi and the BMI, the TSOs have developed and are now implementing security concepts for the protection of certain national critical infrastructure. Furthermore, section 12g of the Energy Industry Act provides that, in order to protect the transmission system, the BNetzA designates those installations or parts of installations of the transmission system, the disruption or destruction of which can have substantial impacts in at least two Member States of the European Union (installation which is critical in European terms). To protect those installations in particular, the TSOs develop security plans and appoint security officers.

²¹ <https://www.umweltbundesamt.de/daten/land-forstwirtschaft/waldbraende#waldbrande-in-deutschland>

²² cf. <https://www.hessen-forst.de/post/rettungskraefte/1980/>

c) Measures to tackle electricity crises

c.1) Market-based measures

Market-based measures are measures which can be taken by the electricity supply companies active on the market, without state intervention.

According to the logic underpinning the Energy Industry Act, system operators must first take all market-based measures in order to counteract a risk to the electricity supply system. The system operators may only undertake non-market-based intervention when all market-based measures have been exhausted (cf. Chapter 3.c.2). Further to this, grid operation must always be compliant with the provisions of the guidelines for electricity transmission system operation of Regulation 2017/1485 and Regulation 2017/2196 (network code on electricity emergency and restoration).

In harmony with Article 11 (1) sentence 2 letter f of Regulation (EU) 2019/941, a distinction must be made between supply-side (relating to electricity generation) and demand-side (relating to electricity consumption) measures in the case of market-based measures.

This means that the TSOs first take market-based measures under section 13 (1) sentence 1 of the Energy Industry Act when the security or reliability of the electricity supply system in the respective balancing zone is endangered or disrupted. Table 3 lists the most important of these measures and the specific technical triggers for them (disruption to frequency (f), voltage (U) or electricity (I)). The market-based measures can affect both the generation side (e.g. redispatch, use of additional reserves, balancing energy) and the consumption side (e.g. contractually agreed interruptible loads under the Ordinance on Interruptible Loads, balancing energy). The other preconditions for the use of the reserves (e.g. grid reserve and capacity reserve) are stipulated in the relevant ordinances (Grid Reserve Ordinance, Capacity Reserve Ordinance²³; cf. also Chapter 3.1.b).

According to section 14 of the Energy Industry Act, section 13 applies correspondingly to DSOs in the context of their responsibilities for distribution to the extent that they are responsible for the security and reliability of the electricity supply in their system.

Table 3: Market-based measures and additional reserves of the TSOs (source: system protection plan of the TSOs of 22 February 2021).

Measure	Disruption due to		
	electricity	voltage	frequency
Redispatch	x	x	
Capacity restriction at interconnectors in agreement with the neighbouring TSO	x		

²³ Ordinance regulating the procedure for the procurement, deployment and billing of a capacity reserve (Capacity Reserve Ordinance). On the basis of section 13h of the Energy Industry Act of 7 July 2005 (Federal Law Gazette I p. 1970, 3621), issued by the Federal Ministry for Economic Affairs and Energy.

Countertrading			
Contractually agreed interruptible loads	x	x	x
Mobilisation of additional reserves by the TSO (e.g. network and capacity reserve)	x	x	x
Support with active power from neighbouring foreign TSO (emergency reserve contracts - MEAS)	x		x
Use of balancing energy			x
Trading on the exchange	x		x

c.2) Non-market-based measures

The term “non-market-based measure” is defined as follows in Article 2 no. 14 of Regulation (EU) 2019/941: any supply- or demand-side measure that deviates from market rules or commercial agreements, the purpose of which is to mitigate an electricity crisis.

If a danger or disruption to the security or reliability of the electricity supply system cannot be remedied by measures pursuant to section 13 (1) of the Energy Industry Act, or cannot be remedied in time, the TSOs are entitled and required – in the context of cooperation pursuant to section 12 (1) of the Energy Industry Act – in accordance with section 13 (2) of the Energy Industry Act to adjust or require such adjustment of all electricity feed-in, transit and purchases in their balancing zones in line with the needs of a secure and reliable operation of the transmission system. This requirement is in harmony with the requirement of Article 16 of Regulation (EU) 2019/941, according to which non-market-based measures may only be used as a last resort. In the case of the necessary adjustment of electricity feed-in and take-off, in particular the relevant operators of electricity distribution systems and electricity traders shall be informed – as far as possible – in advance.

In the case of an adjustment pursuant to section 13 (2) sentence 1 of the Energy Industry Act, all of the performance obligations affected by this shall be suspended until the danger or disruption has been removed. In accordance with section 13 (5) of the Energy Industry Act, this does not in principle result in a suspension of the invoicing of the balancing groups by the operator of a transmission system, so that the market can continue to function as long and as far as possible, even when the electricity supply is disrupted or jeopardised. In line with the requirement of Article 16 (2) sentence 1 of Regulation (EU) 2019/941, under section 13 (7) of the Energy Industry Act the directly affected parties and the regulatory authority must be informed without delay about the reasons for any adjustments and measures. Also, the adjustments must be compatible with the regional and if appropriate the bilateral measures (cf. Chapter 3.2). If the market should have to be suspended as a last resort, strict conditions apply to this.

Intervention by the state is only permitted following the declaration of an electricity crisis by the Federal Government (EnSiG case). The possible measures and rules pursuant to the Energy Security of Supply Act in conjunction with the Electricity Security Ordinance are described in greater detail below in Chapter d) Framework rules for manual load shedding.

d) Framework rules for manual load shedding

d.1) Framework rules for manual load shedding

Manual load shedding by the system operators

Manual load shedding as a non-market-based measure may only be carried out by the TSOs or DSOs in the context of the measures under section 13 (2) of the Energy Industry Act (cf. Chapter 3.1.c.2). The procedure to be followed by the system operators is described in Chapter 3.1.d.3.

Manual load shedding as instructed by the federal load distributor in the event of a crisis

When an electricity crisis under section 1 of the Energy Security of Supply Act is declared by the Federal Government, the Bundesnetzagentur takes responsibility for the task of load distribution in the Federal Republic of Germany. Here, the load distribution serves the purpose of maintaining the electricity supply in a crisis with the aid of management measures by the state. Distributing the load will necessitate individual decisions on the distribution. There will be adjustments in feed-in, transit and take-off of electricity. It is true that such adjustments can be made even before an electricity crisis is declared by the Federal Government: according to section 13 (1) and (2) of the Energy Industry Act, the TSOs can already take far-reaching measures to tackle disruption and impairment; these include adjustment measures. But when an electricity crisis is declared by the Federal Government, the state assumes responsibility for distributing the load.

The declaration of an electricity crisis brings the Electricity Security Ordinance into effect. Section 1 (4) of the Electricity Security Ordinance stipulates the preconditions in which a supply area can be switched off.

d.2) Electricity consumers entitled to special protection against disconnection

In accordance with section 1 of the Energy Security of Supply Act, a corresponding level of minimum energy supply must be ensured “to cover vital needs for energy”. In view of the aims of the act²⁴, the rules are intended to if possible prevent or at least minimise the threat of impairments and damage to the economy and private consumers due to an electricity crisis. The aim is thus to maintain not only the supply of vital needs for energy to private consumers but also economic activity and the efficiency of the overall economy. There is per se no additional special statutory entitlement on the part of individual consumers/groups of customers to priority supply in a crisis. However, in the event of a crisis – within the context of technical feasibility – there is the possibility of corresponding prioritisation by the system operators and authorities.

d.3) Approach taken by the TSOs and DSOs to reducing their network load

In order to treat electricity consumers in the least discriminatory way possible in the event of necessary disconnections (load interruptions), the system operators – particularly at distribution system level – proceed according to a rolling system in their respective network areas to the extent that circumstances permit. To this end, several disconnection groups are usually formed in the respective network area. The relevant system operators have a certain degree of discretion when forming these disconnection groups. Where this is technically

²⁴ Bundestag Printed Paper 7/2461 of 9 August 1974, p. 9

possible and where the situation so demands, they can give priority consideration to certain consumers following a fundamental assessment of the situation.²⁵

The precautions taken by the DSOs must be coordinated with the relevant TSOs. In line with the SO Regulation (Regulation 2017/1485) and with the VDE application rules²⁶, the DSOs have concepts which have been coordinated with their respective TSO on:

- the procedure for the balancing zone of the TSO and
- the contribution by the DSO to the final measures and the cascade.

The national VDE application rule “Kaskadierung von Maßnahmen für die Systemsicherheit von elektrischen Energieversorgungsnetzen” (Cascading of measures for system security of electrical energy supply networks, VDE-AR-N 4140) stipulates the cooperation between the system operators in the case of dangers or disruptions to system security to that all system operators can prepare in advance for such critical situations and there can be clear descriptions of responsibilities, response times and communication channels (“Sicherheit in der Stromversorgung” - “Electricity supply security” - VDE-AR-N 4143-1).

For particularly critical situations like a very rapid and unpredictable frequency deviation in the system, the system operators have established mechanisms for automatic ultimate measures which are also in line with the requirements of the European NC ER (Regulation 2017/2196). Such automatic ultimate measures are applied in the case of disruption and dangers if there is insufficient time for manual measures. The VDE application rule VDE-AR-N 4142 “Automatische Letztmaßnahmen zur Vermeidung von Systemzusammenbrüchen” (Automatic ultimate measures to avoid system collapses) stipulates e.g. measures for load shedding in the case of underfrequency and measures in the event of overfrequency.

e) Informing the public about the electricity crisis

Informing the public means in this case communications with the population – i.e. in particular the citizens, as well as companies and their business associations – in the event of an electricity crisis.

Information or warnings to the affected population in the event of (planned or unplanned) switching off of demand in the context of non-market-based measures of the system operators generally takes place directly on the spot

- by the relevant TSO
- by the relevant DSO or municipal utility
- by the Länder authorities responsible for disaster management and energy
- by the rural districts/municipalities.

The timing and form in which the public is to be informed must be decided in the individual case and depending on the nature, the severity and the duration of the disruption or crisis. In the case of local disruption or crises occurring rapidly, it can be necessary to inform or warn

²⁵ Note: The Federal Office of Civil Protection and Disaster Assistance recommends that all operators of critical infrastructure have an emergency power supply designed to maintain operations for 72 hours without an additional fuel supply. The Federal Office of Civil Protection and Disaster Assistance has developed special guidelines for this, available for download at <https://www.kritis.bund.de/SharedDocs/Downloads/Kritis/DE/Notstromversorgung.pdf>.

²⁶ <https://www.vde-verlag.de/normen/1100690/e-vde-ar-n-4143-1-anwendungsregel-2021-07.html>, last accessed on 22 November 2021, 10:14 hours

the population very quickly via suitable communications channels, e.g. via appropriate smartphone apps, mobile communications services or radio announcements.

Also, it can make sense or be necessary to provide information to the entire German population at federal level in the case of severe crises with a national or even (supra-) regional impact. The BMWi, as the ministry responsible for energy within the Federal Government, also provides the necessary specialist information for the media activities of the Federal Government in the event of an electricity crisis.

The point in time and the form in which the public is informed by the Federation about the situation must again be decided on a case-by-case basis and depending on the nature, the severity and the duration of the crisis; this also applies to the decision on the means of communication used to distribute the information (radio, TV, internet, social networks, etc.), in order to ensure sufficient warning and information for the affected (entire) population and if necessary to give the population indications of how to act.

In the event that the load is distributed by the Bundesnetzagentur in an electricity crisis in line with the requirements of the Energy Security of Supply Act (cf. Chapter 3.1.a.2), the public is informed in a suitable manner.

3.2 Regional and bilateral procedures and measures

The BMWi has engaged in a dialogue with the neighbouring Member States on regional and bilateral procedures and measures in a variety of formats. The aim is to conclude suitable cooperation agreements with all Member States of the system operation region and all directly electrically connected neighbours outside the system operation region. The Federal Republic of Germany has very many (currently 11) electricity neighbours, so that the handling of the regional aspects of risk-preparedness has been subdivided into groups.

Cooperation in the Pentalateral Energy Forum with the following neighbouring countries (BEL, NDL, LUX, FRA, AUT, CHE)

The Pentalateral Forum was founded on the basis of existing structures of cooperation in the energy field, so that it was possible to establish a regular dialogue and cooperation at an early stage.

At the end of 2021, a Memorandum of Understanding (MoU) was concluded on future cooperation in the field of crisis prevention and management in the electricity sector. This MoU confirms the desire for further cooperation and provides timetables for future work.

Cooperation with the neighbours in central eastern Europe (POL, CZE, SVK, AUT)

Regular dialogues have also been established with the neighbours on the southern and eastern borders and it was confirmed that there is a common aim to conclude an appropriate regional agreement on cooperation in electricity crises.

Cooperation with the directly connected northern neighbours (DNK, SWE, NOR)

A dialogue has also commenced with the northern neighbours on crisis preparedness and management in the electricity sector.

The dialogue is to be further intensified in order to conclude agreements in line with Article 15 of Regulation (EU) 2019/941.

Cooperation with neighbours which are not directly connected

Working from the experience made in the agreements with the directly adjacent Member States, and taking account of expected regional and bilateral agreements between the other Member States, it has been agreed that talks should take place with a view to the conclusion of agreements under Article 15 of the EU's Risk-Preparedness Regulation.

4. Crisis coordinator

4.1 Establishment of the crisis coordinator

The crisis coordinator has been set up in the BMWi as the competent authority and can be contacted *as follows*.

Contact:

Federal Ministry for Economic Affairs and Climate Action
Division IIC4 / Crisis Coordinator
Scharnhorststr. 34-37
10115 Berlin

The crisis coordinator acts both as the national crisis coordinator under Article 11 (1) of Regulation (EU) 2019/941 and as the crisis coordinator for regional and bilateral measures under Article 12 (1) a of Regulation (EU) 2019/941.²⁷

4.2 Tasks of the crisis coordinator

The crisis coordinator has the following tasks:

- Single Point of Contact (SPOC) for the European Commission and the other European Member States in the event of a supply crisis within the meaning of Regulation (EU) 2019/941.
- Within the BMWi (competent authority under Article 14 (1) of Regulation (EU) 2019/941), the crisis coordinator is responsible for the prompt transmission of an early warning in the case of a potentially imminent electricity crisis to the European Commission, the competent authorities of the Member States within the same region and, where they are not in the same region, the competent authorities of the directly connected Member States. In the other direction, the crisis coordinator receives early warnings from other Member States and forwards the information to the competent national bodies.
- Within the BMWi (competent authority under Article 14 (2) of Regulation (EU) 2019/941), the crisis coordinator is responsible for informing the competent authorities of the Member States within the same region about the occurrence of an electricity crisis, about the measures planned or taken to mitigate it, and about whether the support of other Member States is required.
- In the event of a severe impairment to the electricity supply (cf. Chapter 3.1.a.1), the crisis coordinator is advised by experts.
- The crisis coordinator coordinates the flows of information between the BMWi, Bundesnetzagentur and system operators and to the neighbouring countries and further stakeholders.
- The crisis coordinator supports the Federal Government's media liaison work in the event of the electricity crisis. In particular, the crisis coordinator makes the specialist information available.

²⁷ The term "crisis coordinator" is defined as follows in Article 2 no. 13 of Regulation (EU) 2019/941: 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.

- In the case of a particularly severe impairment to the electricity supply, which is covered by specific legislation in Germany (EnSiG case; cf. chapter 3.1.a.2), the crisis coordinator participates in the decision-making process.

5. Consultation of the stakeholders

In a letter of 9 April 2021, the BMWi as the competent authority launched consultations on the draft German risk-preparedness plan in line with Article 10 (1) of Regulation (EU) 2019/941. The BMWi presented an updated draft of the risk-preparedness plan for this purpose.

The DSOs, the TSOs, the main generators and their business associations, the electricity and gas companies, the main organisations representing interests of commercial and non-commercial electricity consumers, and the regulatory authority were consulted.

The BMWi, as the competent authority, received ten contributions in the course of the national consultations and fed them into the finalised risk-preparedness plan.

Via a timely upload to the CIRCABC platform on 31 March 2021, the BMWi as the competent authority launched consultations on the draft German risk-preparedness plan in line with Article 10 (4) of Regulation (EU) 2019/941. The BMWi presented an updated draft of the risk-preparedness plan for this purpose.

The competent authorities in the relevant Member States in the region, and, where they are not in the same region, the competent authorities of the directly connected Member States, as well as the ECG were consulted.

Within the deadline of six months from the receipt of the drafts of the risk-preparedness plans, the BMWi as the competent authority received a total of one recommendation from the competent authorities in the relevant Member States in the region, and, where they are not in the same region, the competent authorities of the directly connected Member States, as well as the ECG under Article 10 (5) of Regulation (EU) 2019/941.

The BMWi will take account of the recommendation of a continued dialogue going forward. In addition, the pointers provided by the European Commission at the ECG meeting on 15 September 2021 were taken on board in the finalisation of the risk-preparedness plan.

6. Emergency tests

Under Article 12 (3) of Regulation (EU) 2019/941 the competent authorities of the Central Europe System Operation Region – with the participation of the key stakeholders – regularly test the effectiveness of the procedures developed in the risk-preparedness plans to avoid electricity crises, including the mechanisms to share information and cooperate.

6.1 Timetable for the simulations of responses to electricity crises

The regional simulations of the responses to electricity crises are scheduled to take place every two years. Under the Memorandum of Understanding in the Pentalateral Energy Forum, the aim is to undertake the first regional simulation in the third quarter of 2022.

6.2 Testing of risk-preparedness plans

The risk-preparedness plan is tested and if necessary revised in a dialogue with the competent authorities of the neighbouring Member States and giving particular consideration to the results of the exercises.