A blackout has 3 essential phases

A Europe-wide power, infrastructure and supply failure ("blackout") leads to the complete collapse of almost all vital infrastructure and supply chains and thus to the collapse of the supply of essential goods and services. The real crisis only begins after the power supply has been restored, since the basic supply will not work for a while. Therefore, there are 3 essential phases to consider:[1]

Phase 1: A supra-regional power failure affecting large parts of Europe, which can last from hours to days depending on the region.

For **Austria**, a power failure should be expected for at **least 24 hours**, although the regional power supply can be **partially restored earlier**. However, it can also take

longer if infrastructure damage occurs. A safety buffer is therefore always necessary: a plan C. What happens if the existing emergency power supply is not sufficient (regardless of whether it is due to the duration or failure)?

At the European level, it will take **at least a week** before the power supply is stable again everywhere. **Until then, setbacks can occur at any time**. Companies and infrastructures should only be restarted when it has been clearly communicated that the **European interconnected system is again functioning with sufficient stability and security** and that no more immediate failures are to be expected. If this principle is not observed, there is a risk of serious consequential damage.

In the production environment: Until a stable power supply is available, only systems that can handle voltage and frequency fluctuations and load surges should be connected to the grid again. Otherwise, there is a risk of serious damage to the systems! It can therefore be assumed that the power outage will last several days for most plants, even if the power supply is generally available. It must be specifically determined which systems are robust enough to withstand voltage and frequency fluctuations as well as load thrusts. One possibility for important areas that should be supplied with emergency power would be battery buffer storage since these can be charged from the grid and at the same time safely supply the systems with emergency power.

Phase 2: Phase 2 is completely underestimated, in which the **telecommunications supply** with landline, mobile phone or Internet breaks down. Serious hardware failures and disruptions to be expected, as well as massive overloads when restarting lead to a **recovery time of at least several days** after the power failure can be expected.

In regions where the power supply fails for more than 72 hours, significant damage to the IT infrastructure must be expected. This means that restoring the supply is becoming increasingly difficult and time-consuming.

Without a supply of telecommunications, there is neither **production** nor **fuel supply** and therefore no **supply of food or medicine**. Almost all production, logistics and supply processes depend on functioning data connections. On the other hand, there are often only small storage capacities left as a safety buffer (just-in-time or just-in-process). Health care (hospitals, doctors in private practice, pharmacies, nursing, etc.) will only function to a very limited extent, if at all. Serious failures are also to be expected here, as there will be many supply and disposal problems. **Phase 2 is already becoming an extreme challenge** for crisis management.

There are no sufficient state or other provisions for this, since nobody can help millions of people if nothing works anymore. The helpers and their families are also affected by the effects. Of course, this also applies to the own staff. This means that only very limited staff availability can be expected. Mobility (fuel supply) will also hardly function.

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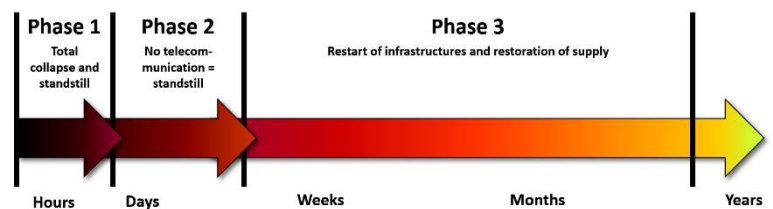
[1] www.saurugg.net/blackout

<u>Phase 3</u>: Depending on the area affected, **this will last weeks, months and sometimes years**. For example in agriculture, where it is expected that millions of animals in Europe will die within hours. After a large-scale, chaotic failure of the production and logistics chains as well as the vital infrastructure, it cannot be assumed that these will be available again to the usual extent within a few days and that they can be quickly synchronized. **Prolonged supply disruptions and bottlenecks** are therefore very likely. Just think of the complex transnational dependencies in supply logistics.

Failures in the plastics industry or packaging logistics would continue across the entire supply logistics. **A chain is only as strong as its weakest link.** Therefore, a **crisis operation lasting at least 14 days** should be prepared in order to be able to deal with the foreseeable subsequent problems as best as possible.

Impact on business

Most companies will no longer be able to act in the event of a blackout. Maintaining operations will be neither possible nor expedient. Therefore, a previously defined emergency operation should be activated as quickly as possible and then the operation should be stopped. Employees should be sent home.

For this purpose, relevant questions must be answered in advance and checklists must be prepared. In the event of a blackout, all sub-areas should be able to act independently as far as possible (decentralization of responsibility in advance).

Situation assessment and alerting

Power failure (during office hours)

- Which body/persons check the scenario in the event of a power failure?
- **Check: Electricity** (fuses, FM, porter) – **Cell phone network** (no cell phone network, or call someone further away to see if there is also a power outage there) – **Radio** (switch on and turn on Ö3 because traffic reports are sent here) – **tunnel closures** (if Ö3 reports that motorway tunnels will be closed throughout Austria due to power failures, then the time has probably come).
- Is a battery-operated radio (or crank/wind-up radio) available (car radio)?
- What additional channels can be used for verification?
- Who checks the elevators for trapped people? Who can carry out an elevator emergency extrication if necessary? Where is the nearest emergency organization to be able to organize help? After checking, labelling of the elevator door on the ground floor: "Elevator has been checked, no people trapped"
- Which electronic locking system is there? How is access regulated/secured? Leaving is possible.

In the event of a blackout

- Who should be informed first?
- Who convenes the crisis team? Independent meeting when nothing works?
- How are all employees informed (detector, assembly point in the event of a power failure, etc.)?
- What critical resources are there and how many are now available (fuel for emergency generator, UPS[2] times, key personnel, etc.)?
- What are the environmental conditions (weather, season, time of day, etc.) and how do they influence the possible course of the crisis?
- What further steps are to be taken before there is official confirmation over the radio after about 1 - 2 hours that it is a matter of a blackout?
- Immediate measures: Which steps are to be taken by when? What are the critical points in time (e.g. UPS times)?

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[2] Uninterruptible power supply

- Which checklists have to be worked through in order to bring company buildings and IT systems etc. into a safe condition?
  - IT shutdown (if not already done).
  - Ensure that an automatic restart is prevented when the power supply returns (deactivate fuses). The IT only starts up again when it has been announced over the radio that the European power supply system is stable enough again and there is no risk of another failure. Otherwise (further) damage could occur.
  - Switching off the power to the floors/devices etc. to prevent damage when the power grid is restarted (voltage fluctuations).
  - Locking away of movable goods (documents, notebooks, etc.) to protect against possible theft/burglaries.
  - Are there possible fire loads?
  - Cordon off all cleared areas.
- Assignment of a security service (in shifts) to ensure the protection of the operating facilities and fire protection.
- The employees are sent home after approval by the crisis management team (highest person present) and a status check in the departments/departments and after the areas have been cordoned off.

Power outage outside of office hours / blackout

- What is the procedure outside of working hours?
- What security measures are required? Who does this?
- Instructions to employees that if a blackout is announced over the radio, they are to stay at home or not come to work unless otherwise agreed (key personnel).

Restart

A restart of operations is only planned for phase 3. Until then, employees should stay at home and take care of their families.

Excluded are employees of facility management, IT, crisis management. In phase 2 (when it was announced on the radio that the European power supply system is stable enough again), they should start assessing the damage to the infrastructure and prepare recovery plans. When the external telecommunications supply and the company's own infrastructure are working again (phase 3), the employees should be contacted, and a restart coordinated.

A timely ability to act will usually not be necessary since all areas of life only have to start up again bit by bit. First of all, the basic supply of the population with essential goods and services must be ensured again. This also includes fuel supply (mobility). This will only gradually start up again. The emergency organizations and other important areas are to be given priority here.

The restart is to be coordinated by the crisis management team. In the event of infrastructure damage, it is to be expected that there will be neither independent service providers nor spare parts. Important components should be kept on site if possible.

Preparedness

- In the prevention (workshops), it must be clarified which external dependencies affect how the company operates (infrastructure supply, customers, etc.).
- In addition, it must be clarified what potential damage is to be expected and how this can be minimized.
- Raising employees' awareness is particularly important so that they can take appropriate personal precautions and get through the crisis safely. This also includes the clarification/preparation of how the employees will get home (if the public transport is not working or there is traffic chaos).
- Flyer for personal preparedness (in German):
  - https://gfkv.at/gfkv-blackout-folder
  - https://gfkv.at/gfkv-blackout-versorgung-basisvorrat
  - https://gfkv.at/gfkv-blackout-pension-personal-preparation-and-bewaeltigung

- The required key personnel (security service, phase 2, etc.) must be prepared separately. If necessary, an on-site supply must be ensured.
- The necessary detailed checklists (IT, FM etc.) are to be drawn up by the departments.
- Critical resources required for safe shutdown or emergency operation must be identified (emergency generator fuel, USV times, key personnel, etc.).
- Which critical processes (payments) are particularly affected by the interruption? What mitigation measures can be prepared? What agreements can be made with others?
- How can the topic of blackout prevention be communicated in internal and external communication? Positive communication! Welfare, etc. ("Join in! Austria is getting fit for the crisis! www.krisenfit.jetzt).

Further information and assistance

- www.saurugg.net (background information and assistance)
- https://youtu.be/L7JlDxl8YiM (lecture by Herbert Saurugg at the Austrian Armed Forces, 02.12.2021)
- http://zivilschutzverband.at (support for stockpiling)

Own notes