Emergency power

– Guide to emergency power preparedness

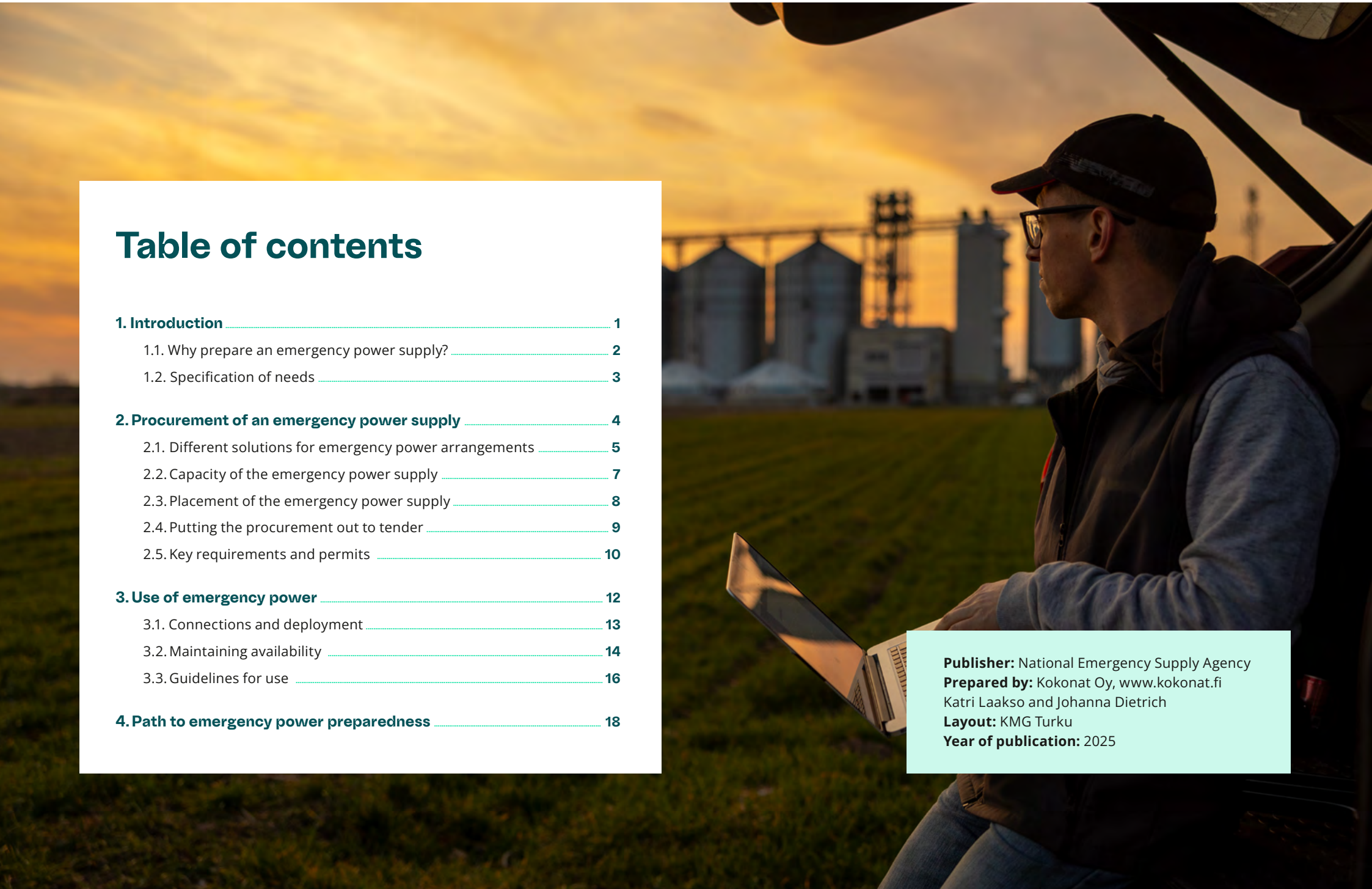
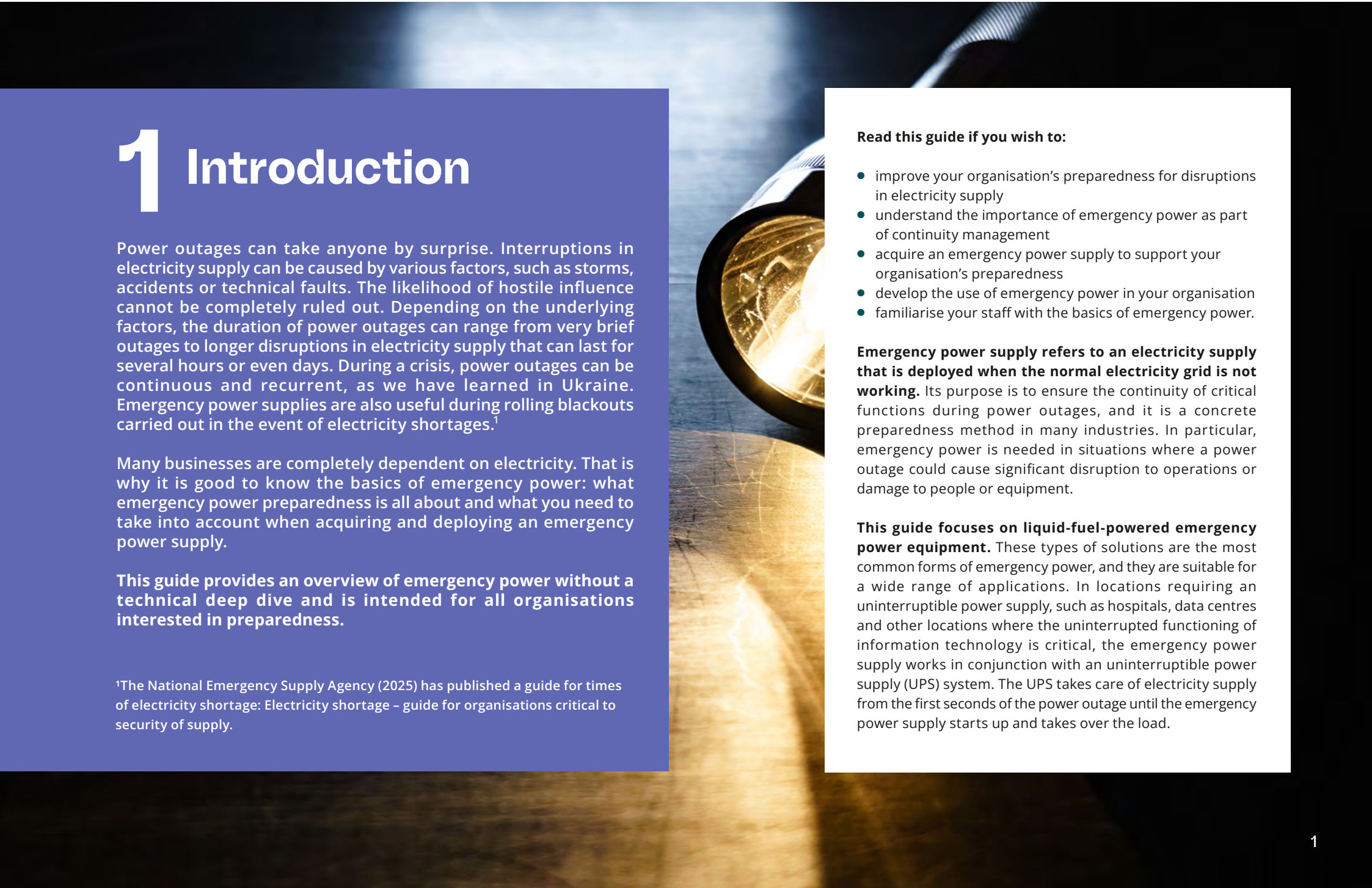


Table of contents

Publisher: National Emergency Supply Agency
Prepared by: Kokonat Oy, www.kokonat.fi
Katri Laakso and Johanna Dietrich
Layout: KMG Turku
Year of publication: 2025



1 Introduction

Power outages can take anyone by surprise. Interruptions in electricity supply can be caused by various factors, such as storms, accidents or technical faults. The likelihood of hostile influence cannot be completely ruled out. Depending on the underlying factors, the duration of power outages can range from very brief outages to longer disruptions in electricity supply that can last for several hours or even days. During a crisis, power outages can be continuous and recurrent, as we have learned in Ukraine. Emergency power supplies are also useful during rolling blackouts carried out in the event of electricity shortages.[1]

Many businesses are completely dependent on electricity. That is why it is good to know the basics of emergency power: what emergency power preparedness is all about and what you need to take into account when acquiring and deploying an emergency power supply.

This guide provides an overview of emergency power without a technical deep dive and is intended for all organisations interested in preparedness.

[1]The National Emergency Supply Agency (2025) has published a guide for times of electricity shortage: Electricity shortage – guide for organisations critical to security of supply.

Read this guide if you wish to:

- improve your organisation's preparedness for disruptions in electricity supply
- understand the importance of emergency power as part of continuity management
- acquire an emergency power supply to support your organisation's preparedness
- develop the use of emergency power in your organisation
- familiarise your staff with the basics of emergency power.

Emergency power supply refers to an electricity supply that is deployed when the normal electricity grid is not working. Its purpose is to ensure the continuity of critical functions during power outages, and it is a concrete preparedness method in many industries. In particular, emergency power is needed in situations where a power outage could cause significant disruption to operations or damage to people or equipment.

This guide focuses on liquid-fuel-powered emergency power equipment. These types of solutions are the most common forms of emergency power, and they are suitable for a wide range of applications. In locations requiring an uninterruptible power supply, such as hospitals, data centres and other locations where the uninterrupted functioning of information technology is critical, the emergency power supply works in conjunction with an uninterruptible power supply (UPS) system. The UPS takes care of electricity supply from the first seconds of the power outage until the emergency power supply starts up and takes over the load.

1.1. Why prepare an emergency power supply?

An emergency power supply is an important part of a functional society, as it keeps critical services, such as hospitals, telecommunications and food supply, running during power outages as well. At the same time, it provides certainty and continuity for all operators for whom electricity is a necessity in their daily lives or work.

- **Safeguards critical functions**
  Emergency power ensures the continuity of critical functions during power outages.

- **Enables continuous operation**
  Emergency power can keep everyday life and work running smoothly during the times when the electricity distribution system is not working normally. It can be used to prevent equipment damage, data loss and production downtime that can cause financial losses.

- **Improves safety**
  In the event of a power outage, fire alarms, access control systems and other alarms will stop working when their batteries run out of power. A power outage has an immediate effect on all lighting that does not rely on a battery pack. An emergency power supply ensures that safety is not compromised in unexpected situations.

- **The responsibility to prepare lies with the organisation itself**
  Each operator is responsible for ensuring the continuity of their own business – no one will do it on your organisation's behalf.

EXAMPLE
Ventilation in chicken coops

In chicken production facilities, ventilation is a critical system for animal welfare and survival. Even a relatively short power outage lasting about 15 minutes can lead to the death of chickens when the electric ventilation stops working. The emergency power supply must start up quickly to ensure that ventilation continues in the chicken coop and the animals' lives are not put at risk.

1.2. Specification of needs

The procurement of an emergency power supply starts with identifying the emergency power needs together with the management team and persons responsible for key functions. The needs assessment should take into account any critical customers and other stakeholders that may be dependent on the organisation's products or services. The questions in Table 1 provide a good starting point for specifying the emergency power needs (what, why and for whom).

Table 1. Questions to support the specification of emergency power needs

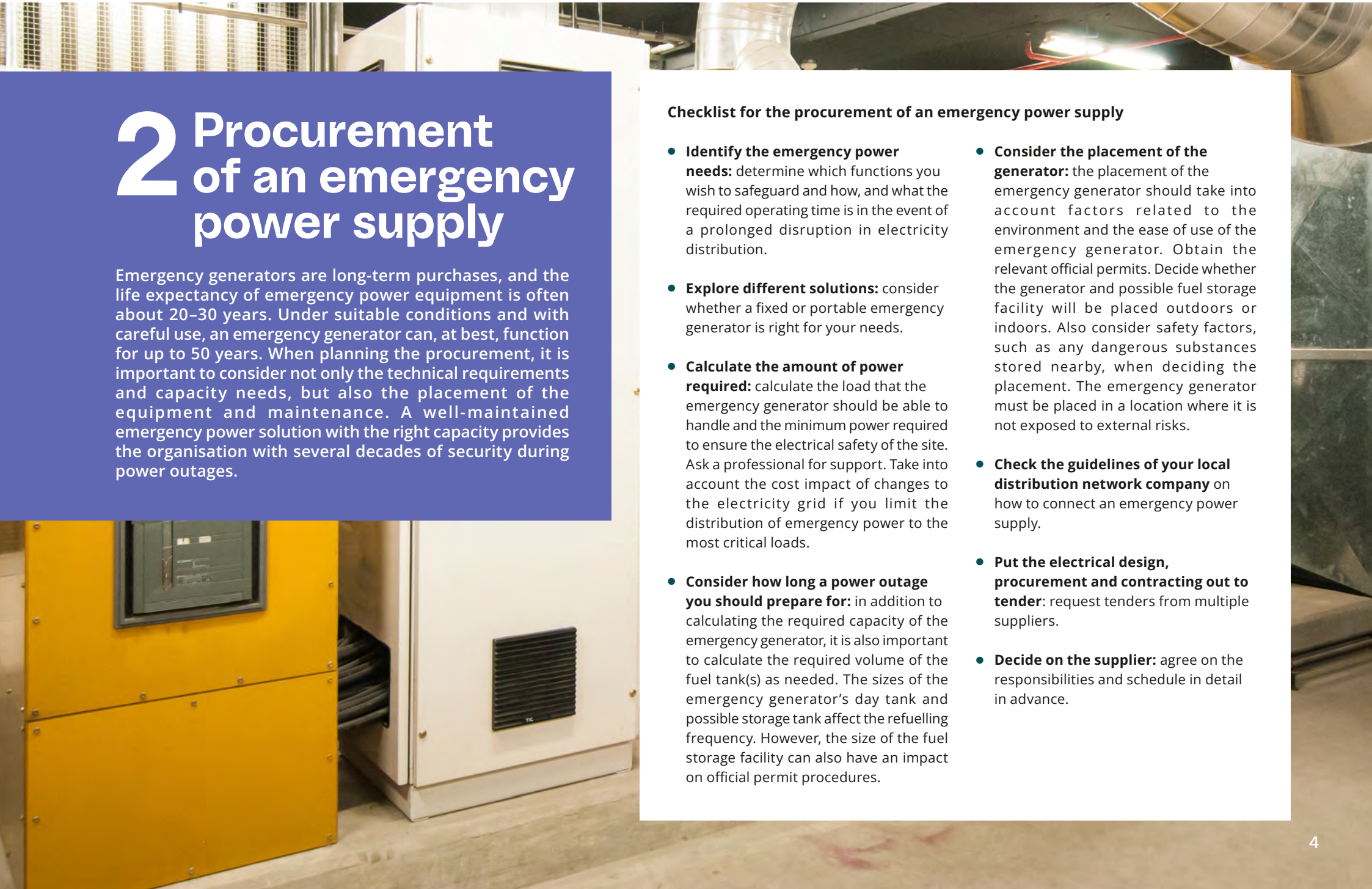
What?
• What kinds of functions in our organisation need electricity?   • What functions do we also want to safeguard during disruptions in electricity supply? What things or functions do we not need to safeguard? • How long a power outage does our organisation need to prepare for? • Who owns the property where we plan to place the emergency generator?
Why?
• How critical are the functions to be safeguarded and on what basis? • Will a disruption in the critical functions immediately cause harm, and how quickly do we need to get them up and running again? • Can the interruption of some functions when the power supply is cut off or their uncontrolled start-up when the power comes back on cause a hazard?
For whom?
• Does the emergency power supply serve the entire organisation or does it only safeguard certain functions? • Does the emergency power supply directly or indirectly safeguard the operations of another organisation?

Operators operating in a rental property must agree with the property owner on the emergency power supply and the responsibilities related to it. This should be included in the rental agreement, which should also define disruptions and the responsibilities of the lessor and tenant in relation to the use of emergency power.

Once the emergency power needs have been jointly specified and delimited, it is time to establish the objectives for the organisation's emergency power supply. Clarifying the objective will increase shared understanding of the scope of the emergency power solution to be procured. For example, the objective of the emergency power solution can be to:

- maintain critical infrastructure
- take care of safety measures
- ensure a controlled shutdown of production in the event of a disruption in electricity supply
- continue operations for as long as possible with limited capacity
- improve reliability in the eyes of stakeholders.

Once you have defined the objective, you can move on to preparing for the procurement of an emergency power supply (Chapter 2).



2 Procurement of an emergency power supply

Emergency generators are long-term purchases, and the life expectancy of emergency power equipment is often about 20–30 years. Under suitable conditions and with careful use, an emergency generator can, at best, function for up to 50 years. When planning the procurement, it is important to consider not only the technical requirements and capacity needs, but also the placement of the equipment and maintenance. A well-maintained emergency power solution with the right capacity provides the organisation with several decades of security during power outages.

Checklist for the procurement of an emergency power supply

- **Identify the emergency power needs:** determine which functions you wish to safeguard and how, and what the required operating time is in the event of a prolonged disruption in electricity distribution.
- **Explore different solutions:** consider whether a fixed or portable emergency generator is right for your needs.
- **Calculate the amount of power required:** calculate the load that the emergency generator should be able to handle and the minimum power required to ensure the electrical safety of the site. Ask a professional for support. Take into account the cost impact of changes to the electricity grid if you limit the distribution of emergency power to the most critical loads.
- **Consider how long a power outage you should prepare for:** in addition to calculating the required capacity of the emergency generator, it is also important to calculate the required volume of the fuel tank(s) as needed. The sizes of the emergency generator's day tank and possible storage tank affect the refuelling frequency. However, the size of the fuel storage facility can also have an impact on official permit procedures.
- **Consider the placement of the generator:** the placement of the emergency generator should take into account factors related to the environment and the ease of use of the emergency generator. Obtain the relevant official permits. Decide whether the generator and possible fuel storage facility will be placed outdoors or indoors. Also consider safety factors, such as any dangerous substances stored nearby, when deciding the placement. The emergency generator must be placed in a location where it is not exposed to external risks.
- **Check the guidelines of your local distribution network company** on how to connect an emergency power supply.
- **Put the electrical design, procurement and contracting out to tender**: request tenders from multiple suppliers.
- **Decide on the supplier:** agree on the responsibilities and schedule in detail in advance.

2.1. Different solutions for emergency power arrangements

Emergency power preparedness can take many forms, depending on the nature of the operations, their criticality and the resources available. The most important thing is for the choice you make to be informed and based on a well-thought-out decision. Table 2 below presents the different emergency power options, which are (1) a fixed emergency power supply, (2) a portable emergency power supply, (3) a UPS system and (4) no emergency power supply at all.

Table 2. Options for emergency power arrangements.

Approach	Usage	Start-up	Considerations
Fixed installation	Permanent part of the electricity system	Automatic or manual start-up Automatic: 10–30 seconds Manual: the start-up time varies	A fully uninterruptible power supply requires a UPS system
Portable, temporary	Brought to the location as necessary (note: agree on who will bring, connect and start the supply)	Manual: the start-up time varies	Not permanently connected to the grid, so slower to start up
UPS (uninterruptible power system)	Protects the equipment from momentary power outages and provides time for either a safe shutdown or starting up an emergency power supply.	Automatic: 0 seconds	Works seamlessly at the beginning of a power outage
No emergency power supply	In some cases, the operator may decide not to procure an emergency power supply. This is a well-thought-out decision, not a state of passiveness.	-	The operator uses other means to prepare for power outages or accepts their impact as part of the operations.

An emergency power supply is either fixed or portable. In a fixed installation, the emergency generator is installed in a specific location and kept connected to the electricity system. In contrast, a portable emergency generator is brought to the site when necessary and connected to a pre-prepared connection point. Although these two options differ from each other considerably in terms of implementation, the choice does not affect the property's electricity grid or its requirements, provided that in both cases the generator starts up automatically, synchronises with the electricity grid and has sufficient capacity. Otherwise, you may need a transfer switch, at least for a portable generator, and you can limit the distribution of emergency power to the most critical loads, if necessary. **You must carefully make sure that the emergency power solution and the existing electricity system are compatible.** For example, the use of solar power in the property can affect the way in which the emergency power solution should be installed as part of the electricity system.

If you choose a fixed installation, you have two main options as to the implementation method: either integrate the emergency power supply into the existing property or install it in a separate space on the plot, but as an integral part of the property's infrastructure. There is also a lighter option for a fixed installation, in which the emergency generator is placed in a portable outdoor unit, such as a sea container. Figure 1 shows an emergency generator being built in a container. This implementation method combines the advantages of permanence and portability, and the generator can be made ready to use without extensive construction work.

There are also smaller, easily portable emergency generators that you can transport from one place to another on a trailer, for instance. **However, the use of a portable emergency power supply requires a functional connection point** (see Figure 2 for an example of a connection point) to which the generator can be connected. It is also possible to rent portable equipment, but this is more intended for specific short-term needs (e.g. maintenance work) than for preparedness for disruptions. You must draw up agreements on a portable generator and its installation, specifying the response times for the delivery of the generator. You should also note that, despite such agreements, it may be difficult to obtain a generator in the event of a severe disruption.

The different implementation options differ from each other in terms of start-up times. **An automatically starting emergency power supply** typically starts up within 10–30 seconds of a power outage being detected.

Figure 1.
Emergency generator built into a sea container

Figure 2.
Ready-made connection point for an emergency generator

In manually started solutions, the delay depends on how quick the staff are to react. In this case, the start-up time is entirely dependent on human factors. If a UPS system is in place, it will secure critical equipment without delay as soon as a power outage occurs and keep it running until the emergency power supply starts up and takes over the load.

2.2. Capacity of the emergency power supply

The required capacity of the emergency generator is estimated from the perspective of the function to be safeguarded. It is a good idea to determine the emergency power capacity required with an expert electrical engineer to ensure that the estimates of the power capacity required are roughly accurate when planning the procurement.

The amount of power required and the load handled by the generator determine the choice of equipment. Depending on the purpose of use, the emergency generator may also be required to operate for longer periods of time in connection with maintenance work, for instance. Use in an industrial environment will place a heavier load on the generator if the amount of power needed is not stable. The start-up currents of large electrical equipment increase the load momentarily. In more stable environments, such as retail stores, the load is more even.

If there is any sensitive electrical equipment on the site, you must take into account the electrical properties of the emergency generator with regard to electric power quality. For example, medical devices or milking robots may react to the electricity produced by a generator due to potential frequency fluctuations.

Table 3 presents examples of the power and applications of emergency generators. However, the final power of the generator is always determined according to the electrical load verified for each site, as the amount of power required can vary significantly depending on the site.

Table 3. Examples of the power ratings and common applications of emergency generators.[2]

Apparent power of the emergency generator (kVa)	Consump-tion (l/h)	Power (kW)	Examples of applications
Depends on the power of the generator*	*	Under 10	Small pumping stations, e.g. wastewater or rain-water pumping stations in sparsely populated areas, telecommunications facilities: individual equipment rooms or small base stations, alarm systems
50	10	40	Farms, small properties
100	20	80	Small markets, fire stations, school centres
200	40	160	Hotels
400	80	320	Health and social services centres, water utilities
1,000	200	800	Power stations, tunnels, airports, large markets
2,000	400	1,600	Hospitals, data centres

A portable emergency generator often has lower power and is used to safeguard essential functions when necessary. Larger fixed emergency generators are more efficient in terms of capacity and can be used to maintain critical functions in production facilities or hospitals, for instance.

Small emergency generators with a capacity below 10 kW are usually powered by petrol, while larger generators are powered by diesel. The fuel consumption can be calculated quite accurately. For a diesel generator, it averages 0.2–0.3 l/h per kilowatt.

[2]The following providers of emergency power solutions were consulted regarding the power ratings of emergency generators and technical considerations: Kw-set Oy, Machinery Oy and PCBI Oy.

2.3. Placement of the emergency power supply

The placement of the emergency generator must take into account considerations related to the environment and the use of emergency power. The facilities and infrastructure of the property limit the placement of a fixed emergency generator, depending on the size of the equipment to be procured. From an environmental point of view, a liquid-fuel-powered emergency generator produces exhaust gases that must be properly channelled away from indoor facilities, and you also have to take into account considerations related to regulations concerning the fire safety of buildings. The battery packs used by the equipment contain electrolytes and other substances harmful to the environment, among other things.

When running, emergency generators cause noise and vibration, which affect both structures and the working conditions of people working nearby. Noise and vibration must be taken into account, particularly in relation to the distances to nearby buildings and functions. When generating electricity, an emergency generator creates a magnetic field around itself, which is why it is necessary to protect the emergency power equipment to avoid disrupting other equipment. The environmental factors mentioned above must also be taken into account when placing emergency power equipment in outdoor facilities, such as a separate container. It is recommended that you consult the local rescue authorities regarding the placement of emergency generators.

When deciding where to place an emergency generator, it is important to consider maintainability and access to the generator under all conditions. Physically cramped or dark spaces make it difficult to carry out maintenance or test runs. From a refuelling point of view, it is essential for the emergency generator to be placed in a location where the fuel filling hatches are accessible by tanker throughout the year. Refuelling also sets requirements for the height of the fuel filling hatches. Furthermore, you must remember to make sure that no vegetation, snow or ice hinders the operation of the air vents or exhaust pipe or blocks the access route to the emergency generator. You must always plan a functional access route in advance. This is particularly important when the tanks need to be filled frequently.

Access to the generator also involves the safety perspective. Those responsible for the procurement and operation of the emergency generator must ensure that no outsiders have access to the generator. It is important to protect the generator from external risks because the equipment plays an irreplaceable role in the event of a disruption. External risks to the emergency generator include vandalism, sabotage, fires and water damage, among other things. You should not place the generator near explosive or toxic materials. The location, visibility and properties of the emergency generator affect its protection, as an emergency generator placed inside a container, for example, is well-protected against various threats as it is. You must decide within your organisation who has access or keys to the generator.

EXAMPLE

A steep hill prevents fuel from being transported to the emergency power supply

The emergency generator must be placed in a location accessible by service vehicle in all weather conditions. For example, a generator placed at the bottom of a steep hill might not be refuelled if the tanker cannot reach it. Potential problems in winter include a slippery hill that cannot be safely driven down, or an unploughed hill where snow accumulation blocks access. You must ensure unobstructed access for service vehicles right from the planning phase.

2.4. Putting the procurement out to tender

Once you have made the decision to procure an emergency power supply, draw up a call for tenders. When procuring an emergency power supply, you should follow your organisation's existing procurement practices. Competitive tendering is recommended, and you should carry out the process with due care in order to obtain not only the most technically suitable solution, but also the most cost-effective one. **During the procurement phase, you should be prepared for long delivery times.**

The procurement process requires you to take all factors into account before sending out a call for tenders. **During the procurement phase, you must be able to describe the load that you are preparing to maintain and the duration for which you expect the emergency generator to run continuously, for example.** You should be as specific as possible regarding the technical requirements, as this clarifies the requirements set for the emergency power supply and speeds up the procurement process.

It is good practice to treat tenderers equally during a tender process. Ensure that the common timetable and specifications for the submittal of tenders are realistic to fulfil. **It is recommended that you consult a competent professional right from the planning phase**, as there are many different aspects to consider when procuring an emergency power solution. You must consider electronic control and automation, as well as HVAC, cooling and fuel systems, among other things. In this phase, well planned is half done, as the background work carried out and capacity estimates drawn up in the tender phase define the boundary conditions of the procurement.

It is useful to set clear selection criteria for the evaluation of tenders. They can be related to the price and properties such as the generator's start-up time, operating time without refuelling, maintenance frequency and noise level, for example. The responsibilities of the client and the supplier and the project schedule should be carefully reviewed before selecting the supplier, so that both parties have a shared understanding of the project's progress. A well-executed tendering process ensures that the chosen emergency power solution is reliable and serves its purpose in the event of disruptions as well.

2.5. Key requirements and permits

The permits required to implement an emergency power solution depend on the size of the emergency power system and the location where it will be built, among other factors. With regard to the construction site, the permits required depend on the land use planning situation and the location of the site in relation to the rest of the urban structure or the groundwater basin. If the emergency generator requires a building permit or causes any environmental impacts, you must file a registration notification with the municipality. You must always confirm the required permits with the local authorities, so you should contact the municipal building control services and environmental services at the start of the planning process. In most cases, the permits that may be required for emergency power supplies are related to the matters compiled in Table 4.

Table 4. The most common permits for an emergency power system.[3]

Permit	Description	Granting authority
Environmental permit, registration as specified in the Environmental Protection Act, or notification procedure as specified in the Environmental Protection Act	This permit is required for activities that may cause environmental pollution or pose a risk thereof. Whether or not you need one depends on the type of construction site, the size of the system required, and the amount of fuel to be stored.	The Regional State Administrative Agency or the municipal environmental protection authority, depending on the type of activity. If you are uncertain whether you need a permit, please contact the authorities listed above.
Decision concerning the need for planning or deviation permit	A permit related to land use planning, which is seldom required. However, you must confirm with building control services whether or not you need one as soon as you have decided on the site.	Building control services
Building permit	The construction of an emergency power system is a measure that affects safety and is likely to require a permit. In addition to safety-related matters, the permit procedure also assesses matters related to noise and the cityscape.	Building control services
Storage of chemicals and control of their use	The Finnish Safety and Chemicals Agency (Tukes) and regional rescue departments control the storage and use of chemicals in Finland. For an emergency power system, you need to submit a notification about minor industrial processing and storage of hazardous chemicals.	Local rescue authority

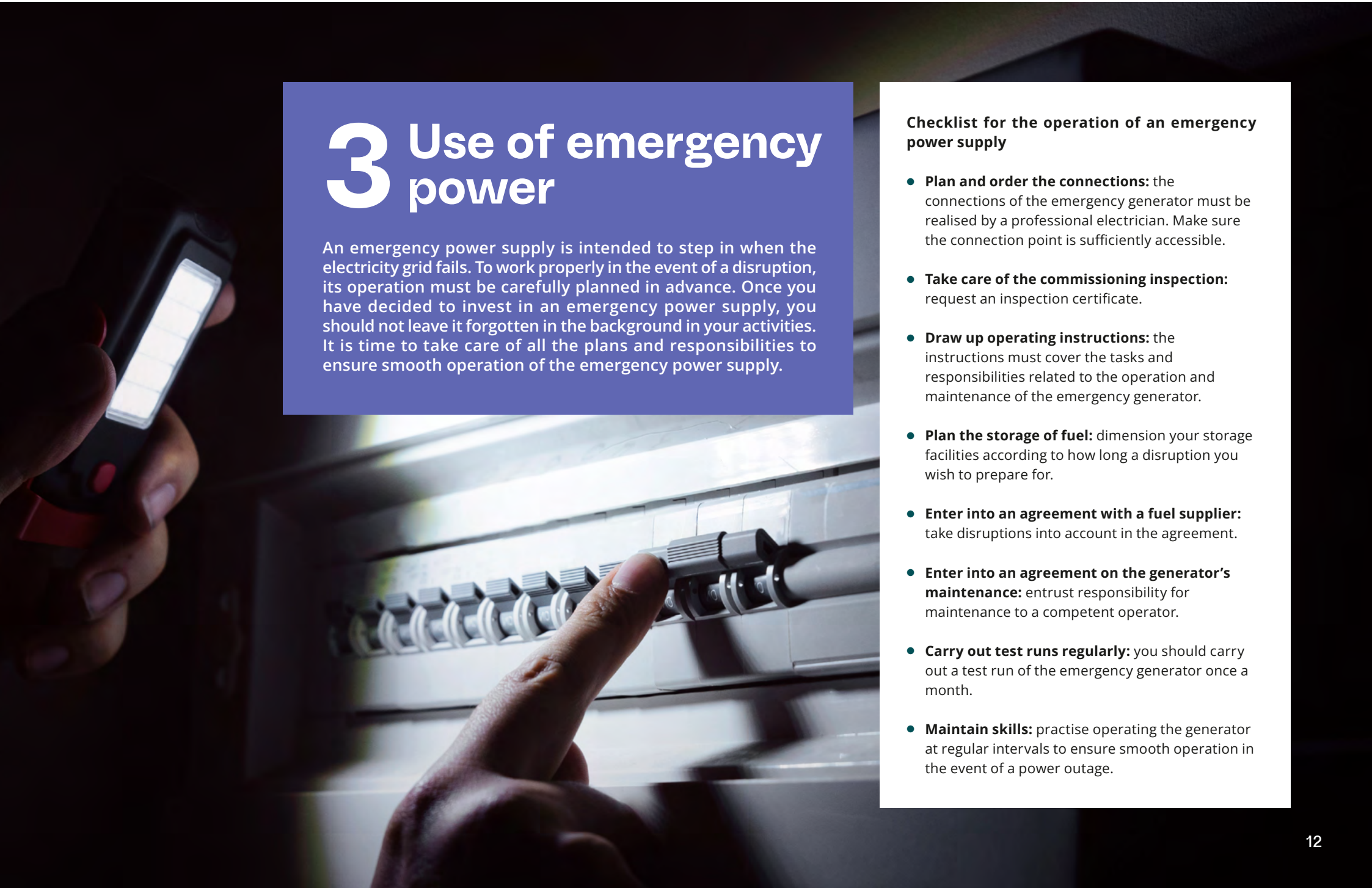
[3]This table was compiled with information valid in June 2025.

In Finland, the procurement, placement and use of emergency power supplies is governed by several laws and regulations. The liquid-fuel-powered emergency generators covered by this guide are subject to requirements with regard to emissions and fuel storage, among other things.

Table 5 lists examples of laws and regulations pertaining to emergency power. In addition to the laws listed below, different industries, such as health care and energy, also have their own legal provisions on emergency power. Furthermore, local and regional authorities, insurance companies and manufacturers of emergency power supplies have developed their own guidelines on the installation and placement of emergency generators.

Table 5. Laws, regulations and standards related to emergency power.

Laws and regulations	
Electrical Safety Act 1135/2016	This Act regulates the safe use of electrical equipment and installations in Finland. It applies to all electrical equipment and installations used in the generation, transmission, distribution or use of electricity, the electrical or electromagnetic characteristics of which may pose the risk of damage or disruption.
Government Decree on Electrical Installations 1434/2016	The essential safety requirements for electrical installations are laid down in the Annex to the Decree.
Environmental Protection Act 527/2014	This Act provides for activities subject to an environmental permit, among other things. An environmental permit is required for activities that pose a risk of pollution. Annex 1 to the Act lists the activities that require an environmental permit.
Water Act 587/2011	This Act provides for matters that may affect the need for an environmental permit when procuring an emergency power system.
Government Decree on Environmental Protection Requirements for Medium-sized Energy Production Units and Plants 1065/2017	This Decree applies to energy production units using solid, liquid or gaseous fuels that have a fuel power of at least 1 megawatt but no more than 50 megawatts. The Decree provides for emission limit values and additional requirements for the handling and storage of liquid fuels, among other things.
Building Act 751/2023	This Act provides for matters related to noise abatement and building permits, among other things.
Regulation at EU level	
NRMM Regulation (EU) 2016/1628	Applies to non-road mobile machinery. With regard to emergency generators, the Regulation applies to generators with a power capacity of 19–560 kW. The Regulation sets out limit values for gaseous and particulate emissions from internal combustion engines (Stage V emission limits), among other things.
Machinery Directive (2006/42/EC)	Matters related to the safety of the emergency generator, such as a CE marking.
Standards	
Electrical safety standards	Standards related to the installation and use of emergency power supplies (e.g. SFS 6000 Low-voltage electrical installations, SFS 6001 High-voltage electrical installations, SFS 6002 Safety at electrical work)



3 Use of emergency power

An emergency power supply is intended to step in when the electricity grid fails. To work properly in the event of a disruption, its operation must be carefully planned in advance. Once you have decided to invest in an emergency power supply, you should not leave it forgotten in the background in your activities. It is time to take care of all the plans and responsibilities to ensure smooth operation of the emergency power supply.

Checklist for the operation of an emergency power supply

- **Plan and order the connections:** the connections of the emergency generator must be realised by a professional electrician. Make sure the connection point is sufficiently accessible.
- **Take care of the commissioning inspection:** request an inspection certificate.
- **Draw up operating instructions:** the instructions must cover the tasks and responsibilities related to the operation and maintenance of the emergency generator.
- **Plan the storage of fuel:** dimension your storage facilities according to how long a disruption you wish to prepare for.
- **Enter into an agreement with a fuel supplier:** take disruptions into account in the agreement.
- **Enter into an agreement on the generator's maintenance:** entrust responsibility for maintenance to a competent operator.
- **Carry out test runs regularly:** you should carry out a test run of the emergency generator once a month.
- **Maintain skills:** practise operating the generator at regular intervals to ensure smooth operation in the event of a power outage.

3.1. Connections and deployment

The connections of the emergency generator must be realised by a professional electrician. Remember the earthing arrangement when realising the connections, as this is essential for safety and fault protection. As residual current devices only work properly in an earthed system, it is also a good idea to check the condition of the earthing conductors from time to time.

When installing an emergency power supply, you must always contact your distribution network company to ensure the safety of the equipment and the electricity system. The electricity supplied by the emergency power supply must be isolated from the distribution network of the distribution network company, which requires the installation of a switch in the emergency power equipment. Your selected contractor can support you with the isolation requirements[4] and the connection of the emergency generator.

The connection of a portable emergency power supply to the electricity grid should be planned so as to allow the equipment to be quickly put into service when needed. The connection point must be easily accessible and tested in advance to ensure functionality. The site must be equipped with clear instructions on how to connect and disconnect the emergency power supply. **When designing the electricity system of a new building, you can take an emergency power connection into account right from the design phase and implement it in conjunction with other electrical installations.** This significantly improves the readiness to procure an emergency power supply in the future and costs less than adding a connection point later. This allows you to cost-effectively create the conditions for a smoother installation of an emergency power supply in the future during the construction phase.

Once the connections have been realised, the emergency power equipment undergoes a commissioning inspection. The selected electrical contractor is responsible for carrying out the inspection and will issue a certificate of completion of the commissioning inspection. After that, the emergency generator is ready for safe operation. The commissioning inspection must also include a blackout test for the purpose of testing the functionality of the emergency power equipment and the electricity system in the event of a power outage.

EXAMPLE
Tractor behind an electric door

A farm needed to use its emergency power supply when a power outage occurred during freezing winter temperatures. In order to run, the generator reserved for this purpose needed a tractor that was stored behind an electric door. However, the door could not be opened due to the power outage. This case is a reminder that each site's emergency power solutions must be considered on a case-by-case basis, without forgetting the various practical arrangements.

[4]The requirements can be found in standard SFS 6000-5-551.6/7 and ST file ST 52.40.

3.2. Maintaining availability

In order to ensure the uninterrupted operation of an emergency generator during a power outage, it is important to take care of its condition and availability in advance. Below are the key things to take care of to ensure that your equipment is ready for operation.

Fuel supply

The reliability of emergency power equipment depends crucially on the availability of sufficient fuel. The best way to ensure this is to **enter into an agreement with a fuel supplier.** It is important to specify in the agreement how fuel deliveries will be organised in the event of a disruption; for example, the delay between the arrival of the order and the contractor's delivery of the refill under normal conditions and during disruptions. Additionally, it is recommended that you enter into agreements with several suppliers as a backup arrangement.

When planning a fuel availability solution, it is important to take into account that fuels are likely to be rationed products under emergency conditions. In such situations, it is very likely that challenges will arise in the availability and supply of fuel, and each operator is responsible for preparing for these challenges independently.

Fuel storage

You must decide the fuel storage capacity according to the disruption duration that your organisation wishes to prepare for. In severe and widespread disruptions, you may not be able to obtain more fuel anywhere. In this case, the operating time of the emergency generator depends entirely on the amount of fuel stored for the generator. Note that the day tank of an emergency generator is usually limited in volume, so you will need to acquire a storage tank for fuel. For example, you can use a farm tank solution commonly used in rural areas, i.e. an above-ground fuel tank placed outside.[5]

The shelf life of fuels is an important consideration when planning a storage solution. During the winter months, you must ensure that the fuel stored is winter grade. If the fuel cycle is slow, it is recommended that you only use winter-grade fuel. When storing fuel, you must adhere to the storage times specified by the fuel manufacturer. This is particularly important when using fuels with a shorter shelf life (e.g. biodiesel containing FAME). *The fuel cycle must be planned so as to maintain product quality. In most cases, test runs alone do not guarantee a sufficient fuel cycle.*

If there are other functions in the organisation that use fuel, you can cycle the emergency fuel stored for use by these functions.

EXAMPLE

A broken power supply cable put the emergency power arrangements to the test

A power supply cable broke at a construction site of a waste management company, prompting workers to use the emergency power supply. The generator had to be kept running overnight, as the site systems had to stay on without interruption. At the end of their shift, the workers discovered that they needed more fuel to keep the generator running until morning. At the same time, they had to find a way to ensure that the generator would operate safely without supervision. The most important lesson learned by the company was to stay prepared by keeping enough fuel in the generator.

IMPORTANT:

An emergency power supply is not a device that simply sits in a corner, but part of the organisation's preparedness measures for disruptions.

IMPORTANT:

Each operator is independently responsible for ensuring that they have sufficient fuel.

[5]Partnership Network of Finnish Rescue Services. Storage of fuel in farm tanks on farms (in Finnish only). https://pelastuslaitokset.fi/julkaisu/farmarisailio

Regular test runs

You should carry out a test run of the emergency generator once a month and under load slightly less often, for example four times a year. Regular test runs ensure that the generator works when you actually need it to. Equipment not used for years rarely starts up without problems – that is why testing is an essential part of equipment maintenance.

EXAMPLE

An untested emergency generator failed to start up

A farm purchased an emergency generator, but did not test its operation at all. Roughly a year after purchasing the emergency generator, the farm attempted to start the generator, but it would not start up because of an equipment fault. Regular testing would have revealed the fault in advance and allowed for repairs to be carried out immediately after purchase.

Maintenance and upkeep

Maintenance must be carried out at least once a year, regardless of the number of operating hours, and if the number of operating hours is high, it is recommended that you follow the manufacturer's guidelines on maintenance frequency corresponding to the number of operating hours. **It is sensible to enter into a maintenance agreement with a specialist, so that the equipment is automatically maintained at pre-agreed intervals.** Maintenance is often carried out by the supplier of the emergency generator, as they have experience in the properties of the chosen generator model and the arrangements at the site in question.

You must look into the availability of essential spare parts together with the party responsible for maintenance. It is a good idea to keep a sufficiently comprehensive set of spare parts near the emergency generator, with the extent of the inventory depending on the level of risk of emergency power failure that the organisation is prepared to tolerate. When deciding the extent of the spare parts inventory, it is useful to consider the availability of spare parts during the worst-case scenario, i.e. when everyone is in need of the same part. It is highly recommended to at least stock up on spare parts that are affordable.

Clear division of responsibilities and maintenance of skills

You should appoint the persons responsible for the operation and maintenance of the emergency generator in advance and document their roles and tasks. They must be familiar with the instructions for operating the equipment and know how to operate it safely, both under normal and emergency conditions.

Maintaining skills is an essential part of operational reliability. It is a good idea to practise situations requiring the use of emergency power, and you must review the entire deployment process carefully at regular intervals. New people must be oriented with their role, and those who have previously undergone training must be given regular opportunities to refresh their knowledge. Well-divided responsibilities and the maintenance of skills ensure confident use of emergency power, even during challenging and urgent situations.

EXAMPLE

Familiar people and knowledge of the equipment helped in an unexpected situation

A healthcare unit was holding an annual exercise to practise what to do during a disruption in electricity supply. One of the site's emergency generators overheated due to a problem with the ventilation system and eventually caught fire. The fire managed to burn through the medium-voltage cables running above the emergency generator, which disrupted the electricity grid of the entire property. The unit overcame the situation with the help of a network with which it was very familiar (distribution network company, service provider) and its competent staff. The most important lesson learned from this unexpected situation was that it is good to know the people needed in the event of a disruption in advance, so that the response to the disruption goes smoothly.

3.3. Guidelines for use

When a disruption in electricity supply occurs, it triggers measures that are not taken in normal everyday life. The situation is often unexpected and puts pressure on people. Therefore, it is important for **there to be clear instructions on how to operate the emergency power supply and for the operator to not be operating the equipment for the first time.** Having prior experience of operating the emergency power supply makes things go more smoothly.

Every organisation should therefore draw up instructions on how to operate their emergency power supply, covering the steps related to the operation and maintenance of the equipment clearly and concisely.

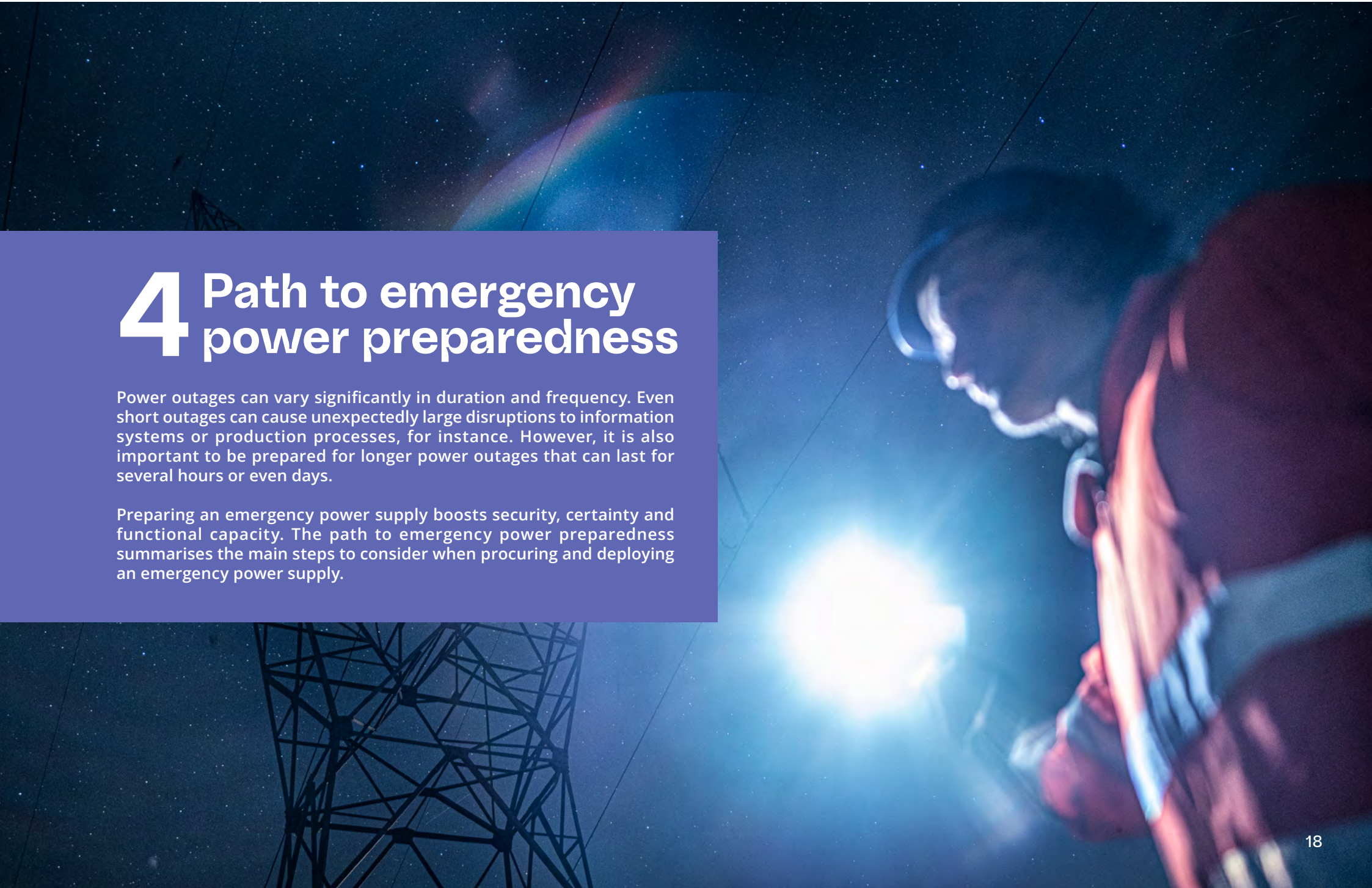
It is a good idea to cover at least the following in the instructions:

1. **Overview**
   - **Situations requiring the use of emergency power**
   - **Main functions to be safeguarded**
     Not all functions and equipment are equally important during a power outage. In the instructions, describe the functions safeguarded with emergency power.
   - **Tools available near the emergency generator**
     It facilitates the operation and maintenance of the emergency generator when you list the tools and spare parts available near the generator and mention their location in the instructions. This way, everyone can find the product they need when they need it.
2. **Responsibilities and contact details**
   - **Who can and who must start the emergency power supply**
     It is extremely important to appoint and train responsible persons who know both the equipment and their own role in the event of a disruption. It is smart to train several people to operate the emergency power supply and agree on a policy on who is responsible for matters related to the deployment of the emergency power supply in various situations and under what conditions.
   - **Contact details for on-duty staff and maintenance**
     If something is not working or questions arise about the use of emergency power, you must immediately know who to contact. Therefore, each organisation must have an up-to-date list of responsible persons and their contact details, including:
     - the on-duty responsible person for emergency power in the organisation
     - the contact details of the equipment supplier and/or maintenance company in case of equipment failure
3. **Start-up instructions**
   - **Step-by-step instructions on how to start the organisation's emergency generator**
     Proper start-up is essential to ensure that the power supply works as planned and safely. It may be useful to include a simple diagram of the equipment interface and buttons as part of the instructions.
   - **Checking load transfer**
     It is useful to note in the instructions how to ensure that the power supply is actually transmitted to the intended equipment and systems. This means that the electricity generated by the emergency generator is transmitted as planned to the equipment and systems identified as critical (e.g. cold storage, IT equipment). Describe in the instructions how load transfer is implemented (e.g. a manual transfer switch).

4. **What to do during operation**
   - **How to monitor the emergency generator during operation**
     It is important to outline in the instructions what to monitor during operation and what to do if something seems abnormal. If the load includes sensitive electrical equipment, such as medical devices, pay particular attention to it.
   - **Fuel sufficiency and refuelling instructions**
     Fuel sufficiency is often forgotten during preparations, and it is too late to buy more fuel during a power outage. For this reason, you must stock up on fuel in advance. The operating instructions for the emergency generator should indicate the operating time on a full tank and the amount of fuel consumed per hour. If you purchase an emergency generator for potential longer disruptions, you must enter into an agreement with a fuel supplier regarding fuel refills.
   - **Who to contact in the event of emergency generator failure**
     Each equipment operator must know who to contact when something does not work as expected. The instructions must explain who to notify (e.g. maintenance, on-duty technician), what to do if the person is unavailable (substitutes) and how to make the notification (e.g. by phone, text message).

5. **Shutdown and switching back to mains power**
   - **Shutdown sequence and safe transition to mains power**
     Once mains power has been restored and system stability is ensured, you should make a controlled transition back to normal power supply. Explain the shutdown process of the emergency power equipment clearly in the instructions.
   - **Taking care of refuelling without delay**
     After operation, check the fuel tank status and order a refill without delay to ensure that the emergency power supply remains in good working order for the next time it is needed.
   - **Documentation, writing down notes on usage**
     When shutting down the generator, it is important to document pre-defined matters related to the use of emergency power. This will help improve the activities. For example, write down the phases of recovery in detail and review the experiences as part of the development of preparedness.

6. **Maintenance and testing**
   - **Regular test runs (once a month, also under load four times a year, for instance)**
     An emergency power supply is not useful if it fails to start up when it is most needed. That is why regular test runs are an essential part of preparedness. You must write down the schedules and responsibilities concerning test runs in the operating instructions, and you should record each test run in a log or checklist.
   - **Maintenance frequency and related responsibilities**
     Just like any other technical equipment, emergency generators require long-term maintenance. Regular maintenance extends service life, prevents malfunctions and ensures that the equipment is in working order when you need it. It is important to define the maintenance frequency, the content of the maintenance, and who is responsible for ordering/carrying out the maintenance. If the maintenance is outsourced, you should provide the contact details and indicate the scope of the agreement clearly.
   - **Information on the fuel used and storage practices**
     Without fuel, an emergency power supply will not work. The instructions should specify at least the type of fuel, the storage period and who is responsible for restocking. Additionally, the instructions should include the contact details of the fuel supplier for restocking purposes.



4 Path to emergency power preparedness

Power outages can vary significantly in duration and frequency. Even short outages can cause unexpectedly large disruptions to information systems or production processes, for instance. However, it is also important to be prepared for longer power outages that can last for several hours or even days.

Preparing an emergency power supply boosts security, certainty and functional capacity. The path to emergency power preparedness summarises the main steps to consider when procuring and deploying an emergency power supply.

Path to emergency power preparedness

1. Carry out a preparatory analysis

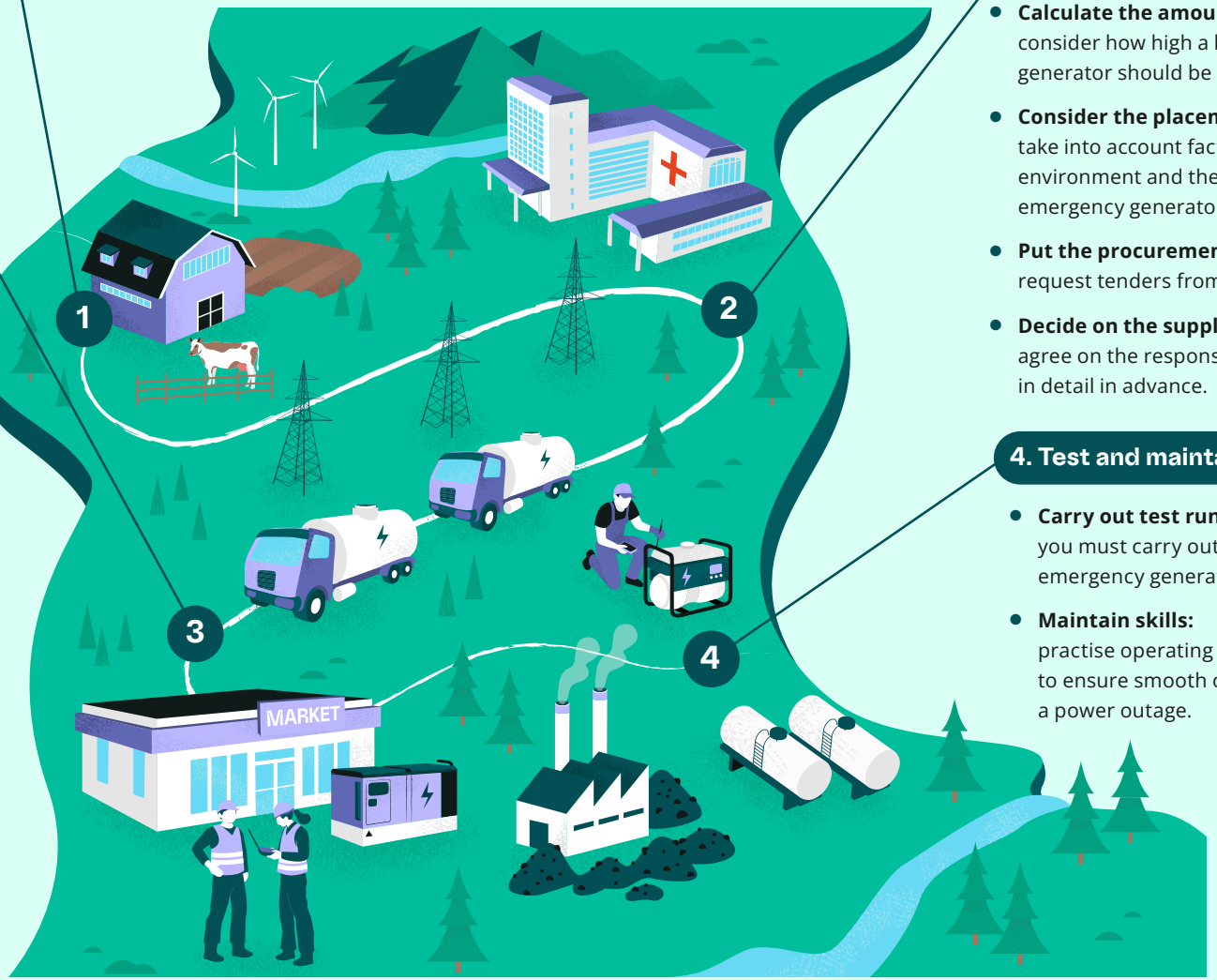
- **Identify the emergency power needs:** determine which functions need to be safeguarded.
- **Explore different solutions:** consider whether a fixed or portable emergency generator is right for your needs.

2. Choose a suitable solution

- **Calculate the amount of power required:** consider how high a load the emergency generator should be able to handle.
- **Consider the placement of the generator:** take into account factors related to the environment and the ease of use of the emergency generator.
- **Put the procurement out to tender:** request tenders from multiple suppliers.
- **Decide on the supplier:** agree on the responsibilities and schedule in detail in advance.

3. Deploy the emergency power supply

- **Plan and order the connections:** the connections of the emergency generator must be realised by a professional electrician. Make sure the connection point is sufficiently accessible.
- **Take care of the commissioning inspection:** request an inspection certificate.
- **Draw up operating instructions:** the instructions must cover the tasks and responsibilities related to the operation and maintenance of the emergency generator.
- **Plan the storage of fuel:** consider how long a disruption you wish to prepare for.
- **Enter into an agreement with a fuel supplier:** take disruptions into account in the agreement.
- **Enter into an agreement on the generator's maintenance:** entrust responsibility for maintenance to a competent operator.



4. Test and maintain

- **Carry out test runs regularly:** you must carry out a test run of the emergency generator once a month.
- **Maintain skills:** practise operating the generator regularly to ensure smooth operation in the event of a power outage.

Huoltovarmuuskeskus

A power outage can take you by surprise. Business does not have to stop.

Emergency power preparedness is part of a company's risk management and operational reliability. It increases safety and also facilitates continuity in the event of disruptions.