



Federal Office  
of Civil Protection and  
Disaster Assistance



**WARNUNG DER  
BEVÖLKERUNG**  
*Ein Bund-Länder-Projekt*



# Local emergency support hubs

Experiences, good practice and obstacles in the implementation of the basic concept of local emergency support hubs under consideration of their positioning in the warning system

**Version  
01-2025**



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Author: Team HF Hofinger, Künzer & Mähler PartG Ludwigsburg  
Franz Kather, Dr. Cleo Becker, Prof. Dr. Gesine Hofinger, Dr. Frauke Fried  
With the assistance of Dr. Mareike Mähler

Picture credit: Federal and state working group on local emergency support hubs  
(Bund-Länder offene Arbeitsgruppe Katastrophenschutz-Leuchttürme, BLoAG KatS-L); BBK

Layout: KOMPAKTMEDIEN Agentur für Kommunikation GmbH

Version: 01  
Date: January 2025

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# List of abbreviations

| Abbreviation        | Meaning                                                                                                                              |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>AO</b>           | Aid organisation(s)                                                                                                                  |
| <b>BBK</b>          | Federal Office of Civil Protection and Disaster Assistance<br>(Bundesamt für Bevölkerungsschutz und Katastrophenhilfe)               |
| <b>BLoAG KatS-L</b> | Federal and state working group on local emergency support hubs<br>(Bund-Länder offene Arbeitsgruppe Katastrophenschutz-Leuchttürme) |
| <b>BMFTR</b>        | Federal Ministry of Research, Technology and Space<br>(Bundesministerium für Forschung, Technologie und Raumfahrt)                   |
| <b>CI</b>           | Critical infrastructure                                                                                                              |
| <b>EPS</b>          | Emergency power system                                                                                                               |
| <b>HWR</b>          | Berlin School of Economics and Law<br>(Hochschule für Wirtschaft und Recht Berlin)                                                   |
| <b>ISF</b>          | Internal Security Fund of the European Commission                                                                                    |
| <b>LEIP</b>         | Local emergency information point                                                                                                    |
| <b>LESH</b>         | Local emergency support hub                                                                                                          |
| <b>MoWaS</b>        | National modular warning system<br>(Modulares Warnsystem)                                                                            |
| <b>NGO</b>          | Non-governmental organisation                                                                                                        |
| <b>PSAO</b>         | Public safety authorities and organizations                                                                                          |
| <b>TETRA</b>        | Terrestrial Trunked Radio                                                                                                            |
| <b>VFB</b>          | Volunteer fire brigade(s)                                                                                                            |
| <b>ZSKG</b>         | German Civil Protection and Disaster Assistance Act<br>(Gesetz über den Zivilschutz und die Katastrophenhilfe des Bundes)            |

# Executive summary

This report summarises the **findings of an interview study** around experiences with **establishing and implementing local emergency support hubs (LESH)** and feasible solutions in various contexts.

The explorative study was carried out by the Federal Office of Civil Protection and Disaster Assistance (BBK) and Team HF PartG. It is part of the ISF project of the German Federal Government and the federal states on the “Warning of the Population” and co-financed by the EU Internal Security Fund (ISF). The research objective was to collect information around **practical experiences in the establishment of LESH**, to identify recurring difficulties and viable strategies and possible solutions in the planning and implementation phases (**good practice**) and determine the **success factors and obstacles** around the establishment and implementation of LESH (→ *Sect. 6 & 6.10*). There were two other focal areas: involving the population and finding out how significant LESH are for warning activities. The findings of the interview study were the basis for developing **recommendations for future implementation** (→ *Sect. 6.10*).

A total of **38 interviews** with a total of 48 individuals responsible for LESH who work at regional authorities were conducted between April and October 2024 (→ *Sect. 4 & 6*). Qualitative and quantitative methods of evaluation were combined in order to identify topics and focal areas, and their relevance and frequency in specific contexts and institutional settings received a preliminary weighting. Due to the **explorative nature** of the study, it cannot claim to be complete or representative. The interviews were supplemented by research data.

A large proportion of respondents had already **delved into** the subject of **LESH** and were in the implementation phase. With the requests from higher levels in the context of a pending **gas shortage**, many places began setting up LESH in 2022. At the time of the survey, the respective

concepts were in **various planning and implementation phases**. However, the survey contained only **isolated** reports on the deployment of LESH and most emergency response-related drills are still in the planning phase. For these reasons, the statements on the viability of LESH collected here are related to planning activities or rather, completed drills.

With regard to planning-related localisation and anchoring, **very different prerequisites** for the design of LESH are shown: LESH were typically planned by specialists from the **field of disaster management**. In some cases, **longer-term positions** were created for this purpose and in others the tasks were taken care of “**on the side**”. The respondents estimated a time requirement ranging from several weeks as part of a lower full-time equivalent to several months and multiple staff (→ *Sect. 6.2*). The scope and reach of the plans varied with staffing capabilities. At some regional authorities, the LESH concept is embedded in a **higher-level concept**, which made it possible to fall back on existing planning elements. At the same time, the multi-scenario deployment of LESH generates synergy effects and facilitates awareness of LESH as a contact point for the population. The concepts from other administrative levels and organisational units were also relied on to provide expertise.

In almost all cases, collaboration and coordination **with other stakeholders** in both the planning and detailed implementation phases was emphasised as being helpful or rather, desired if it had not been possible (→ *Sect. 6.4*). Further, support in the form of **detailed decrees or recommendations** including **minimum standards**, requirements (“**blueprints**”) and **financial and coordinated support** was frequently desired or rather, positively emphasised when present. Not least, this would advance an often-expressed desire for an increase in the **standardisation of implementation**. However, design and implementation are always caught between adaptation to

specific, local requirements and circumstances and standardisation.

The desire for standardisation responds to a high level of **diversity in the implementation of LESH** as well, which is already obvious in the **range of designations**: both among and within the federal states and in some cases, even within districts, the concepts have **different names**. Depending on the type, size and resource breakdown of the regional authorities, they also **differ** in terms of **how many** LESH are set up and what **services the facilities** (→ *Sect. 6.1*) offer in detail. Around half of the concepts include standardised basic capabilities across all facilities within a regional authority; in other cases, different facilities with services varying in scope were planned – some as modules that could be mobilised as needed, depending on the dynamics of the situation. This type of modular structure appears to be advisable with regard to the effectiveness of resource deployment and its flexibility in terms of calling up different modules for **other scenarios** and for possibly **escalating situations**. **Early needs analyses, specifying protection objectives and a realistic estimation** of which services can actually be offered on site contribute to planning and implementation efficiency. The **multiple use of resources** and pragmatic thinking can contribute to saving resources and avoiding structural overload.

The selection of **locations and staff** for LESH is another example for fundamentally different decisions being taken based on local conditions. For example, around half of respondents fall back on fire brigade depots and staff in the form of the available (volunteer) fire fighters and other PSAO. Others explicitly decide against this option and set up LESH in public municipal buildings and staffed them with administrative personnel. In terms of the actual assertion of service obligations for the longer-term staffing of LESH, many respondents consider that they, too, will be affected or rather, that other tasks will arise within the context of disaster management. However, the **population is systematically included** in planning activities or implementation **early on only in isolated cases**. And the possible

coordination or **integration of spontaneous volunteers** in emergencies is **rarely considered**.

Typically, the function of LESH as an option for **communication with the population** is considered unilaterally: the ability of the population to make emergency calls has top priority, while sharing information with the population in the context of a **warning** is included as a possibility. Designs that include bilateral communication that could systematically strengthen self-care from the very beginning or call for support from the population are few and far between. **Involving the population early on is recommended** as a means of strengthening the capability for independent self-help within local social services structure on the one hand and to relieve the burden on disaster management in an emergency on the other hand. In particular, it should contribute to increasing the overall resilience of society.

**Recommendations** in greater detail were derived from the findings of the study. An attempt was made to deal with the wide range of conditions of various regional authorities. They resulted from the explicitly expressed recommendations of the respondents, as well as the overview of the survey data of the total sample and are supplemented based on the literature and research in the field of psychology in crisis management. For the table with the recommendations, see → *Sect. 7*.

# 1 Introduction & objectives

In the event of a power failure in a large region that cannot be reconnected within a period of time that does exceed the amount of backup by a buffer, the result would be significant limitations on the functioning of critical infrastructure and key governmental and societal functions – limitations occurring in cascades and with mutual dependency. Light, heating, water and wastewater, transportation, healthcare and communication – every area of private and public life would be affected by limitations on the government's ability to act. Safeguarding **basic social services** and protecting the **safety and health** of those affected would quickly present all the stakeholders involved with substantial challenges. **Communications system failure** would make it significantly more difficult for public safety authorities and organizations (PSAO) to assess and control the situation. At the same time, warning of and emergency communication with the affected population would be severely limited. This makes the capability for self-help and neighbourhood assistance indispensable.

In view of **society's vulnerability to power failures** and the risks that go hand in hand with it, but also based on experience with actual, large-scale power failure incidents, the Federal Ministry of Research, Technology and Space (BMFTR) funded the **"Local emergency support hub" (LESH)** research project of the Berlin School of Economics and Law in collaboration with the Berlin Fire Brigade. The project partners developed a concept for points of contact for the population: for information and communication, as well as for social services and support for self-help (Berliner Feuerwehr, Forschungsprojekte, 2015). The concept makes provisions for **communicative core functions**: on the one hand, safeguarding communication among the authorities and organisations involved in emergency response coordination and on the other hand, between the authorities and those affected, as well as within the population to a certain extent. It intends to support the resilience of local communities irrespective of the civil protection measures

organised by the authorities and strengthen self-organised, post-emergency recovery.

Since it was developed against the background of this type of power failure scenario – and particularly since then, in the context of the war in Ukraine, a possible gas and power shortage has become more topical and the plausibility of a power failure has increased – the concept of local emergency support hubs is being implemented in different forms in many places. As this usually happens on the initiative of different administrative levels and actors without centralized requirements, there is a broad spectrum with regard to all the key design elements. Until now, these diverse implementation forms have rarely been accompanied by empirical research or other conceptual work. For this reason, in 2024 the BBK commissioned a study researching the **forms of implementation** of the "local emergency support hub" concept **against the background of different contextual conditions** and local circumstances. The findings of this study are introduced in the present report.

The explorative study had the objective of collecting practical experiences during the establishment of local emergency support hubs (LESH) and identifying **recurring difficulties, possible solutions and success factors** (*good practice*). The focus is not only restricted to the material and technical parameters of setting up LESH. Instead, the concept is examined from a holistic point of view in terms of its **organisational embedding, interaction and communication** with other actors inside and outside civil protection. The activating, people-orientated aspects of LESH and their functions in communication and information, as well as increasing resilience, were also to be examined. The role in and connection to the warning system was also included in the study.

Practical **recommendations** for planning, establishing and operating LESH were developed from the findings of the study. As a result, the practitioners entrusted with the planning and



operation of LESH for their very own contexts and general conditions would be able to benefit from the ideas and specific experiences of others.

## 1.1 Questions

The basic concept for LESH was developed based on the specific structures and conditions in the city state of Berlin. A national rollout would require the concept to be adapted to the respective local conditions. Alongside multiple variables involving geography and demography, they include the institutional anchoring and connection of the LESH. These aspects in turn have an effect on planning, the resources available for implementation and the option of cooperating and coordinating with other actors in disaster management and above and beyond the authorities.

The aim of the study was to identify detailed, communicable examples of *good practice* within the various topics and also to identify problems and issues that must be considered in the plan, as experience teaches that they will be relevant. They refer to the conceptual and plan-related components of LESH establishment, as well as to the specific material, staffing-related and communicative setup.

They resulted in the following questions, which served as the basis for the survey tool:

- What **conditions** are necessary for planning and implementing the basic LESH concept? → The topics addressed here are: legal prerequisites and requirements, inclusion in disaster management coordination strategies, the reasons for engagement with LESH, financing, areas of responsibility and the inclusion of other stakeholders
- How is the **LESH concept implemented and designed in detail**? → The following aspects were touched upon here: naming the relevant facilities, place and materials used, components and modules used, services offered, staffing, activating or rather, alerting the LESH
- How do the concepts on coordination and **strengthening the capability for self-help** behave on site? → These related aspects were studied: communicative connection of the LESH, handling of information, inclusion of the population in planning and operation and the role of the LESH in the warning system
- What **practical experience** is available on the deployment of LESH? → Here, the researchers looked at drill experiences and real deployment experiences, evaluation and feedback to planning
- What **obstacles** should be anticipated, which pragmatic **solutions** can be found and what **recommendations** can be made?

## 1.2 Structure of the report

Section 2 introduces the research context of the study. Next, key aspects of the basic concepts of the local emergency support hub are presented (→ *Sect. 3*). The study concept and methodology is presented next (→ *Sect. 4*) and the sample is described (→ *Sect. 5*). The findings of the survey are presented in ten sub-sections (→ *Sect. 6*) and each one is augmented by case studies. Recommendations are derived from the findings (→ *Sect. 7*), and then they are arranged and presented in groups. Finally, the findings are discussed and the methodology is critically examined before the report concludes with identifying areas with further need for research (→ *Sect. 8*).

## 2 Local emergency support hubs: background information

In this section, central topics of the research literature on disaster management for power failures are briefly discussed. After a short introduction to the **power failure scenario** and the associated **challenges for disaster management, opinions on “the population”** in disaster management are discussed. A perspective shift in research and the field towards the “population as a stakeholder” is postulated. Based on this synopsis, → *Sect. 3* introduces the **basic concept of local emergency support hubs** that builds upon these research fields and concepts.

### 2.1 Challenges of long-lasting, full-coverage power failures

The scenario of a **long-lasting, full-coverage power failure** seems unlikely against the background of good grid stability and stringent safety requirements in network operation, however it reveals our immense **technical and social dependence on the energy infrastructure**. A power failure caused by external influence, human or technical failure or by force majeure would most likely trigger failures in all parts of the critical infrastructure and extensive parts of social life (Petermann, Bradke, Lüllmann, Poetzsch & Riehm, 2011). The failure of electrical (and electronic) devices also goes hand in hand with the collapse of entire sectors like transport and logistics, banking and finance, the supply of water and food, healthcare (unless previously safeguarded), industry and agriculture – alongside the immediately visible consequences.

In some cases, a power failure event might also have serious long-term consequences that could have a technical and social impact far beyond the actual duration of the failure (Lorenz, 2010). As energy networks are subject to few interruptions under normal circumstances, dependency on them paradoxically increases to the extent that everyday interdependencies and complex

dependencies remain invisible (Folkers, 2018): *infra-structure* is literally understood as a functioning structure located below the surface and the fact that its characteristics influence the lived world does not become visible until it fails (Lorenz, 2010). The resulting **vulnerability** in the event of a failure has the character of a systemic risk insofar as it is a direct consequence of societal structures and in the event of a failure, it generates cascading effects in the system that created it (Schweizer, 2023). In this sense, the ubiquitous dependency on the supply of power can be understood as an in vivo experiment on the complex interdependency of technical interventions in the lived world of modern societies. Its most recent consequences cannot be predicted, as it cannot be modelled until it is in place (Dombrowsky, 2014). **In a scenario like this, the capacity of government crisis management quickly reaches its limits.**

The most immediate practical challenge for disaster management in this type of scenario alongside the expected additional volume of traffic accidents and persons to be rescued in public transport infrastructures and elevators, for example, (Petermann et al., 2011) is the failure of **communication infrastructures**. Unless redundancies have been planned, set up and adequately integrated into disaster management, if the mobile telephone networks failed it would be impossible to report emergencies and requests for help and alert first responders and other civil protection and emergency rescue teams. This leads to immediate problems around safeguarding social services and rescue missions, which interact in conjunction with the large number of simultaneously occurring infrastructure failures elsewhere, as well as the foreseeable significantly higher use of emergency call channels and false alarms from automated reporting systems (Lorenz, 2010).

We can assume that in crisis situations, people have an increased **need to receive information**.<sup>1</sup> This varies with the type and familiarity of the respective emergency or crisis situation. With regard to a failure of the common information channels in the event of a power failure in particular, respondents also indicated that they wanted to find information (Maduz, Prior, Roth & Wolf, 2018; Ohder, Röpcke, Sticher, Geißler & Schweer, 2014; Schulze, Lorenz & Voss, 2017). For this reason, emergency hotline channels were used more frequently for the search for information. Alongside the difficulties in communication on the part of PSAO and the failure of the emergency hotlines, we can also assume an increased need for information in this situation as an additional challenge. Of course individual channels like radio broadcasting could continue to function if safeguarded accordingly, but these functions would have to be tested and we can assume a limited audience reach. Consequently, a power failure is primarily a crisis of communication for the authorities – particularly at the beginning.

At the same time, the content of the communication situation must be addressed. After all, what those affected consider **relevant information** that is helpful and useful may not be congruent with the information that most disaster management officials consider essential – rather, professionalised crisis management circles tend to have a technically orientated perspective on emergencies that does not satisfy the public's need for information (Schopp, 2016). To the extent that a technical understanding of the term “relevant information”, which has its primary focus on the function and maintenance of infrastructure operations organised by the private sector and is often reliant on its statements and expertise (Dombrowsky, 2014; Lorenz, 2010), is negotiated within the framework of a communication concept similarly focussed on technology, crisis communication is in danger of failing to reach its target groups during a crisis.

## 2.2 Perspectives on “the population”

In special and extraordinary circumstances, disaster management and crisis management have the paradoxical habit of taking decisions based on accustomed heuristics. In doing so, they deny the uniqueness of the event – which is presented prominently in the rhetoric around it – by dealing with it on the basis of rules (Dombrowsky, 2013). One of the heuristics that is very firmly anchored in disaster management appears to be the assumption of a passive, helpless population experiencing anything from irrational panic to apathy. In the worst case, it is aggressive, antisocial and marauding. Despite countless, mantra-like assurances from research that has proven this assumption to be a harmful **myth** (e.g., Mähler, Hofinger, Becker & Künzer, 2023; Richwin, Schopp & Helmerichs, 2019) and that people in crisis situations are calm and capable of acting, are caring and willing to help and provide self-organised aid with limited resources (Heidt, Groneberg, Knoch & BBK, 2017; Heidt, Groneberg, Knoch & Helmerichs, 2017), this conviction has surprisingly survived. As part of this study as well, the conviction was regularly stated in different formulations (→ Sect. 6).

PSAO frequently lament the sense of entitlement and passive lack of independence of those affected that leads to overloading the professional support staff with tasks (Schopp, 2016), and in the sense of the Thomas theorem we can assume that this has real-life consequences (Dombrowsky, 2013). Paternalistic, uni-directional and thematically pre-determined crisis communication and the exclusion of the lay public and those affected from the organisation and implementation of their protection are partially responsible for creating a demanding, dependent and latently aggressive-appearing population (Lukas & Tackenberg, 2023; Schopp, 2016).

To prevent civil protection from operating past the primary target of its protection, in recent years programmatic efforts have taken place at many levels to devote attention to **more**

<sup>1</sup> While this assumption is basically plausible, the available documentation for it is based on prospective self-assessment and fragmentary empirical observation in very specific situation. Therefore the formulation shall remain hypothetical here.

**people-orientated crisis communication.** At the same time and not least as a basis for a successful communication situation, the cooperative interaction between civil protection and the population has been strengthened, often with slogans like **“the population as stakeholders”**, “safety partnership” and “civil protection as a partnership of equals”.

This also includes **differentiating “the population”** above and beyond its function as the recipient of official communication and grasping it in specifics (Mähler et al., 2023) instead of veiling it in collective, uncountable nouns (“population”, “public”). Aspects of the population’s behaviour like its perception of hazards and risks, specific abilities around self-help and the support of others, the resource situation and not least, respective, specific exposure and vulnerability must be considered in a more nuanced way if they are to be meaningfully included in disaster management. To the extent permitted by the still-too-unsystematic, existing studies, they are differentiated along socio-demographic factors like age, gender, education and income, ethnicity and sociocultural and political context, but also in terms of the sense of belonging to a place and social rootedness, social capital and the quality of personal contacts (Holenstein & Köng, 2014; Lukas & Tackenberg, 2023).

Constellations of this differentiation are reflected in various sociospatial, sociocultural *settings* (Beerlage, 2018) in which attitudes, patterns of interpretation and way of acting can and must be distinguished from each other (Geenen, 2010; Holenstein & Köng, 2014; Richwin et al., 2019; Schulze et al., 2017). Thus we can safely conclude that **there is no such thing as “the population”**. Similarly, it does not display any collective behaviour nor is it affected by unambiguous vulnerabilities. Rather, it would be preferable to understand vulnerabilities and ways of behaving to deal with them as being in the field of tension of the previously mentioned heterogeneity as dynamic characteristics and patterns of behaviour that could catapult those affected into more or less **vulnerable situations** (Gabel, 2019).

## 2.3 Fostering resilience in social settings

This simultaneously produces a need for official crisis management to avoid focussing on reactively working to cushion given vulnerabilities – although this capacity can be understood as the acid test of crisis management (Lorenz, 2010). Rather, the structural conditionality of vulnerability points out the need for the longer-term establishment and support of stabilising social structures. Becoming familiar with the specific settings (Beerlage, 2018) in which detailed, specific crisis and disaster management take place and including them in civil protection and disaster management is thus a long-term mission removed from the specific crisis context. It takes place in a grey zone of administrative modes between normal operation and the exception: crisis management structures are typically active only while the crisis is unfolding and everyday structures rarely have an eye on crisis preparations. To the extent that disasters already exhibit an anticipative relation to the present in that they are prepared and planned for (Bröckling, 2012) and at the same time, last far longer than the specific event due to their long-term effects (Lorenz, 2010), the long-term mode of disaster management is absolutely logical. After all: **after the disaster is before the disaster**.

This is why the explicit policy goal is to establish resilience as the ability of collective resistance to disruptive events (Beerlage, 2016). People’s willingness to help depends on their social embeddedness in order to be aligned with actual requirements. This observation leads to the conclusion that the effort cannot be limited to strengthening individual precautions and education, but instead must be embedded in strengthening local communities. Social cohesion, collective social capital and a sense of sense of belonging to a place in the immediate living environment have a positive impact on pro-social and public welfare-orientated ways of behaving (Schulze et al., 2017). The frequency and quality of the contacts among the local population, shared values, norms and goals represent beneficial factors in crisis reaction. They give rise to expectations of and trust in the collective ability to act. Sharing the experience of a critical or rather,

catastrophic situation like a longer-term power failure can also have a strengthening influence on social cohesion within sociospatial communities: as a “*therapeutic community*”. Experiencing a crisis reinforces social cohesion and can cushion the psychosocial consequences to the extent that it enables people to experience their collective ability to act. When anchored in local communities, this type of experience base can also strengthen both the preparations for possible further crises and the agency of local communities (Lukas & Tackenberg, 2023). In the sense of a *bounce forward*, forms of successful crisis management can lead to the advancement and transformation of local cooperation (Gilan & Helmreich, 2023).

Despite this aspiration, detailed forms of redesigning the relationship between disaster management and “the population” are rarely encountered in practice. Programmatic demands are gaining prominence (Schopp et al., 2022), but research, practice and policy makers often have difficulty in formulating feasible concepts (Gerhold, Peperhove, Lindner & Tietze, 2021; Schuchardt, Peperhove & Gerhold, 2017). This is where the concept of local emergency support hubs comes into play, as presented in the following section.

The limitation here is an important one: crises and disasters *could* have a positive effect on shared experiences of agency, but at the same time they could also prove to be an acid test of social structures (Lukas & Tackenberg, 2023). Trust in the authorities and their crisis management can emerge in this case to the extent that communication is open, the limitations on capacity are justified and priorities are transparent. With the option to contribute personal capacity, a sense of shared situational control can be established. The opportunity to address the needs of people in particularly vulnerable circumstances is essential here (Lorenz, 2010). If people notice that their vulnerable neighbours are not being taken care of and at the same time, communication is defensive and opaque, are unable to see how humanitarian resources are being distributed vis-à-vis who needs them and the damage is being controlled while their capacity is being excluded and disregarded, it is no wonder when they react accordingly. This is another reason why consideration and knowledge of the care and needs situation of scenario-specific, vulnerable groups and planning their protection in advance, in tandem with strengthening the capability for self-help and including those affected are particularly relevant.



# 3 Local emergency support hubs

The local emergency support hub concept emerged at the interface of the efforts to strengthen the capacity of civil protection to communicate and act and the longer-term integration of local *communities* into civil protection. It formulates an offer of the opportunity for longer-term risk communication in dialogue form and strengthening district-related resilience, as well as the opportunity to combine crisis communication with active integration of those affected in the event of an incident (Kaczmarek & Bohne, 2015; Ohder, Sticher, Geißler & Schweer, 2015a).

## 3.1 Basic concept of LESH and LEIP

The model concept of “local emergency support hubs” (LESH) was initially developed as part of the BMFTR-funded research project “Local emergency support hubs as a point of contact for the population in crisis situations” of the Berlin School of Economics and Law (HWR) in collaboration with the Berlin Fire Brigade. Based on various literature-based and empirical analyses of human behaviour in crises (Ohder et al., 2015a), the requirements and expectations around help and assistance, as well as the willingness to help in different districts of Berlin (Ohder et al., 2014), the project aimed to strengthen the joint and cooperative crisis management of PSAO and local communities and ensure the longer-term support of networking among local stakeholders and groups. To achieve this, a model was designed for implementing decentralised stations for coordinating, providing information, feeding and supporting those affected in designated, permanently maintained public facilities called local emergency support hubs. The technical dimension of the model concept was tested and its legal requirements and consequences were examined (Stoephadius, Dittes & Schweer, 2015a, 2015b).

The Berlin Model concept is based on the **technical integration of an organisational supplement to disaster management**: in the event of a power failure, stationary buildings with safeguarded

emergency power under municipal ownership (e.g., town halls, community centres, schools) would serve as central points of contact for gathering and sharing information from and to the population – and among its members as well. Using a safeguarded emergency power connection to a communication system (cf. Nagel & Barsuhn, 2015; Schwenzien, 2015), the stationary **local emergency support hubs (LESH)** would exchange up-to-date situational information with control centres and crisis teams, and distribute relevant information gathered and compiled in advance (e.g., on operational healthcare centres and support programmes, cooperation partners and the location of emergency drinking water fountains and shelters, as well as information on water treatment and hygiene, self-protection and similar leaflets) to the population. At the same time, they provide the opportunity to make emergency calls. They could also offer basic support programmes, including

- first aid,
- enhanced medical assistance from aid units (if available),
- emergency care for the children of emergency personnel,
- psychosocial support programmes,
- registration and coordination of volunteer helpers.

In addition, the concept considered using the structures as home bases for other official functions (e.g., buses for transporting relevant administrative information) (Lawrenz & Surma, 2015a).

The buildings of stationary LESH would be illuminated to enable the population to recognise them as points of contact. They should be geographically distributed within walking distance (with a maximum of 3-4km walking distance for all inhabitants of the catchment area) based on sociospatial planning processes and also positioned along relevant “spaces of day-to-day life” based on socio-statistical data (Lawrenz & Surma, 2015b). Buildings that are **public, well-known,**

**easy to reach and low-barrier** are obvious candidates to become LESH, but they must also **accommodate technology and staff** and be able to provide first aid care behind curtains or screens.

These stationary facilities would be supplemented and supported by portable LESH containing cases of materials used to respond flexibly to local needs, while temporary points of contact would be rolled out in more sparsely populated regions. The coordination and information needs of “organic” points of contact like police stations and aid organisations could also be covered in order to prevent their restricted operation. These systems of capabilities are designed for use in public buildings without an emergency power supply or with vehicles in parking lots or on public squares. They also include options for mobile electricity generation, connection to the communication system and options for presenting information (Bohne, 2015).

Further, the system developed in Berlin with **emergency response information and interaction points (LEIP)** includes a dedicated component devoted to longer-term, district-based work on integrating those affected and residents in disaster control and pooling local willingness to help, particularly as part of the immediate living environment (Ohder, Sticher, Geißler & Schweer,

2015b). These points, which are in turn coupled to the informational structure of LESH, would primarily be supervised and administered by residents themselves. They serve to merge local, district-related relief requirements and support programmes, as well as disseminate and integrate practical information and tips around self-reliant situational control (Ohder, Sticher, Geißler & Schweer, 2015c). The concept integrates three levels of coordination here (Figure 1): The authorities train regional LESH representatives, who supervise the LEIP assigned to their district. The regional representatives are in contact with the local LEIP coordinators, who coordinate the helpers in their relief area. A technical connection between the LEIP and the communication system is not part of the concept and therefore the coordination between LESH and LEIP would have to be taken care of autonomously at the three levels of LEIP supervision (helpers, coordinators and regional representatives) (Ohder, Sticher, Geißler & Schweer, 2015d).

The citizens participating in the LESH would be recruited and trained independently, within the local districts and be able to activate local social networks in an emergency. For this reason, this component in particular (LEIP) requires extensive site-related advance planning in order to integrate people and locations from the very

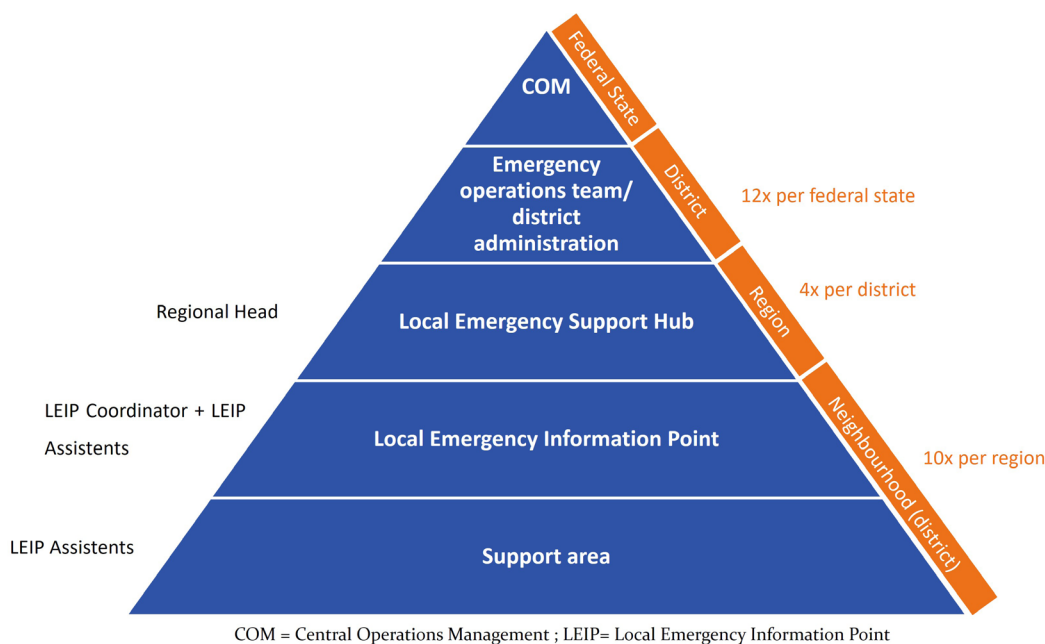


Figure 1: Structure of the LESH system in disaster management. From Kaczmarek & Bohne (2015), p. 3 (reproduced and translated)

beginning, define information paths and collect and compile locally relevant information (Ohder et al., 2015d).

As a concept for integrating the population as part of activating, people-orientated disaster management (Ohder et al., 2015a), this network of self-organised, local coordination and information points plays a central role in coupling civil engagement and official crisis management (Ohder, 2018).

In an interview with Prof. Birgitta Sticher (project lead from HWR in the Berlin research project) as part of our project, she emphasised again that from a social sciences perspective, exactly this longer-term work in city districts was an essential component of the local emergency support hubs developed in Berlin. At the same time, in the interview she also expressed regret that when the concept was adapted in other federal states and municipalities, this component was often lost sight of. It cannot be adopted and completed by one-off cost expenditures nor can it be presented in a media-effective way, as the case would be with technical acquisitions (Sticher, 2024).

To ensure that mutual help is organised by citizens themselves and not ordered by the authorities, and as such can have the effect of local, productive crisis control, advance planning is indispensable (Ohder et al., 2015a). The complicated, long-term work to strengthen social ties and self-support is particularly prone to the prevention paradox: the better this type of increased resilience functions, the less visible is its impact, as it effectively eliminates the need for official relief.

### 3.2 Aspects of planning and implementation

From the previously presented conceptual elements of the basic concept (Ohder et al., 2015a, and as a supplement based on Kircher, Wienert & Kaczmarek, 2016) and isolated publications on the application and transfer of the basic concept outside Berlin (Reuber, 2024; Schedel, 2023; Wieser, 2023), it is possible to derive multiple topics relevant to planning local emergency support hubs. They are also the basis of the question sets

in the interview study on forms of implementing the concept in other contexts (→ Sect. 4.3):

- (1) **Organisational location and integration.** The organisational component of the model project represents a new structure in disaster management whose location and integration must be planned.
  - Determining the organisational responsibility
  - Specifying how the costs will be financed
  - Structural integration and location in the sets of rules pertaining to specialist staff and disaster management (deployment planning)
  - Planning of calls to action and alerts
  - Staffing of LESH
- (2) **Legal general conditions.** Alongside the legal responsibility for disaster relief, legal issues arise with regard to (cf. Stoephasius et al., 2015b):
  - Stipulating the legal framework and any obstacles to the activity of the LESH
  - Use of buildings
  - Measures pertaining to the right to intervene during setup (barriers, cordoning off the area, orders to leave the scene, etc.)
  - Legal basis and insurance protection for the integration of volunteer helpers
- (3) **Location selection.** The following must be considered when selecting the location of LESH:
  - Ensuring the option of emergency power feed-in or the presence of an emergency power system (EPS) in the form of a diesel-powered emergency generator or another autonomous power supply form. The relevant provisioning or developing a concept for fuel replenishment to support permanent operation should also be included here.
  - Easily visible illumination to enable the “light-house” function and offer orientation through visibility
  - Spaces that offer sufficient room for all planned services, technology and staff (and stocks of good, if necessary) (e.g., curtains or screens for medical services)



- Adequate sanitary facilities
- Logistics concepts for the materials required for carrying out the planned tasks

(4) **Capabilities and tasks.** One of the core planning responsibilities is to determine the tasks of LESH and appropriately set up the LESH to accomplish them. In order to coordinate the two aspects, the following must be planned:

- Scope of the desired offerings
- Planning and actual needs on site
- Planning and logistics of the required resources
- Staffing needs and required qualifications
- Prioritising the tasks
- Capacity limits for specific services
- Spatial conditions to ensure that the tasks can be carried out properly
- A range of possible services around adaptation to local conditions is presented in *Table 1*

(5) **Communication and information.** A key task of LESH is to function as the point of contact and communication for information. To accomplish this, the following must be considered:

- Safeguarding a fail-safe communication connection between LESH and higher-level structures in disaster management (crisis teams/ heads of operations/control centres)
- Designing information dissemination and collection
- Collecting and compiling relevant, useful information in advance
- Registering specific needs for information on site
- Identifying and symbolising the LESH
- Integrating the LESH into the warning system

(6) **Involving the population/people-orientated crisis management.** The self-organised coordination of relief offerings and requirements and strengthening of autonomous, neighbourly disaster control comprises planning tasks in terms of:

- Advance planning and acquiring responsible persons for the supervision of LESH

- Connecting to local structures and institutions of civil society
- Planning the longer-term integration of LEIP into the respective catchment areas
- Raising residents' awareness of the LEIP and supporting the acceptance of LEIP as points of contact for coordination
- Recording protection and relief needs and willingness to help

The concept of local emergency support hubs has increasingly gained nationwide attention since it was developed in 2015. Some federal states explicitly orientated their scenario planning for the threat of an energy shortage in 2022 on the basic concept of the Berlin Model project and recommended setting up comparable points of contact (→ *Sect. 3.4*). The concept also explicitly became a topic of discussion as part of study commissions in Landtag Baden-Württemberg, the state parliament, and presented as an example of people-orientated disaster management (Landtag of Baden-Württemberg, 17th legislative period, 2024). In various statements of Study Commission II of Landtag North Rhine-Westphalia, the concept of points of contact for the population and special needs groups for strengthening resilience and crisis control organised by citizens (in preventive work as well) has been specifically named and requested (Gabel, 2024; Netzwerk bürgerschaftliches Engagement in NRW, 2024; Pütz, 2024; Tondorf, 2024). However, uniform rules are mostly non-existent and the adaptation and adjustment of the concept in municipalities exhibits a very broad range of forms and designs. The findings of our study support this (→ *Sect. 6*).

As part of the Federal and state working group on local emergency support hubs (Bund-federal states offene Arbeitsgruppe Katastrophenschutz-Leuchttürme, BLoAG KatS-L), a catalogue of icons and a logo for LESH were developed to support a uniform presentation and offer the option of uniform signage. *Table 1* shows the icons and the services they are allocated to. *Figure 2* presents the logo that can be used for sign-posting in particular. It also offers an overview of which services are basically conceived of as federal states-specific.

Table 1: Icons to symbolise the possible services of LESH. Developed by the Federal and state working group on local emergency support hubs (Bund-Länder offene Arbeitsgruppe Katastrophenschutz-Leuchttürme, BLoAG KatS-L).

| Purpose                                                            | Icon(s)                                                                                                                                                                 | Purpose                                             | Icon(s)                                                                               |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|
| Receipt of information in the event of a disaster                  |                                                                                        | Communication options                               |    |
| Services by medical first aid                                      |                                                                                        | Internet access via WLAN (with personal end device) |    |
| Option to forward emergency calls                                  |                                                                                        | Food                                                |    |
| Availability of drinking water                                     |                                                                                        | Shelter                                             |    |
| Charging option for small devices (e.g., mobile telephone, tablet) |                                                                                      | Dispensing iodine tablets                           |  |
| Auxiliary power supply                                             |   | Childcare                                           |  |
| Air-conditioned rooms                                              |   | Pet care/pet intake                                 |  |



Figure 2: Logo for LESH developed by the federal and state working group on local emergency support hubs (Bund-Länder offene Arbeitsgruppe Katastrophenschutz-Leuchttürme, BLoAG KatS-L). The federal and state working group agreed that the word “Leuchtturm” in the logo could be replaced by different terms used accordingly. As logos for LESH already existed in a few German states at the time of adoption, they should continue to be used as signposts – both physical and digital ones. Icons should be replaced with the icons from Table 1.

### 3.3 Interfaces for warning the population and LESH

The call for target group- and needs group-specific communication and crisis communication that is more orientated to interaction and support – and therefore prepared well in advance and accustomed – has become increasingly established in the context of warning the population as well (Richwin & Schopp, 2019). In this sense, “warning” is considered a dynamic communication situation that is not only concerned with technical issues of transmission at the time of the official warning. Instead, it also includes the recipient side, their needs and requirements around information and its conditions of understanding. At the same time, it is understood as a cyclical process that reaches beyond the acute warning – as a “**communication context**” in which mutual knowledge, understanding and trust must be established and gained (Künzer & Tomczyk, 2022; Schopp, Fröschke & Rüter, 2024). A nuanced understanding of the motivational situation of different socio-demographic groups and communicative situations, as well as the necessity of abandoning paternalising instructions and image work on the public image of crisis management in addition to **more transparent crisis communication** that is open to dialogue, is increasingly viewed as the basis for successful warning that gains trust instead of demanding it and still achieves activation and participation (Geenen, 2009; Lorenz, 2010; Schopp, 2016; Schopp et al., 2024).

In its effort to integrate the population into a longer-term, dialogue-orientated communication context, the research on **warning** the population and crisis communication is intermeshed with the demand for more active integration into crisis control and strengthening **resilience and the capability for self-help**. According to their basic concept, local emergency support hubs are active at the interface between preventive communication and acute crisis communication. Preparatively, they should strengthen the sociospatial structures and communication contexts that favour resilient crisis response (→ Sect. 2). In particular, specific local knowledge of on-site vulnerability factors, groups of persons affected,

civil actors and other factors of the relevant socio-structural situation, as well as longer-term collaboration, are important concerns for both the design of local warning concepts and the linkage of the LESH structure to crisis control. They will be considered more specifically in the following.

Based on this programmatic interaction, it is obvious that the **setting up of LESH must be further intermeshed with the processes of warning the local population**. With regard to opportunities for the multiple use of facilities, processes and resources (→ Sect. 6.10), linking information, cooperative efforts and channels for longer-term communication and participation here is a way of working towards integrated risk and disaster management. For this reason, the present study also examines the intermeshing of local warning systems and concepts around local emergency support hubs.

### 3.4 Legal bases and stipulations around local emergency support hubs

In the Federal Republic of Germany, disaster management is subject to regulations at the federal and state levels. The Federal Republic of Germany stipulates the general conditions for disaster management in the following Acts:

- Basic Law (GG): Article 30 of the Basic Law assigns the responsibility for disaster management to the federal states. Therefore, the federal states have the legislative power in this area and the federal government can act to support them.
- German Civil Protection and Disaster Assistance Act (Gesetz über den Zivilschutz und die Katastrophenhilfe des Bundes, ZSKG): The ZSKG regulates the collaboration between the federal government and the federal states in the area of disaster management.

These federal laws set the legal framework within which the federal states have enacted specific regulations for disaster management. As a result, a uniform national law for LESH is not necessary.

All 16 German federal states have disaster management laws coordinated with specific local needs and circumstances. These laws stipulate the organisation of disaster management and regulate the areas of responsibility and duties of the authorities, as well as collaboration with other authorities and aid organisations. Accordingly, the legal stipulations for the establishment, setting up and operation of LESH depend on the respective state laws of the federal states.

In accordance with state laws, municipalities and rural districts are responsible for local risk prevention and local disaster management. They often set up points of contact that offer the population protection and food in the event of a disaster. The disaster management act of North Rhine-Westphalia (NRW) (Act on fire protection, the provision of relief and disaster management), for example, contains specific regulations on disaster prevention and setting up emergency shelters. As part of municipal responsibility, LESH could be set up to create centralised points of contact for the population in the event of a disaster.

**Binding legal stipulations** at the state level for the establishment, setup and operation of LESH are largely **lacking**. Most federal states do not have legislative-administrative measures for establishing LESH. For this reason, LESH are usually justified as part of public services (Basic Law of the Federal Republic of Germany) and disaster prevention (state disaster prevention laws). The specific establishment and operation of LESH are typically a result of needs planning in disaster management. In some federal states, there are also regulations on LESH or rather, the power failure/energy shortage scenario, for example

in the form of recommendations (details from the present study → *Sect. 7.3*). In NRW, for example, there is a decree on raising awareness of “preparatory measures as part of a possible gas/energy shortage” in which district governments are called upon to prepare for a gas shortage scenario with power failures of up to 72 hours (Ministry of the Interior of the State of North Rhine-Westphalia, 2022). Baden-Württemberg has a framework concept (Ministry of the Interior, for Digitalisation and Municipalities Baden-Württemberg, 2022) for the establishment of LESH. However, it is a recommendation and not legally binding, as are the LESH concepts for rural districts derived from it. On the other hand, Brandenburg has adopted fixed-price financing for setting up LESH based on a state-wide needs plan. In doing so, the state supports municipalities in setting up LESH (Ministry of the Interior and Municipal Affairs of the State of Brandenburg, 2024a).

*Table 2* (below) lists examples of the regulations of individual federal states for LESH (Version: 2024). It does not claim to be complete.

Table 2: Example of legal general conditions for LESH in the federal states.

| Federal State            | Type of Source                                                                                                                                                                                                        | Example Regulations on LESH                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Baden-Württemberg</b> | Framework recommendation for the planning and operation of emergency meeting points for the population in Baden-Württemberg (Ministry of the Interior, for Digitalisation and Municipalities Baden-Württemberg, 2022) | <ul style="list-style-type: none"> <li>• Objectives and tasks of emergency meeting points</li> <li>• Range of services of emergency meeting points (target and optional services)</li> <li>• Legal situation</li> <li>• Responsible body and collaboration</li> <li>• Press and public relations</li> <li>• Staff and operation</li> <li>• General conditions: Selection of location, requirements, capabilities, operation, alerts, training and further education/drills</li> </ul> |
| <b>Bavaria</b>           | Letter to district administrative authorities (Bavarian State Ministry of the Interior, for Sport and Integration, 2022)                                                                                              | <ul style="list-style-type: none"> <li>• Crisis prevention in the event of a blackout</li> <li>• Ensuring that the population is warned and informed</li> <li>• Contact point for the population in the event of a crisis (SOS centres, LESH)</li> </ul>                                                                                                                                                                                                                              |
| <b>Brandenburg</b>       | Needs analysis and distribution of LESH (Ministry of the Interior and Municipal Affairs of the State of Brandenburg, 2024b)                                                                                           | <ul style="list-style-type: none"> <li>• Needs analysis</li> <li>• Distribution of LESH in the state</li> <li>• Financing of LESH</li> </ul>                                                                                                                                                                                                                                                                                                                                          |
|                          | Support for setting up local emergency support hubs in the municipalities (Ministry of the Interior and Municipal Affairs of the State of Brandenburg, 2024a)                                                         | <ul style="list-style-type: none"> <li>• Volume of measures 2024/Financing of LESH</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hesse</b>             | General recommendations on deployment planning for fire protection and disaster management for blackouts (Hessian Ministry of the Interior and Sport, n. d.)                                                          | <ul style="list-style-type: none"> <li>• Differentiated planning and deployment measures for power failure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                 |
|                          | Recommendation for action on deployment planning for fire protection and disaster management for a gas shortage (Hessian Ministry of the Interior and Sport, 2023)                                                    | <ul style="list-style-type: none"> <li>• Preparatory measures for LESH</li> <li>• LESH as a point of contact for the population</li> </ul>                                                                                                                                                                                                                                                                                                                                            |

| Federal State                        | Type of Source                                                                                                                                                                                                                                                      | Example Regulations on LESH                                                                                                                                                                                                                                                                                                         |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mecklenburg-Western Pomerania</b> | Expert directive incl. annexes (Ministry of the Interior, Construction and Digitalization of the State of Mecklenburg-Western Pomerania, 2023)                                                                                                                      | <ul style="list-style-type: none"> <li>• Directive for the preparation of LESH and warming rooms</li> <li>• Directive for carrying out impact analyses</li> <li>• Stipulations on the procedure for cost coverage</li> </ul>                                                                                                        |
| <b>North Rhine-Westphalia</b>        | Preparatory measures as part of a possible gas/energy shortage (Ministry of the Interior of the State of North Rhine-Westphalia, 2022)                                                                                                                              | <ul style="list-style-type: none"> <li>• Auditing of properties for the maintenance of regular service, with regard to their energy supply in particular</li> <li>• Planning for the (emergency) staffing of fire stations and fire brigade depots</li> <li>• Creating “additional points of contact” for the population</li> </ul> |
| <b>Rhineland-Palatinate</b>          | Checklist for deployment measures in the event of power failure (Ministry of the Interior and Sport of the State of Rhineland-Palatinate, 2013)                                                                                                                     | <ul style="list-style-type: none"> <li>• Differentiated planning and deployment measures for power failure</li> </ul>                                                                                                                                                                                                               |
|                                      | General recommendation for gas shortage (Supervision and Service Administration Body Rhineland-Palatinate, n. d.)                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Areas of responsibility and a stage/phase model</li> <li>• Recommendations for setting up LESH, warming rooms and emergency shelters</li> <li>• Sample structure of an alert and deployment plan for power failure</li> </ul>                                                              |
| <b>Schleswig-Holstein</b>            | Planning assistance for state government and the lower civil protection and emergency recovery authorities on consequence management based on the example of a power failure (Ministry of the Interior, Municipalities, Housing and Sport Schleswig-Holstein, 2014) | <ul style="list-style-type: none"> <li>• Differentiated planning and deployment measures for power failure</li> </ul>                                                                                                                                                                                                               |
|                                      | General recommendation for setting up local emergency information points (Ministry of the Interior, Municipalities, Housing and Sport Schleswig-Holstein, 2024a)                                                                                                    | <ul style="list-style-type: none"> <li>• Tasks and requirements for LESH</li> <li>• Services offered by LESH</li> <li>• General conditions by local communities</li> <li>• Ensuring order and safety</li> <li>• Costs</li> </ul>                                                                                                    |
|                                      | Directive on funding measures in the field of risk and crisis communication (Ministry of the Interior, Municipalities, Housing and Sport Schleswig-Holstein, 2024b)                                                                                                 | <ul style="list-style-type: none"> <li>• Funding purpose and prerequisites for LESH</li> <li>• Financing of LESH</li> </ul>                                                                                                                                                                                                         |



## 4 Methodology

The present interview study examined the extent to which the “Local emergency support hub” concept is **planned** and **implemented** against the background of different **contextual conditions** and local circumstances, where the respective **challenges** are and what has been proven to be **good practice** (cf. → *Sect. 4.7*). The objective was to gain an overview of the various forms and designations under which the LESH concept or comparable approaches are realised. Another aim was to identify specific challenges and potential solutions that arose during the implementation phase in various contexts. Combined with an analysis of proven approaches, this resulted in **recommendations for action**. (cf. → *Sect. 7*).

### 4.1 Study design

The research project focussed on process characteristics of the implementation of the LESH concept with the aim of simplifying and improving its ongoing implementation. Success factors and obstacles for the effective implementation of the basic concept “Local emergency support hubs” were identified. Alongside the feasibility of the basic concept, the integration of LESH into the warning system for the population was examined.

The study does not aspire to be an evaluation with quantifiable measures of success; it is not a comparative evaluation of implementation concepts. Instead, *good practices* that function locally were wanted, which we understand to be viable solutions without the aspiration to be the only possible or best solution (*best practice*).

To examine the implementation of the basic concept from the Berlin Model project, a survey of users, persons responsible at various political level and persons who are involved in planning (hereafter “respondents”) based on guided interviews was conducted (Atteslander, 2008). The study has a multi-modal design (Mayring, 2016): to be able to establish greater detail for individual cases at the same time. To establish comparability between the interviews, quantitative elements

(in particular, of descriptive statistical form) were linked to qualitative methods.

The ethical research standards of surveys were also observed as part of the survey, as were the quality standards of qualitative and quantitative data collection.

### 4.2 Analysis of documents and the literature

In its theoretical and thematic framing, the presentation of the concept of LESH and for the design of the data collection tool, the study relied on an analysis of documents and the literature. The relevant literature was compiled from research in specialized portals and technical journals for fire protection and disaster management, common search engines and tips from the respondents, and then examined. The following types of literature were identified and evaluated to arrive at the basics and background of LESH and similar concepts:

- **Research literature** of HWR and the Berlin Fire Brigade from the BMFTR-funded research project “Local emergency support hubs as points of contact for the population in crisis situations”.  
This literature is the contextual skeleton of the interview study and broadly outlines the basic concept from the Berlin Model project.
- **Reports on application experience** and implementation of the basic concept from the Berlin Model project.  
Individual reports and presentations could be found in the press and media. These reports, which were also used as reference points for the research on relevant respondents, also served to identify forms and patterns of implementation of the concept. The group of respondents also provided several reports of this type. Further, we conducted research on the contextual question sets of the interview study: publicly available concept papers, public announcements and press reports on LESH



and lists and maps of the federal states were included, where available, as supplements to the interview-based database (→ *Sect. 5*).

- **Specialist literature** on civil protection and disaster management, in particular on *resilience, behaviour of the population, people-oriented disaster management and warning the population* (→ *Sect. 2*). The relevant specialist literature on several key research topics around civil protection with a focus on literature from social sciences contributed to the basic classification of the LESH concept. Alongside peer-reviewed publications in technical journals, this comprised handouts, guidelines and BBK guides, as well as reports on the findings of relevant research projects.
- **Legal stipulations and legal bases:** Based on an enquiry to the federal states by the contracting authority about relevant decrees and stipulations, and other legal texts, the available documents that recommend, specify or otherwise mention LESH were used in an analysis of the legal general conditions of LESH. Statements on disaster management made in Enquete commissions from NRW and Baden-Württemberg were also included.

### 4.3 Data collection tool: guideline

To carry out interviews with the respondents in contexts recognised as varied even before the study took place, a data collection tool was desired that could be applied as flexibly as possible but matched the situation perfectly. Due to the unknown differences or rather, the implementation of LESH in the various federal states and disaster management authorities, the development of a suitable survey tool that was able to grasp the variance but also enable the statements to be compared was one main challenge. For that reason, a **partially open, modular and iteratively developed** guideline was created.

#### 4.3.1 Partially structured interviews

The issues relevant to the research for the interview study were operationalised in the interview guidelines. The chosen interview concept was that of **partially structured interview guidelines**.

In the sense of the multi-modal approach, various characteristics of surveys were implemented: the focus in the development of question formats for the survey tool was to achieve sufficient specificity and precision for a **comparative analysis** with as much **flexibility** of application context as possible. For this reason, a combination of closed and open questions was chosen. On the one hand, this enabled multiple core characteristics to be quantified and evaluated, and on the other hand, left enough room for specifying the characteristics in question in the context of the respective locality.

Closed question formats were applied in order to collect previously determined deductive variables based on those with which the data could be structured. They enabled a comparative classification of more context-specific designs compared to a sample. For this purpose, differences that could be identified in advance – such as the type of property of the institution, equipment features, and available services – were surveyed. Depending on the thematic relevance, there were different formats of closed questions (Atteslander, 2008):

- Identification type (e.g., “What places did you choose for setting up LESH?”)
- Selection type (e.g., “What services do you provide in your facilities?” – selection among 17 items)
- Yes/No type (e.g., “Do the LESH have specific offers on site?”); if necessary, combined with an open question (e.g., “If so, which ones?”)
- They also included filter questions that flag a topic of follow-up questions as relevant or irrelevant and thus guide the subsequent conversation.

Open questions are usually necessary with such closed formats. They enable specific questions to be asked about the facilities, reasons for specific decisions to be explained and an open conversation about challenges in implementation to be held, as well as helpful factors and *lessons learned* to be detailed. It was also possible to systematically ask about specific topics that the specialist literature indicated are foreseeable (e.g., legal general conditions, staffing, areas of responsibility).

Here, the focus was on the inductive acquisition of the thematic issues introduced into the conversation by the users and expounded on (→ *Sect. 4.6*).

#### 4.3.2 Modular structure

Following the concept of multiple indicators, multiple questions were asked within a topic. Questions about the same aspects of a theme were handled in **question sets** whenever possible (Schnell, Hill & Esser, 2008), however, in the interviews the respondents were given the opportunity to answer within their own thematic contexts. The question sets were classified into modules under consideration of the previously named topics (→ *Sect. 3*) and with reference to the research objectives.

The specific question sets were compiled and structured along the topics into the **modules** represented in *Table 3* (below) (Schnell et al., 2008). First, introductory questions were asked about the respondent and their job title, their personal approach to LESH and the status of the implementation. Questions around the motivation for implementing LESH and the underlying concepts were also asked. The next set of questions focused on the detailed design of the LESH, including aspects like services, local special features, staffing and communication. After the topics of legal framework and organisational linkage, information on practical experiences and any tips and tricks was recorded.

Table 3: Overview of the topic-related structure of the modular interview guideline.

| Theme                                             | Module                                      | Question set                             |
|---------------------------------------------------|---------------------------------------------|------------------------------------------|
| <b>Introduction</b>                               | Introduction (I)                            | Person and job title                     |
|                                                   |                                             | Approach to the topic                    |
|                                                   |                                             | Status of implementation and experiences |
|                                                   | Concept and cause (CC)                      | Cause (person responsible and reasons)   |
|                                                   |                                             | Strategy and concept                     |
|                                                   |                                             | Beneficial and useful aspects            |
| <b>Detailed design</b>                            | Services (S)                                | Services                                 |
|                                                   |                                             | Location                                 |
|                                                   |                                             | Standardisation                          |
|                                                   | Local special features and integration (LF) | Cooperations on site                     |
|                                                   |                                             | Local special features                   |
|                                                   |                                             | Site-specific offerings                  |
|                                                   | Staffing (HR)                               | Numbers                                  |
|                                                   |                                             | Roles and credentials                    |
|                                                   |                                             | Safeguarding of staffing concept         |
|                                                   | Communication (C)                           | ... lateral and horizontal               |
|                                                   |                                             | Local reputation                         |
|                                                   |                                             | Information flow                         |
| <b>Legal framework and organisational linkage</b> | Warning (W)                                 | LESH in warning concept                  |
|                                                   | Financing and linkage (FL)                  | Financing                                |
|                                                   |                                             | Organisational location                  |
|                                                   |                                             | Collaboration with authorities           |
|                                                   | Legal framework (F)                         | Legal prerequisites                      |
|                                                   |                                             | Areas of expertise and responsibility    |
|                                                   |                                             | Staff exemption (from work)              |
| <b>Experiences, tips and tricks</b>               | Practical experience (X)                    | Deployment and experiences               |
|                                                   |                                             | Evaluation concept                       |
|                                                   |                                             | LESH beyond emergencies                  |
|                                                   | Solutions, tips and tricks (TT)             | Notes, tips and suggestions              |

### 4.3.3 Iterative development of the interview guideline

To do justice to the explorative character of the study, during the first survey phase the guideline was **developed further** to become **iterative**. The structure of the guideline was checked for its practicability in the interview format, as well as the appropriateness of the content and clarity of the questions, their selectivity and not least, some details of the specified options for responding.

After the first four interviews, the experiences made with the interview guideline were reviewed and the interview guideline was adjusted. A further aspect of the original guideline concept was also adjusted: the initial plan was to use different guidelines for LESH operators and administrators in order to do justice to the specific issues around planning and implementation in each case. The initial hypothesis was that persons in administrative bodies (particularly at higher levels like the rural districts and city councils) who tend to have planning-related tasks and persons in emergency response organisations and administrative bodies at the municipal level and urban district administrations who are tasked with specific implementation would participate. However, the first interviews showed that the differentiation between operators and administrators could not be maintained as expected, and planning and implementation were not as clearly separate as originally assumed. For example, as professional fire fighters are located in urban administrations, planning and implementation often take place in the same department.

## 4.4 Sample concept and acquisition

In collaboration with the contracting authority, BBK, a basic **sample structure** was specified before acquisition began (Flick, 2008). The specified target was a survey sample of 30 persons. As it is an **explorative study** designed to generate an overview and information on patterns in the data situation, the present study does **not claim to be representative** (Schnell et al., 2008).

The persons acquired for interviews would primarily be:

- (1) Responsible persons in municipalities/districts, rural districts and city or rather, municipal administrations
- (2) Assigned planners and implementers of LESH (e.g., members of the fire brigade, an administrative body or aid)

Further, **geographical and structural dispersion** was an aim. For this reason, differences with regard to multiple geographical and structural characteristics were aspired to, with the acquisition of:

- Regional authorities from as many federal states as possible
- Rural districts and independent cities
- Municipalities assigned to rural districts
- Urban regional authorities
- Rural regional authorities

The contracting authority provided lists with contact data based on an enquiry to the federal states in order to help identify possible interviewees. Internet search portals and existing contacts were also used to request interviews from possible contacts. In the course of the interview study, respondents mentioned other potential contacts.

Based on the contact data compiled with these methods, the possible interviewees received information about the research project and its objectives per email in the form of an information sheet and were asked to participate in an interview. The guidelines for implementing the data policy (→ *Sect. 4.5*), particularly those regarding anonymity, and an overview of the topics of the interview were included in the enquiry email. They were not offered compensation for expenses, as this contradicts the compliance rules applicable for authorities. Instead, the respondents were offered a copy of the completed research report. For a positive reply, a personal appointment or a video conference was arranged.

Potential interviewees who were difficult to reach but were deemed very important to the sample were also contacted via telephone in order to improve the response rate (Schnell et al., 2008). The composition of the sample acquired in this way is described in → *Sect. 5*.

#### 4.4.1 Additional data sources

In the wake of research and acquisition, **data** on LESH were collected from **other sources**. Their data were included in the evaluation at an appropriate place. The **sample sizes** this altered are flagged accordingly:

- For negative answers to a request for an interview due to the early planning status of the project, for example, a follow-up question was asked and the potential interviewee was told that projects at the beginning of their development were also of interest to the researchers. The request for participation was repeated. If this was not possible in the form of participating in an interview, the contact was asked to briefly indicate in an **email** whether or not the plan included setting up LESH, what the status of the project was and what challenges it posed. In six cases, this request was answered with an email containing information about the existing challenges. In one interview, the approach and possible reasons for the present failure of implementation were explained and the description was provided as part of a vignette (cf. → *Sect. 4.6*).
- Ten of the potential interviewees identified in the course of sample acquisition could not be acquired for an interview, but their respective **websites** (7) or the **information provided to the BBK** from their enquiry (3) could be used for evaluation in some questions of the guideline.

### 4.5 Conducting the interviews, data processing and data preparation

The interviews were conducted between **July and October 2024**. They typically lasted between 60 and 90 minutes. To satisfy the more stringent requirements that a guided interview places on conducting a conversation and producing the

transcript (Atteslander, 2008), each interview was carried out by two persons from Team HF. While one person moderated the conversation based on the guideline and took supplementary notes, the other person prepared a contextual transcript.

The interviews were conducted **in person** in the rooms of the respondent (e.g., offices, staff rooms) or **online** (video conference via Zoom). For the desired sample, the advantages of online interviews discussed by Rick (2023) – including resource conservation and more flexible handling ability – led to a preponderance of online interviews (9 personal interviews, 29 online). Disadvantages like technical difficulties or crashes did not arise. Overall, differences in terms of the quality of the working relationship between interviewers and respondents or the depth of detail of the interviews (Rick, 2023) between online and offline interviews were not observed.

As a rule, all the **questions** in the guideline were asked, but not necessarily in the same order. On the one hand, the answers could be compiled into categories in this way, thus establishing comparability (Atteslander, 2008). On the other hand, the respondents retained a certain degree of freedom in answering and also generated additional information.

After the interview was conducted, the two interviewers **consolidated the transcript**. Answers written down in the flow of conversation were associated with the corresponding questions and paraphrased or made smoother in terms of the language used. As part of the consolidation process, the data were always **anonymised**: references to places, names and clearly recognisable characteristics were generalised.

Next, the transcripts were sent to the respondents for **validation**, where they were corrected and supplemented. The processed data were entered into a table.

Further, the interviewers had already highlighted **relevant isolated aspects** of the individual interviews for processing as “vignettes”.

## 4.6 Evaluation strategy

The evaluation process was orientated to the methodologies of qualitative social research. Based on the method of qualitative contextual analysis (Mayring, 2016), **deductive evaluation categories** were created using the research questions and literature research. They basically correspond to the question sets in the interview guideline.

In line with the questions in the guideline, additional **inductive categories** were developed from the answers across the cross-section of the datasets. This system of categories was entered on a spreadsheet (MS Excel) and **inductively supplemented and expanded**. Wherever possible and meaningful, the categories were grouped into clusters.

To achieve the highest possible **intercoder reliability**, the data from one interview were coded individually by all persons involved in the coding process to create an example. Next, the different coding results were compared, ambiguities were discussed and the agreements around the future procedure were written into the code book.

As some of the deductive categories were not touched upon by any group, they were removed from the spreadsheet. Statements that were interesting from the research point of view but did not fit into any category were put into the “other” category and monitored.

For some statements, it was impossible to avoid contextual overlaps in the categories and codes. However, as the research interest was primarily oriented to acquiring an **overview of decisive categories** and not in a final allocation of the statements to categories, such overlaps were deemed acceptable. Therefore, the **frequency information** for the coding primarily has the function of indicating the significance of a theme. To help illustrate the report section and understand the context better, the original statement were entered next to the corresponding category.

### 4.6.1 Vignettes

Cross-case analysis along individual questions is suitable for establishing a degree of comparability across individual characteristics of the implementation of LESH. However, this conceals the specific context, which is relevant in order to classify the respective characteristic and its background. Further, special features and *good practice* are lost in the abstraction of categorisation. This is why the findings were supplemented by the presentation of case studies and example contexts in the form of *vignettes*.

**Vignettes** are methodologically categorized differently across various research contexts. Whereas they appear as exemplary case examples in clinical disciplines, in sociological-ethnographic field research they tend to be short, essayistic and condensed descriptions and documentations of observed phenomena. These aim to highlight specific elements of analytical interest and prepare them for in-depth qualitative analysis. (Baur & Schratz, 2015). Vignettes are also useful as a method in experimental study designs. They can offer a framework within which controlled brief descriptions can illustrate a situation and within which specific characteristics can be systematically modified (Dülmer, 2022; Schnurr, 2011). For the present study, parts of this form are relevant. Vignettes are used as *examples* in order to describe specific *combinations of characteristics* of a formulation of the LESH concept and thus present compressed excerpts from the interviews, targeting the expression of recommendations aimed for by the analysis.

In this study, vignettes are used as **in-depth brief presentations** of individual applications of LESH in which multiple surveyed topics can be related to one another against the background of relevant information about the context. They provide the option of making the types of implementation of LESH, which are to be determined, comprehensible based on examples.



#### 4.6.2 Derivation of context-dependent recommendations

Alongside the variance in the location, role and design of LESH in disaster management (→ *Sect. 6*), one of the key findings of the examination of *good practice* in the implementation of the LESH concept is **dependence on the context and path of the respective recommendations**, challenges and enabling factors. The respondents gave contrary recommendations on many of the characteristics, depending on the framework they deal with in the implementation of LESH. This is why the recommendations derived from the findings are related to contexts and general conditions whenever possible.

#### 4.6.3 Validation of findings by expert practitioners

After the evaluation was completed, the findings of the study were reviewed by **two expert practitioners** in the disaster management field (large city, rural district). Here, their evaluation of the **recommendations** in terms of comprehensibility and contextual clarity was the focus. They were also invited to provide questions and comments on the complete report and their additions were included.

### 4.7 Definitions and notes on presentation

In the Federal Republic of Germany, disaster management is the task of the federal states. With this allocation, disaster management is written into the legislation of each individual state and is therefore part of state-specific structures and their inherent terminology. Therefore, any nationwide study on the themes of disaster management is faced with the difficulty of using **terminology** that does justice to this diversity. Alongside the points of contact for the population examined, this also applies for the structures in which they are embedded and with which they interact.

For the present report, several rules for naming were adopted:

- In the context of the interview study with experts and practitioners from a range of institutions and political levels, we speak of **respondents** in order to use a uniform term that covers interviews with individuals and multiple persons at the same time.
- The points of contact for the population that were developed based on the Berlin Model project are not only called LESH by the respondents, but are referred to with many different names. As a collective term, we use **local emergency support hubs**, abbreviated to **LESH**
- In various contexts of the work (esp. → *Sect. 2 & 6*), reference is made to the research literature from the BMFTR-funded project “Local emergency support hubs as points of contact for the population in crisis situations” (FKZ 13N12419 - 13N1225). For this project and its findings, the respondents used different terminology. We name the LESH concepts formulated in this report the **basic concept from the Berlin Model project**.
- Leadership structures in disaster management in the federal states are called a range of names and often their details cannot be mapped to each other. To establish meaningful comparability and make it impossible to identify the location within specific state structures of individual responses, in our presentation of the findings of the interview study we relied on the following generalised forms: management or specialist administrative **staff**, **crisis team**, **heads of operations** and **(integrated) control centre**.
- The respondents represent different regional authorities that in some cases are specifically differentiated by geography. We use the general terminology for regional authorities: **state – rural district/self-governing city/urban district – municipalities**.



In addition to the theme of nomenclature in disaster management, some **notes on presentation** must be considered:

- **Anonymisation:** To ensure the anonymity of the respondents and their institutions, in the presentation of *good practice* and individual presentations, the generalised form of the respective level of regional authorities is used. Designations and specialist terms are generalised to the extent that clear identification is only possible if the surveyed regional authority has agreed to forego anonymity. To support the reading flow, however, names are never used.
- **Sample sizes:** The findings of the study refer to a range of population. For some themes, it was possible to gain information beyond the interview study on the regional authorities that did not participate in the interview study from enquiries by the contracting authority and from research in publicly available documents. For this reason, the total number of collected data points per topic can exceed the number of interviews. Further, several questions in the interview guideline were iteratively adjusted at the beginning of the study. This also results in varying sample sizes in some cases and must be considered when classifying the frequency values. The corresponding sample sizes are indicated before each presentation of the findings (→ *Sect. 6*) if they deviate from the core sample of N=38 interviews. In this case, the additional data is entered as a summand behind the number of interviews, for example: (N=38+5).
- **Response frequencies:** To better classify frequencies of mention, the actual number of answers (be it in interviews or from other data sources) is listed in addition to the size of the sample that theoretically could have given an answer. This can take into consideration the fact that, due to the flexible use of the guideline, not all questions were asked in every case. Likewise, the respondents did not always answer every question they were asked. Therefore the meaningfulness of the frequencies of mention of categories can also be related to the total number of responses (although it has only limited significance due to the possibility of multiple responses). Response frequencies are listed after the sample size as: (N=38+5, 41 responses).
- **Frequencies of mention:** The frequencies of mention of individual categories are described as numbers in body copy (also if less than twelve). On lists and where it does not interrupt the text flow, frequencies of mention are listed in parentheses after the respective category. In isolated cases in which categories summarise many, very different designations and multiple answers always came from individual respondents, the report does not contain frequencies of mention as they could convey misleading distortions.
- **“Highlighted boxes”:** Individual presentations as examples (vignettes), information on challenges and *good practice* examples are highlighted in blue, framed boxes.
- **Quotes:** Quotes from interviews and other datasets are quoted in accordance with the pattern in the following examples. The dataset number from the evaluation table is also listed. “I:24” (for interview: 24); “B:2” (for BBK enquiry: 2); “M:1” (for email invitation: 1); “R:3” (for research: 3).

## 5 Sample description

The sample of the study was developed in coordination with and support of the contracting authority (→ *Sect. 4.4*). It does not claim to be complete or representative, but does attempt to cover the multifaceted nature of several key dimensions. Responsible persons and employees from institutions were interviewed who are responsible for the planning and/or implementation of LESH.

### 5.1 Sample size

Thanks to the BBK data lists, internet research and recommendations from the interviews (→ *Sect. 4.2, 4.3 & 4.4*), a total of 198 regional authorities were asked to provide an interview. They are presented in Figure 3. As visible on the map, the requests were designed to generate a sample that maps Germany in its heterogeneity, leading to a distribution across the federal states and including everything from small municipalities and urban districts to large cities in the interviews. Administrations in municipalities and rural districts, as well as operators of individual facilities, were also requested to provide an interview.

Interviews were carried out with 38 of the regional authorities requested to provide an interview. Based on the limited collection period resulting from the project runtime and the waiver of representativeness in the study design, interviews were arranged as soon as the interviewee consented. As a result, the actually conducted interviews are unequally distributed across Germany. Figure 4 visualises the distribution of the **38 interviews** across the federal states.

**An additional 16 datasets** were generated on the basis of information provided from a query to the federal states by the BBK, from publicly available information from the internet and from information received via email. Therefore, a total of **54 datasets on regional authorities** were available for evaluation, although the datasets from the interviews are more extensive than the datasets based on other data sources. Figure 5 visualises the distribution of the 54 regional authorities for which data from interviews and other sources are present.

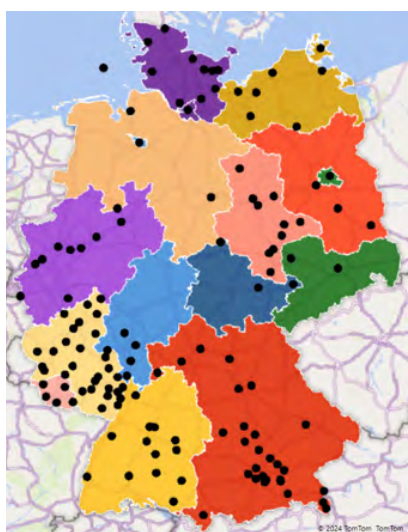


Figure 3: Cartographic illustration of the municipalities and regional authorities requested as interview partners

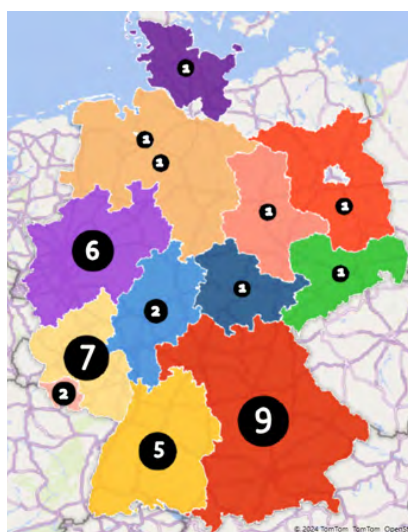


Figure 4: Cartographic illustration of the regional authorities with whom interviews were conducted. To ensure the anonymity of the respondents, the participating regional authorities were not visualised as single dots on the map, but instead as a sum per German state.

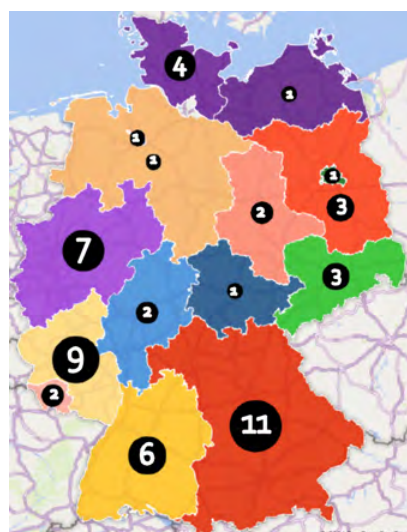


Figure 5: Cartographic illustration of the regional authorities for which data is present. To ensure the anonymity of the respondents, the participating regional authorities were not visualised as single dots on the map, but instead as a sum per German state.

## 5.2 Characteristics of the sample

The regional authorities in the sample can be divided into four groups: rural districts and local authorities, district seats and independent cities, municipalities and special cases. They are listed

in *Table 4* with the total number of datasets. As cities strongly vary in size, they are divided into large, medium and small cities.

Table 4: Presentation of the number of subdivisions in the responding regional authorities, number of inhabitants and population density. In parentheses, “number” on the list is differentiated by the number of conducted interviews (first summand) and other data (second summand). All other columns contain average values and (rounded) minimums and maximums in parentheses.

| Regional Authority                                                        |             | Number of LESH | Inhabitants                     | Inhabitants per km <sup>2</sup> | Sub-regions       |
|---------------------------------------------------------------------------|-------------|----------------|---------------------------------|---------------------------------|-------------------|
| Rural district & local authority                                          |             | 21<br>(14+7)   | 196193<br>(~ 5,000;> 500,000)   | 273<br>(~ 70;~ 800)             | 31<br>(< 5;> 80)  |
| Large district seat, independent city and city in administrative district | Large city  | 13<br>(1+12)   | 374647<br>(~ 100,000;> 500,000) | 1780<br>(~ 500;~ 5,000)         | 24<br>(< 10;> 50) |
|                                                                           | Medium city | 6<br>(3+3)     | 54573<br>(~ 50,000;~ 70,000)    | 1281<br>(~ 500;~ 2,000)         | 9<br>(< 5;~ 20)   |
|                                                                           | Small city  | 4<br>(2+2)     | 10,875.50<br>(~ 2,000;~ 20,000) | 290<br>(~ 50;~ 500)             | 9<br>(< 5;~ 20)   |
| Municipality                                                              |             | 8<br>(7+1)     | 9,303.75<br>(< 1,000;~ 20,000)  | 639<br>(~ 50;~ 2,000)           | 20<br>(< 5;~ 100) |
| Special cases: District of a large city & city state                      |             | 2<br>(2+0)     |                                 |                                 |                   |

*Table 4* shows that with reference to the size of the regional authority and population density, the sample meets its aim of being very heterogeneous. The smallest municipality interviewed has less than 1,000 inhabitants, while large rural districts and independent cities have more than 500,000 inhabitants to take care of. Everything from rural areas and small cities with a low **population density** to high-density parts of large cities were included in the sample.

The range of the **subdivision** in the survey also varies greatly: from small regional authorities, for example rural districts with fewer than ten municipalities or small cities with only a few districts, to large rural districts covering large surface areas with more than 70 municipalities and large cities with more than 50 districts. Where necessary, these differences are taken into account in the evaluation and recommendations.

### 5.2.1 Respondents

Interviews were conducted with a **total of 48 persons from 38 regional authorities** who dealt with LESH in various positions and functions (*Figure 6*).

The respondents were asked to list their function and position, as well as their relationship to LESH (N=38).

Most of the respondents were persons who dealt with LESH as they:

- bore the **overall responsibility** for their area of responsibility (10)
- were responsible heads of **concept development** and planning (11)
- **edited the concept, created and planned** a new one (13), sometimes in larger teams (2)
- **implemented** or were responsible for implementation (7)
- **at a higher level, coordinated** the planning and implementation (3)

Additionally, some respondents indicated private interest (3) and in-depth preoccupation with the theme. In individual cases, their interest led them to create a relevant lectureship or work on the theme of power failure privately.

The categories are not sharply delineated. Depending on the scale of the organisation, responsibility for planning may mean leading a team of specialists in a civil protection/emergency response authority and being responsible for coordination: on the other hand, the person could be the chief of the local volunteer fire brigade responsible for management, planning and operational implementation (also see → *Sect. 6.1*).

**Example interview situation:** We are conducting the interview with the chief of the volunteer fire brigade of a small community. A representative of the local government is also present. Both persons have addressed the implementation of LESH in their community on the initiative of the rural district, although additional department heads also participated.

The respondents carried out these tasks as part of the following functions:

- Head of department, head of unit, head of division (17)
- Assistant desk officer (14)
- Head of agency (7)
- Fire protection/disaster management inspector (3)
- Head of project (2)

**Example interview situation:** We are conducting the interview with the emergency response subject area of the professional fire brigade of a large city. Those present are an administrative assistant who has dealt with LESH planning, among other tasks, for 2 years and the head of subject area, who has dealt with the theme since requested to by state government, drives coordination and supervised the concept creation phase. LESH are a small part of their daily work in general disaster management. In specific planning phases they had a lot of work but often had a short time to produce results.

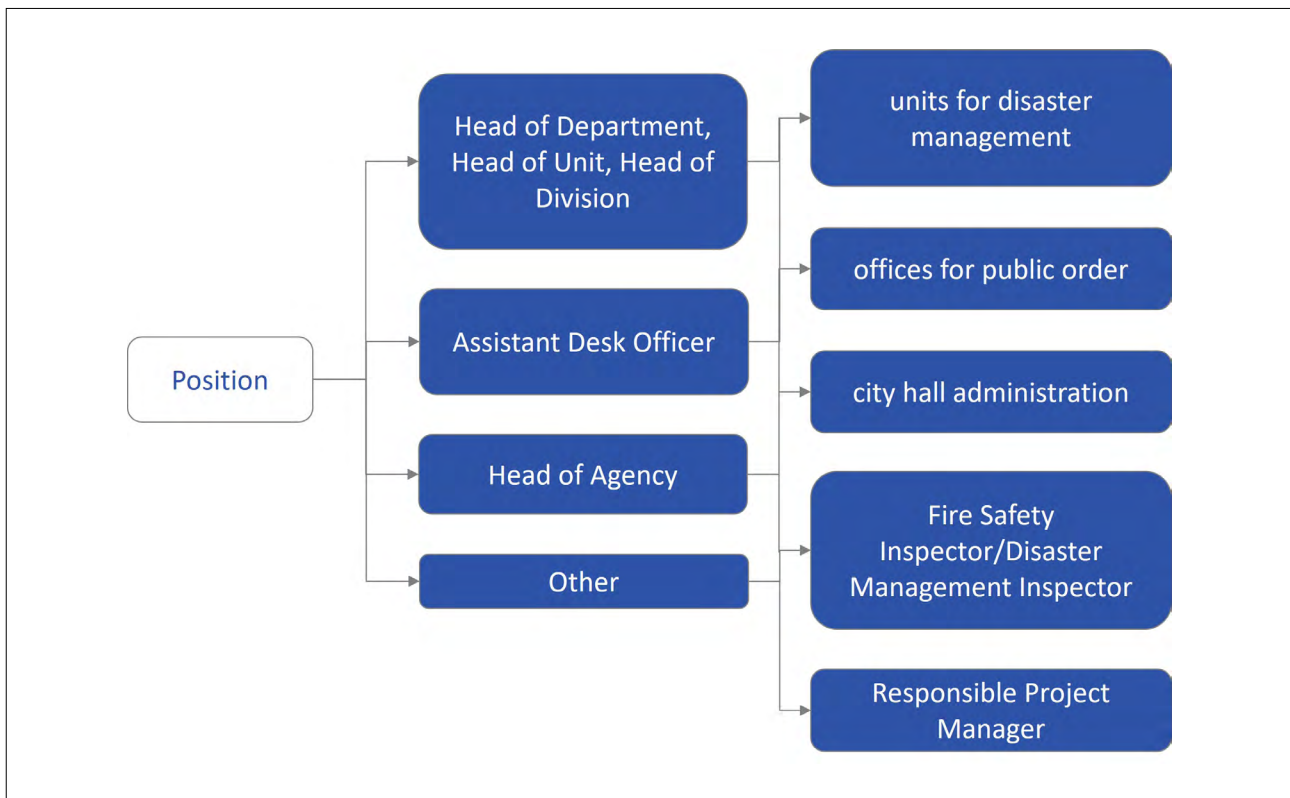


Figure 6: Positions and functions of the respondents.

The respondents primarily had these functions in:

- **Departments and subject areas for disaster management** in various forms and institutional settings (28).
  - Professional fire brigades as a department/subject area of city administrations (7)
  - District administrations (9)
  - Smaller municipalities and local authorities (7)
- **Offices for public order** (6) as part of municipal administration
- **Specialist administrative departments for civil protection and disaster management** (4)
- **Town hall administrations** (in municipalities) (3)

**Example interview situation:** We are speaking with the head of the disaster management department of a district administration. At the beginning of the war in Ukraine, the rural district began deployment planning for the energy shortage/power failure scenario and drew up a joint concept with municipalities and the support of the district administration.

Where administrations have departments, offices or subject areas for disaster management, they were tasked with setting up LESH. As is yet to be seen, the options for allocating resources, time and staff vary greatly. Where this type of department does not exist – particularly at the municipal level – the tasks around LESH are sometimes located at the authorities for public order or in city halls (see → *Sect. 6.1* for more information).



## 6 Findings

The findings of the study are presented with an orientation to the structure of the topics created in the guideline.

### 6.1 Forms and design

One of the key findings of the study is the compilation of the very broad range of forms in which

LESH are implemented and designed. This refers to all important parameters of their setup: name, number, scope of services and level of care, locations and structure. As the subsection contains some data that were aggregated from several questions, the following *Table 5* first provides an overview of the underlying interview questions, sample size and type of database.

Table 5: Questions and databases in the Services module.

| Services Module Interview Questions                                                                                                                                                 | Sample + Additional Data/<br>Frequency of response | Database                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------|
| What do you call your LESH? Why?                                                                                                                                                    | 38+10 / 48                                         | Interview<br>Email survey<br>BBK information<br>Internet research |
| How many facilities are you responsible for?                                                                                                                                        | 38+8 / 46                                          | Interview<br>Email survey<br>BBK information<br>Internet research |
| What places did you choose for setting up LESH? Why?                                                                                                                                | 38+10 / 48                                         | Interview<br>Email survey<br>BBK information<br>Internet research |
| What services do you provide in your facilities?                                                                                                                                    | 38+9 / 47                                          | Interview<br>Email survey<br>BBK information<br>Internet research |
| How many people can you provide these services to?                                                                                                                                  | 37+1 / 36                                          | Interview<br>Internet research                                    |
| Are there escalation levels/expansion in use of the LESH?                                                                                                                           | 38+2 / 40                                          | Interview<br>Internet research                                    |
| Are the LESH permanently set up in this function or only for emergencies? If only for emergencies: In what scenarios? If permanent: What tasks do you perform in the “normal case”? | 38+5 / 43                                          | Interview<br>Internet research                                    |
| Why did you decide in favour of these services/ these particular capabilities?                                                                                                      | 38+2 / 38                                          | Interview<br>Internet research                                    |



The following subsections first provide an overview of the possible structures of LESH – whether the concept plans for expansion structures or escalation levels and what they look like. This differentiation is important for the next section. Here, the number of facilities and how many people they can take care of, followed by the places where they are set up and the services offered, are evaluated. This section ends with a summary of the wishes and obstacles that have emerged in these areas.

### 6.1.1 LESH structures and possible escalation levels

LESH concepts are fundamentally differentiated by how the **services of the facilities are structured**. They can be divided into 2x2 categories. This structure is presented in *Figure 7* and illustrated by examples.

On the one hand, there are concepts that plan for the LESH with the same or similar services in one regional authority. In turn, they can be subdivided into facilities with **uniform basic equipment, if necessary with local, specific extra offerings** (first path) or concepts that are subdivided into standardised **modules** that could be individually mobilised according to need (second path). On the other hand, there are concepts that plan for different LESH with different services, which have different names accordingly. These in turn are differentiated in terms of concepts whose

facilities offer **services with comprehensive scopes** (third path) and concepts whose facilities consciously offer **different services** (fourth path).

#### Example: Uniform basic equipment (path 1 in *Figure 7*)

In a small city, material like radios, cable drums, lights, hi vis vests, laminated posters (for information about LEIP setup) is stored in a crate in city hall with a packing list and instructions. Anyone can open it and set up the LESH.

A large city has uniform materials for all LESH, which is accordingly published on the internet. They comprise:

- Emergency generator/emergency power system incl. building feed-in
- Mobile diesel fuelling station (1,000 l) for emergency vehicles
- Heating solution (e.g., heat blowers)
- Emergency supply of drinking water (IBC drinking water tank)
- Solution for heating food
- Seating
- Communication
- Mobile sanitary facilities/portable toilets
- Leaflets/information overviews/forms
- Charging solution for mobile communication devices (cable drums and socket strips)

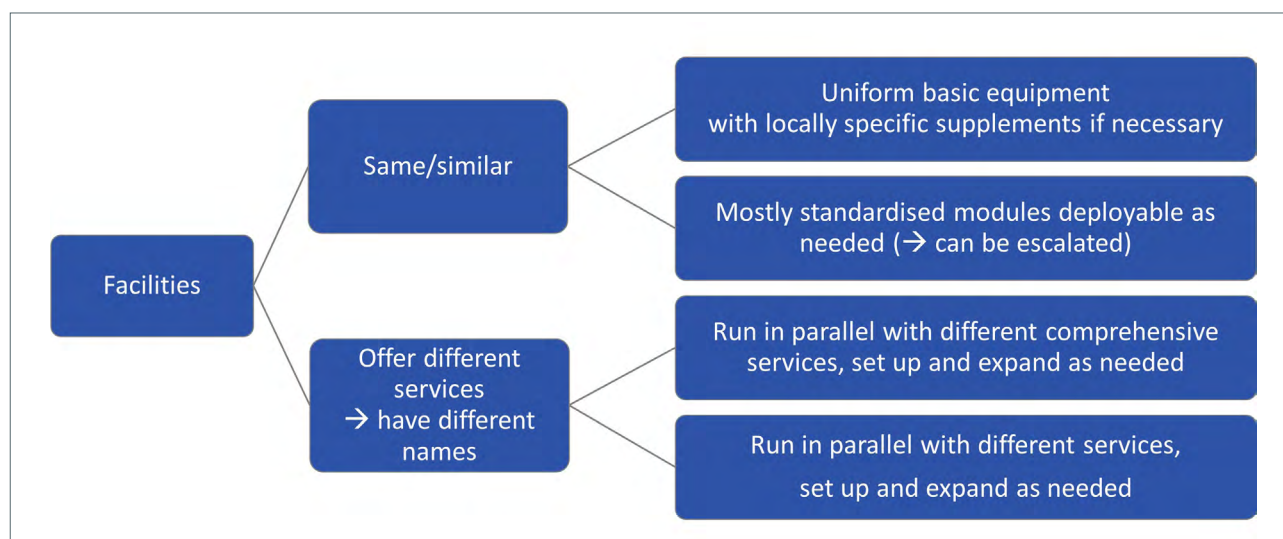


Figure 7: Various concepts for differently/similarly equipped LESH.

**Example:** Modules (path 2 in *Figure 7*)

A rural district describes its concept as modular, as it comprises 7 modules. While 1-4 should always be mobilised, 5-7 are only used as needed:

- First aid: provided by local fire brigade
- Making emergency calls: via radio in fire stations
- Information to the population: Disseminating information team → population
- Gathering information: Population → Specialist staff
- Coordinating spontaneous volunteers
- Integrating Aid organizations
- Integrating fire brigade and municipal vehicles

**Example:** Various comprehensive services (path 3 in *Figure 7*)

One municipality has a three-level concept. The first level comprises mobile emergency vehicles that provide emergency calls, information and first aid. The second level is a permanent building structure recommended for emergency power but not necessarily capable of it. They also offer warm drink preparation and if possible, emergency child care, and distribute food and drinking water. Level 3 comprises buildings with a secure supply of emergency power that offer an extended presentation of information, emergency shelters with cots and refuge in a heated space (warming room). Further, at the district level there are emergency shelters for disaster management in general that can also be relied on.

**Examples:** Various comprehensive services (path 4 in *Figure 7*)

In a rural district there are five different facilities. To ensure anonymity, the facilities are not named:

- Facilities in which emergency calls can be made, which is why they should be staffed promptly and easily accessible to the population.
- Decentralized facilities intended for use as points of contact for information and coordination of neighbourhood assistance. The exchange of information is the focus here but depending on the facility, additional services like charging mobile telephones could be available and of course emergency calls could also be made here.
- Heated buildings that could offer refuge. They should avoid offering additional services like charging mobile telephones. This would counter any capacity overload from people who do not require them.
- Shelter for persons without any special care needs (heating, hygiene, sleep, refuge). If necessary, they can be combined with the buildings from 3) to save resources.
- Facilities in which persons requiring assistance (e.g., persons in need of care from nursing homes or hospitals) can stay and which are equipped with special staff, materials and medical supplies.

In our sample, half of the respondents planned their LESH concepts with uniform basic equipment. Around one-quarter of the concepts envision different LESH with services of different scopes. Concepts that function with a modular principle and concepts with different facilities that offer completely different services are rare. *Figure 8* summarises these findings.

The differentiation of these concepts is also made clear in German by the different terminology used for the concepts.

Unfortunately there is no practical experience detailing which concepts are most effective in which scenarios. Qualitative examination of the interviews shows that there are pros and cons for each of the different concepts.

The respondents are aware of the advantages of uniform capabilities or uniform modules in terms of easy operation. Particularly when personnel must be flexibly deployed in different facilities in a city or rural district, uniform capabilities make this easier. Equal opportunity is another theme touched upon by larger regional authorities in particular. Here, uniform capabilities are based on the aim of providing all communities of the rural district with the same services, irrespective of the financial means of the community.

In large-scale regional authorities with low population densities, however, it is not possible to equip all facilities with the same capabilities – particularly if good accessibility must be ensured. In these cases, concepts with different comprehensive services are thought to have an advantage. For example, everyone could access emergency calls and information quickly and on foot, but further services would only be offered in places with high population densities.

Concepts in which services are separated between facilities plan for persons finding goods or shelter

in one type of facility, but going to a different facility for information. It would be interesting to see if this could be maintained in an emergency.

### 6.1.2 Number of facilities and emergency care key

The sample description (→ Sect. 5) showed that the surveyed regional authorities are very heterogeneous in terms of population number and structure. This has an influence on the number of required facilities. *Table 6* (below) summarises the number of **facilities per regional authority** in the sample, ranging from one facility to over 100 facilities. The breakdown by regional authority shows that, with an average of 80, rural districts and local authorities have significantly more facilities, followed by large cities with an average of 36 facilities and medium cities with only 11 facilities. On average, small cities and municipalities have less than ten facilities. These findings correlate with the number of inhabitants of the regional authorities and therefore are not surprising. The broad range of facilities in large cities (6 to 102) and rural districts & local authorities (13 to 161) is quite interesting.

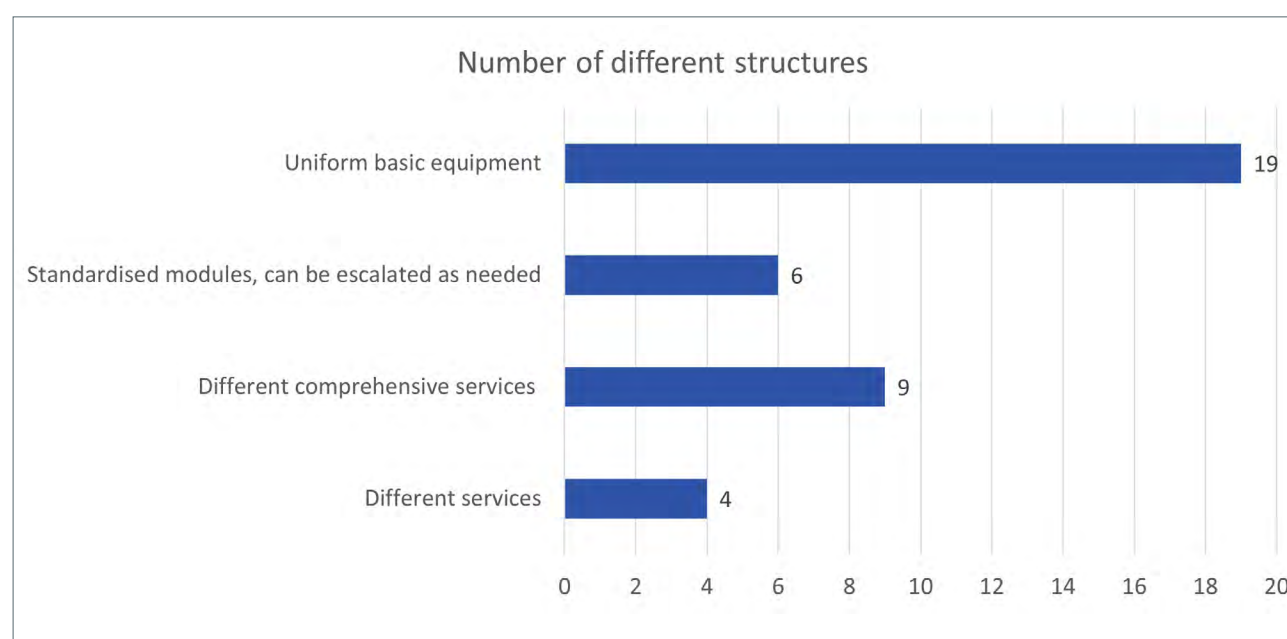


Figure 8: Number of different LESH structures.

Table 6: Number of LESH per regional authority.

| Regional Authority                  | Average Value | Min. | Max. |
|-------------------------------------|---------------|------|------|
| Large city                          | 36            | ~5   | ~100 |
| Medium city                         | 11            | ~5   | ~20  |
| Small city                          | 2             | 1    | ~5   |
| Rural districts & local authorities | 80            | ~10  | >150 |
| Municipality                        | 3             | 1    | ~5   |
| Total                               | 41            | 1    | >150 |

These figures lead to the assumption that the **size of the population to be cared for** per LESH ranges widely. To examine this more closely, an emergency care key was calculated based on the number of inhabitants:

$$\text{Emergency care key} = \frac{\text{Number of inhabitants}}{\text{Number of facilities}}$$

The box plots in *Figure 9* show the distribution of this emergency care key for each regional authority. The median of cities is between 5,000 and 8,000 inhabitants per facility, while that of rural districts, local authorities and municipalities is only between 1,000 and 3,000 inhabitants per facility. In our sample, the **emergency care key in cities** is much **higher**, considerably **more people per facility** must be cared for than in rural regions. With regard to large cities, this means that 75% of respondents have an emergency care key below 12,000 inhabitants per facility and 25% have more. The highest value is approx. 19,000 inhabitants per facility. The range is the widest for large cities. For rural districts & local authorities, there are two outliers that deviate too strongly from the other and therefore are not presented as boxes, but instead are identified by two dots. However, they are not as large as some of the values for large cities.

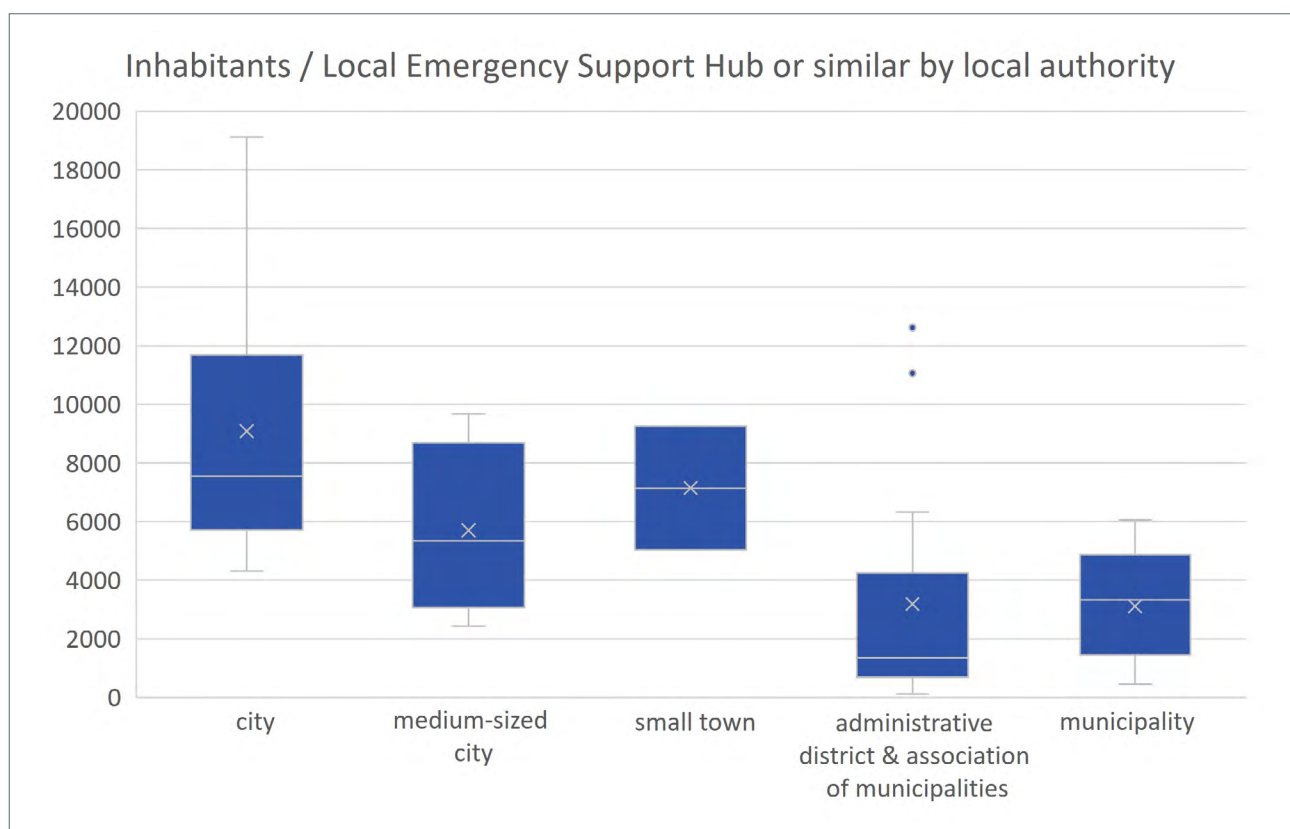


Figure 9: Box plots inhabitants/LESH The X in the boxes marks the average value. The horizontal line in the boxes indicates the median, which means that 50% of values are above and 50% below this value. The boxes and whiskers (=lines above and below the box) indicate the distribution of the values. The box contains 50% of the values and 25% each is above and below.

In view of the fact that the population in rural regions has been attributed with greater neighbourly aid and care competence (presence of wood-fuelled stoves, gardens with grills, vegetable gardens, food conserves, etc.) and therefore a significantly greater need for LESH services could emerge in cities, these findings are surprising. They do not map the expected need in the population. Some respondents also highlighted possible refugee movement or a high volume of tourists at specific times as additional planning unknowns. The calculations of the emergency care key are only based on inhabitant statistics, and these unknowns, along with people who commute into the city, shop there or are visiting, are not factored into the equation.

To the question of **how many people can be cared for in the facilities**, the respondents supplied very different replies:

- 12 respondents gave answers based on data about **population density and demographic data**, in particular when election districts were used as the basis for the facilities. In some cases, the facilities were planned and distributed to encompass election districts, but in other cases the respondents indicated that they could not cover such magnitudes.
- 8 respondents estimated that 1-10% of the population will be **in need of help** and they have planned for this magnitude, although none of them were certain that this level of coverage would be adequate.
- 9 were unable to make concrete statements. They indicated that they could augment if required or pointed out that the capacity for points of contact without refuge or shelter is basically unlimited and therefore the only problem could be care bottlenecks at shelters.

As the facilities have very different designs, it is entirely possible that very different numbers could be cared for and that this was considered in the respective concept. To gain insight into more detailed implementations, the two facilities with the highest and lowest emergency care key respectively, and two with an average emergency care key were examined more closely.

#### Example 1 and 2: High emergency care key

The two respondents with the highest emergency care key are a large city with more than 19,000 inhabitants per facility and a rural district with almost 13,000 inhabitants per facility.

The large city currently has 4 and is planning 2 additional points of contact that were already included in the calculation. In the interview, the respondents said that the facilities could possibly reach their limits in the event, as there are only approx. 50 charging stations for mobile phones and individual medical care for one person. The facility is staffed with one person and in the event more personnel from aid organisations. If we use the optimistic estimate of 1% in need of help that was mentioned in other interviews, we must assume that with 19,000 inhabitants per facility, at least 190 would want to take advantage of its services. The staffing ratio seems very low, but the respondents said: "Subsequent to a risk analysis (as per the BBK concept) and the determination of vulnerable groups, the scope of service that initially could be provided with acceptable expenditures was specified."

In the rural district, LESH are conceived of only for communication and should primarily serve to establish the situation. According to the interview, precise capacity planning was not carried out. And the interview remained open as to how many persons would operate the LESH. If 1% is also used here, the calculation yields 130 persons in need of help per LESH, which would be possible to deliver if the purpose is information exchange only.



### Example 3 and 4: Average emergency care key

The two selected LESH with an average emergency care key are a large city and a municipality with 5,000 inhabitants per facility.

The responding large city has a three-level concept with LESH whose resources, according to the interview, are unlimited. They are supplemented by warming rooms with capacity for 50 persons and care spaces for 500 persons. Looking at the number of facilities in relation to the number of inhabitants of the large city, 0.6% of the population could be permanently cared for and an additional 0.35% could find relief in warming rooms. Further, LESH are also available as points of contact. 1% of the population mentioned by several respondents would thus be fulfilled – but if it were somewhat higher, the facility would quickly reach its capacity limit.

The municipality has only one facility with a safeguarded supply of emergency power and 2 mobile points of contact that are operated by the fire brigade. The crisis team would meet in the facility but in a separate area. According to the interview, there is no limit to care, but a limited offering of services was mentioned and a limit of 50 cots was mentioned. Whenever possible, only information would be exchanged. The municipality has almost 15,000 inhabitants and if 1% of these required care, 150 persons would have to be cared for. The capacity would be inadequate there. For exchanging information, for which the two mobile points could provide support, this concept would probably be sufficient.

The evaluations show that it is difficult to say whether or not the planned facilities will be sufficient, as almost no experience reports are available to indicate how many persons will actually seek relief in the facilities. The respondents

### Example 5 and 6: Low emergency care key

A rural district with 280 and a local authority with 120 inhabitants per facility have the lowest emergency care key in the sample.

In the surveyed rural district, emergency call points are set up in all 41 fire stations of the district, as well as 24 LESH in the communities that are used as points of contact for communication, information and self-help support. Further, there are 3 evacuation centres at the rural district level and additional care spaces in the communities. In its planning phase, this rural district completed a highly detailed needs analysis: for 1/3 of the persons from nursing homes, facilities with the corresponding staff will be set up. The assumption is that the remaining 2/3 will shelter with relatives. The low emergency care key probably reflects this needs-guided plan.

The local authority has 15 (mobile) points of contact in fire stations and other neuralgic points and an additional 16 emergency shelters in administrative buildings that will be set up in the event of a longer power failure. The locations selected for the points of contact can be reached on foot. According to the interview, the assumption is that approx. 10% of the population is vulnerable but at the same time, much self-help is present in the rural area. The points of contact are staffed by two persons and no information was provided on the emergency shelters. The points of contact and emergency shelters were added together to calculate the emergency care key, but even if the facility types are considered separately the equation yields approx. 250 persons per point of contact. For the assumed 10% of persons in need of help, a sufficient number of emergency shelters are present. This seems to be an emergency care key that can be dealt with adequately. Those responsible are aware that: “Having points of contact with power feed-in in all districts is a high standard for any community.”

who carried out very accurate needs analyses for their regions and vulnerable groups and are focused on excellent care appear to have planned with a low, three-digit emergency care key. However, many respondents emphasised that “overall



[the] service is not planned for masses of people.” In cases in which a very high emergency care key is planned, protection for the facilities and their staff seems to have been given little consideration.

### 6.1.3 Locations at which LESH can be set up

The choice of locations for LESH considered suitable by the respondents was very heterogeneous. More than half of respondents (56.3%) used fire stations (among others), followed by administrative buildings (43.8%), sport and multi-purpose halls (29.3%), schools (22.9%) and mobile services (20.8%) (multiple answers possible). For a complete list of the buildings used, see *Table 7*.

The interviews indicate that when considering which buildings are suitable, different criteria played a role and the respondents used very different approaches in some cases:

(1) Almost all respondents used public buildings that are within the area of responsibility of their regional authority. The advantages of this decision mentioned are:

- fewer bureaucratic obstacles in the retrofitting and maintenance, if necessary, of the buildings: for example, equipping them with emergency generators
- quick access to the building in the event of an emergency: for example, access to keys,

which may have to be issued by building managers.

(2) Some respondents relied on **needs-orientated** planning in which they considered the following, for example:

- how the locations would have to be distributed across the entire area to be supplied in order to ensure good access for everyone and then searched for suitable properties for each location
- which locations are known to the population and already serve as points of contact, e.g., polling places.

(3) Some respondents relied on **resource-orientated** planning in which they:

- chose locations that already have infrastructure to a certain extent, e.g., buildings with emergency power or properties located near an analogue telephone line that could be tapped if necessary
- cooperated with aid organisations and/or PSAO and used their buildings as points of contact
- searched for buildings for refuge or shelter that could be set up quickly and have ample capacity: for example, halls or youth hostels
- included the use of the vehicles at hand, e.g., city buses, as mobile points.

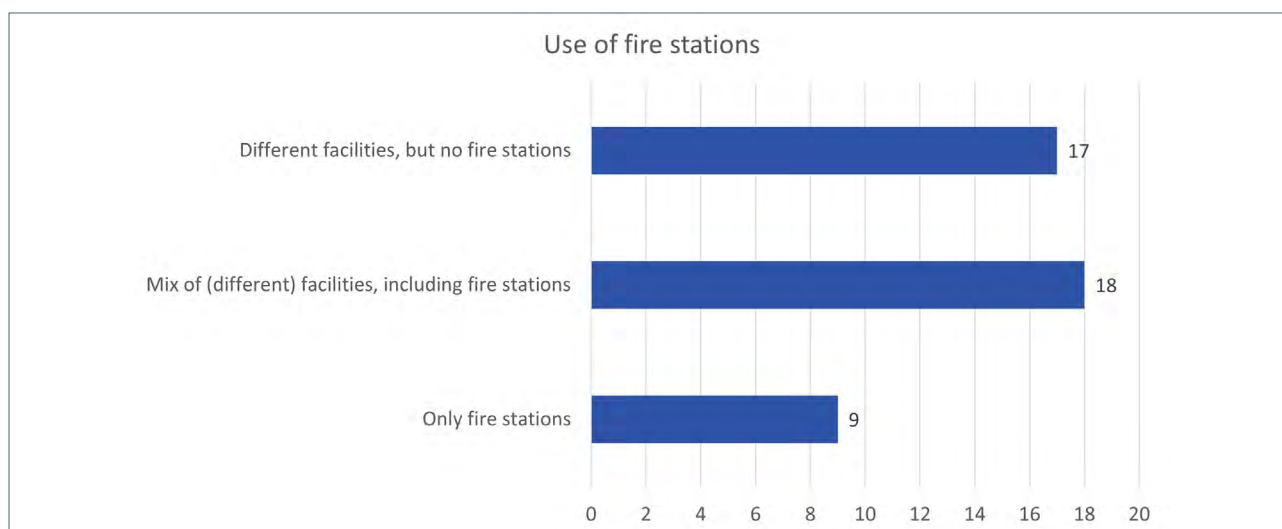


Figure 10: Use of fire stations as LESH.

Another basic decision that divided the opinions on the respondents into two camps is the use of **fire stations as LESH**. While some respondents exclusively or partially use them as locations, other respondents avoid using the fire brigade as a point of contact. *Figure 10* shows that the majority of respondents included fire stations as a possible location. 37.5% used a mix of fire stations and other properties and 18.85% use fire stations exclusively. On the contrary, 35.4% excluded the use of fire stations.

Within regional authorities as well, the opinions appear to be divided. One rural district in the survey explicitly warned against setting up LESH in fire stations and urgently requested its communities to choose other properties, but individual communities in the rural district decided to use fire stations after all. In the role of LESH operators, fire brigades told us that they would have preferred a different location, but the administration specified their use. Still other fire brigades firmly locate LESH in their administrative and competency area and are therefore certain that LESH are correctly located in fire stations. Further, the buildings of the volunteer fire department in very small local authorities are frequently worth considering with reference to the

pragmatic consideration that they already contain relevant equipment.

#### Good practice:

- Choice of properties according to quality criteria: emergency generator feed-in options, visibility, accessibility, drainage, energy footprint (if external emergency heating is necessary (I:20)
- Municipal property: Emergency opening via key safe by pre-defined group of persons (I:25)
- Mobile services in city buses at pre-defined bus stops. (I:25)

*Table 7* provides an overview of the different locations chosen and the advantages and concerns mentioned in the interview.

**Good practice:** One community sets up LESH in its **polling places**. They have already been planned by population density and geographic distribution, are established points of contact and have already been proven in short-term building use for a different purpose than intended.

Table 7: Advantages and disadvantages of LESH locations. The number behind the location indicates how many respondents mentioned the location. The locations are listed in descending order. As the majority of respondents have a mix of different locations, multiple answers have been taken into account and the sum of the absolute numbers is therefore not equal to N and the sum of the percentages is not 100%.

| Location                          | Advantages                                                                                                                                                                                                                                                             | Concerns                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fire stations</b><br>(27; 56%) | <ul style="list-style-type: none"> <li>• Usually have emergency power supply</li> <li>• Safeguarded emergency communication present</li> <li>• Known to population</li> <li>• Easy to reach</li> <li>• Owned by municipality</li> <li>• Staffed in any case</li> </ul> | <ul style="list-style-type: none"> <li>• Must remain operational</li> <li>• Command and technical/logistical measures controlled from there must not be interrupted</li> <li>• Communication there should not be visible to everyone</li> <li>• Intended as place of retreat for emergency personnel</li> </ul> |

| Location                                                                             | Advantages                                                                                                                                                                                                                                                              | Concerns                                                                                                    |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Administrative buildings</b><br>(21; 44%)<br><b>For example: town halls, etc.</b> | Known<br>Easy to reach<br>Typically barrier-free<br>Owned by municipality<br>Easily accessible, esp. key                                                                                                                                                                |                                                                                                             |
| <b>Halls (14; 29%) and cultural/conference centres</b><br>(3; 6%)                    | <ul style="list-style-type: none"> <li>Owned by municipality</li> </ul>                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Perhaps required for other purposes - conflict</li> </ul>            |
| <b>Schools</b><br>(11; 23%)                                                          | <ul style="list-style-type: none"> <li>Known</li> <li>Owned by municipality</li> <li>Food service present</li> <li>Primary schools often well distributed and easy to reach on foot</li> </ul>                                                                          | <ul style="list-style-type: none"> <li>No emergency power supply, perhaps lacking feed-in option</li> </ul> |
| <b>Mobile services (10; 21%)</b>                                                     |                                                                                                                                                                                                                                                                         |                                                                                                             |
| <b>PSAO properties (4; 8%), specifically aid organisations</b><br>(3; 6%)            | <ul style="list-style-type: none"> <li>Known</li> <li>Well-distributed and easy to reach</li> <li>Owned by municipality</li> <li>Have digital radio</li> </ul>                                                                                                          |                                                                                                             |
| <b>Churches (2; 4%)</b>                                                              |                                                                                                                                                                                                                                                                         |                                                                                                             |
| <b>Other properties (one-off mention)</b>                                            | Community bakehouse, shopping centre, football stadium, inn, corporate headquarters, youth hostel, emergency call boxes, socio-cultural centre, utilities buildings, filling station, Technical Relief Service (THW), university buildings, regional newspaper building |                                                                                                             |

#### 6.1.4 Services offered by LESH

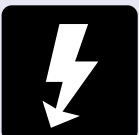
The first part of this section on the different concepts and different services offered by LESH showed that the offerings in LESH are very different. Overall, the interviews gave the impression that a broad range exists between respondents who consider in detail which services they must provide in order to supply the population with what is only absolutely necessary and do not want to arouse rapacity above and beyond this, and respondents who try to offer everything that the equipment and staff on hand make possible. The design of the services varies accordingly. Further, there have been many trials of materials and experiences, as well as creative ideas and thoughts. This information is summarised in *Table 8* (below).

The number of mentions in the second column indicates that most LESH offer information, emergency calls and first aid. Fuel and pet care are offered less frequently. This information does not always mean that these services are not offered at all. In terms of shelter or emergency care, many regional authorities have separate concepts but only services that were mentioned to us as part of the LESH concept were included in the evaluation.

Table 8: Services of LESH

| Service                                                                                                       | Number      | Ideas/Pragmatic Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Obstacles/Problems/<br>Proven Impractical                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>First aid</b><br>         | 36<br>(77%) | <ul style="list-style-type: none"> <li>• Refrigerator for cooling drugs present</li> <li>• Integration of local physicians and practices (enquiry in advance)</li> <li>• Ensuring first aid training of staff</li> <li>• Cooperation with emergency chemists and hospitals</li> </ul>                                                                                                                                                                                            |                                                                                                                                                                                                  |
| <b>Information</b><br>       | 45<br>(96%) | <ul style="list-style-type: none"> <li>• Monitors with programmable scrolling text messages</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                  |
| <b>Coordination</b>                                                                                           | 23<br>(49%) | <ul style="list-style-type: none"> <li>• Integration of associations with large network and experience</li> <li>• Using an app</li> </ul>                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                  |
| <b>Shelter</b><br>         | 20<br>(43%) | <ul style="list-style-type: none"> <li>• Bed plans created</li> <li>• Using plans for acute care points from other situations</li> <li>• Sanitary facilities (portable toilets plus cleaning and disposal system)</li> <li>• Materials (sleeping bags, bedding, hygiene sets, emergency beds) can also be used elsewhere</li> <li>• Schools suitable: various rooms, locking windows also for special-needs groups</li> <li>• Replacement clothing probably necessary</li> </ul> | <ul style="list-style-type: none"> <li>• Care of mentally ill (from clinics), nursing home (e.g., patients needing ventilation) difficult to realise</li> </ul>                                  |
| <b>Water</b><br>           | 18<br>(38%) | <ul style="list-style-type: none"> <li>• Proximity to emergency fountain considered in LESH planning</li> <li>• 1,000-litre reservoir for each facility</li> <li>• Mobile drinking water supply</li> <li>• If elevated tank present, available without power and thus not a problem</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Emergency fountains may only be used if the federal government approves them for use and in the case of defence must not be used<sup>2</sup></li> </ul> |
| <b>Emergency calls</b><br> | 45<br>(96%) | <ul style="list-style-type: none"> <li>• Ambulance or rescue vehicle at every facility as they are equipped with radio</li> <li>• Use of fibre optic network</li> <li>• Use of redundant systems like emergency call boxes and analogue telephone lines</li> </ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Rescue equipment, if necessary, not in power of the operator</li> </ul>                                                                                 |

<sup>2</sup> Please note that this statement expresses the respondent's understanding of the legal situation. According to the understanding of the BBK, this is not the actual legal situation.

| Service                                                                                                                                                                                                                                                                                | Number      | Ideas/Pragmatic Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Obstacles/Problems/<br>Proven Impractical                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Communication</b><br>                                                                                                                                                                              | 24<br>(51%) | <ul style="list-style-type: none"> <li>• Radio case in order to avoid tying up emergency personnel</li> <li>• Citizen's emergency radio: Walkie-talkies with fixed channel = also accessible for citizens with walkie-talkie (amateur radio association also integrated)</li> </ul>                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Consider well and coordinate well the things that must be procured, as ongoing costs for satellite telephones are very expensive</li> </ul>            |
| <b>Childcare</b><br>                                                                                                                                                                                  | 10<br>(21%) | <ul style="list-style-type: none"> <li>• Separately organised and planned for emergency personnel</li> <li>• Sports for children in a separate area</li> </ul>                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                 |
| <b>Electricity</b><br><br><br> | 28<br>(60%) | <ul style="list-style-type: none"> <li>• Halls contain very few sockets → design of floating layout from the limited number of sockets: only one 32 ampere socket to distribute electricity in sports halls to ensure that enough sockets are available</li> <li>• Solar modules and energy storage</li> <li>• Bicycle generators</li> <li>• Operation of emergency generators with city tractors</li> <li>• Ikea CD unit used to build a mobile telephone charging tower with 48 charging points</li> </ul> | <ul style="list-style-type: none"> <li>• Parked emergency vehicles must also be supplied with electricity</li> </ul>                                                                            |
| <b>Heating/Air conditioning</b><br><br>                                                                          | 29<br>(62%) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Could lead to long stay of population</li> <li>• Shelter frequently in halls, but energy supply is difficult and expensive</li> </ul>                  |
| <b>Fuel</b>                                                                                                                                                                                                                                                                            | 4<br>(9%)   | <ul style="list-style-type: none"> <li>• Cooperation with filling stations, recirculating from other filling stations to that location possible</li> <li>• Cooperation with heating oil firms – fuel can also be transported in heating oil tankers without prior cleaning</li> </ul>                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• All devices required for pumping fuel must be emergency power-capable</li> <li>• Unaffordable fixed costs for storage and provision of fuel</li> </ul> |

| Service                                                                                                      | Number      | Ideas/Pragmatic Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Obstacles/Problems/<br>Proven Impractical                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pet care</b><br>         | 4<br>(9%)   | <ul style="list-style-type: none"> <li>• As a pack in fenced-in areas (e.g., tennis courts)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Not possible for exotic pets</li> </ul>                                                                                                                                                                                                                                                |
| <b>W-LAN</b><br>            | 6<br>(13%)  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                 |
| <b>Food</b><br>             | 13<br>(28%) | <ul style="list-style-type: none"> <li>• Use of mobile field kitchens</li> <li>• Mobile bar converted into field kitchen (procured and converted through volunteer network); considerable cost savings compared to original Kärcher field kitchen trailer</li> <li>• Food for helpers for 7 days</li> <li>• Personal kettles can be connected to emergency generators (e.g., of vehicles)</li> <li>• Cooperation with a supermarket with an emergency power supply</li> <li>• Ask supermarkets if pick-up and distribution of perishable frozen food would be possible</li> </ul> | <ul style="list-style-type: none"> <li>• Care of personnel must be taken into account</li> <li>• Many supermarkets are not interested in cooperations – in other countries, this is stipulated by the government, for example</li> <li>• Provisioning not easy as the best before dates require constant replacement</li> </ul> |
| <b>Refuge</b>                                                                                                | 24<br>(51%) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                 |
| <b>Iodine tablets</b><br> | 12<br>(26%) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                 |



## 6.2 Cause and background, anchoring

To gain an overview of the background and circumstances of the planning of LESH, interviewers asked about the cause of planning, the scope of planning activity, status of planning and implementation and practical experience, if any, as well as possible linkage of the concept to other or more comprehensive planning versions at the beginning. The responses provided insight into the institutional framing of the concepts.

### 6.2.1 Reasons for beginning to plan LESH

We asked if the respective regional authorities initiated planning on their own or if a higher-level authority stipulated that they do so in the form of a decree or detailed requirements (N=39, of them 1 from supplementary data; 39 replies).

According to the respondents, 29 regional authorities initiated planning around power failure emergency response **on their own**. 6 began because of a **decree** or the **stipulation of a higher-level authority**. Both were the case for 8 respondents: their own considerations were reinforced by a stipulation or recommendation from a higher-level office. Two respondents provided no information about a direct reason.

With 19 mentions, the context for corresponding plans most often listed was the gas or rather, energy shortage that threatened in the wake of the invasion of Ukraine in 2022. 13 respondents indicated that they were thinking about power failure scenarios before 2022. The specific reasons for this were, in chronological order (multiple answers possible):

- Report of the Commission on Technology Assessment of Parliament 2010 (Petermann et al., 2011) (1)
- Fukushima 2011 (1)
- Blackout in Rome (1)
- Special emergency response plan for blackouts 2018 (1)
- LÜKEX drill 2018 (2)
- Berlin Fire Brigade lecture (2)
- Scenario drill with gas shortage 2019 (2)

In 6 interviews, the respondents could not remember any explicit causes but indicated that they engaged with the topic before 2022.

**Good practice:** In the context of global change and the threatening energy shortage in the wake of the war in Ukraine, one regional authority has already established 4 emergency power supplied “energy islands” to safeguard the basic supply. They were relied on when the State of Brandenburg announced a fixed amount of financing for LESH with a total volume of ~€40 m in March 2023. (I:11) (Ministry of the Interior and Municipal Affairs of the State of Brandenburg, 2024a).

### 6.2.2 Scope of staffing

The interviewers asked about the size of the estimated scope of staffing used for planning and implementation of LESH (N= 36, 27 responses).

5 of the respondents replied that the work in the disaster management area or as part of a task force was done on the side. The more detailed information varies and is characterised by fluid transitions. It can be divided into several key types (*Figure 11*):

- **Long-term staff** dedicated to disaster management planning as well as LEIP and power failure planning over extended periods (>1 year) (9). Examples of this include “two years with 1 position”, “3 positions in the core period, later 1.5 positions and in the end, on the side” (I:23), “two full-time positions in the core period, now around 20%” (I:16), “for around 2 years, at 25%” (I:21)
- **Multiple-month, intensive phases of work** with **several participants** (up to 6 months) (7). Examples: “3-4 months, 2 positions, afterwards sporadically” (I:19), “6 months with 2.5 positions” (I:4), “6 months ‘more work than usual’” (I:2), “4 positions for 3 months plus 1 ‘voluntary year of social service’ position” (I:27)

- **Short-term or sporadic engagement**, usually by **individual persons responsible** (5): for example “4 months with 1 position” (I:10), “at the beginning 5-6 hours for the concept, isolated days, afterwards sporadically” (I:38)

Many respondents indicated that the planning load in all constellations **fluctuated greatly** – planning peaks alternated with phases in which the theme was inactive.

The findings indicated that far from all respondents have defined **positions/fractions of positions** for LESH and where they have, they are frequently for only a few weeks. The data do not detect any systematic differences in terms of the fractions of positions among different types of regional authorities.

**Good practice:** “At the peaks of planning intensity, up to three persons in the district administration dealt with the planning full time. Over time, staffing was reduced to approx. 1.5 positions – and the boundaries to other areas of disaster management planning were blurred”. (I:23)

### 6.2.3 Status of implementation

To classify the point in the planning process where the respondents were, the interviewers asked about the status of planning and implementation (N=33+10; 43 responses)

Overall, different planning and implementation statuses of LESH could be observed:

- Planned and implemented (of these, 2 since 2016 or rather, 2022 operational) (16)
- Planning/concept (almost) completed (5)
- Planning/concept completed; implementation unclear (3)
- Planning/concept completed, partially implemented (4)
- Partially implemented (1)
- In planning process (4)

**Almost half** of the respondents who answered had **completed planning and implementation**. In 5 interviews, **planning or rather, the concept** was described as completed. In 3 cases it was not clear if and how the plan will be implemented. They are all rural districts where implementation is incumbent on the communities, but the administration has not received status reports yet.

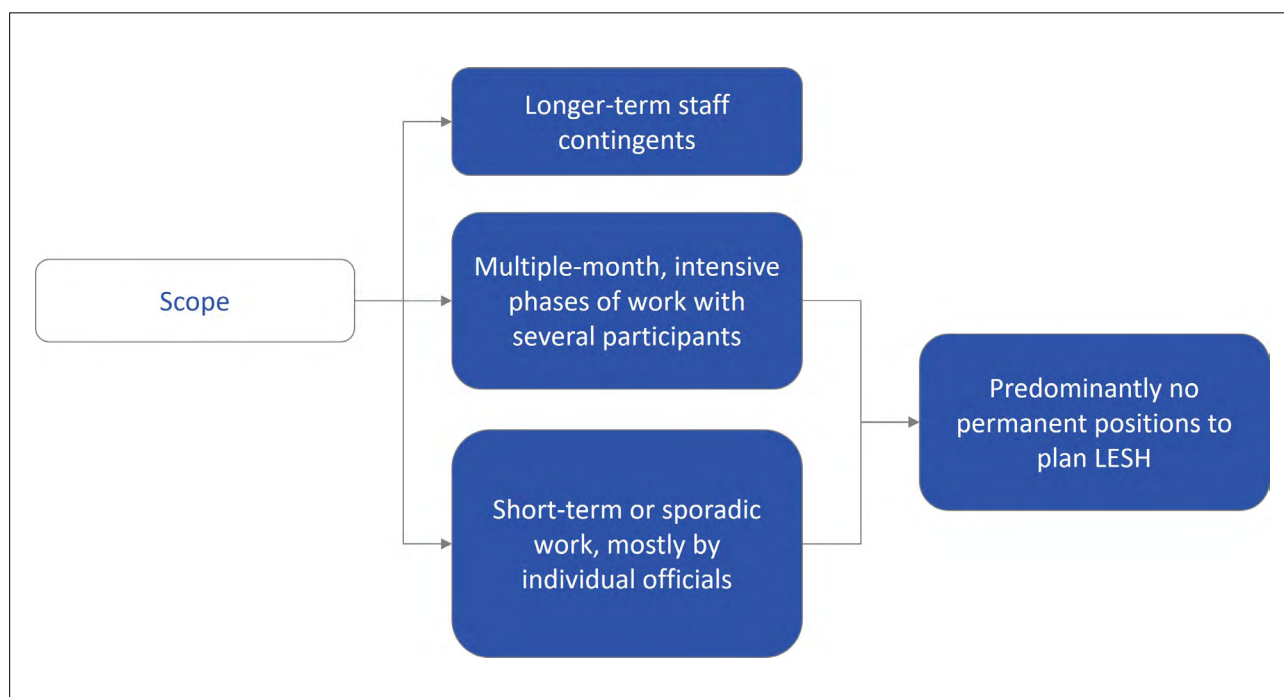


Figure 11: Illustration of the magnitude of planning positions for LESH.

The high proportion of nearly completed planning and implementation is a sample effect, as most regional authorities agreed to an interview when they were at least in the planning phase of LESH.

**Good practice:** “Implemented, this year already fully rehearsed through drills”. (I:37)

**Challenge:** In some cases, the respondents reported that rural districts had difficulties in terms of monitoring the implementation of the district-wide concepts they provide to their municipalities. “The concept was forwarded to municipalities/local authorities for implementation. However, it is difficult to monitor implementation as it is not a binding stipulation.” (I:23)

#### 6.2.4 Practical experience

The interviewers asked if the LESH were already in use and if any experience had already been gained from them (N=38; 38 responses).

At the time of the survey, most respondents had experienced **no practical deployment yet** of the LESH (22). Of them, however, 5 had already rehearsed. The **drills** yielded lots of positive feedback, but also highlighted weaknesses like communications problems. Overall, the conclusions of the respondents were positive and each LESH concept was deemed “viable”.

9 respondents indicated that their LESH had **already been deployed**. Some of the deployments occurred in power failure situations (5), whereby the duration and intensity of the situations were different, ranging from one local incident of 3-4 hours to longer-term events with 15,000 households. One incident occurred before the time of the “official” LESH and the respective points of contact were called “alert points for fire brigade accessibility” at that time. In 2 cases, the LESH were mobilised when the emergency hotline failed. In two other cases, it was also not an “official” LESH but instead was called a “shelter” during a major fire and a snow situation. One respondent indicated that a warming room was deployed after the highway was closed during a

snowstorm and 500 persons required shelter. Another respondent indicated a brief deployment, but a warming room drill took place for a full day.

**Good practice:** “Deployment for an Euro Cup game, for example, a storm caused a power failure (1-3 hours), the alert was effective.” (I:29)

Experience gained in practice shows that in some cases, LESH were not taken advantage of by the population. However, these cases involved shorter, smaller incidents or rather, the mobile telephone network was still intact. The feedback from the major deployment during a power failure with 15,000 affected household was, according to the respondent, very positive and the LESH were met with acceptance by the inhabitants. During a brief failure of the emergency hotline as well, the population used the LESH for questions.

**Good practice:** “Very positive feedback (from surrounding physicians, population). The point of contact was used as a general meeting point. People met there even without an emergency.” (I:6).

**Challenges:** “The concept cannot be tested in its entirety, as a full drill under real conditions is not feasible. To the extent foreseeable, however, the concept has proven to be viable.” (I:12)

“Overall, a less comprehensive picture of what would happen if the power really failed for a longer period of time (how would the population behave, etc.).” (I:24)

#### 6.2.5 Higher-level strategies

The question was whether the planning for LESH can be embedded in a higher-level strategy (N=38 + 1; 38 responses).

In terms of embedding the plans for LESH in broader strategies (*Figure 12*), it appears that in 19 of the responding regional authorities, a **higher-level concept** was present and an additional 13 had at least a partial concept.

In this context, the respondents explicitly mentioned:

- Disaster management (11)
- Power failure concepts (11)
- Critical infrastructure (CI) precautionary measures (4)
- Integrated risk management of BBK (2)
- Municipal security master plan (1)
- Strategy for the promotion of democracy (1)
- Civil protection 2035 (1)
- “Making the community more future-proof” (1)

Only 5 respondents indicated that the LESH concept presented an isolated, silo project, whereby in one case alert projects were mentioned that run “in parallel”. In this case, we can assume the existence of a broader disaster management context.

Overall, the evaluation suggests that in quite a number of regional authorities, concepts and plans for civil protection in the event of a power failure were developed before Russia invaded Ukraine. Ultimately for the majority of respondents, however, the gas shortage and the threat of an **energy or rather, power shortage** triggered as part of the war in Ukraine from 2022 tipped the scales in favour of finding a detailed solution for the power failure scenario and more specifically with LESH. In some cases, this was initiated by the relevant **decrees** or rather, **general recommendations** of the respective federal state or rural district. LESH were implemented as isolated solutions in only a few cases. Typically, they are embedded in or run parallel to other measures as part of disaster prevention and/or the protection of critical infrastructure.

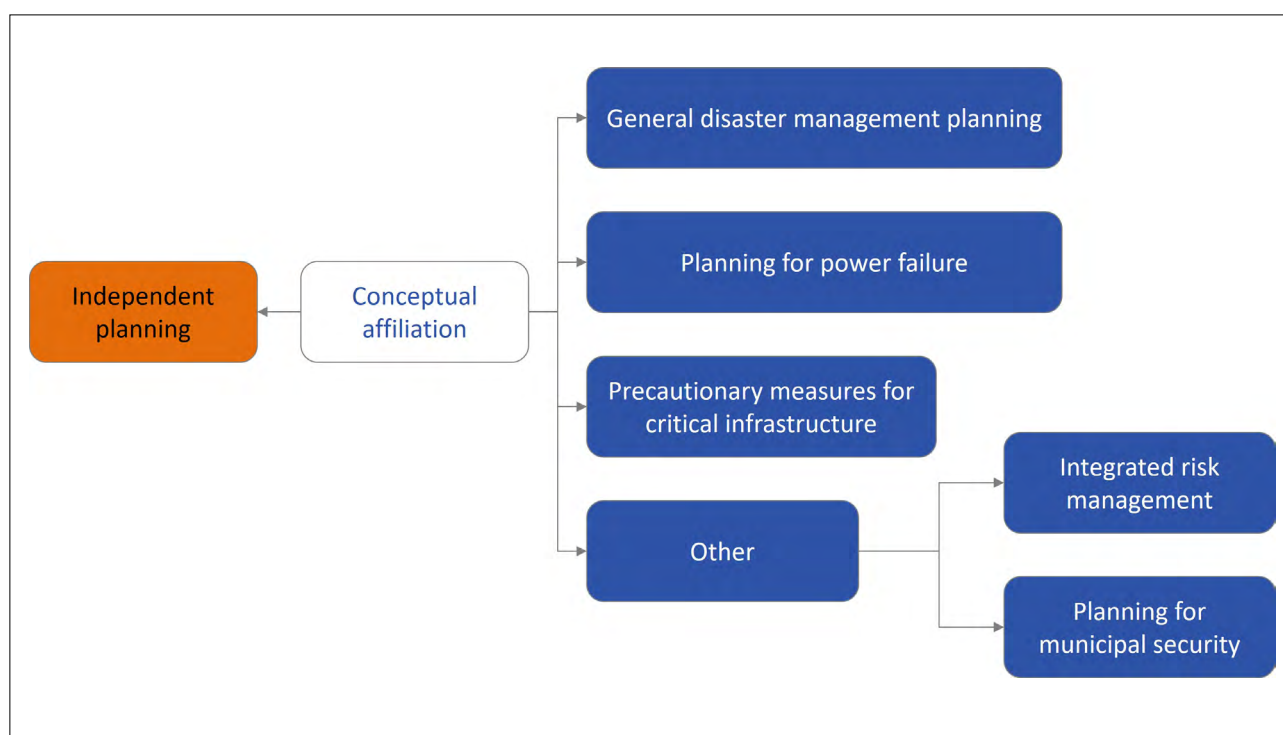


Figure 12: Categories of the most relevant higher-level strategies and concepts with which LESH are affiliated

## 6.3 Financing and legal framing

### 6.3.1 Cost bearer

In this module, the interviewers first asked questions about who is responsible for the costs of LESH (N=38 + 1; 39 responses)

When asked about the financing of LESH, 35 respondents mentioned the **municipalities** as being responsible for bearing the costs. Further, the **rural districts** were mentioned as the co- (2) or sole financial backer (1). In one case, planning and implementation were fully covered from the **budget of the professional fire brigade**. In another case, the respondent indicated that, except for the costs of fuel, printing, posters and POS stands, no extra costs were incurred. The context leads to the assumption that these items were covered from the **ongoing administrative costs**.

**Good practice:** The State of Brandenburg made a total of more than €40 million available to its independent cities and rural districts in 2023 and 2024 for setting up “local emergency support hubs” there. Their distribution was determined based on the population structure and surface area of each rural district.

The respective allocation decisions began to be sent to the rural districts and independent cities at the end of May 2024. This created financial planning stability and together with the local authorities, the rural districts and independent cities were able to specify in the fine planning what must be procured or structurally converted before they could set up their LESH.

In addition to the fixed-contribution financing model of the State of Brandenburg, in the event of a disaster Bavaria will take on the costs incurred by the LESH.

In the interviews, state funding pools or rather, possible subsidies were mentioned 4 times. One respondent pointed out that somewhat more flexibility would be helpful here. For example, a respondent said that the state fire academy recommendation of 60 kVA as a condition for funding is oversized for two of the locations and now

smaller generators are being procured without funding. (I:30) In another interview, the respondent pointed out that funding is only intended for one specific scenario: flooding. (I:31)

**Challenges:** “When it comes to allocating public monies under conditions of beleaguered budgets, the pressure to justify cost-intensive procurement is always high.” (I:12); “Finances are an important theme, particularly because of the poor state budget situation.” (I:7)

**Good practice:** “City building management was responsible for retrofitting the emergency points of contact.” (I:4); “Dual use is the aim.” (I:12)

### 6.3.2 Responsibility

The interviewees were asked who holds the responsibility in terms of sponsorship for LESH or similar (N=38 + 1; 39 responses).

The overwhelming majority of respondents assigned the responsibility for LESH to the **municipalities**. They explicitly mentioned:

- Municipalities (including local authorities) or rather, city administration/mayor (29)
- Fire brigade (3)
- Lower-level disaster management authorities (2)
- Rural district (2)
- Operators or rather, location managers (as implementing actors) (2)

The fire brigade responses were from independent cities with professional fire brigades, which by definition are full-time municipal institutions. Ultimately, the municipalities are also responsible here. One rural district assigned responsibility for LESH to the fire brigades without further specification. The references to lower-level disaster management authorities being responsible came from independent cities that were lower-level disaster management authorities themselves – and therefore are also responsible as a municipality. In this context, it is interesting to note the statement of one respondent who indicated that civil protection and disaster



management had been transferred to the municipalities. In a different rural district, the respondent gave this reason for the municipalities being responsible for LESH: they must be seen in the context of public services and not as part of disaster management.

### 6.3.3 Organisational linkage

The next question was how LESH are organisationally linked (N=38; 38 responses).

With regard to which departments or rather, authorities LESH are organisationally linked to, the findings show that municipal **administrations** play the largest role, but fire brigades are also highly significant. Here, a distinction can be made in terms of the level at which the LESH are operated:

- Independent cities (13):
  - Fire protection and disaster management department or civil protection (7)
  - Professional fire brigade as a department of city administration (3)
  - Operator (2)
  - City administration in general (1)
- Rural districts (11)
  - Municipalities (5)
  - Fire brigades (3)
  - Rural district (1)
  - Office for public order (1)
  - Authorities for public order or fire brigade (1)
- Municipalities (14)
  - Office for public order (5)
  - Fire brigade (4)
  - Municipality in general (3)
  - Specialist administrative department (2)

In the independent cities, LESH are typically linked to the relevant departments for fire protection and disaster management or civil protection only. It can be assumed that the staff there have the required expertise. In the case of rural districts, the organisational linkage is to the district itself in only one case. Otherwise it is to undifferentiated administrations, the fire brigades

or the office for public order of the associated municipality. A similar picture is evident with the municipalities themselves: in some cases LESH are assigned to the fire brigades. Otherwise, they are linked to the public order office or more generally, the administration. In the latter cases above all, it cannot be automatically assumed that the relevant expertise is present, particularly in smaller municipalities.

**Good practice:** “Often offices for public order or fire brigades – also depending on where LESH competences are located on site.” (I:23)

**Challenge:** The specialist expertise required for planning and implementing LESH may not be sufficiently available in small municipalities.

### 6.3.4 Legal framing

The interviewers asked about the design of the legal framing for planning or rather, implementing LESH (N=38+2; 40 responses).

The understanding of whether or not LESH are covered by a legal framing is divided in the interviews: 18 respondents answered with “yes” and 21 with “no”. In 4 responses, the German Civil Protection and Disaster Assistance Act (Gesetz über den Zivilschutz und die Katastrophenhilfe des Bundes, ZSKG) was explicitly named as the basis. At the federal state level, various legal frameworks were viewed as the basis from which LESH could be derived (some multiple responses):

- General public service (7)
- Respective state law on disaster management or more general decrees, e.g., around creating “energy failure” alert and deployment plans (4)
- (Municipal) disaster management plan or resp. planning of demands (3)
- Specific decree or general recommendations like in Brandenburg or Baden-Württemberg (3)

In one interview, a community specifically named the framework concept of the rural district. On the other hand, in another interview the municipality pointed out that there was no legal



means of forcing municipalities to provide feedback, not to mention to implement LESH. In one case, the responsibility of municipalities in the event of inaccessibility of the lower-level disaster management authority.

The cases in which LESH are supported by specific legal bases are rather rare. Typically the federal or state law on disaster management in general or general public service was mentioned.

**Good practice and challenge:** “The NRW decree on raising awareness plans the emergency staffing of fire stations as a basis for planning, but LESH/LEIP cannot be specifically derived from it.” (I:20)

### 6.3.5 Legal prerequisites

The question about the necessity of legal prerequisites (e.g., disaster incident) for deploying LESH was a follow-up question to the preceding one (N=38; 38 responses).

In order to **implement or rather, to operate** LESH, most respondents (32) were of the opinion that **no legal basis** is required. Only 6 respondents view the explicit deployment of an LESH by a head of operations, head of specialist staff or the district administration as necessary. In 2 cases, the political decision-makers who mobilise LESH were explicitly named. In 2 cases, the proclamation of a disaster incident was mentioned as a prerequisite.

**Good practice:** “The specialist staff decides and deploys the points of contact.” (I:8)

**Challenge:** “Specification by the district administration is probably not legally binding. The district administration is theoretically at a higher level, but ultimately the binding character is uncertain.” (I:30)

### 6.3.6 (Possible) legal problems around operating LESH

The next question dealt with possible legal problems around the planning, implementation and operation of LESH (N=38; 36 responses).

No information was provided on possible problems with the present or rather, assumed legal basis in 4 cases. 22 of the respondents saw no problems. One respondent indicated in general that this was a grey area. 11 responses described possible problems:

- Problems in terms of **access rights** (food, fuel, exemption of personnel; 5). In 4 regional authorities, they were solved cooperatively by each one concluding agreements with partner organisations. Compensation for expenses and continued pay for volunteer workers were also agreed in a separate contract in one municipality.
- Lack of **binding character** with various effects (5). Alongside a lack of enforceability (3), a lack of financing or rather, funding (2) and a lack of standardisation were mentioned.
- **Data privacy protection** of staff, workers and vulnerable groups (2).
- Problems with handling norms and standards with respect to **hygiene** and **personal care** (2)

In one interview, a “constant shifting of responsibilities” was perceived in the context of a general lack of statutory regulations.

**Good practice:** “The city basically aspires to avoid making operation dependent on access rights in the emergency ordinance, but instead want to organise it as a partnership. This has worked well so far.” (I:1) “The exemption from work and continued pay of volunteer workers in aid organisations below the disaster threshold was not regulated. That is why it was agreed in a contract.” (I:6)

**Challenges:** “Lack of clarity”. (I:7); “Data privacy challenges”. (I:13)

## 6.4 Cooperations, support and local linkage

### 6.4.1 Anchoring in additional stakeholders

In the interview, the respondents were asked what other stakeholders from civil society were integrated into planning – and also if the population had participated. 32 respondents provided answers to this (N=33+3; 35 responses). As multiple responses of a limited number of sources often influence the categories, frequency of mention was not counted for many points.

4 of the respondents indicated that they had **integrated the population** (Figure 13):

- As part of town hall meetings
- At citizen question round (when planning had already started)
- By integrating self-help groups
- One argument for integrating citizens was obtaining valuable input and offers of support that otherwise could probably not have been leveraged.
- Some mentions of integration of the population into disaster management did not specifically refer to LESH (3). Integration around heavy rainfall maps, opportunities for volunteers, registering with an app, an information day about LESH.

15 of the respondents said they did not involve the population. Reasons for this were indicated in only a few cases:

- Did not want to arouse desires (3)
- Avoiding panic (1)
- Communication with the population is the task of the municipalities (1, on the part of a rural district)

That information came from the population was mentioned several times; however it did not play a role in planning. Accordingly, the population was rarely involved in planning and in some cases was **consciously kept on the sideline** as shown in the following examples:

- “We consciously did not involve the population and did not inform them until everything was ready (did not want to ignite panic or arouse rapacity).” (I:30)
- “Population: No integration of the public in planning but identification of vulnerable groups (residential ventilation communities, dialysis patients and survey of needs of other institutions (police, rescue service, care and healthcare institutions)).” (I:10)

The answers to the question of which actors were included in the planning very often (27) mentioned the **fire brigade**. In 13 cases, the LESH were (co-)designed by a professional fire fighter and a further 6 cases mentioned a membership or

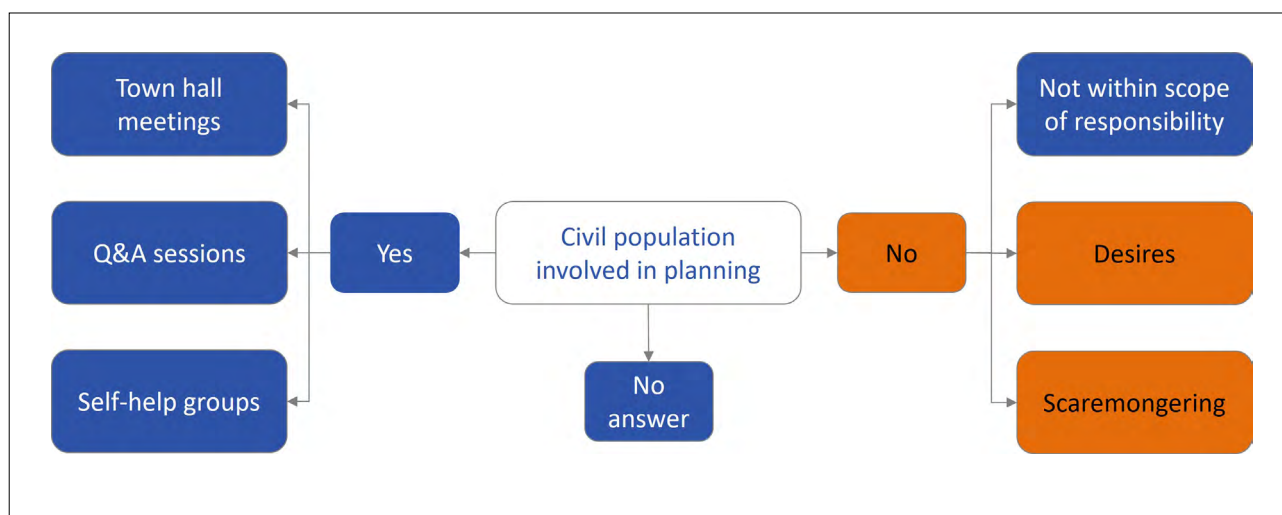


Figure 13: Forms of integration of population groups into planning and reasons for rejecting this type of integration.

leadership position in the volunteer fire brigade. In additional 7 cases, the fire brigade in general was mentioned.

The number of **organisations integrated into the planning** varied: only 5 respondents indicated that only the office or team responsible did the planning. In the other cases, the range is from one to six additional actors who were involved in concept development.

The following describes other authorities and organisations that were integrated into the concept development of LESH projects and if necessary, participated in the implementation. The mentions are summarised according to contextual aspects whenever possible (multiple responses possible):

- Administrative or rather, disaster management specialist staff of the emergency operation teams
- Other offices or administrative units of the regional authority, including
  - Land office or building authority
  - Technical services/building yard
  - Central procurement
  - Office for statistics and polling
  - Veterinary office
- Administrations or rather, associates of the local mayor or surrounding regional authorities
- Water supply (e.g., city utilities, wastewater, water treatment plants)
- Energy supply (e.g., electricity companies)
- Aid organisations of PSAO (e.g., DRK, DLRG, THW)
- Care and healthcare institutions (e.g., head emergency physician, hospitals, nursing homes, physicians, chemists)
- Police
- Sports clubs
- Self-help groups
- Local universities, schools

Overall, most other actors and their expertise were integrated as early as the planning phase for LESH. The majority were from **administrations and PSAO**, but **stakeholders from civil society** were also mentioned.

**Good practice:** “The municipality founded a type of ‘disaster management specialist team’: the mayor, fire brigade commander, specialists on digital radio, head of the building yard (for buildings, emergency power, etc.) and IT. Around every 3 months, they meet and discuss themes, in addition to exchanging information with neighbouring places”. (I:30); “The contextual concept development and advance planning was mostly carried out in the fire protection and civil protection department in close coordination with the specialist offices of city administration and relevant operators”. (I:12)

**Challenge:** “An explanation of what is involved with power failures or could be involved is often necessary”. (I:22)

#### 6.4.2 Specific local implementation and offerings of LESH

The respondents were asked if the implementation of the LESH integrated local, specific special features or rather, offerings as part of LESH and if they were also included in the offerings (N=38+1; 38 responses)

15 of the respondents indicated that the **LESH were identical**. 11 responses indicated that **minimum requirements** were communicated but offered **room for manoeuvre for operators** (e.g., aid organisations or communities), whereby the specific design remained vague in some cases or was still in planning. The local special features mentioned are:

- Capacity adaptable to local needs (4)
- Specific rooms met local needs (4)
- District-specific offerings like translation possible (2)
- Called “emergency meeting point” instead of LESH
- Medical services varied
- Active participation of population according to information on LESH
- Longer operation of streetlights surrounding LESH in the event of controlled shutdown
- Use of special infrastructure like tourist information (window)

**Good practice:**

- “The design is being carried out by the municipalities but is orientated to the minimum standards of the district, adapted to the needs situation on site”. (I:20)
- “Active involvement of the population: e.g., 5,500 litres of water provided in old manure trailer for animal care or fire-fighting”. (I:36)
- “Location in town hall is singular – use of tourist information rooms (reception area with counter already exist)”. (I:37)
- “City utilities want to configure the street-lights in the areas surrounding LESH to be switched off last”. (I:5)

**Challenge:**

- “Parts of the exact design are unknown and are being carried out by the municipalities”. (I:21)
- “In summer, the volume of those affected is unclear because of the high number of tourists (several thousand day and multi-day guests)”. (I:37)

**6.4.3 Cooperations around implementation**

Subsequently, respondents were asked about the local cooperations established during the implementation or operation of LESH (N=37; 36 responses). Due to the frequency and varying scope of multiple answers, no counts were made here either.

Among the respondents, 4 said there were no co-operations during implementation of LESH. Conversations in that direction were conducted twice but were either unsuccessful or not systematically followed up on. An additional respondent indicated that those carrying out implementation had cooperations.

32 of the regional authorities surveyed entered into **cooperations**. Similarly to the situation of the actors involved in planning, the list of possible partners is very **diverse** and difficult to classify, as in some cases terminology was not used

uniformly. For a more detailed idea of who was named as a cooperation partner, the institutions mentioned are listed below, but no count was made. The sorting groups institutions that belong together by content (e.g., healthcare institutions) and is listed by order of occurrence in the interviews.

- Fire brigade
- Aid organisations (DRK, ASB, Malteser, Johanniter, DLRG)
- Municipal operations and offices (city utilities, land office, building yard, offices for public order, neighbourhood associations, water treatment plants)
- Police
- Technical Relief Service (THW)
- Healthcare institutions (physicians, pharmacists, nursing homes, hospitals, dialysis centres, residential ventilation communities, emergency psychologists)
- Energy suppliers
- Filling stations, operators of heating oil tankers
- Non-governmental organisations (NGOs) (e.g., food banks) and associations or clubs (e.g., sport, carnival and shooting clubs)
- Local secondary schools, student unions, schools
- Retailers (e.g., food, sanitary needs, electrical goods shops)
- Trades
- Businesses in the local economy (firms, agriculture)
- Spontaneous volunteers, neighbourhood assistance associations
- U.S. military bases
- Church communities (with a good network of volunteer helpers)
- Hunting clubs

**Good practice:**

- “Early on, we launched a broad poll and were welcomed with open arms: (‘We thought you’d never ask!’) – “Know who to call in a crisis.’ Collaboration with NGOs (e.g., migrant self-organisations) is also very good”. (I:1)

**Challenge:** Multiple use of resources and personnel whenever possible

“We did not involve local aid organisations to avoid adding an extra burden”. (I:38)

On the other hand, many respondents were unable to make a more detailed statement on how many persons LESH should be staffed with. Either this was the responsibility of the operator or municipalities (6), or in some cases it could not be clearly specified due to various obstacles (5). Further, some respondents indicated that they would plan ad hoc, based on the availability of the persons actually present (4).

**Challenge:** Across various question sets, the respondents often answered that personnel planning was difficult insofar as there is no reliable knowledge as to who would/could actually show up in an emergency. Possible problems during the journey to the destination, uncertainty about whether communication for alerting personnel is actually safeguarded, anticipation of conflicts of interest regarding operational readiness – especially among personnel outside traditional emergency organizations – and similar concerns led respondents to suspect that there are practical difficulties in meeting the planned staffing levels for LESH. Even if the theoretical option of disciplinary procedures was available, the planners doubted the existence of any leverage (or the desire) to apply them.

## 6.5 Personnel planning and staffing

For many respondents, dealing with staffing was one relevant component of planning and implementing the concepts for LESH. It is formulated in various themes that are discussed in the following:

Questions were asked about the number, qualification and roles and tasks of the LESH staff.

### 6.5.1 Number

(N=37+1; 37 responses)

In most cases, **minimum staffing** (14) or a fixed number of workers (9) was specified in the LESH concept. But operators often had the opportunity to expand the staff. Minimum staffing consisted of 2-8 persons who typically had specific roles (details in the following section). The majority planned for a minimum of two (6) or three (3) persons and in larger disaster management departments and at higher escalation levels with care offerings, some respondents listed 8 persons (3).

Some administrations quantified the total personnel costs for all LESH in their region of responsibility in multi-shift operation as total numbers (5) ranging from 100-600 persons. In some cases, separate staffing levels were specified for the respective level (3).

### 6.5.2 Qualifications

(N=38; 38 responses)

In many LESH, **different professional groups and personnel areas** are deployed at the same time (23).

In particular, **fire brigades** and **administrations** are frequently included in personnel planning (26 each) and many plans include both at the same time (17). Further, PSAO units overall are often mentioned as staffing:

- Members of aid organisations (15)
- Disaster management units (13)
- Police forces (9)
- Psycho-social emergency care personnel (6)



**Good practice:** If the planning authority outsources the operational responsibility to third-party organisations, in some cases the respondents recommended that works agreements be concluded and reported that they were. The agreements regulate performance requirements, staffing keys and operational objectives, and pay for the work as well. In the little-regulated field of LESH, this autonomously designs the legal space of LESH and establishes its binding character.

**Good practice:** Some respondents indicated that integrating volunteer workers was a decisive factor in anchoring LESH in the local structures of civil protection. As a group of workers who frequently have experience in deployment and disaster management, they are a link between professionals in the field and self-help as practised by civil society.

Sometimes the staffing of LESH (*Figure 14*) was also filled by volunteer activities (5) and for example, the age scales of the PSAO (1). In many cases, the inclusion of volunteer workers was explicitly recommended (cf. → *Sect. 6.10*).

In contrast, some respondents also explicitly released the PSAO from this task so that they could pursue their activities around basic protection without any obstacles (3) (cf. → *Sect. 6.1*).

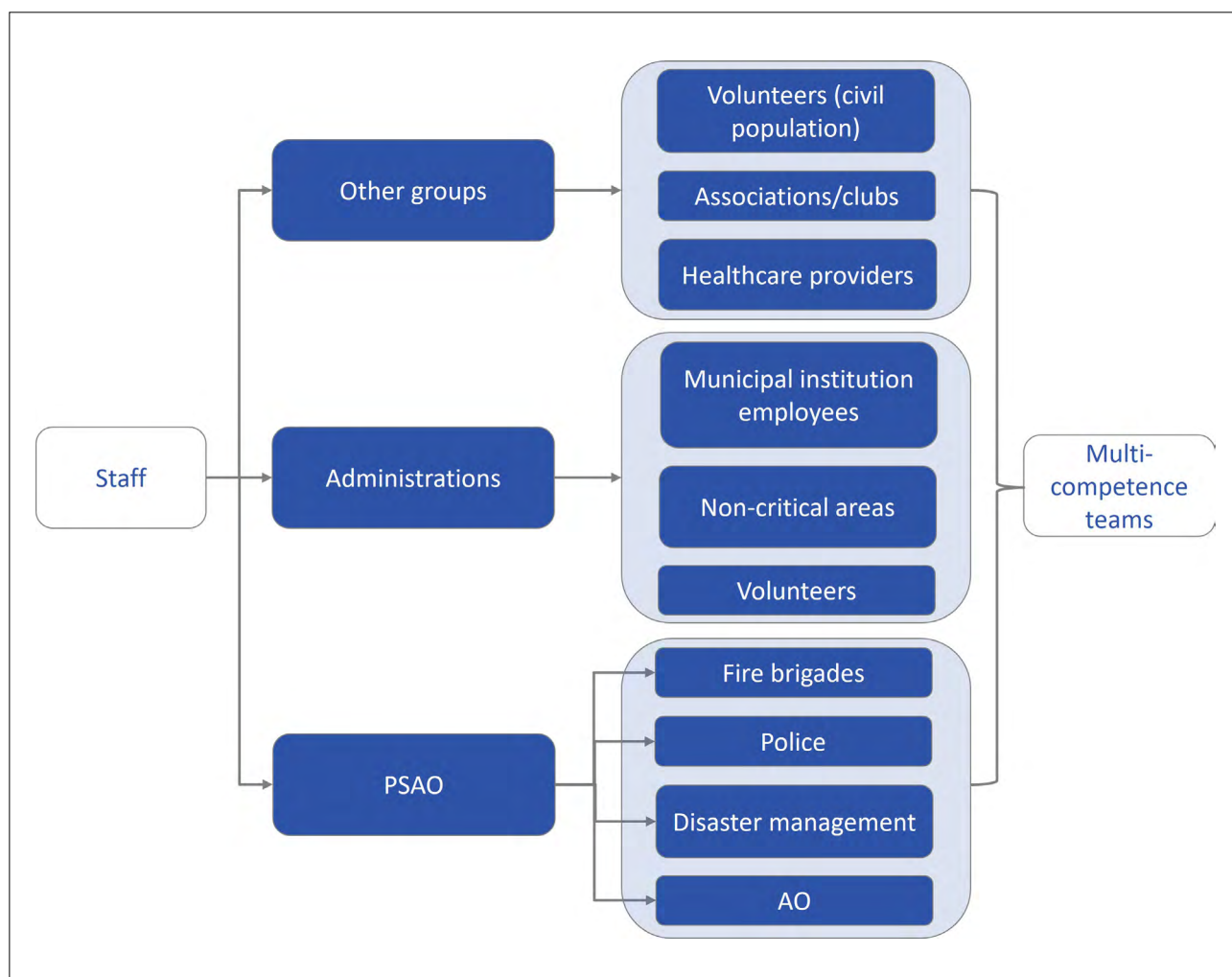


Figure 14: Groups used as staffing for LESH.



In the context of requests for tips and recommendations, this theme was also discussed. Here, 3 of the respondents recommended **staffing LESH with personnel from PSAO** and/or supplementing them with **(volunteer) administrative staff**. In terms of integrating fire brigades, there was also disagreement on this point. 2 respondents recommended **collaboration with the fire brigade** and reminded that it should be integrated **as early as possible**. This would ensure that planning is not done in parallel or drifts apart. At another point, respondents also recommended avoiding **the multiple planning of persons who work in disaster management (not putting them in LESH)** (→ Sect. 6.10).

**Good practice:** 2 respondents explicitly recommended setting up multi-competence, **interdisciplinary** teams at the very beginning of the planning phase. This would help to determine what potential is available above and beyond the boundaries of individual specialisms in a cross-sectional situation like power failure and would avoid a restricted view of how to control the situation.

Employees of municipal institutions were mentioned less frequently:

- Building yard (6)
- City utilities/water companies (2)
- Personnel from non-essential administrative areas (4) (who should be specified in advance, cf. → Sect. 6.1)
- Members of the local council (1)

The response around **involving actors and interfaces** beyond disaster management in particular – be it additional level, other municipalities, participating organisations like the police or volunteer organisations – was often ultimately emphasised as a recommendation (10).

Not least, there were several mentions of civil co-operation partners (→ Sect. 6.4):

- Volunteers (5), some pre-registered but also spontaneous volunteers
- Associations/clubs (4)
- Physicians and medical care services (2)
- Security agencies (2)
- Preschool teachers (1)
- Employees of neighbourhood meeting points (1) and social workers (1)

**Good practice:** In a large city, LESH are set up in sport halls in the city districts. Here, the **home clubs of the respective halls** are integrated into the staffing of the LESH. “From the neighbourhood for the neighbourhood” is the motto under which they take on support tasks and non-specialist activities. Further, volunteers have the opportunity to register in advance and participate in the setup and staffing of the LESH.

**Good practice:** A large city integrates volunteers from the neighbourhood for staffing LESH of the lowest escalation level. They are specially trained and have their own alert chain in the event of a power failure. Access to the buildings is safeguarded. The city expressly tied the programme to a support initiative for strengthening democracy and practises publicly supported crisis management.

Here, too, some respondents stated that they were unable to provide specific information: either the qualification profile was the responsibility of the operators (5), or no specific qualification areas were included in the plan (2), based on the assumption that adequate staffing could not be ensured (4).

**Good practice:**

- “Collaboration with other municipalities is an advantage”. (I:8)
- “Include other players: town leaders, senior advisory boards, ombudsmen for persons with disabilities, housing associations (that post the map with emergency points of contact in their buildings for example)”. (I:4)

The comments also showed that **personnel from different organisations** either take on **specific tasks** more frequently (6) or supervise different escalation levels or LESH modules (6). For example, technical operations are covered by fire brigades or LESH teams, communicative and caring tasks by employees of the city administration and aid organisations provide medical services; or specific institutions are covered by different personnel areas if, for example, emergency reporting points are the responsibility of fire brigades and municipal warming rooms of the city administration. Depending on the scope of services and objectives of the LESH, the number of participating organisations varies greatly. Other respondents indicate that in an atmosphere of ambiguous staffing arrangements that depend on current availability (7), they make ad hoc plans and in individual cases, assign personnel directly from the specialist staff (2).

Some small, rural municipalities do not make dedicated staffing plans insofar as all areas of crisis management will be located on site anyway. Led by the mayor and fire chief in one, LESH as points of contact are supervised by the members of the local council and the municipal organisations. It is assumed that the respective tasks emerge and are organised in mutual awareness.

### 6.5.3 Roles

(N=33; 33 responses)

The previously heard relevance of **qualification-specific division of tasks** and functions was confirmed with regard to the roles to be assigned (*Figure 15*): Half of the respondents (19) indicated that they defined and planned specific roles in the LESH in advance. Around half of the respondents also indicated that they described general roles that did not require any specific qualification (17). In a number of facilities there was a mixture of both forms of roles (6).

Specially defined roles were primarily mentioned as functions that enable integration into the control and communication system of the LESH on site and also facilitate key offerings of the LESH like disseminating information, reporting

emergencies (cf. → *Sect. 6.8*) and providing first aid:

- Communication roles (to the public)
- Radio operator (PSAO authorisation) (8)
- Technology/operation (8)
- Management functions (7)
- Medical service tasks (7)
- Assistant roles (5) (often also called floaters/generalists and understood as a general function)

The previously mentioned specified minimum staffing was described as a combination of these functional areas. They reflect the central sets of tasks for LESH that the respondents indicated must be covered by LESH. This approach has the advantage of leading to a clear allocation of existing competences to specialist areas of responsibility. If additional personnel and volunteers, if necessary, are available, this can also enable general support roles to be assigned. However, this would also create dependency on the availability of specific persons/groups of persons.

Some respondents addressed the challenge of unclear personnel availability by defining specific roles, while ensuring they were documented and designed to be independent of specific persons (5). As a result, it would be possible to flexibly deal with the number of persons who are also actually on site. However, the more the services offered required prerequisites (e.g., PSAO radio, medical service, etc.), the more difficult this approach would become. Accordingly, many respondents also recommended a low-threshold, limited offering that can be certain to be available (not only with regard to staffing) instead of making plans that are too ambitious. (→ *Sect. 6.10*).

And many respondents indicated that they filled roles based on the **specialist competence** of those present (14). In case of doubt, this also determined the range of possible services that can be offered.

The tendency can be formulated like this: the larger the number of LESH to be responsible for and in turn, the larger the staff requirement, the more clearly roles and their qualification profiles are defined – in particular if the higher-level

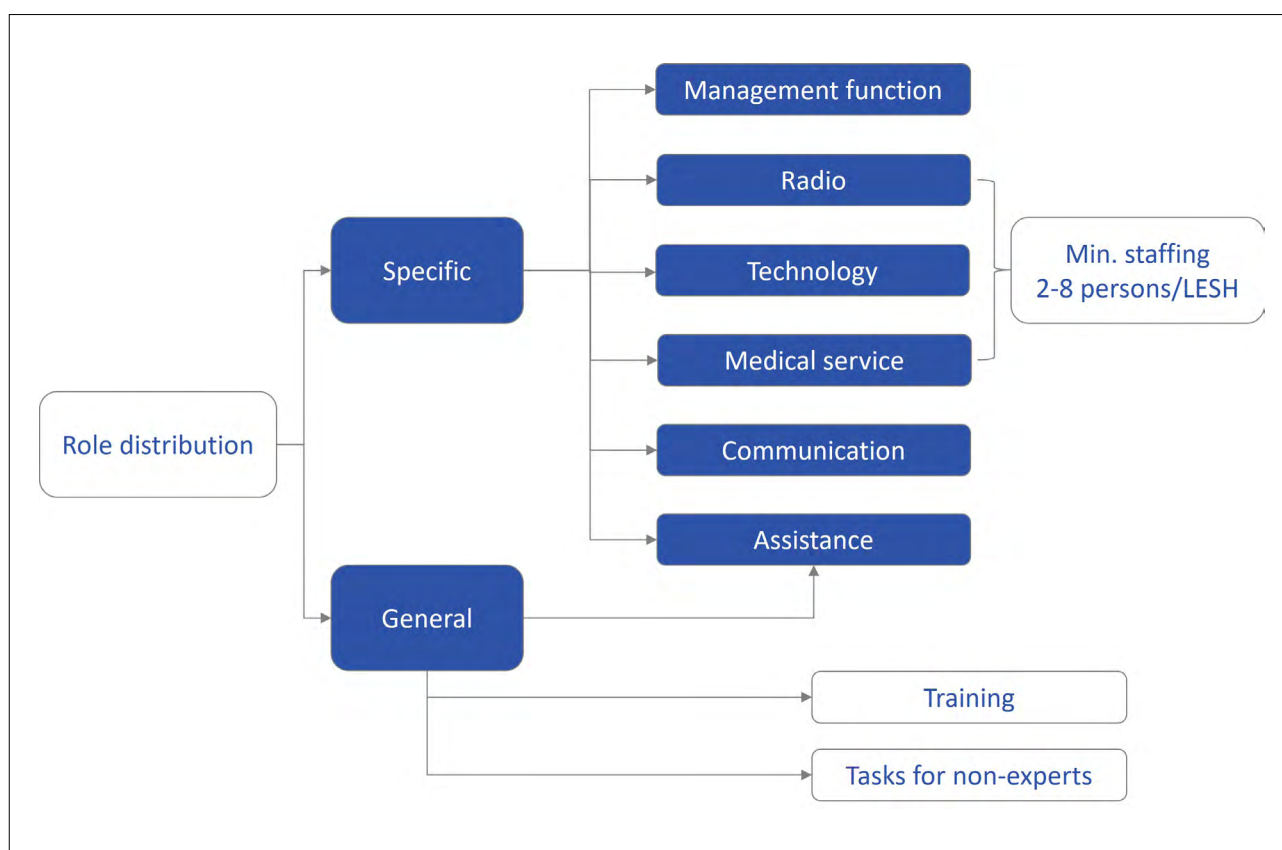


Figure 15: Definition of roles in the staffing of LESH.

administration itself organises the operation of the LESH. The minimum requirements for the roles to be fulfilled could also be formulated, but it makes sense to ensure that the requirements can also be met on site. “All municipalities are not able to deliver the same performance”. (I:25)

And some respondents indicated that they neither planned roles in advance (4) nor handed over the competency for this to the operator (3). 5 respondents provided no information.

#### 6.5.4 Behind-the-lines care by administration

Based on the assumption that the administration and operator of the LESH belong to differentiated systems and clear boundaries have been set up between executive teams and the planning administration, the respondents were asked about the type and scope of supervision from the administration. As previously described, this differentiation was not particularly useful in the stratification of the sample (cf. → Sect. 5). (N=37; 36 responses)

A large proportion of respondents indicated that the question is invalid insofar as **the administration is actively involved in operation** (16).

In many cases, a connection of and supervision by administrative staff in communication with the respective higher-level **crisis team** was reported (15) (cf. → Sect. 6.8). Some respondents also reported a linkage to a “crisis town hall” that maintained key administrative functions and

safeguarded central processes (4). The majority of such linkages took place in a setting of spatial coincidence: in small municipalities, the town hall was used as an LESH in some cases such that safeguarded processes were available directly on site there.

**Good practice:** One community equipped the new town hall building with emergency power and planned to use it to maintain operation of the internal server as well. This would enable the local administration to continue offering key processes in the event of a power failure. As the crisis team meets on site and an LESH was set up in the building, channels are short and those affected can also be assisted with administrative matters.

One large city also plans to establish a “crisis city hall” in which essential processes can be safeguarded and continued to be carried out. However, LESH will only be linked to them via the interface to the head of operations and the channel through the crisis team in order to prevent the crisis city hall from being limited in its activities by excessively large crowds.

In some cases, support was reported to have been provided by a district-level “power outage task force” or by a project team on the administrative side. At the same time, 7 respondents indicated that they had not included supervision in their plan. This does not mean that linkage to official crisis management is not planned (cf. → *Sect. 6.8*). Instead, the statement was based on a different understanding of “supervision”. Two respondents provided no information.

### 6.5.5 Exemption from work

The interviewers asked whether the exemption of the respective personnel in order to operate LESH is regulated (N = 38; 37 responses).

Most respondents replied that the exemption of personnel for staffing LESH was not met with many difficulties. Around half of the respondents (25) indicated that they could fall back on agreements that were either regulated by the federal or state law on disaster management or the public

service law of the administrations (multiple responses possible):

- Timetables in accordance with the laws on disaster management that include exemption from work and compensation for expenses of members of disaster management organisations (17)
- Public service law that includes the deployment of administrative public servants on instruction or rather, in the case of the professional fire brigade, compulsory service in two-shift operation (16)

In 7 interviews, both options were included.

A total of 8 respondents indicated that the exemption of personnel is either not regulated (6) or not yet planned (2). In three cases, they relied on volunteers: even the regional authorities that indicated they could apply public service law said they also hoped for volunteer agreements and willingness to help. After all, as they explained, even civil servants or employees who are theoretically obligated to work would be affected themselves in an emergency of longer duration and might have to care for children or relatives – or might not be able to get to work without support. In these cases, legal means would theoretically be useful but would provide little help in the actual staffing of LESH (cf. → *Sect. 6.6*). One respondent pointed out that long-term exemptions had not yet been tested on the part of employers (I:9).

**Good practice:** “Both exemption from work and the provision/safeguarding of volunteer employees are legally certain. If it is a longer-term situation, an agreement might have to be concluded between employers and volunteers on the basis of Art. 20 et seq. of the disaster management law of North Rhine-Westphalia and local by-laws”. (I1)

**Challenge:** “We hope for the personal initiative of the workers, as we can control the deployment of personnel during regular work hours but not beyond that. Further, the administration does not have any means of enforcement, even if disciplinary procedures were available”. (I28)

## 6.6 Safeguarding operability

To find out whether LESH are set up for longer-term operation even under these sometimes difficult conditions, the interviewers also asked about the measures for safeguarding the staffing and operation of the LESH (N=38; 37 responses).

Most frequently, personnel planning measures were mentioned, including:

- Planning for (two- or three-) **shift operation** (19); in some cases under the explicit consideration of an anticipated default rate (5).
- Further, in order to estimate the default rate (estimated ranges from 20% to 79% default), some administrations sent out **enquiries to the planned personnel** as to their realistic willingness and capability to be deployed in the event of a power failure and concluded volunteer agreements that they rely on (6).
- The involvement of **volunteers** and helpers for support or staff general roles (5).

**Good practice:** Involving volunteers can, on the one hand, support high motivation and on the other hand, relieve the burden on staffing by the planned personnel. In two large cities, help and support troops are qualified for civil protection and emergency rescue that could also be deployed to support LESH. Voluntarily organised agreements among the emergency personnel like shuttle runs or other resource pooling could successfully strengthen mobility and willingness to work.

- **Training for** as many workers as possible but also volunteers in the roles of LESH (2) in order to deploy personnel as flexibly as possible.
- **Test operation** and drills as an option for consolidating the plans (1 each).

Here as well, doubts were expressed as to the feasibility of ameliorating the **uncertainty around actually present personnel** with advance planning (6). Rural districts in particular, which place the operation of LESH in the hands of the municipalities, do not have direct planning options for safeguarding measures, which are also the responsibility of operators (8 mentions, 5 of them

in rural districts). In smaller municipalities, the respondents also indicated that sometimes there are no safeguarding options (2).

In order to make the work of the personnel intended to staff LESH easier and to minimise the obstacles to willingness to be deployed, in some cases administrations that have the means rely on an offer of basic care services for emergency personnel and their families. Supplying stocks of simple food (6), options to bring families along or care for children (3) and arrangements for shuttles/pick-up (2) can be planned in advance with few resources on the basis of voluntary cooperations.

**Good practice:** The LESH concept is based on the redundant provision of key infrastructure or taking preventive measures against its failure. This also includes the **safeguarding of sanitary facilities**, which are essential for permanent operation. Although an emergency power system cannot replace the failure of municipal pumps, and therefore the water supply in many places cannot be permanently safeguarded, only a few respondents explicitly mentioned having a concept for the provision of substitute toilets or safeguarding existing sanitary facilities.

One large city has planned to provide chemical toilets at LESH, including a cleaning and disposal agreement.

Further, some respondents considered the theme of **protection** against agitated persons or a big rush to secure limited resources as a relevant aspect of safeguarding. As few LESH (can) plan to include police officers in their staffing, the involvement of security services (2) or distribution of protective material (pepper spray) (1) at LESH is also under discussion.



## 6.7 Mobilisation and transition into operation

The **logistics of the mobilisation** of LESH and the **transition of the property into the operational state** play a key role with regard to personnel planning. This issue is also at the interface between personnel planning and communication and LESH which is discussed next.

In the context of the question as to whether the institutions would be permanently set up as LESH or only in the event of an emergency (→ *Sect. 6.1*), the respondents were also asked how the transition from “normal operation” to use as LESH was regulated. (N=38+1; 29 responses)

10 respondents did not provide detailed information on this question. Further, a solid number of respondents (12) from higher-levels of administration answered that this was the responsibility of the operator.

**Good practice:** One city administration that is not directly involved in operating the LESH left the transition to specific details to the operators but did specify objectives – above all with regard to the time span within which start-up and notification of operability would be assured. The objectives are also written into cooperation agreements with the operators. This retains the aspects of local specificity and adaptability of the implementation but at the same time, ensures that the general conditions are defined.

The transition of the chosen facilities to operation as LESH (only one of the facilities was permanently set up as a LESH) raised various themes that the respondents presented as relevant aspects around the planning and regulation of the transition:

### (1) Access to the properties

- Many properties were chosen by the administrations partly because they are owned by the respective authority, allowing for **uncomplicated access** (cf. → *Sect. 6.1*). This has the additional advantage of possibly simplifying

transition planning, as core staff are already on site and can facilitate access (3).

Many respondents whose organisations are directly responsible for operation and set up LESH in their own properties indicated that mobilising LESH would not involve any great effort. Already present or stored materials would be set up, access to the property is present and staffing multiple posts would not involve any extra effort – particularly in the case of the fire brigades, which already have regulated alert plans. **Checklists are sometimes available for the detailed setup work.** This is in line with the frequently made observation that the use of fire brigade infrastructures can pragmatically make many aspects easier, although it can also conflict with safeguarding basic protection (cf. → *Sect. 6.1*)

- When properties are not the responsibility of the administration or the operator (and sometimes even in the case of schools, if they are but local personnel do not operate the LESH themselves), a **key concept** makes sense in order to have an advance plan of how the operator of the LESH will obtain a key (2).

### (2) Competence for mobilisation

- Many respondents answered the question about the transition with regard to competence to mobilise the LESH, but this is usually the responsibility of the crisis team (6), the other local heads of operations or operation control centres (4) and sometimes political decision-makers as well (2). At the same time, this opens up the issue of the alert channels on which mobilisation is based.

**Good practice:** To maintain flexibility for deployment – also beyond the disaster threshold –, various regional authorities have planned for the mobilisation of LESH through different channels. For example, mobilisation could be integrated through alert planning in regular alert operations, but also by political or operative managers based on need when required.



### (3) Alerting or rather, summoning personnel

- The regulation of alerting the personnel of the LESH was deemed particularly relevant for the transition. This is evident in particular with regard to the high number of administrations that do not plan this in detail but instead have an alert triggered. Alerting most frequently takes place via an **alert chain planned in advance** based on specified times or time spans after an incident occurs (7), e.g., “staffing of the LESH one hour after the power failure begins”. Particularly where administrations do not staff the LESH from their own ranks but instead in cooperation with third parties (e.g., aid organisations or volunteer fire brigades), targets are defined (7) that specify time periods until the LESH is operational, for example.
- Where LESH are staffed by PSAO, there is also integration into regular alert planning (8) (sometimes with an own alert prompt (2)). Alerting takes place via the nationwide modular warning system (MoWaS), for example (2).

**Good practice:** One municipality did not make the regulation of the alert chain dependent on the occurrence of an incident (e.g., 4 hours after the incident occurs), because if the situation began at night, many would not be able to detect that an incident had started. This is why fixed times and meeting points for the alert chain in the event of an incident, irrespective of when the situation began (e.g., at 10:00 a.m. in the event of a power failure), were specified here.

- Some administrations that provide staffing from their own ranks have laid rules down based on **personnel plans** (2) which can be used for alerting.
- At the same time, the alerting of personnel leads to the issue of realistic expectations of the **staffing level**, insofar as it is difficult to estimate who would be able to actually respond to the alert in the event of an actual power failure (more on this in the following).

**Good practice:** Power failure planning frequently works with analogue redundancy for technical processes. As does alerting: many regional authorities have a regulated alerting plan, but at the same time factor in interference or failure in the warning and alert structure itself. Although TETRA-PSAO radio is still safeguarded for the alerting-relevant time period in many cases, advance planning of the alert chain does make sense – particularly in the case of LESH that are staffed by administrations.

### (4) Logistics of the necessary materials

- Some administrations with large personnel and logistics capacities of their own (cf. → *Sect. 6.4*) plan LESH logistics from **central storage facilities**. Crisis teams or professional fire brigades transport material to the LESH (4). In the case of large emergency power systems in particular, specific devices may be needed that are usually available only from well-equipped urban disaster management authorities. For the other devices and materials, **material crates** are a possible solution (1).

**Good practice:** For provision of the materials for equipping LESH that do not have their own storage capacity, material crates, trolleys and other portable equipment were emphasised as a pragmatic solution (also see → *Sect. 6.1*). With this solution, the relevant materials can be pre-sorted, gathered and quickly transported to the right place. Together with instructions for use, even inexperienced personnel can quickly set up an LESH. In cases that do not involve heavy technical devices like emergency power supplies, the logistics can be thoroughly prepared and used by many groups of persons.

- In regional authorities in particular, which often centrally organise many comparable LESH, **checklists** (6) for setup or requirements in the setup plans (2) offer support to local personnel, who often have little practical experience with setting up LESH.

## 6.8 Communication

One of the central functions of LESH is their use as a substitute structure for failed telecommunications and other digital media (cf. → *Sect. 3*). They should provide the option to make emergency calls, get situational information and coordinate help needs and relief offerings. For this reason, a module of the interview was devoted to communication to LESH within the disaster management organisation, as well as with regard to communication with those affected.

### 6.8.1 Communication planning within the disaster management system

We asked the respondents about their planning of communication with other actors in disaster management and administration (N=38+2; 40 responses). We also asked whether LESH are in contact with each other and if so, for what purpose (N=38+1; 38 responses).

The questions were developed as part of the creation of the guideline with the aim of schematically grasping who in the operation of LESH shares *what information how, and with whom*. The questions focussed on the structural, technical and socio-communicative elements of the basic concept of the Berlin Model project. During the interviews, however, it became obvious that when most respondents were asked about planning their communication, they primarily and sometime exclusively only considered it in terms of the **technical aspects** of enabling communication. This also reflected the assessment from the perspective of the social-scientific project management of the basic concept, which emphasised that LESH would be received in terms of the technical equipment in particular and not with respect to the fundamental socio-communicative idea (cf. → *Sect. 2*) (Sticher, 2024). Setting up the technical option for communication is an essential, indispensable task in disaster management, however the respondents' choice of focus shows a neglect of the non-technical aspects of communication.

Almost all respondents indicated that they had planned for **communication of LESH with other**

**actors** (38) and only 2 said no, although in one case the planning task was transferred from the rural district to the communities. In another case, the status of the planning had not progressed sufficiently. In general, the respondents understood the theme to be relevant for planning.

The responses focussed on two main topics:

- Issues of technical implementation and communications media
- Issues of linkage and control of LESH to and within the leadership structures of civil protection and crisis management

#### Technical implementation and communications media

With one exception, all respondents who indicated that they have a plan for communication made statements about their technical implementation (37):

- In most cases, communication was planned to take place via **TETRA-PSAO digital radio** (30)
  - A fair number of respondents indicated that the communication infrastructure used for power failures was hardened by buffer storage (10).
  - Further, some communities also highlighted its provision in the form of radio cases (3) that also enabled facilities to achieve low-threshold access to the radio network without the corresponding equipment.

**Good practice:** Multiple municipalities (6) replied that through positioning stand-alone, emergency power-safeguarded repeaters, they had the option provide a safeguarded, independent TETRA radio network for direct mode operation (DMO mode) in their own community or city district.

- Frequently, **satellite telephony** was mentioned as a fail-safe means of communication (20)
  - It was often planned to be used for communication with actors at higher levels (10) who are not within range of the fall-back levels of the local radio network: with authorities in the state or rural district, for example.

- They mentioned difficulties at the same time (3): satellite telephony is very expensive to provide and comes with difficulties in actual use, as all participants must be located outdoors. Further, it requires the maintenance and availability of printed, up-to-date telephone lists.

**Good practice:** One rural district uses satellite terminals for more than just telephony. Instead, they are primarily used for text-linked communication between municipalities and the rural district based on the chat function they offer. The local emergency information points of the communities are also connected to this system. This communications mode has the advantage of automatically recording rudimentary documentation of the deployment activities.

- Alternatively, the respondents chose the use of **Starlink terminals** for providing communication (3). On the other hand, some respondents explicitly rejected this choice, as they had second thoughts about the security of both availability and the data, not least in terms of the headquarters and management of the company (2).

Many respondents also said that they had **built redundancy** into the communication channels (14). This is supported by the fact that most respondents indicated they have **multiple communications media** at the same time (26). The most frequent fall-back levels are:

- **Analogue radio** (14)

**Good practice:** To enable emergency calls to be made, one large city relies on the participation of the population as part of its “citizens’ emergency radio” in the form of a radio chain with walkie-talkies. Based on a defined channel that is monitored by the communications centres of the LESH, emergency reports could be “passed on” across the limited range of the walkie-talkies.

- **Messenger concepts** (15) that strongly vary in their formulation – between detailed advance planning of routes and times to the statement that in case of doubt and if all other fall-back

levels fail, workers could be despatched by car or bicycle. This is highly dependent on the respective regional authority: in very small communities, the footpath to the town hall would not necessarily need to be planned. However, larger cities and large-scale rural districts would have to plan more in advance.

- At the same time, these types of messenger concepts can be coupled to the transfer of analogue documentation formats (2)

**Good practice:** For communication with the population at designated bus stops, one large city uses city buses as points of contact that are assigned to the more comprehensive, stationary LESH. The buses can be used as a logistical communication channel at the same time, to transport files and materials between LESH and also provide an emergency route network between LESH. This concept couples LESH as points of contact for information to the provision of mobility and anchors them in more comprehensive crisis management at the same time.

- Analogue **cable networks** (copper and fibre-glass networks) or networks with a constant supply of electricity from an independent source (5)

**Good practice:** Copper cables and fibreglass networks can also be used for communication without a constant supply of electricity. In places where the expansion of fibreglass networks has progressed further, they can be used as a fall-back level. Copper cables can also be used this way: analogue telephone lines or fire alarm systems could be used by the relevant specialist teams. However, their operation would require an existing infrastructure and the associated specialists.

### • Roadside emergency phone (2)

**Good practice:** Two large cities reported concepts for using decentralised options for making emergency calls. In one case, it involved reactivating an older system of roadside emergency phones in the city district that enable emergency calls to be made independently via analogue lines. In the other case, the concept featured planned, buffered smart city columns that could be used for a bi-directional exchange of information alongside making emergency calls.

In very small communities in which LESH are in contact with the local administration, **direct communication** (“police, fire brigade, production plants are easily reached by foot/car”, I:26) was mentioned as a fall-back level.

**Good practice:** Via the positioning of directional radio antennas on the tallest urban buildings, one large city developed a means of establishing rudimentary W-LAN in the entire city district in an emergency. It can be used for operative text message communication. It also enables public access to a simple input screen on which emergency calls and needs can be entered. Documentation of the input is also possible.

A few respondents indicated that the means of communication in the various set-ups of their modular systems were different (3). Further, a few respondents said that communication with the LESH would not be safeguarded (3) or was not planned to be (1). Communication is basically possible here, but its accessibility, range and reliability are all limited.

### Linkage and control of LESH to and within the leadership structures of civil protection and crisis management

Alongside the question of how it will be possible to communicate, *with whom* the LESH should communicate was also discussed. Almost all participants provided information here (36). Linkage is typically established as part of the control

system of disaster management, such that linkage was mentioned as being

- direct to the **crisis team** (13); in one case also directly represented by a liaison there
- to the **(integrated) control centres** (15) or communications centres (information and communication systems) (3) for forwarding emergency calls
- in the **command department** of fire brigades (EL/TEL) (7)
- to the **higher-level political levels** (district, state) (14), usually however only indirectly via local crisis teams or heads of operation
- to **local political leadership** (local council, mayor, etc.) (7).

The question about horizontal communication reveals that communication from the LESH was often basically conceived of as vertical participation in PSAO radio. For example, around one-third of the respondents said that **LESH-to-LESH communication** was not planned (14), even if it is technically possible (7). There and at other LESH, communication is explicitly organised in the form of central coordination (9) or rather, star-shaped (4), even if communication with each other is possible.

However, horizontal communication among individual LESH is also part of the plans of the majority of respondents (24). In almost all cases, this would take place through participation in a common radio network (21) and in other cases (also) via messengers (6) or “analogue” (1). Coordination via radio is often a technical given whose use is not theoretically excluded but is typically not formulated at all or formulated in vague terms. The communication content, which has a recognisable focus, also shows this.

### 6.8.2 Communication content and information management at LESH

The interviewers asked whether any special information is collected and transmitted, and how it is subsequently handled (N=38+1; 39 responses).

4 respondents indicated that they do not collect information at LESH, although in each of these

cases it was emphasised that no information beyond the incidents relevant for reporting to PSAO was collected. 3 respondents provided no information. 32 respondents and datasets indicated that information is communicated to the following areas:

#### (1) Collection of situational information

- The respondents stated that, in addition to **emergency calls** (14), they reported **specific needs related to the efforts of the emergency services (PSAO) to manage the situation** (15), as well as **situational information** (13) for the creation of situation reports within the command organization. These reports may also include administrative matters, which become increasingly relevant in longer-term response efforts. Not least, LESH are also regarded as “interfaces to administrative functions” (I:35).

**Good practice:** As a municipal association with relatively low population density, one local authority planned to conduct scouting missions from the communities’ emergency contact and information points starting at alert level 3, in order to gather situational information and reach more remote local areas.

- A particular focus is also placed on collecting and forwarding situational information regarding the population – including **needs and requests for assistance** that go beyond the direct scope of PSAO activities (8), as well as **information on the psycho-social situation** (2).
- Information on the **operational status of the LESH** or other components of multi-level systems (5)
- **Safety information** (2)

#### (2) Issuance of situational information and recommendations for action

- The interviewers also asked about communication concepts. Only a few respondents explicitly said that the LESH would also be used to transmit information **to the population**. They mentioned: the available information

(display of informational material (2), issuance of recommendations for action (1)) and conditional issuance of situational information (4). In addition, warnings and information via mobile alerting units and loudspeaker announcements were reported (one mention each).

**Obstacle:** One small community that set up an LESH on its own initiative complained that network operators and control centres do not ensure that they are alerted in the event of a power failure and receive information on their involvement and the extent of the damage.

#### (3) Information on self-organisation and coordination by citizens

- Collection of information on local self-organisation (8)
  - For example, through notices, bulletin boards, FAQ compilations, etc.

#### (4) Situation-specific information management

- Some respondents indicated that they designed the communication according to the situation (3), which can be due to the lack of a plan (1 of 2) or upon the request of the specialist staff (1).

In this answer, it is possible to detect the various patterns of viewing LESH (*Figure 16*), which are reflected in the respective communication-related plan: LESH that are strongly affiliated with the managing organisation of PSAO, recruit personnel from them for staffing and basically are understood to be the “eyes and ears of the crisis team” (I:27, I:18), a “dynamic extension of the ‘team for exceptional occurrences’” (I:18), serving the needs of disaster management in higher-level, coordinating regional authorities or administrative levels in particular. It cannot be ruled out that locally, in individual LESH, needs can also be coordinated, and situational information collected. They would, however, forward this to the higher-level control centres tasked with situational control. Further, they could issue situational information but plans for them seldom included the role of coordination of self-help.



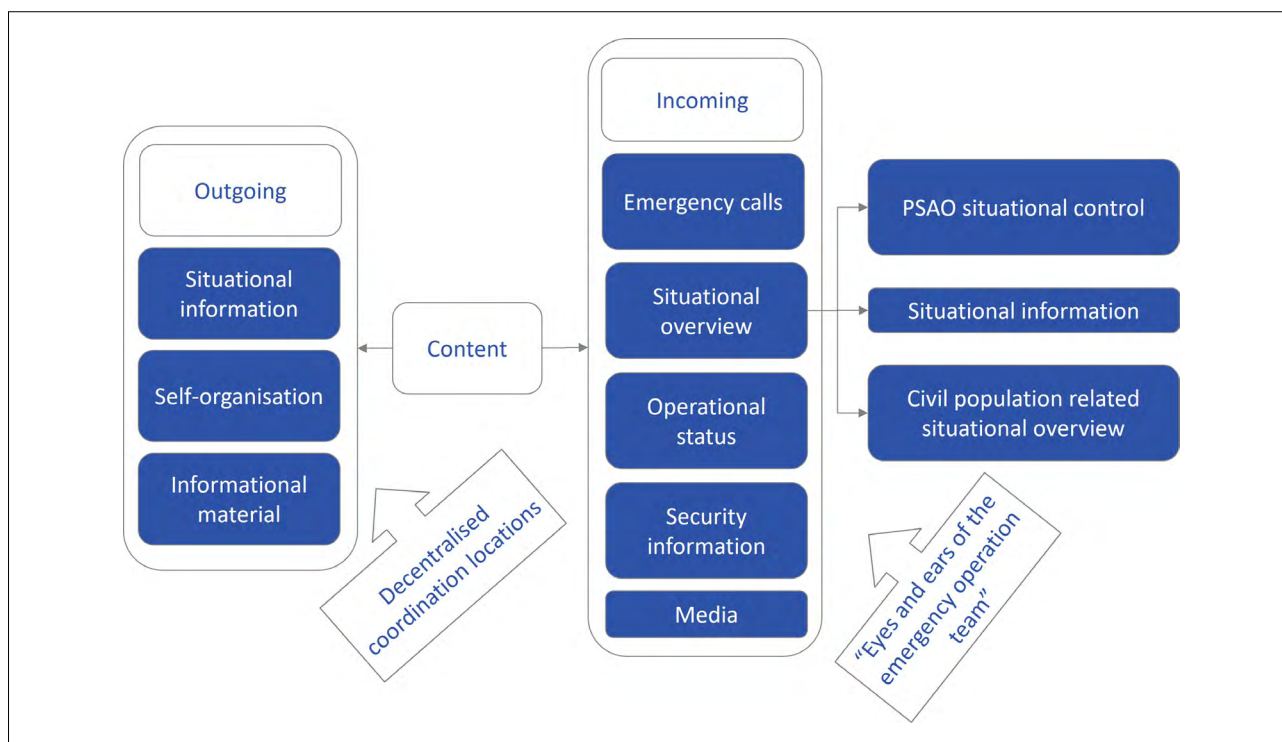


Figure 16: Type of information communicated in and to LESH

On the other hand, there are LESH facilities that are organised to be more decentralised and autonomous. In addition to reporting their own operational needs, they also report general needs of the civilian population to administrative staff – and, if necessary, forward these to PSAO or operational command units, provided that such needs cannot be met through on-site coordination of relief efforts or by local resources. These facilities sometimes explicitly describe themselves as “not the eyes and ears of the command team” (I:6), yet they remain embedded within civil protection structures. In such cases, however, the importance of “two-way communication” (I:5) is emphasised.

**Good practice:** One large city integrated actors into requests for help and the coordination of support offerings into drills with the LESH system as well.

These types occur in varying degrees and mixed forms, with many specifically local approaches – often based on local cooperation – influencing which information is considered relevant and available within their overlaps.

### 6.8.3 Communication to the public

The interviewers asked if and how the respondents ensure that LESH are known and established on site (N=38+8; 46 responses). The respondents were also asked if specific distinctive features and signage are used (N= 38+2; 40 responses). In this context, they were also asked if they were familiar with the icons and symbols developed by the BLoAG KatS-L (→ Table 1) (N=38; 34 responses).

Most of the respondents indicated that they ensured awareness of the LESH by means of **communication to the public** (30 respondents plus 8 researched datasets that were part of this communication themselves). They mentioned multiple different formats for communication to the public (Figure 17):

- Providing information on the **internet** (24) on the websites of the respective regional authorities or in an app run by a regional authority (2). GIS applications on the position of the LESH (6) were also used.



- The distribution of **flyers** (direct mail) with information on the LESH – which are also often available online (20) – as well as their display at public events (4) or in display cases (1).

**Good practice:** A city in an administrative district deposited its information on its local emergency information points on a dedicated page of the annual waste disposal calendar. This ensured that the key information would be regularly published and available in all households in the city – in a format that was repeatedly viewed all year long.

- Publications in the **classic media** (press, radio, television) (18); also regularly published (3).

**Good practice:** In the course of developing its concept for LESH, one large city produced a film with the aims of presenting the functioning and citizen-orientated staffing of LESH. It was used for an application to the European Capital of Democracy (ECOD) calls for entries and can be further used for the public relations work as planning progresses.

- Communication and announcement in **social media** (11)
- **Public events** (7) and information days (2)

The majority of respondents listed multiple formats (20) that could be combined with each other. In some cases, these publications were integrated into larger informational campaigns on LESH (6) or were part of longer-term communications concepts in disaster management (6) which, as a rule, carry out communication to the public and risk communication beyond the power failure scenario at schools (4), for example.

**Good practice:** One rural district commissioned a research project with a university on public communication in disaster management, long-term risk communication, and the integration of the general population and spontaneous volunteers. The project included the development of communication strategies that explicitly addressed LESH. The resulting measures were partly implemented with the support of an advertising agency.

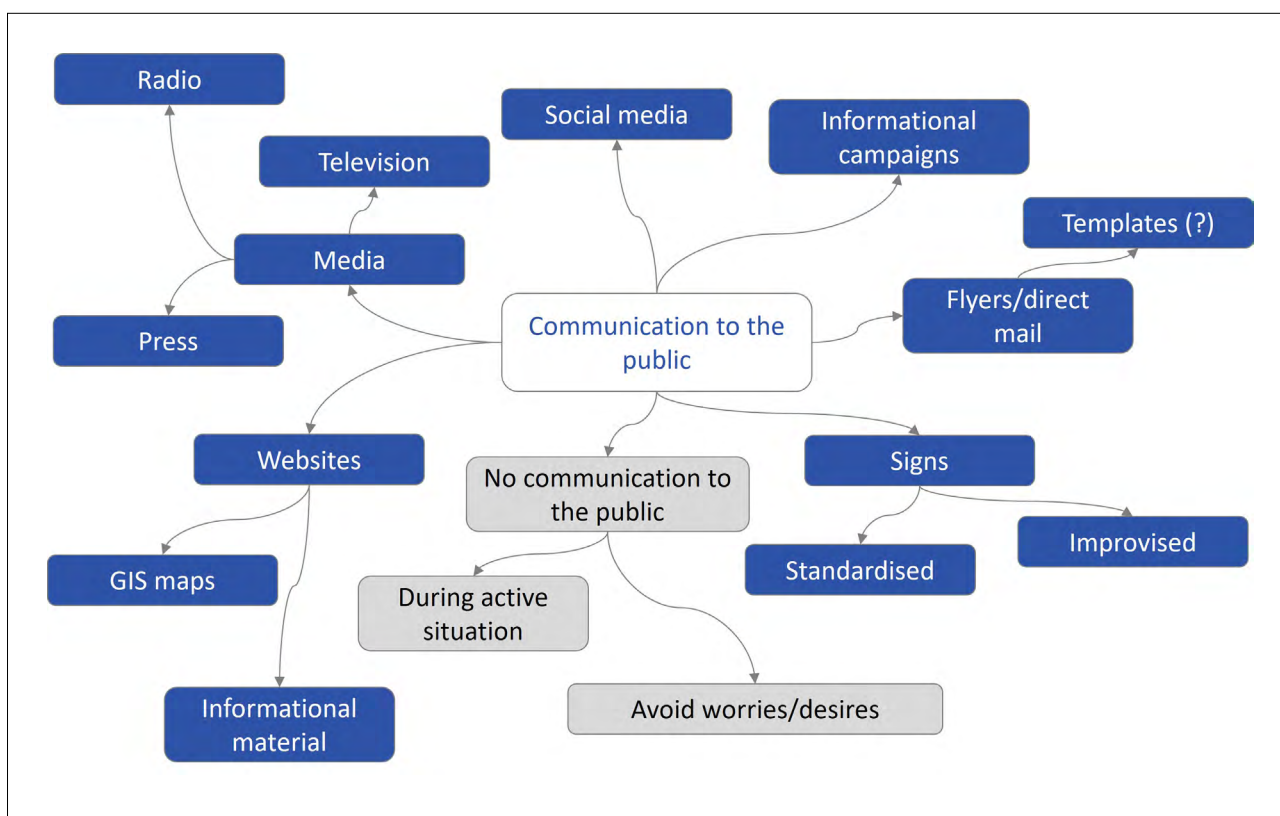


Figure 17: Forms of communication to the public.

Conversely, some respondents emphasised that they deliberately communicated sparingly and with caution (2) and avoided using media formats (1). They intended to communicate the locations and services of LESH (or other components of modular systems) only once they were in actual use (4) – or not at all (1). The goal was to avoid “raising expectations and feelings of entitlement among the public” (I:13), “fueling anxiety,” or being perceived as “alarmist” (I:1; I:37).

**Challenge:** Some respondents apply some effort into safeguarding LESH against excessively large crowds or exaggerated support or care concerns – in advance and also in the event of use. From cooperating with security services and having self-defence equipment on hand to maintaining preventive secrecy around the locations of LESH, this study also pinpoints the concern of respondents around a potentially aggressive population that is extremely needy at the same time and in any event must be managed. In any case, the authority dealing with the needs has no choice but to protect itself against the population.

The literature agrees that these expectations are not based on experience and in the worst case, this type of behaviour – performative safeguarding against the public – can generate such behaviour in the population in the first place (cf. → *Sect. 2*).

Some respondents were not far enough along in planning to consider public relations (4), other authorities transferred the responsibility for communication to the operators (3) or were not responsible (1). One person indicated that financial difficulties were an obstacle to public relations.

**Challenge:** In cross-level collaboration in particular, offerings and concepts could lose their momentum: One rural district that developed and offered a template for a locally adaptable flyer concept complained that the municipalities did not use it.

In contrast, somewhat more than half of the respondents said that they **identified the LESH as such in the event of an incident** (23). In particular, they mentioned:

- Signs (10), in some cases also for directions to the LESH (4); in other cases directions were excluded from consideration (2).
  - Permanent signage was only present in a few cases (4)
- Sandwich boards (6)
- Banners (4), e.g., put up on a construction fence (2)
- Beach flags (4)

In some cases, the identification showed specific icons (7) and symbols (1). The responses around forms of identification were equally distributed among respondents or their departments who **developed their own** (6) or were coordinated or specified by higher levels (6).

In some cases, the lack of identification in the situation (17) was explained by the fact that the respective properties already served as “organic” points of contact (3). Others limited this by indicating that the city could produce corresponding identifying features (also signs) if the situation called for them (6).

Several respondents explicitly expressed the wish for a template or guideline from higher-level authorities regarding marking and directional signage (6). In parallel with the survey, the BLoAG KatS-L developed the corresponding templates (→ *Sect. 3*).

Some respondents (10) indicated that they were aware of this process. Further, some respondents remarked that they desired or expected this type of uniformity (3) and they also wished for more active communication of this and were interested in receiving the templates (3). In isolated cases, respondents were also sceptical with regard to the benefits and design of the template (2). One respondent was unable to wait until the templates were published.

## 6.9 The role of LESH in warning the population

As a process, warning the population is at the interface between risk communication and situational crisis communication and similarly to the communication around power failures, is tied to longer-term preparation and raising awareness (→ Sect. 3.3). To warn effectively, the recommendation is to develop local warning concepts that take local groups of stakeholders and needs profiles, as well as specific vulnerability factors, into consideration (Schopp et al., 2024). Linkage of LESH into an integrated local warning concept is also a consideration on the part of the literature.

The interviewers asked whether the regional authorities of the respondent had created a local warning concept (N=38; 38 responses). Next, the respondents were asked whether the LESH played a role in this concept and if so, which one (N=38; 36 responses). The respondents were also asked if warning and communication are practised (drills held) (N=38; 37 responses).

A large proportion of respondents indicated that a local warning concept is available to them (27). Often, however, they only described the existence of certain **warning systems or devices**. From the viewpoint of the authors, this does not really correspond to a warning concept. The principal means of warning were:

- Sirens (29)
- MoWaS access (22)
- Mobile warning systems (17)
  - Plans for warning districts and warning routes (3) were rarely mentioned

In isolated cases, the respondents also mentioned:

- Digital information boards (4)
- A dedicated app (3)
- Darksites for the provision of disaster-related information (2)
- Face-to-face warning (1) (“going from door to door”, I:36)

**Good practice:** Different cities use the digital display panels of municipal transportation companies and city administrations for warning and sharing information with the population. They are already distributed throughout the city, can be centrally controlled and are located at well-frequented places. If they can be safeguarded against power failures, they represent a good option for the broad dissemination of information.

Although only a few respondents explicitly mentioned using a warning mixture (3), a majority of respondents reported at least two different warning modalities (26). In some cases, setting up a warning system is still in progress (7) or in the design phase (4). For example, in many municipalities the siren network is currently being restored, expanded or converted (from analogue to digital sirens).

Beyond mentioning warning systems, only a few respondents mentioned the **explicit planning elements** of a comprehensive warning concept. For example, warning tests were prepared for specific scenarios (4), acoustic audits were carried out for the siren warning system (1) or a general warning and alert plan was mentioned (3). Two respondents referred to a state-wide warning concept (2).

**Good practice:** In collaboration with local churches, one large city reactivated an old warning system and re-established “ringing the alarm” with church bells.

2 respondents indicated that they were not responsible for the warning process.

Insofar as the responses to the warning concept question primarily referred to the use of warning systems in acute warning situations, the responses also referred to integrating LESH into warning plans for this acute phase of the warning process. Therefore, while more than half of the respondents indicated that they play a role (22), this role is typically limited to **listing (or being able to list) the locations of LESH in the warning message** (17).

Beyond this, isolated responses mentioned elements of a type of integration that also designate the LESH as warning systems (3) (“passive warning system” I:27): for example, in the form of the **display of warning messages** (2) or warning texts (2) on site. It was also remarked that through their function in the warning chain of the LESH, information from the LESH is also fed into the warning system (2).

**Good practice:** One large city planned that its LESH would be an active link in the warning mix for the power failure plan. In the advance planning, each LESH was assigned to its own warning district and tasked with feeding relevant information to and despatching a mobile warning system from there.

4 respondents explicitly stated that warning followed a separate, independent concept.

The majority of respondents indicated that they had organised some form of drill for warning and communication in the LESH (general):

- Many times in the context of National Warning Day (20)
- Or otherwise at regular intervals (10)
- “Yes” (3)

An explicit reference to communication above and beyond warning was rarely included (2). In fact, sometimes the respondents emphasised that these drills take place independently of the concept of LESH (3).

Further, some regional authorities were not yet in a practice-capable stage of warning process planning but planned to conduct drills (8).

According to the information derived from the literature and the Berlin Model project in particular, it makes sense to link the LESH and local warning systems in two respects in particular:

- On the one hand, as a replacement structure for disseminating warning-relevant information in the event of an acute failure of other warning infrastructure.

- On the other hand, as an institution involved in the longer-term, constant local efforts to increase resilience and capable of supporting the vulnerability-related networking of specific needs groups on site, co-creating concepts for needs-specific and if necessary, authority-independent, warning and engaging in long-term risk communication.

There are virtually no forms of coupling LESH and local warning systems and planning above and beyond the display of warning texts occasionally planned in advance, which is not least explained by the lack of permanent anchoring of LESH on site. After all, the respondents to the survey reported a lack of permanent anchoring of LESH on site and lack of permanent operation of LESH in the sense of a higher-level resilience concept.

## 6.10 Beneficial factors, obstacles, wishes and tips

At many points in the course of the interviews, the respondents were asked to mention beneficial, helpful and supportive factors along with obstacles, hurdles and needs for support.

Although the authors attempted to examine these issues separately in terms of specific topics (planning, equipment and implementation, linkage and cooperations, general recommendations) and differentiate between obstacles and factors of success, the responses did not support separate examination. Under all of these topics, similar themes and often higher-level themes were addressed. In the key topics, success factors can naturally be obstacles at the same time if they are not present. Consequently, correcting this deficiency is simultaneously formulated as a need and a recommendation. As a result, the presentation is based on a thematic structure and describes the success factors and obstacles to success wherever they can be detailed more specifically.

In this case, frequencies of mention would be mapped from a stack of multiple different question contexts and a count of frequencies of mention would create some distortions: themes were often mentioned by the same respondent in the

context of different questions around beneficial factors, obstacles and tips. For this reason, focal areas were identified but not quantified. They are illustrated by examples (wherever possible) in order to point out possible characteristics of the themes.

### Expertise and knowledge

Setting up LESH was a great challenge for many of those involved in planning as there is a lack of relevant knowledge, be it in general with regard to disaster management or in particular with regard to the concept for LESH and the planning of comparable concepts. **Relevant knowledge and specialist expertise** were therefore mentioned by the majority of respondents as a key success factor in planning and implementing LESH – accordingly, the absence of it was described as an obstacle.

General experience and basic knowledge of processes, structures and issues were emphasised as success factors which primarily were obtained from:

- Own **experience in disaster management** – although this was unevenly distributed (→ Sect. 6.2)
- Existing **portfolios of plans** and disaster management plans
- The **involvement of emergency response organisations** or specialists from disaster management

It was possible to productively fall back on existing scenario definitions and advance planning of situation with related themes (gas/energy shortage), as well as on recent experiences in crisis management (pandemic, floods, refugees).

“It helped that all PSAO (above all, volunteer fire brigades) and aid organisations were involved and a major consensus on the necessity prevailed”. (I:2)

“There, specialist expertise was a central help”. (I:32)

Further, different materials were leveraged as useful bases for planning and preparatory aids in

developing the concept for the respondents’ own plans for LESH. Insofar as they were not provided by the respective higher administrative level, the respondents discovered them in the course of research:

- Literature on the **basic concept from the Berlin Model project**
- **Concepts of other federal states and regional authorities**, but also from other European countries.
  - These included general recommendations, plans of action and alert and checklists
- **BBK publications** (for example on integrated risk analysis) and in isolated cases, publications of other institutions (TAB reports, LÜKEX 2004 evaluation)
- Acquiring and generating expertise in **research cooperations** (in a few cases)

These materials were used as a means of “getting **inspiration from others**” (I:16) in terms of themes, issues and structural templates for concepts.

In the regional authorities in which planning and implementation of concepts for LESH was not the responsibility of dedicated specialist departments in disaster management and consequently, the relevant expertise had not already been firmly anchored in the planning authority, the **need for opportunities to receive relevant information and further training** or similar educational offerings was emphasised. This wish included everything from the detailed concept development of LESH to general educational, training and practise offerings in disaster management.

### Requirements and recommendations

In order to overcome the initial planning hurdles that arise in situations of little relevant planning experience, many of the respondents stated their desire for a **handout** as a blueprint with **more detailed support**, including standards, scenarios, drill concepts and comparable offerings. The respondents viewed this as lightening the **burden of planning** and the opportunity to use experience and ideas from existing plans through the provision of **concept designs or modules**.



“Left very alone in the concept development phase; all assistance very general. Everyone in the country is developing their own plan, even basic coordination is lacking”. (I:7)

The need for **control and coordination by higher-level authorities** was mentioned just as frequently, in particular with regard to enabling **standardisation and comparability** (and the opportunities of centralised, coordinated procurement) – also by respondents with experience in planning. Multiple respondents described this as not only being practical from a planning perspective, but also as providing orientation support for citizens and avoiding envy or rapacity due to unequal supply situations in an emergency.

“Coordination of the various communities would be desirable (we were ‘sailing the seven seas without a captain’). (I:31)

“Almost 100 municipal administrations in the country must grapple with the theme because there are no central handouts/requirements”. (I:3)

While various administrations that were generally tasked with planning only wished for detailed templates and requirements, in those regional authorities where requirements and standards were defined, the respondents indicated that they were helpful.

At the same time, there were also representatives of higher-level administrations in the sample whose offerings in the form of templates and samples were not received well. They complained about the lack of verifiability and enforceability of the requirements.

With regard to the desired **binding character** of the requirements and also with regard to the associated obligation of **cost absorption**, several respondents also expressed the need for **legally binding decrees** by the respective federal states.

“A decree would naturally make a difference in terms of financial responsibility”. (I:2)

The interviews also emphasised that such requirements or decrees – and their specific provisions – should not restrict the **possibility of locally adapted implementation**, taking into account local particularities and conditions.

“Balancing act between an implementation standardised to the greatest extent possible and preservation of flexibility corresponding to local needs and prerequisites”. (B:1)

### Exchange of information and networking

Perpendicular to the thematic lines of standardisation, coordination and the need for expertise, **exchange and networking** were often mentioned – within the respective administration and regional authority and beyond them, and as both beneficial/success factors and needs/aims.

An **exchange among all departments and sectors of the authorities and administrations, the private economy and civil society** would ensure internally that the relevant contact persons have already been able to develop a **relationship of trust** among themselves and that reciprocal **needs and competences are known**. The saying “In times of crisis, know minds” was also brought up in this context (crises can only be managed by a set of actors who know what (abilities) the others contribute and ideally have practised their actions together).

“High level of willingness to cooperate in the kick-off event of the authority: town hall meeting with all PSAO/aid organisations (volunteer fire brigade/federal and state police) and contacts to churches and city administration”. (I:2)



More specifically, exchange was positively highlighted and recommended with:

- **Heads of office and departments:** Property administration, statistics offices, procurement administration, crisis teams
- **Municipal businesses:** Building yards, waterworks
- **CI operators**
- **PSAO**
- **Stakeholders from civil society:** churches, firms, agriculture

“High level of willingness to collaborate on the part of property administration and those responsible for buildings”. (I:12)

Further, the exchange with **neighbouring regional authorities** and **across administrative level** was often described as being supportive. Here, the positive effects of an integrated approach to disaster management were tangible.

“Established practice of interdisciplinary thinking in administration and civil protection: the activities as part of integrated risk and crisis management have already led to good mutual knowledge gained from task forces and cooperations that are used to collaboration”. (I:12)

Sometimes **difficulties in exchange** were reported: for example, due to **conflicts around areas of competence**, differences in **organisational culture** or the conflicting **economic interests** of actors from the private economy.

“The fire brigade is not used to someone from administration ‘taking away’ responsibility for certain themes. This is a situation that requires lots of diplomacy”. (I:30)

Overall, however, comprehensive integration and networking were deemed productive and an enrichment.

“Strong networks, local firms, farmers, every building in the town has something that might be useful – it’s all about give and take”. (I:36)

This is why many respondents recommended (and existing efforts also reported) **developing networks** and actively **establishing and maintaining contacts**. To do this, formats like **coordination meetings, task forces, mayoral staff meetings, town halls** and **expert symposia** were suggested. The respondents also described joint test operations for developing joint practical experience.

“The state-wide or higher level coordination of the theme in the form of a symposium has already been considered”. (I:7)

This could encourage **knowledge transfers** and **standardisation** and would also facilitate the formation of **alliances** for the political positioning of concerns.

### Political backing

“Leading minds who are highly committed to a theme”. (I:18)

“Prioritisation of the theme on the part of the mayor and a high level of commitment in the core administration”. (I:12)

A central element that has an impact on the capacity to plan and successfully implement LESH is the **presence** and also the **absence of political backing**. The respondents emphasised frequently that success in planning could also be traced to the strong prioritisation of the theme on the part of political leaders – or at least their support. This was expressed in the corresponding intention to allocate the necessary resources (personnel, financial, property) and in willingness to provide space, and an audience and emphasis for the theme – or their respective lack.

“Resources are available only where the political will is committed”. (I:27)

On the other hand, respondents complained that the political topicality of the theme (in the wake of an impending energy shortage) did not last longer than the duration of the planning and implementation phases: the urgency with which the

theme was driven forward at the beginning diminished just as quickly.

“‘Disaster dementia’: demands like ‘We have no choice but to do this’ are quickly forgotten and afterwards, the financial expenditure is called into question”. (I:10)

This is why some respondents recommended sustainably motivating the relevant **persons responsible** early on and with detailed explanations of the far-reaching risks of a long-term power failure. At the same time (in contradiction to the suggestion of early involvement), the recommendation was also made to enable the simple integration into political decision-making processes by presenting calculations and cost breakdowns that are as detailed as possible.

Another, more general, recommendation was to locate disaster management close to the political decision-makers (who are also responsible for it in an emergency as the ultimate instance).

“A detailed draft of the risk analysis is persuasive in the political setting”. (I:27)

“Directly inform policy-makers (local councils, city councils) and inspire them. The project must have their backing”. (I:29)

### Resources

Alongside the intention to allocate resources, their basic availability is of course one of the main conditions for the success or failure of political plans. While expertise, networking and political backing could also be understood as resources in the planning process, the scope of planning capability and its implementation depend to a great extent on which financial means they can be supported by.

“The municipality is financially healthy and was able to provide good options for implementation”. (I:22)

Accordingly, where it was present, the **good financial health** of the planning administrations and departments – which also reflects the corresponding personnel configuration and in turn,

access to specialist competence – was also mentioned as a **key factor of success** that opened up ample room for manoeuvre for needs-based planning.

However, the respondents more often emphasised that a **lack of financial options** considerably **limited planning**. Consequently, the need for **financial support** options from higher levels was emphasised here. In tight budget situations in particular, the argumentation in favour of **expensive purchases** (like emergency power systems and feed-in equipment) as preventive action is not likely to be persuasive. Further, the high **provision costs** of systems for satellite telephony are an obstacle to providing the basic functions of LESH as well.

“The conversion of old buildings for emergency power is prohibitively expensive”. (I:9)

And above and beyond financial health, the resource situation in terms of the infrastructure is also fundamental for planning-related options. The **infrastructure** of disaster management, including **property, emergency vehicles and logistics centres** and not least the heating infrastructure, can also have a decisive influence on room for manoeuvre in planning.

Many respondents focussed on this, based on the availability of **properties** that could fulfil the suitability criteria for LESH (safeguarded emergency power/feed-in capability, accessible, available, etc.), they often recommended the use of **municipal facilities**, as access could at least be ensured. Expanding on them, the **functional scope and offering could be defined**, also **with regard to the rooms and circumstances present there**. Details like heating capability through connection to an external heating system (in cases that include plans for shelter) must also be considered. In the sense of **integrated risk planning**, **in the longer term** how these **prerequisites** can be **successively established** must be considered.

“Build/call for tenders for new properties in the city such that emergency power supply is possible”. (I:9)

Desirable offerings like **barrier-free or low-barrier accessibility to properties with safeguarded emergency power** can strain the resources of even financially healthier regional authorities. Resource problems overlap here and make it virtually impossible to include desirable services and planning objectives. Planning access to properties also requires advance planning.

Key concepts that enable access to the designated properties are required in order to ensure a rapid transition to operational status. They must set up rules as to how the personnel deployed on site can get the key or gain access through other, known responsible persons.

Other infrastructural circumstances such as the untested fail-safe state of the communication infrastructure present individual planners with uncertainty in terms of the necessity of planning steps.

Obsolete, analogue communications equipment could become useful infrastructure in the event of a power failure: places where the conversion and removal of analogue telecommunications and radio structures has not progressed far could use these old structures. Existing analogue radio equipment, copper cables and siren systems that have not yet been removed are ideal for the advance planning of redundant communication. In this sense, when planning properties for LESH and communication in and out of them, whether old infrastructure might be useful should also be considered.

Although frequently expressed advice for avoiding expensive initial purchase costs involves the **multiple use of existing infrastructure and emergency materials**, this assumes that they are already on hand. Against this background, considerations around **not using fire brigade depots for the maintenance of basic protection as LESH** could be unnecessary if no other available buildings that can be safeguarded for emergency power are on hand.

“Sidestepping fire brigade depots is a challenge”. (I:20)

In this sense, many respondents also recommend keeping the **tasks and objectives of LESH realistic**: for example, procurement costs are not the only expenditures to consider. **Follow-up costs like provision, operating and personnel costs must be included in the calculation** and critically measured against the actual options. While sell-offs at major construction sites, for example, and other bargains can be an option for saving money, the desire for a standardised structure for LESH contradicts the wisdom of acting on this option.

Defining **minimum and core tasks** can provide a basis to which tasks can still be flexibly coupled in any given situation. If necessary, this could also follow minimal approaches and workarounds: entire buildings do not need to be safeguarded by an emergency power system if portable generators for individual device cabinets or trolleys with minimal equipment are operated. Locally specific improvisation, however, can hardly be considered general recommendations.

Producing signage for large numbers of buildings and permanently attaching them can be expensive and difficult to plan. However, LESH can be identified for little money and produced with the help of existing materials. Partitions, poster displays and pre-printed posters can also be created for very little money, and banners on fences require only low-threshold development if the funds for more complex forms of identification are not available.

Another recommendation involved **ensuring the usability** of the materials provided: either by training staff accordingly or by using **known, established technologies** that can be used by everyone involved.

“Don’t build castles in the air, but instead plan what is feasible: when the facility is up and running, that’s a feat of strength!”. (I:5)

“Overloading with tasks is an obstacle: no heating or care, no charging mobile telephones, etc. These needs have no chance of being met by the operational units”. (I:14)

Not least, safeguarding the staffing (and in turn, operation) of LESH can prove to be a resource problem in small administrations in a state of weak financial health. If available persons who can be deployed are lacking (even if this were possible via a service obligation), this can call the planning stability of maintaining the LESH into question.

### Population & communication

From the perspective of the basic concept and the related literature, one option for dealing with limited human resources is the **structural integration of volunteers** on site for the supervision of the components of the LESH system that are focussed on information and communication.

Due to a strong orientation towards linkage to operational leadership in civil protection, the respondents said this option was **only part of the plan in individual cases**. Although in the interviews, the **integration of volunteer workers** was more often described as a significant relief and option for local involvement in existing structures, the descriptions focussed on volunteer work in the **emergency response organisations**. Where the integration of volunteer helpers was described (→ Sect. 6.4), this was usually not explicitly categorised as a success factor or an obstacle, despite positive experiences in the initial (minimal) practice and drill situations.

Only isolated respondents recommended the acute involvement of volunteers and spontaneous volunteers in emergency deployment. They recommended **advance registration** using a corresponding app. One respondent, however, suggested **scheduling them via the specialist staff** using offers of help collected on forms. However, this undermines the decentralised approach of

self-support. Not least, this is traceable to the location of planning in operational civil defence.

Yet in multiple cases, volunteers and spontaneous volunteers, as well as those affected with concerns around information or care, were explicitly understood **as an extra burden** in a personnel situation and on processing capacity that was strained anyway. The population was viewed as a supporting factor particularly when it did not use LESH due to its **independent self-help capability**. For this reason, establishing self-sufficiency should also be the aim of long-term risk communication.

“The population expects emergency provisioning from LESH, but the population must do this itself. In turn, someone must explain this to the people”. (I:18)

### Planning procedures and general tips

As general information for the planning process, respondents frequently pointed out that the determination of the scope of the plan should be based on a **needs analysis** (including the vulnerable groups and needs of the municipalities) and a **definition of the protection targets**. Insofar as this tip is also transferable to overall civil protection, this recommendation is linked to the tip that planning for LESH should be **affiliated with a more comprehensive, systematic planning concept**.

“Foundation derived from needs planning for disaster management”. (I:12)

At the same time, the respondents recommended planners to keep in mind that the complexity of the scenario should not prevent them from **starting**. By separating the task into different **levels or modules**, a **basic level** can be set up even before planning and procurement are completed and then it can be **continuously supplemented**. This way, a “large-scale” planning approach can avoid never being completed due to its complexity, scope or the duration of the procurement process. Further, this type of planning has the advantage that it can be openly applied in other scenarios.

“The important thing is to view the planning-related preparation for power failure and therefore, also the implementation, setup and start-up of local emergency support hubs as a dynamic process. The dependencies among the different planning focuses are very large, particularly for blackout planning. The solutions can mesh gradually and thus lead to resilience and preparedness”. (B:2)

This type of approach also allows inconsistencies, gaps in the plan or problems in its practical implementation to be identified more quickly. After all, based on their experience the respondents explicitly addressed **details** like **stockpiling** to care for the staff and pointed out that – particularly for foreseeable problems in the resource situation around civil protection and the range of LESH – how to deal with the “**ugly**” **details** of the scenario (for example, the logistics of large numbers of corpses) must be specified, but the specific problems on site can only be solved in detail through practical tests and **drills**.

#### 6.10.1 Obstacles and failure – a vignette

In an interview with a disaster management professional from a larger regional authority, some **arguments against implementing** LESH were expressed.

According to the respondent, there were initial thoughts about setting up local emergency information points, which were not pursued further because the **financial resources were not deposited**. The reasons for this, in the opinion of the respondent, were a **lack of political intention** and in turn, a **lack of resources**. Despite an existing cooperation with aid organisations, the implementation of an emergency response centre was also stopped for financial reasons. There is, however, a **recurring local scenario** that is handled very well overall, because it is familiar and technically easy to manage. However, it **seems difficult to introduce other themes or rather, scenarios** for which the regional authority is not as well-positioned. Concerning this matter, there is a wide gap between the self-assessment of the politically responsible persons and the realisation of possible other foreseeable dangers

like a longer-term power failure. The respondent perceives this as “lethargy” with the attitude “**Things won’t get that bad**”.

The respondent also addressed the dilemma that generally goes hand in hand with prevention: it costs money, is not politically appealing and if nothing happens, the pressure to justify the project is high. Accordingly, neither money for the implementation of local emergency information points nor personnel was made available. As the respondent described the situation, not only is the **responsible authority poorly positioned in terms of staffing**, but in some cases the **numerical ratio of responsible disaster management professionals to the population is absolutely too low** as well. Many special and additional tasks are expected to be handled alongside day-to-day operations and are not assigned to dedicated positions. Alongside a lack of political intention and resources, the respondent also indicated that in terms of the power failure theme or rather, local emergency information points overall, there were **too few specific orientation options**. A “collection” of ideas from other federal states was accessible, but **a detailed general process was lacking**.

From the viewpoint of the respondent, it would be helpful if the government applied more pressure by issuing comments and briefs at the federal level, supplemented by BBK products that contained clear recommendations and process descriptions that the disaster management professionals on site could reference.

## 7 Recommendations

In the following, recommendations broken down by specific themes are derived from the results of the interview study. They are developed from the

- explicitly stated recommendations of the respondents,
- overview of the survey data of the total sample
- and were supplemented by the bases sourced from literature and research.

Thus, a mixture of specific actors' perspectives and the overview of the research perspectives are present in this report. The recommendations were broken down in terms of their respective addressees, as not all recommendations can be equally applied in the various contexts in which LESH are implemented.

Some recommendations are so general that they could be designated cross-theme and -addressee. They were stated as general recommendations by respondents and from the viewpoint of the authors, must be underscored. They are presented at the beginning. The thematic organisation of the structure, which was also used in the presentation of the findings, follows.



## 7.1 Cross-thematic recommendations

| Theme                                     | Recommendation                                                                                                                                                                                            | Possible Obstacles                                                                                                | Opportunities                                                                                                                                                                                                                                                  |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Linkage</b>                            | <ul style="list-style-type: none"> <li>• Link LESH to more comprehensive disaster management plan</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>• Delay establishment if no disaster management plan is present</li> </ul> | <ul style="list-style-type: none"> <li>• Use of existing infrastructure &amp; competence</li> <li>• Avoid special costs</li> <li>• Overall increase in people-orientation in disaster management</li> </ul>                                                    |
|                                           | <ul style="list-style-type: none"> <li>• Anchor overall civil protection close to political leadership</li> </ul>                                                                                         |                                                                                                                   | <ul style="list-style-type: none"> <li>• Raise awareness of the theme among decision-makers</li> <li>• Simplify support</li> </ul>                                                                                                                             |
| <b>Integration</b>                        | <ul style="list-style-type: none"> <li>• Integrate all participants and relevant actors</li> <li>• Involve the population</li> <li>• Integrate competencies where already present</li> </ul>              | <ul style="list-style-type: none"> <li>• Coordination effort</li> </ul>                                           | <ul style="list-style-type: none"> <li>• Joint understanding of objective and situation</li> <li>• Use diverse capacity and expertise</li> <li>• Use local knowledge and abilities of population</li> </ul>                                                    |
| <b>Training</b>                           | <ul style="list-style-type: none"> <li>• Qualify staff for specific tasks</li> </ul>                                                                                                                      | <ul style="list-style-type: none"> <li>• Costs</li> <li>• Effort</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Establish handling security</li> </ul>                                                                                                                                                                                |
| <b>Communication and coordination</b>     | <ul style="list-style-type: none"> <li>• Coordination with others in comparable situation</li> </ul>                                                                                                      | <ul style="list-style-type: none"> <li>• Coordination effort</li> </ul>                                           | <ul style="list-style-type: none"> <li>• Exchange of experience</li> <li>• Option for cooperation</li> </ul>                                                                                                                                                   |
|                                           | <ul style="list-style-type: none"> <li>• Maintain regular communication with all participants – also involved groups of citizens (e.g., in clubs, associations, town halls/roundtables)</li> </ul>        |                                                                                                                   | <ul style="list-style-type: none"> <li>• Joint understanding of objective and situation</li> <li>• Strengthen involvement</li> </ul>                                                                                                                           |
| <b>Scenario openness and multiple use</b> | <ul style="list-style-type: none"> <li>• Consider scenario openness</li> <li>• Use of existing resources (materials, personnel, planning, etc.)</li> <li>• Consider multiple use for purchases</li> </ul> | <ul style="list-style-type: none"> <li>• Tense budget and personnel situation/lack of resources</li> </ul>        | <ul style="list-style-type: none"> <li>• Conservation of resources</li> <li>• Avoid scenario-specific procurement costs</li> <li>• Linkage to other crisis management structures</li> <li>• Promotion of integrated planning in disaster management</li> </ul> |
|                                           | <ul style="list-style-type: none"> <li>• Define priority deployment scenario</li> </ul>                                                                                                                   |                                                                                                                   | <ul style="list-style-type: none"> <li>• Avoid “cannibalisation”</li> <li>• Clarify use of resources for overlapping deployment scenarios</li> </ul>                                                                                                           |

| Theme                        | Recommendation                                                                                                                                       | Possible Obstacles                                                                                                                                | Opportunities                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Drills and reflection</b> | <ul style="list-style-type: none"> <li>• Practise processes, sequences and scenarios</li> <li>• Reflect on and evaluate drills/deployment</li> </ul> | <ul style="list-style-type: none"> <li>• Effort</li> <li>• Costs</li> <li>• Realistic drill (“cut off electricity” hardly practicable)</li> </ul> | <ul style="list-style-type: none"> <li>• Find gaps in plan</li> <li>• Establish handling security/develop routines</li> </ul> |
| <b>Checklists</b>            | • Create checklists for all key processes                                                                                                            |                                                                                                                                                   | • Reduce error rate under stress and in unusual situations                                                                    |
|                              | • Make current, printed plan available                                                                                                               |                                                                                                                                                   | • Viewing of plan independent of electricity supply                                                                           |
| <b>Start</b>                 | <ul style="list-style-type: none"> <li>• Do not “over plan”</li> <li>• Start with what is present</li> </ul>                                         | <ul style="list-style-type: none"> <li>• Incomplete preparation</li> <li>• Risk of hasty measures being taken</li> </ul>                          | <ul style="list-style-type: none"> <li>• Find planning gaps</li> <li>• Maintain practical capability</li> </ul>               |

## 7.2 Planning, local linkage and cooperations

| Theme                                                                   | Addressee/<br>Conditions                                                                                                                         | Recommendation                                                                                                                                                                                                                                                                                                                               | Possible<br>Obstacles                                                                      | Opportunities                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Organi-<br/>sational<br/>linkage</b>                                 | <ul style="list-style-type: none"> <li>• Planning authorities of low-level disaster management</li> <li>• Implementing municipalities</li> </ul> | <ul style="list-style-type: none"> <li>• Create structures (department, office, task force) that encompass expertise in disaster management</li> <li>• Set up a crisis/administrative team or task force if not already present</li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>• A tight budget and personnel situation</li> </ul> | <ul style="list-style-type: none"> <li>• Strengthening the general resilience of the authorities/municipalities</li> <li>• More LESH are implemented</li> <li>• Support for executing operators</li> </ul>                                                                                  |
| <b>Anchor-<br/>ing with<br/>addi-<br/>tional<br/>stake-<br/>holders</b> | <ul style="list-style-type: none"> <li>• Planning authorities of low-level disaster management</li> <li>• Implementing municipalities</li> </ul> | <ul style="list-style-type: none"> <li>• Create expertise with own structures or consulting/exchange</li> <li>• Integrate other offices/departments (e.g., property office, technical services)</li> <li>• Integrate lower levels (e.g., local mayor)</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>• Personnel resources</li> </ul>                    | <ul style="list-style-type: none"> <li>• Synergy effects</li> <li>• Broad knowledge of needs and resources</li> <li>• Broader positioning of LESH</li> <li>• Higher resilience through interdisciplinary approach</li> <li>• Broader acceptance of LESH</li> </ul>                          |
| <b>Coopera-<br/>tions</b>                                               | <ul style="list-style-type: none"> <li>• Planning authorities of low-level disaster management</li> <li>• Implementing municipalities</li> </ul> | <ul style="list-style-type: none"> <li>• Actively reach out to local stakeholders (population, etc.)</li> <li>• Network and exchange with other municipalities</li> <li>• Good, regular communication</li> <li>• Inform and involve the population</li> <li>• If necessary, legally safeguard of agreements through own contracts</li> </ul> |                                                                                            | <ul style="list-style-type: none"> <li>• Broad anchoring of LESH</li> <li>• Possible synergy effects through collaboration</li> <li>• Possible pragmatic solutions to problems through local expertise</li> <li>• Relieving own municipal structures by integrating other actors</li> </ul> |

| Theme            | Addressee/<br>Conditions                                                                                                                                          | Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Possible<br>Obstacles                                                                                                                                                         | Opportunities                                                                                                                                                                                                                        |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Planning support | <ul style="list-style-type: none"> <li>Political decision-makers</li> </ul>                                                                                       | <ul style="list-style-type: none"> <li>Resolve to implement LESH</li> <li>Consider obligations (with consequences for cost absorption).</li> </ul>                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Politically probably a difficult theme</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>More LESH are implemented</li> <li>Support for executing operators</li> <li>Enabling uniformity in area of responsibility</li> </ul>                                                          |
|                  | <ul style="list-style-type: none"> <li>Planning authorities</li> </ul>                                                                                            | <ul style="list-style-type: none"> <li>Integrate disaster management-related expertise</li> <li>Fallback on or rather, provision of “blueprints” of disaster management for implementation</li> </ul>                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Until now, few directly implementable concepts available</li> </ul>                                                                    | <ul style="list-style-type: none"> <li>More municipalities implement LESH</li> <li>Standardisation of implementation</li> </ul>                                                                                                      |
| Planning         | <ul style="list-style-type: none"> <li>Upper and top authorities of disaster management</li> <li>Planning authorities of low-level disaster management</li> </ul> | <ul style="list-style-type: none"> <li>Offer/take advantage of educational programmes</li> <li>Offer consultation and/or central organisation or rather, coordination</li> </ul>                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>A tight budget and personnel situation</li> <li>Lack of in-house expertise</li> <li>Lack of external educational programmes</li> </ul> | <ul style="list-style-type: none"> <li>Cross-departmental thinking in administration</li> <li>Better support of implementing municipalities/operators</li> <li>More LESH are implemented</li> <li>Support standardisation</li> </ul> |
|                  | <ul style="list-style-type: none"> <li>Implementing municipalities or rather, operating institution</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Provide expertise with own structures or consulting/exchange</li> <li>Integrate other municipal areas (e.g., building yard, building management, IT, etc.)</li> <li>If necessary, get information from networking with other municipalities/operators, for example</li> <li>Broad network through integrating other actors</li> <li>Take local special features into consideration</li> <li>Good, regular communication</li> </ul> | <ul style="list-style-type: none"> <li>A tight budget and personnel situation</li> <li>Lack of in-house expertise</li> <li>Lack of external educational programmes</li> </ul> | <ul style="list-style-type: none"> <li>More effective approach</li> <li>More LESH are implemented</li> <li>More ideas for pragmatic solutions at local level</li> </ul>                                                              |

### 7.3 Financing and legal framing

| Theme                | Addressee/<br>Conditions                                                                                                                           | Recommendation                                                                                                                                                                                                                                                                         | Possible Obstacles                                                                                                                              | Opportunities                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Costs</b>         | <ul style="list-style-type: none"> <li>Upper- and lower-level disaster management authorities</li> </ul>                                           | <ul style="list-style-type: none"> <li>Financial support as part of civil protection and disaster management</li> </ul>                                                                                                                                                                | <ul style="list-style-type: none"> <li>Tight budget situation</li> <li>If funding remains the same, at the expense of other projects</li> </ul> | <ul style="list-style-type: none"> <li>Improvements in disaster management</li> <li>Lower the implementation threshold for LESH</li> </ul> |
|                      |                                                                                                                                                    | <ul style="list-style-type: none"> <li>Specific funding guidelines with room for manoeuvre, e.g. for emergency generators, funded size adaptable to needs of municipality</li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>Guidelines of budgetary law</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>Needs-based procurement</li> </ul>                                                                  |
| <b>Legal framing</b> | <ul style="list-style-type: none"> <li>Federal government</li> <li>Federal states</li> </ul>                                                       | <ul style="list-style-type: none"> <li>Ensure legal clarity through decrees, for example</li> <li>Possibly create an unambiguous legal basis for LESH with enforcement and control options</li> <li>Clarify legal issues (e.g., data protection, compensation for expenses)</li> </ul> | <ul style="list-style-type: none"> <li>Conflict with structural federalism and subsidiarity principle</li> </ul>                                | <ul style="list-style-type: none"> <li>Legal security for planning and operating actors</li> </ul>                                         |
|                      | <ul style="list-style-type: none"> <li>Authorities of lower-level disaster management</li> <li>Municipalities below disaster management</li> </ul> | <ul style="list-style-type: none"> <li>In the event of legal uncertainty, conclude own agreements (e.g., with operators, food retailers, filling station operators)</li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>Legally complicated</li> </ul>                                                                           |                                                                                                                                            |

## 7.4 Forms and design

| Theme    | Addressee/<br>Conditions                                                                                       | Recommendation                                                                                                                                                                                       | Possible Obstacles                                                                                                                                                 | Opportunities                                                                                                                                    |
|----------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Aims     | <ul style="list-style-type: none"> <li>Planning authorities</li> </ul>                                         | <ul style="list-style-type: none"> <li>Define (protection) objectives in advance</li> <li>Define deployment scenarios for LESH</li> </ul>                                                            | <ul style="list-style-type: none"> <li>Selective understanding of objectives</li> <li>Scenarios not sufficiently known yet due to lack of risk analyses</li> </ul> | <ul style="list-style-type: none"> <li>Fit of planning</li> <li>Broader deployment spectrum</li> </ul>                                           |
|          | <ul style="list-style-type: none"> <li>All</li> </ul>                                                          | <ul style="list-style-type: none"> <li>Plan realistically: what can be implemented and is suitable?</li> </ul>                                                                                       |                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Cost/benefit comparison</li> <li>Limit planning efforts</li> </ul>                                        |
| Names    | <ul style="list-style-type: none"> <li>All</li> </ul>                                                          | <ul style="list-style-type: none"> <li>Uniform name (as extensive as possible) through:               <ul style="list-style-type: none"> <li>Cooperations</li> <li>Guidelines</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Double use of otherwise familiar terms like “lighthouse”</li> </ul>                                                         | <ul style="list-style-type: none"> <li>Recognition value</li> </ul>                                                                              |
| Services | <ul style="list-style-type: none"> <li>If larger scope of services</li> </ul>                                  | <ul style="list-style-type: none"> <li>Escalation levels with different services</li> <li>(Alert) level planning</li> </ul>                                                                          | <ul style="list-style-type: none"> <li>Complexity of planning and logistics</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>Situation-appropriate deployment</li> <li>Coupling to existing plans (e.g., evacuation spaces)</li> </ul> |
|          | <ul style="list-style-type: none"> <li>If existing disaster management planning for other scenarios</li> </ul> | <ul style="list-style-type: none"> <li>Modular setup</li> </ul>                                                                                                                                      |                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Situation-appropriate deployment</li> <li>Multiple use of resources</li> </ul>                            |
|          | <ul style="list-style-type: none"> <li>All</li> </ul>                                                          | <ul style="list-style-type: none"> <li>Needs planning with anticipated utilisation (“emergency care key”)</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>Only very rough reference values, ambiguous basis for estimation</li> <li>Non-local are difficult to plan</li> </ul>        | <ul style="list-style-type: none"> <li>Assessment of whether a service can be adequately offered</li> </ul>                                      |



| Theme     | Addressee/<br>Conditions    | Recommendation                                                     | Possible Obstacles                                                                   | Opportunities                                                                                                                               |
|-----------|-----------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Locations | • All                       | • Use municipal properties                                         |                                                                                      | <ul style="list-style-type: none"> <li>• Easy access</li> <li>• Fewer legal hurdles</li> <li>• Often “organic points of contact”</li> </ul> |
|           | • All                       | • Safeguard properties beyond only electricity (e.g., dry toilets) | <ul style="list-style-type: none"> <li>• Costs</li> <li>• Planning effort</li> </ul> | • Care of staff                                                                                                                             |
|           | • All                       | • Consider if fire brigade depots can be used                      | • Possible limitation of basic protection                                            | • Use buildings that have emergency power supply                                                                                            |
|           | • Municipal administrations | • Plan feed-in options for new municipal buildings                 | • Low additional costs                                                               | • Avoiding expensive retrofitting                                                                                                           |
|           | • All                       | • Consider degrees of accessibility                                | • Limited choice                                                                     | • Ensure reachability for vulnerable persons                                                                                                |

## 7.5 Personnel planning and staffing

| Theme                                             | Addressee/<br>Conditions                                                                                                                                                                                 | Recommendation                                                                                                                                                                                                                    | Possible Obstacles                                                                                                                                                                                                                 | Opportunities                                                                                                                                                    |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Scope of staff-<br/>ing for plan-<br/>ning</b> | <ul style="list-style-type: none"> <li>Lower-level disaster management authorities</li> <li>Municipalities</li> <li>federal states if necessary</li> </ul>                                               | <ul style="list-style-type: none"> <li>Make fixed positions/fractions of positions available for intensive planning phase</li> <li>Plan min. 25% scope of staffing for ongoing work</li> </ul>                                    | <ul style="list-style-type: none"> <li>Tense personnel situation</li> <li>“Cannibalisation effect”, i.e., do not plan resources for multiple concepts (e.g., buildings, emergency personnel)</li> <li>Lack of expertise</li> </ul> | <ul style="list-style-type: none"> <li>Comprehensive, successful planning as prerequisite for good LESH implementation</li> </ul>                                |
| <b>Minimum<br/>staffing</b>                       | <ul style="list-style-type: none"> <li>Planning authorities that administer multiple LESH</li> <li>In particular for good personnel availability and strong linkage to PSAO management system</li> </ul> | <ul style="list-style-type: none"> <li>Define minimum staffing, if necessary formulate specific roles with necessary qualifications</li> </ul>                                                                                    | <ul style="list-style-type: none"> <li>Prone to failure of specific functions in the event of staff shortages</li> </ul>                                                                                                           | <ul style="list-style-type: none"> <li>Standardisation</li> <li>Safeguarding a (basic) scope of service</li> </ul>                                               |
|                                                   | <ul style="list-style-type: none"> <li>Administrations that do not operate LESH themselves</li> </ul>                                                                                                    | <ul style="list-style-type: none"> <li>Define minimum requirements of service spectrum for operators</li> <li>Support of municipalities with administrative recommendations (framework agreements for operators, etc.)</li> </ul> | <ul style="list-style-type: none"> <li>Empowerment of municipalities to implement</li> <li>Unclear return and little binding character</li> <li>Financial expenditure in the event of more extensive support</li> </ul>            | <ul style="list-style-type: none"> <li>Simplifying planning in the municipalities</li> <li>Standardisation</li> <li>Option for collective procurement</li> </ul> |

| Theme                        | Addressee/<br>Conditions                                                                        | Recommendation                                                                                                                  | Possible Obstacles                                                                                                  | Opportunities                                                                                                                                  |
|------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Descriptions of roles</b> | <ul style="list-style-type: none"> <li>If personnel availability good</li> </ul>                | <ul style="list-style-type: none"> <li>Define specific roles for basic services</li> <li>Checklists/role description</li> </ul> | <ul style="list-style-type: none"> <li>Dependency on specific staff</li> <li>Difficulty of verification</li> </ul>  | <ul style="list-style-type: none"> <li>Safeguarding of key processes</li> <li>Reducing error rate</li> </ul>                                   |
|                              | <ul style="list-style-type: none"> <li>If personnel availability is unclear</li> </ul>          | <ul style="list-style-type: none"> <li>Define “generalist” role</li> <li>Checklists/role description</li> </ul>                 | <ul style="list-style-type: none"> <li>Advance planning of actual needs with little practical experience</li> </ul> | <ul style="list-style-type: none"> <li>Strengthening the response capability of LESH</li> <li>Strengthening local linkage</li> </ul>           |
|                              | <ul style="list-style-type: none"> <li>If volunteers are integrated</li> </ul>                  | <ul style="list-style-type: none"> <li>Training for inexperienced workers</li> </ul>                                            | <ul style="list-style-type: none"> <li>Costs</li> <li>Planning effort</li> </ul>                                    | <ul style="list-style-type: none"> <li>Participation</li> <li>Increase ties with volunteers</li> </ul>                                         |
|                              | <ul style="list-style-type: none"> <li>If personnel availability is unclear/doubtful</li> </ul> | <ul style="list-style-type: none"> <li>Lay public-compatible role descriptions/checklists</li> </ul>                            | <ul style="list-style-type: none"> <li>Fewer specific tasks</li> </ul>                                              | <ul style="list-style-type: none"> <li>More flexible personnel deployment possible</li> </ul>                                                  |
|                              |                                                                                                 | <ul style="list-style-type: none"> <li>Define general tasks</li> </ul>                                                          | <ul style="list-style-type: none"> <li>Increased need for drills</li> <li>Less standardisation</li> </ul>           | <ul style="list-style-type: none"> <li>Option to involve additional groups of persons</li> </ul>                                               |
| <b>Shift operation plan</b>  | <ul style="list-style-type: none"> <li>If personnel availability good</li> </ul>                | <ul style="list-style-type: none"> <li>Plan shift operation (minimum staffing)</li> </ul>                                       | <ul style="list-style-type: none"> <li>High personnel costs</li> </ul>                                              | <ul style="list-style-type: none"> <li>Different personnel costs, day- and night-specific</li> <li>Safeguarding permanent operation</li> </ul> |
|                              | <ul style="list-style-type: none"> <li>If personnel availability low</li> </ul>                 | <ul style="list-style-type: none"> <li>Consider 24/7 operation</li> </ul>                                                       | <ul style="list-style-type: none"> <li>Emergency call coverage gaps</li> </ul>                                      | <ul style="list-style-type: none"> <li>Don’t demand too much from staff</li> </ul>                                                             |

| Theme                                      | Addressee/<br>Conditions                                                                       | Recommendation                                                                                                                       | Possible Obstacles                                                                                                                                                                                                          | Opportunities                                                                                                             |
|--------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Core personnel</b>                      | <ul style="list-style-type: none"> <li>Operator and disaster management authorities</li> </ul> | <ul style="list-style-type: none"> <li>Integrate municipal businesses and relevant administrative departments</li> </ul>             | <ul style="list-style-type: none"> <li>Friction in cooperation between emergency response organisations and administration</li> <li>Safeguarding specific services, if necessary dependent on specific personnel</li> </ul> | <ul style="list-style-type: none"> <li>Integrating administration</li> <li>Relieving fire brigades</li> </ul>             |
|                                            | <ul style="list-style-type: none"> <li>Operator outside of administrations</li> </ul>          | <ul style="list-style-type: none"> <li>Integrate administration</li> </ul>                                                           |                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Expanding the spectrum of tasks</li> </ul>                                         |
|                                            | <ul style="list-style-type: none"> <li>All</li> </ul>                                          | <ul style="list-style-type: none"> <li>Use diverse personnel pool</li> </ul>                                                         |                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Expanding the spectrum of tasks</li> <li>More flexible setup</li> </ul>            |
|                                            | <ul style="list-style-type: none"> <li>Very small administrations</li> </ul>                   | <ul style="list-style-type: none"> <li>Flexible staffing according to presence</li> </ul>                                            |                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Compensating for lack of resources</li> </ul>                                      |
| <b>Integrating volunteers</b>              | <ul style="list-style-type: none"> <li>All</li> </ul>                                          | <ul style="list-style-type: none"> <li>Survey of volunteer willingness to work in administration and municipal businesses</li> </ul> | <ul style="list-style-type: none"> <li>Need for training</li> <li>Lack of clarity around deployment conditions (e.g., compensation for expenses)</li> </ul>                                                                 | <ul style="list-style-type: none"> <li>Raising motivation</li> <li>People-oriented crisis management</li> </ul>           |
|                                            |                                                                                                | <ul style="list-style-type: none"> <li>Integrate honorary positions</li> </ul>                                                       |                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Local anchoring</li> <li>Use deployment experience</li> </ul>                      |
|                                            |                                                                                                | <ul style="list-style-type: none"> <li>Integrate previously registered volunteers</li> </ul>                                         | <ul style="list-style-type: none"> <li>Lack of familiarity and participation</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>Self-sufficiency</li> <li>Strengthening the response capability of LESH</li> </ul> |
| <b>Involving groups from civil society</b> | <ul style="list-style-type: none"> <li>All</li> </ul>                                          | <ul style="list-style-type: none"> <li>Cooperations with associations/clubs for LESH staffing</li> </ul>                             | <ul style="list-style-type: none"> <li>Less standardisation</li> <li>Central planning more complicated</li> </ul>                                                                                                           | <ul style="list-style-type: none"> <li>Local anchoring</li> <li>Self-sufficiency of LESH</li> </ul>                       |

| Theme                                     | Addressee/<br>Conditions                                                                      | Recommendation                                                                                                                                 | Possible Obstacles                                                                                          | Opportunities                                                                                                            |
|-------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Support of personnel and endurance</b> | <ul style="list-style-type: none"> <li>• If financial health and staffing are good</li> </ul> | <ul style="list-style-type: none"> <li>• Provide supervision and care for families of staff, e.g., shuttles</li> </ul>                         | <ul style="list-style-type: none"> <li>• Resources and budgetary situation</li> </ul>                       | <ul style="list-style-type: none"> <li>• Safeguarding permanent operation</li> </ul>                                     |
|                                           | <ul style="list-style-type: none"> <li>• Operator</li> </ul>                                  | <ul style="list-style-type: none"> <li>• Organise cooperations for common childcare, ride shares, etc. among staff</li> </ul>                  | <ul style="list-style-type: none"> <li>• Need for volunteer planning of participants</li> </ul>             | <ul style="list-style-type: none"> <li>• Safeguarding permanent operation</li> </ul>                                     |
| <b>Test operation</b>                     | <ul style="list-style-type: none"> <li>• All</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Carry out test runs of operation with personnel deployment</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Personnel, time-related and financial costs</li> </ul>             | <ul style="list-style-type: none"> <li>• Identify indispensability of planned personnel</li> <li>• Advantages</li> </ul> |
| <b>Personnel for planning</b>             | <ul style="list-style-type: none"> <li>• Planning authorities</li> </ul>                      | <ul style="list-style-type: none"> <li>• Plan personnel deployment for concept development and setup phases and permanent operation</li> </ul> | <ul style="list-style-type: none"> <li>• Multi-year planning made difficult by uncertain budgets</li> </ul> | <ul style="list-style-type: none"> <li>• Sufficient personnel capacity for every phase</li> </ul>                        |

## 7.6 Mobilisation and transition into operation

| Theme                          | Addressee/<br>Conditions                                                                                       | Recommendation                                                                                                                                                                      | Possible Obstacles                                                                                                                                                                              | Opportunities                                                                                                                                                                             |
|--------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Alerting the personnel</b>  | <ul style="list-style-type: none"> <li>If few options for technically safeguarding the alert system</li> </ul> | <ul style="list-style-type: none"> <li>Specify mechanisms for alert chains</li> </ul>                                                                                               | <ul style="list-style-type: none"> <li>Lack of clarity around being affected themselves</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>Faster alerting</li> <li>Independence from digital alerting infrastructure</li> </ul>                                                              |
|                                | <ul style="list-style-type: none"> <li>All</li> </ul>                                                          | <ul style="list-style-type: none"> <li>Alert planning for staff</li> <li>Specify alert threshold keywords</li> <li>Regulate the responsibility for initiating deployment</li> </ul> | <ul style="list-style-type: none"> <li>Preference for flexible deployment also in other scenarios</li> <li>Alert paths impossible to implement due to data protection considerations</li> </ul> | <ul style="list-style-type: none"> <li>Rule-based alerting according to regulated criteria</li> <li>Clarifying areas of responsibility</li> <li>Safeguarding prompt deployment</li> </ul> |
| <b>Regulating access</b>       | <ul style="list-style-type: none"> <li>If operated in properties by non-local staff</li> </ul>                 | <ul style="list-style-type: none"> <li>Locking or key concepts</li> </ul>                                                                                                           | <ul style="list-style-type: none"> <li>Security considerations (e.g., in case of central locking devices)</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>Safeguarding operability independent of specific persons</li> </ul>                                                                                |
| <b>Deployment targets</b>      | <ul style="list-style-type: none"> <li>Administrations that are not operators</li> </ul>                       | <ul style="list-style-type: none"> <li>Targets for operator sign on message</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>Reachability</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>Comparability of LESH</li> <li>Providing planning approach</li> </ul>                                                                              |
| <b>Logistics of transition</b> | <ul style="list-style-type: none"> <li>If required resources are available for deployment</li> </ul>           | <ul style="list-style-type: none"> <li>Central storage and issuance of materials</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>Dependency on e.g., traffic and availability (vehicles)</li> </ul>                                                                                       | <ul style="list-style-type: none"> <li>Option for situation-specific equipping of LESH</li> <li>Relieving the operator</li> </ul>                                                         |
|                                | <ul style="list-style-type: none"> <li>Planning authorities</li> </ul>                                         | <ul style="list-style-type: none"> <li>Use material crates</li> </ul>                                                                                                               | <ul style="list-style-type: none"> <li>Storage capacity required</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>Simple storage</li> <li>Standardisation of equipment</li> </ul>                                                                                    |
|                                | <ul style="list-style-type: none"> <li>Operator</li> <li>If independently structured LESH</li> </ul>           | <ul style="list-style-type: none"> <li>Storage on site</li> </ul>                                                                                                                   | <ul style="list-style-type: none"> <li>Space requirements</li> </ul>                                                                                                                            | <ul style="list-style-type: none"> <li>Self-sufficiency of LESH</li> <li>Independent start-up possible</li> </ul>                                                                         |
|                                | <ul style="list-style-type: none"> <li>Operator</li> </ul>                                                     | <ul style="list-style-type: none"> <li>Plan stocks in time</li> </ul>                                                                                                               | <ul style="list-style-type: none"> <li>Maintenance logistics</li> </ul>                                                                                                                         | <ul style="list-style-type: none"> <li>Planning in time</li> </ul>                                                                                                                        |



## 7.7 Communication

| Theme                                                               | Addressee/<br>Conditions                                                                                                                     | Recommendation                                                                                                                                                               | Possible Obstacles                                                                                                                                                    | Opportunities                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Planning communication with other disaster management actors</b> | <ul style="list-style-type: none"> <li>• All</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>• Define communication partners (depending on tasks and scenarios)</li> <li>• Specify information for respective addressee</li> </ul> | <ul style="list-style-type: none"> <li>• Technical limits of making contact</li> <li>• Planning obstacle: actual communication volume difficult to foresee</li> </ul> | <ul style="list-style-type: none"> <li>• Targeted communication</li> </ul>                                                                                                                                                                                                           |
|                                                                     | <ul style="list-style-type: none"> <li>• Planning authorities</li> <li>• Particularly if concept has strong operative orientation</li> </ul> | <ul style="list-style-type: none"> <li>• Linkage to crisis teams</li> <li>• Alternative liaison to lower-level disaster management authorities</li> </ul>                    | <ul style="list-style-type: none"> <li>• No existing crisis team</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>• Information of higher levels</li> <li>• Linkage to various departments/specialist areas</li> </ul>                                                                                                                                          |
|                                                                     | <ul style="list-style-type: none"> <li>• Disaster management authorities</li> <li>• Network operators</li> <li>• Control centres</li> </ul>  | <ul style="list-style-type: none"> <li>• Plan information in direction of LESH as well</li> </ul>                                                                            |                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Information of operative level</li> <li>• Enabling output of information</li> </ul>                                                                                                                                                         |
|                                                                     | <ul style="list-style-type: none"> <li>• All</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>• Advance planning of communication among LESH</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>• No overview of participants/those responsible</li> <li>• Contradicts centralised command communication</li> </ul>            | <ul style="list-style-type: none"> <li>• Exchange and support also on matters below acute emergency threshold</li> <li>• Strengthening the self-sufficiency of LESH</li> <li>• Option to process smaller matters without involving the control centre or specialist teams</li> </ul> |
| <b>Documentation</b>                                                | <ul style="list-style-type: none"> <li>• All</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>• Advance planning of documentation paths without digital transmission</li> </ul>                                                     |                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Traceability</li> <li>• Option for evaluation</li> </ul>                                                                                                                                                                                    |

| Theme                                 | Addressee/<br>Conditions                                                                                    | Recommendation                                                                                                                             | Possible Obstacles                                                                                                | Opportunities                                                                                                                               |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fail-safe state and redundancy</b> | <ul style="list-style-type: none"> <li>• All</li> </ul>                                                     | <ul style="list-style-type: none"> <li>• Plan and specify multiple communication channels</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Priorities of use still open</li> </ul>                                  | <ul style="list-style-type: none"> <li>• Effort</li> <li>• Additional purchases if necessary</li> </ul>                                     |
|                                       | <ul style="list-style-type: none"> <li>• If using satellite telephony</li> </ul>                            | <ul style="list-style-type: none"> <li>• Make telephone lists available (printed &amp; up to date) if using satellite telephony</li> </ul> |                                                                                                                   | <ul style="list-style-type: none"> <li>• Definition and practise of interfaces</li> <li>• Access to administration as well</li> </ul>       |
|                                       | <ul style="list-style-type: none"> <li>• All</li> </ul>                                                     | <ul style="list-style-type: none"> <li>• Use of older infrastructure (cable lines, analogue radio, emergency call boxes, etc.)</li> </ul>  | <ul style="list-style-type: none"> <li>• If necessary, need for specialists for operation</li> </ul>              | <ul style="list-style-type: none"> <li>• No expenditure for new purchases</li> <li>• Use of existing resources</li> </ul>                   |
|                                       | <ul style="list-style-type: none"> <li>• Planning authorities</li> </ul>                                    | <ul style="list-style-type: none"> <li>• Develop messenger concept (e.g., define routes, times and persons)</li> </ul>                     | <ul style="list-style-type: none"> <li>• Planning effort and exemption of personnel</li> </ul>                    | <ul style="list-style-type: none"> <li>• Establishing a fail-safe fall-back level</li> </ul>                                                |
|                                       | <ul style="list-style-type: none"> <li>• If good resource health</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Develop an independent radio network (e.g., satellite telephony)</li> </ul>                       | <ul style="list-style-type: none"> <li>• Costs</li> </ul>                                                         | <ul style="list-style-type: none"> <li>• Safeguarding fail-safe communication for various scenarios</li> </ul>                              |
|                                       | <ul style="list-style-type: none"> <li>• Operator</li> <li>• Planning authorities</li> </ul>                | <ul style="list-style-type: none"> <li>• Linkage with amateur radio</li> <li>• Set up citizens' emergency radio</li> </ul>                 | <ul style="list-style-type: none"> <li>• Coupling of different communication systems must be planned</li> </ul>   | <ul style="list-style-type: none"> <li>• Integration of local communications resources</li> <li>• More options for integration</li> </ul>   |
| <b>Information</b>                    | <ul style="list-style-type: none"> <li>• All</li> </ul>                                                     | <ul style="list-style-type: none"> <li>• Plan two-way communication</li> </ul>                                                             | <ul style="list-style-type: none"> <li>• More planning necessary</li> </ul>                                       | <ul style="list-style-type: none"> <li>• More comprehensive communication possible</li> <li>• Ability to serve information needs</li> </ul> |
|                                       | <ul style="list-style-type: none"> <li>• Disaster management authorities</li> <li>• Crisis teams</li> </ul> | <ul style="list-style-type: none"> <li>• Integrate information on "situational overview, population"</li> </ul>                            | <ul style="list-style-type: none"> <li>• No specialist knowledge on "situational overview, population"</li> </ul> | <ul style="list-style-type: none"> <li>• Target to needs of population</li> </ul>                                                           |

| Theme                                | Addressee/<br>Conditions                                                                               | Recommendation                                                                                                                                                                                    | Possible Obstacles                                                                           | Opportunities                                                                                                                                                        |
|--------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Coordination<br/>of self-help</b> | <ul style="list-style-type: none"> <li>Operator</li> </ul>                                             | <ul style="list-style-type: none"> <li>Compile local needs and offers of help (bulletin boards, displays, etc.) during the incident and before</li> </ul>                                         | <ul style="list-style-type: none"> <li>No public communication desired in advance</li> </ul> | <ul style="list-style-type: none"> <li>Empowerment of self-help</li> <li>Relief for civil protection</li> <li>Processing matters beyond acute emergencies</li> </ul> |
|                                      | <ul style="list-style-type: none"> <li>Operator</li> </ul>                                             | <ul style="list-style-type: none"> <li>Network with groups of stakeholders and organisations in local society (e.g., clubs)</li> </ul>                                                            | <ul style="list-style-type: none"> <li>Time and communication costs</li> </ul>               | <ul style="list-style-type: none"> <li>Strengthening local linkage</li> </ul>                                                                                        |
|                                      | <ul style="list-style-type: none"> <li>Operator</li> <li>If necessary, planning authorities</li> </ul> | <ul style="list-style-type: none"> <li>Enable advance registration of volunteer helpers</li> </ul>                                                                                                | <ul style="list-style-type: none"> <li>Need for training, if any</li> </ul>                  | <ul style="list-style-type: none"> <li>Strengthening local linkage</li> <li>Relief for emergency personnel</li> </ul>                                                |
|                                      | <ul style="list-style-type: none"> <li>All</li> </ul>                                                  | <ul style="list-style-type: none"> <li>Tie into familiar formats of publication (e.g., flyer, social media)</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>Financial expenditure</li> </ul>                      | <ul style="list-style-type: none"> <li>Groups in population are reached better</li> </ul>                                                                            |
|                                      | <ul style="list-style-type: none"> <li>All</li> </ul>                                                  | <ul style="list-style-type: none"> <li>Use public events (festivals, action days, theme nights, etc.)</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>Personnel costs</li> </ul>                            | <ul style="list-style-type: none"> <li>Reaching new groups</li> </ul>                                                                                                |
|                                      | <ul style="list-style-type: none"> <li>If comprehensive risk communication is present</li> </ul>       | <ul style="list-style-type: none"> <li>Integrated risk communication: Integrating LESH into public relations programmes and formats</li> <li>Longer-term, bi-directional communication</li> </ul> |                                                                                              | <ul style="list-style-type: none"> <li>Merging topics in disaster management</li> <li>Promoting disaster management partnerships</li> </ul>                          |
| <b>Identification/signage</b>        | <ul style="list-style-type: none"> <li>If common templates are present</li> </ul>                      | <ul style="list-style-type: none"> <li>Use standardised icons</li> </ul>                                                                                                                          |                                                                                              | <ul style="list-style-type: none"> <li>Standardisation</li> <li>Recognition value</li> </ul>                                                                         |
|                                      | <ul style="list-style-type: none"> <li>If resource shortage</li> </ul>                                 | <ul style="list-style-type: none"> <li>Improvise: Banners on construction fences, displays, posters, etc.</li> </ul>                                                                              | <ul style="list-style-type: none"> <li>Little standardised</li> </ul>                        | <ul style="list-style-type: none"> <li>Inexpensive</li> </ul>                                                                                                        |

## 7.8 Role of LESH in warning the population

| Theme                                    | Addressee/<br>Conditions                                                                                           | Recommendation                                                                                                                                                                        | Possible Obstacles                                                                                                                                                      | Opportunities                                                                                                           |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Operation of LESH during warnings</b> | <ul style="list-style-type: none"> <li>Warning authorities and operators</li> </ul>                                | <ul style="list-style-type: none"> <li>Coordinate between warning authorities and operators</li> <li>Ensure start-up of LESH in the event of corresponding warning message</li> </ul> | <ul style="list-style-type: none"> <li>Necessity at beginning of situation not clear</li> <li>Communication may be limited</li> </ul>                                   | <ul style="list-style-type: none"> <li>LESH as point of contact for population</li> </ul>                               |
| <b>Warning messages</b>                  | <ul style="list-style-type: none"> <li>All</li> </ul>                                                              | <ul style="list-style-type: none"> <li>Disseminate/display MoWaS warning messages</li> </ul>                                                                                          |                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Substitute for failed warning channels</li> </ul>                                |
|                                          | <ul style="list-style-type: none"> <li>Operator</li> </ul>                                                         | <ul style="list-style-type: none"> <li>Option to present analogue warning messages (e.g., whiteboard)</li> </ul>                                                                      |                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Fail-safe state of forwarding warning messages</li> </ul>                        |
|                                          | <ul style="list-style-type: none"> <li>Warning authorities</li> </ul>                                              | <ul style="list-style-type: none"> <li>Name LESH in warning messages</li> </ul>                                                                                                       | <ul style="list-style-type: none"> <li>In the event of power failure, warning apps functional in short-term only</li> <li>Some fear excessively large crowds</li> </ul> | <ul style="list-style-type: none"> <li>Increase knowledge and use of LESH</li> </ul>                                    |
| <b>Linkage to warning concept</b>        | <ul style="list-style-type: none"> <li>All</li> </ul>                                                              | <ul style="list-style-type: none"> <li>Coordinate and record special (communicative) needs</li> </ul>                                                                                 |                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Stronger linkage of LESH on site</li> </ul>                                      |
|                                          | <ul style="list-style-type: none"> <li>If local warning concept (with mobile warning system) is present</li> </ul> | <ul style="list-style-type: none"> <li>Coordinate own warning districts with LESH</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>Comprehensive concept required</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Integrated use of LESH</li> </ul>                                                |
|                                          | <ul style="list-style-type: none"> <li>If there is an option to permanently use LESH</li> </ul>                    | <ul style="list-style-type: none"> <li>Longer-term risk communication and organisation of self-help to LESH</li> </ul>                                                                | <ul style="list-style-type: none"> <li>Costs</li> <li>Staffing</li> </ul>                                                                                               | <ul style="list-style-type: none"> <li>Strengthen local linkage of LESH</li> <li>Increase self-help capacity</li> </ul> |

# 8 Conclusion, discussion and outlook

Key insights are summarised and discussed in the following. After a reflection on the methodology, the section closes with recommendations for further research.

## 8.1 Summary and discussion of the findings

The findings from surveys in the very **dynamic field of LESH** are subject to the risk of the study being obsolete as soon as it is completed. For example, the question regarding standardised design features and signage form that was relevant in some interviews was no longer up-to-date at the end of the survey, as the results of the BLoAG KatS-L were published shortly before this report was completed.

Nevertheless, the study identified **focal areas** that recur in a large number of the activities around implementing the basic concept from the Berlin Model project or implementing the original concern of creating points of contract for the population in the event of a long-term power failure and will remain current in the foreseeable future. At the same time, it also showed where different issues and solutions emerge from different local prerequisites.

The following arrangement of key findings follows the question sets in the study (→ *Sect. 1.1*)

### What conditions are necessary for planning and implementing the basic LESH concept?

Although the basic concept of LESH was published almost a decade ago, most of the respondents did not begin implementing the concept **until 2022**. The most frequent reason indicated was **concern about an energy shortage** and associated power failures due to the war against Ukraine. However, it is also obvious that many of the responsible persons in disaster management had examined the theme previously (also

in terms of planning), but the political relevance of the theme had grown. Both show that efforts such as setting up LESH tend to be initiated when there is a specific reason or an imaginable danger – which speaks in favour of the basic implementation of LESH with associated decrees or general recommendations, e.g., at state level, to provide support or initiate them.

In accordance with their responsibility for disaster management, in most cases the municipalities bear the **responsibility**, although the **specific operators vary**. They usually are fire brigades, administrations and/or aid organisations. Sometimes they are financed from the general budget for disaster management and sometimes from a separate budget.

Only a few respondents indicated that they operate LESH on a clear legal basis. This correlated with our research on legal stipulations. The demand for **standardisation and structured specifications** was frequently expressed: the actors involved are also aware of the difficulty around standardisation across national boundaries. Despite the high standards demanded of the competence sovereignty of the federal states (Dombrowsky, 2014), regulations that are as uniform and binding as possible are desired. They would create planning security and increase clarity around (the coverage of) costs. Across all forms and planning stages, alongside the desire for guidelines we found the clearly stated wish for support in the form of templates or at least practical tips (“**handouts/blueprints**”).

This also reflected the relevance of specific specialist knowledge and expertise in the planning administrations. Staff with relevant specialist skills and knowledge with sufficient time to implement their expertise would be just as helpful as existing plans and concepts that could serve as blueprints. These competences and capabilities

were, however, very unequally distributed in the sample. For this reason, LESH are only allocated to higher-level **disaster management strategies** in some cases.

Due to these very different prerequisites, specifying the options and objectives for implementing LESH on site is a relevant process. In it (and also in the case of expertise in support of planning), the networks and cooperations within which planners can get support and advice have outstanding importance.

### How is the LESH concept implemented and designed in detail?

The diversity of implementation of the basic concept of LESH is particularly obvious with regard to **names and equipment**. Although “local emergency support hub” (German: *Katastrophen(-schutz)-Leuchtturm*) is the most frequently used name, followed by “emergency meeting point/local emergency information point” (German: *Notfalltreffpunkt/Notfallinfopunkt*), numerous other terms are in circulation. They correspond to the contextual design or offered services only to a partial extent. There are also many differences with regard to **location**. Frequently, properties that the regional authority also has access to in everyday life are preferred. Particularly with regard to the use of fire stations, there is dissent among the respondents depending on whether reachability and the existence of emergency power are emphasised or lack of interruptions to the work of the fire brigades is prioritised. The diversity of forms reflected here is also fed by the diversity of the implementation concepts, as well as their various prerequisites and aims.

Many concepts rely on a **modular** structure (with various names for the modules) or contain **escalation levels** of deployment with an increasing expansion of the offering.

The **services** planned by the BLoAG KatS-L were usually not completely reflected in the LESH service offering. Shelter, for example, would rarely be offered in an LESH; other concepts around shelter frequently already exist. Many respondents had not considered other potential services

like the availability of food for children or care and shelter for pets as possible services yet.

In their diversity, the solutions for **staffing** also correspond to the mixed picture of the sample. The majority of strategies are to either use personnel from municipal administrations or fire brigades and other PSAO to operate LESH. However, various mixed forms and limitations to the strategies are also found. The key challenge here is uncertainty as to who could actually be/want to be available for operation in the event of deployment. Most respondents indicated that they could theoretically enforce a service obligation, but they often rely on volunteer agreements and establishing support offerings for staff – also due to the lack of any practically applicable means of enforcement. Another personnel planning challenge is a possible “cannibalisation effect” if the same personnel resources are planned for different tasks (e.g., emergency personnel with the fire brigade or aid organizations are planned for LESH).

When it comes to the **activation or alerting** of LESH, respondents emphasised both access to the respective property and the authority to activate the LESH and mobilise staff accordingly. In some cases, this is regulated in regular alert planning or alert chains planned in advance are relied on. Each staffing plan for LESH is subject to the condition that the staff are available in the event of a disaster, which cannot be evaluated yet without any real experience.

### How do the concepts on coordination and strengthening the capability for self-help behave on site?

The differences in terms of various general conditions are underpinned and supplemented by the understanding of the aims and tasks of LESH anchored in different organisational cultures. While the basic concept from the Berlin Model project is strongly orientated towards integrating and **activating local social structures** and independent **self-help**, this aspect carries weight or is explicitly included in the concept of very few actual applications. Although a frequent complaint was that the **local population** and general public demonstrated too little crisis-resistance and capacity for



self-help, LESH were seldom perceived as an opportunity for reversing this.

In this context, the use of LESH for **communication** was typically not designed as **intended in the basic concept**. The receipt of situational information and emergency calls, i.e., communicative linkage to the rest of disaster management, which support and coordination of cooperative self-help within the population, was explicitly planned in isolated cases only. Overall, the communicative aspects of LESH that are not related to the technical dimension (e.g., atmosphere among or behaviour of the population) received little attention and were rarely formulated.

In line with the findings on the rather limited involvement of local population groups, the intended link between strengthening warning-related resilience and establishing structures for self-help and cooperation – such as those envisioned for LESH – is often missing.

#### **What practical experience is available on the deployment of LESH?**

The respondents' LESH were only actually mobilised in **isolated cases** in different situations, including power failures and storms. As a result, the **experiences** of the respondents primarily refer to **planning and establishing** LESH and not their operation.

The general consensus is that LESH must be regularly **tested or drills** must be held. However, most of the respondents have planned this for the future. To hold a drill around a power failure of longer duration hardly seems possible due to practical and ethical considerations. Like practice, the respondents considered an **evaluation** of their experiences a matter of course, although in few cases had a concept already been drawn up. The integration of LESH (or rather, individual modules from the respective systems) into drills and evaluations that would take place anyway seemed promising.

#### **What obstacles should be anticipated, which pragmatic solutions can be found and what recommendations can be made?**

The obstacles appeared to primarily involve financial and personnel resources. Both the expertise and capacity for planning, as well as the opportunities and range of the plans are significantly limited by the scope of the resources available for them. In view of tight budgets and competing needs in the municipalities, political intention and support from the decision-makers and bodies is required in order to have the respective resources made available. Alongside the resource shortage but repeatedly mentioned was the lack of a *uniform* legal framing that, if necessary, would also be able to qualify the dependency on political support on site.

The respondents mentioned solutions in many areas (→ *Sect. 6.10*), many of which highlighted **cooperations and integrating other actors and material/technical equipment**. This shows how important knowledge of the local circumstances is and how creative actors in disaster management are when it comes to dealing with bottlenecks pragmatically.

The marked discrepancy between the available funding for equipment and personnel provision does not permit uniform recommendations. Ideal requirements orientated towards the regional authorities with the healthiest financial and personnel situations are not universally applicable. Our study shows that despite the frequently expressed desire for standardisation and standards, “one size fits all” is simply not possible. This is why the many **recommendations** (→ *Sect. 7*) derived were differentiated by **addressee or rather, the conditions of context** whenever this appeared to make sense.

## **8.2 Discussion of methodology**

The data and with it, their interpretation and meaningfulness, are subject to multiple methodological limitations that must be considered in order to classify the findings derived from them.

## (1) Sample

- In developing the concept of the sample and acquiring the respondents, a focus was placed on gaining the participation of planners in very early stages of implementation and those regional authorities that decided against implementing LESH or failed when doing so. However, it quickly became obvious that despite these efforts, above all persons whose planning was at a later stage or even completed were willing to be interviewed. Therefore, we can assume that the collection of relevant obstacles to planning must remain incomplete, as the ones that caused planning to fail could not be included (*survivor bias*).
- The sample does not claim to be representative, but should, however, map as many structural aspects as possible (German state, type and size of regional authority, population density) in order to map the **spectrum** of the LESH. This was mostly successful, but not all federal states are equally represented in the sample. Due to the specifically limited time period of the study, the interviews had to start before respondent acquisition had finished. At the same time, the study design limited the number of interviews. As a result, the regional authorities whose contact data for LESH was publicly accessible and/or where contacts were passed on to the BBK are more strongly represented.

## (2) Suggestive moments of descriptive quantification

- Using semi-open question formats made it possible to also collect content that was not already deductively foreseeable from a little-structured field. It is rendered recognisable by qualitative evaluation methods. Due to the sample size, the necessary quantification of the responses generated in this way is not without problems.
- With open questions, counts of inductive categories let absolute frequencies of mention appear to map a distribution within the sample. For example, if 5 out of 38 respondents mentioned a category, this falsely leads to the conclusion that this would not be the case for all others. However, this conclusion

is not permissible, insofar as a non-mention only means that the theme was not *mentioned* (with regard to this question). When conducting interviews, there is not enough time to additionally ask if every category that was not mentioned is present, particularly as not all evaluation categories are known in advance. In open questions in particular, this can lead to distortions in the meaningfulness of quantitative weighting. This is why the evaluation of thematic relevance cannot be linked to quantitative statements.

- Due to the semi-open interviewing procedure, which was orientated towards the guideline but also adapted to the course of the conversation, themes distributed across multiple question sets were often documented. Therefore, sometimes answers were given early on when, according to the guideline, they were planned for later question sets. This means that depending on the circumstances, not all detailed questions that were planned for a corresponding place in the guideline were picked up again. The interviewers attempted to match the statements in the transcript to the respective question set but were not always successful. This weakened the meaningfulness of quantitative statements.
- The fact that those respondents who responded to a theme frequently provided answers that could be assigned to multiple categories (“multiple mentions”) led to persons who said a lot being disproportionately strongly represented in the answers. This further weakens the relationship between frequency of mention and the total sample.

## (3) Data validity

The format of the self-evaluation report led to a basic limitation. Distorted presentations and perceptions, omissions and lack of or rather, incorrect knowledge are adopted as is and the categorising abstraction of data processing may render them invisible. Other study designs (like questionnaires) are similarly susceptible. On the other hand, these elements could be integrated interpretively and reflexively as part of more in-depth qualitative research or also made visible by supplementary data in the course of non-report-based research.

#### (4) Generalisation and type formation

“Horizontal” and “vertical” analyses meet in this study. One aim of the study was to make statements on what could be found across as many different data points as possible. However, the forms of data collection and evaluation chosen here do not shed much light on relationships among the various topics *within different cases*. In the chosen successive quantification of data that cannot be classified into a scale-based distribution, it is hardly possible to create reliable statements on cross-theme relationships beyond the individual case. Due to the data level, the authors chose not to calculate any correlations. Further, the unexpectedly high diversity of the data made it necessary to create highly differentiated categories, which in turn make it difficult to form clusters.

Despite the methodological limitations, the aim of identifying success factors and obstacles was achieved. It was also possible to derive recommendations for planning, establishing and operating civil protection and local emergency support hubs.

### 8.3 Further need for research and outlook

Building on the presented findings which, as part of an initial, explorative study, provide insights into the issues and themes around planning for LESH, a further need for research can be formulated.

- The present study is the first one to show the spectrum of implementation of LESH and the topics relevant to their implementation. Due to the sample size, it does not claim to be representative. In view of the rapid development and progressive rollout of LESH in quite a number of federal states, a full survey would be desirable – one that could be ideally repeated at regular intervals. This way, a broader overview over the **existing structures and plans** could be gained. Where reports are regularly produced on the status of disaster management planning, the LESH part could be added to it and this way, the database would grow without any additional effort.
- To collect other **good practices** and pragmatic solutions, additional in-depth qualitative analyses could be helpful. Due to the lack of LESH deployment in real life, little practical experience could be integrated into the present study. This is why future studies should focus on **practical experiences** gained from real deployment situations that can be expected to occur.
- In this study, organisational and communicative elements and processes were considered, but the responses also show that **material and technical questions** and issues required further examination. Many respondents are concerned with options for safeguarding communications and energy. However, not all participants were able to recognise usable solutions.
- The respondents had only included **integrating the warning function** into the LESH concepts in rudimentary detail. As local warning concepts become more widespread, however, this could change. Concepts and knowledge around using LESH for people-orientated, multi-directional crisis communication would be helpful here.
- The role of LESH in **scenarios beyond those of power failure** was rarely thought through. This also applies for civil protection scenarios. Here, pilot concepts could be helpful.
- Integrating the population into the planning and operation of LESH and in turn, strengthening the collective self-help capability as part of LESH was already included in the Berlin Model concept. However, further study of the options for systematically integrating these aspects into planning and implementing LESH appears to be necessary.
- In addition to providing an initial overview of forms, strategies and guidance for planning and implementing LESH, the study contributes to the widely expressed desire for an exchange of experiences and ideas. Here, the study refers to concepts that exist nationwide. Further, using **international concepts (e.g., from the Netherlands or Scandinavia) for comparisons and as catalysts seems promising**.

In conclusion, the authors can state that the idea of establishing “lighthouses” for the population has broad appeal and despite many open questions, is being implemented in a wide range of formats. If they can be consistently safeguarded and anchored in overarching civil protection concepts, LESH have the potential to be a **key pillar of civil protection**. The consolidation of the facilities as a point of contact for local communities could strengthen the self-help potential of various population groups and in turn, contribute to **increasing the resilience** of society.

## 9 List of references

Atteslander, P. (2008). *Methoden der empirischen Sozialforschung* (12th edition). Berlin: Erich Schmidt Verlag.

Aufsichts- und Dienstleistungsdirektion Rheinland-Pfalz. (n. d.). Rahmenempfehlung Gasmangellage.

Baur, S. & Schratz, M. (2015). Phänomenologisch orientierte Vignettenforschung. Eine lernseitige Annäherung an Unterrichtsgeschehen. In M. Brinkmann, R. Kubac & S.S. Rödel (eds.), *Pädagogische Erfahrung: Theoretische und empirische Perspektiven* (pp. 159-180). Wiesbaden: Springer VS. <https://doi.org/10.1007/978-3-658-06618-5>

Bavarian State Ministry of the Interior, for Sport and Integration. (2022, December 23). Krisenvorsorge für den Fall großflächiger langandauernder Stromausfälle – insbesondere Sicherstellung der eigenen Handlungsfähigkeit.

Beerlage, I. (2016). Community Resilience. In A. Fekete & G. Hufschmidt (eds.), *Machbarkeitsstudie für einen Atlas der Verwundbarkeit und Resilienz (Atlas VR). Wissensmanagement im Bevölkerungsschutz* (pp. 30-31).

Beerlage, I. (2018). Der Setting-Ansatz in der Bevölkerungsschutzbildung: Ein Beitrag zur nachhaltigen Förderung der Resilienz der Bevölkerung. *Bevölkerungsschutz*, (4), 8-12.

Berliner Feuerwehr, Bereich Forschungsprojekte (eds.). (2015). *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (Research for civil security). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Bohne, P. (2015). Der portable Katastrophenschutz-Leuchtturm. In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 12-13). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Bröckling, U. (2012). Dispositive der Vorbeugung: Gefahrenabwehr, Resilienz, Precaution. In C. Daase, P. Offermann & V. Rauer (eds.), *Sicherheitskultur: Soziale und politische Praktiken der Gefahrenabwehr* (pp. 93-108). Frankfurt am Main: Campus Verlag.

Dombrowsky, W. R. (2013). Der Mensch als Risiko: Geht alle Gefahr vom Volke aus? In L. Hempel, M. Bartels & T. Markwart (eds.), *Aufbruch ins Unversicherbare: Zum Katastrophendiskurs der Gegenwart* (pp. 29-52). Bielefeld: transcript.

Dombrowsky, W. R. (2014). Gesellschaftliche Bedingungen eines adäquaten Katastrophenmanagement. In O. Grün & A. Schenker-Wicki (eds.), *Katastrophenmanagement: Grundlagen, Fallbeispiele und Gestaltungsoptionen aus betriebswirtschaftlicher Sicht* (pp. 23-38). Wiesbaden: Springer Fachmedien Wiesbaden.

Dülmer, H. (2022). Vignetten. In N. Baur & J. Blasius (eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 1135-1146). Wiesbaden: Springer VS. [https://doi.org/10.1007/978-3-658-37985-8\\_76](https://doi.org/10.1007/978-3-658-37985-8_76)

Flick, U. (2008). *Qualitative Sozialforschung: Eine Einführung* (rowohlts Enzyklopädie) (Vollständig überarbeitete und erweiterte Neuauflage.). Reinbek bei Hamburg: rowohlt.

Folkers, A. (2018). Was ist kritisch an Kritischer Infrastruktur?: Kriegswichtigkeit, Lebenswichtigkeit, Systemwichtigkeit und die Infrastrukturen der Kritik (Science Studies). In J.I. Engels & A. Nordmann (eds.), *Was heißt Kritikalität?: Zu einem Schlüsselbegriff der Debatte um Kritische Infrastrukturen* (pp. 123-154). Bielefeld: transcript.

Gabel, F. (2019). Chancen dynamischer Konzeptionen von Vulnerabilität für den Katastrophenschutz. In M. Krüger & M. Max (eds.), *Resilienz im Katastrophenfall: Konzepte zur Stärkung von Pflege- und Hilfsbedürftigen im Bevölkerungsschutz* (pp. 77-96). Bielefeld: transcript.

Gabel, F. (2024, 28 June). Statement on the expert hearing “Krisen- und Notfallmanagement im Kontext von Klimawandel (vulnerable Gruppen)” on 28 June 2024. Held at Study Commission II “Krisen- und Notfallmanagement – durch die Lehren der Vergangenheit die Zukunft sicher gestalten”, Landtag North Rhine-Westphalia 18th legislative period.

Geenen, E. M. (2009). Warnung der Bevölkerung. In Schutzkommission beim Bundesminister des Innern (eds.), *Gefahren und Warnung. Drei Beiträge. Schriften der Schutzkommission* (pp. 59-102). Bonn.

Geenen, E. M. (2010). *Bevölkerungsverhalten und Möglichkeiten des Krisenmanagements und Katastrophenmanagements in multikulturellen Gesellschaften* (Forschung im Bevölkerungsschutz) (Vol. 11). Bonn: Federal Office of Civil Protection and Disaster Assistance.

Gerhold, L., Peperhove, R., Lindner, A.-K. & Tietze, N. (eds.). (2021). *Schutzziele, Notfallvorsorge, Katastrophenkommunikation: Wissenschaftliche Empfehlungen für den Bevölkerungsschutz* (Sicherheit publication series of Forschungsforum Öffentliche Sicherheit) (Vol. 28). Berlin: Freie Universität Berlin.

Heidt, V., Groneberg, C., Knoch, T. & BBK. (2017). “Es überwiegt die Hilfsbereitschaft”: Ergebnisse einer Expertenbefragung mit Vertretern von Behörden und Organisationen mit Sicherheitsaufgaben.

Heidt, V., Groneberg, C., Knoch, T. & Helmerichs, J. (2017). *Bevölkerungsverhalten in Krisen und Katastrophen: Eine Auswertung naturbedingter Großschadenslagen der letzten fünfzig Jahre in Deutschland*. Available under: [https://smart-er-projekt.de/wp-content/uploads/2017/12/Auswertung\\_Bev%C3%B6lkerungsverhalten\\_Krisen\\_Katastrophen\\_Dezember\\_2017.pdf](https://smart-er-projekt.de/wp-content/uploads/2017/12/Auswertung_Bev%C3%B6lkerungsverhalten_Krisen_Katastrophen_Dezember_2017.pdf)

Hessian Ministry of the Interior and Sport. (2023). Handlungsempfehlung zur Einsatzplanung des Brand- und Katastrophenschutzes bei einer Gas-mangellage. Accessed on 23/10/2024. Available under: [https://feuerwehr.hessen.de/sites/feuerwehr.hessen.de/files/2023-03/handlungsempfehlung\\_gasmangellage\\_v1.2\\_230223.pdf](https://feuerwehr.hessen.de/sites/feuerwehr.hessen.de/files/2023-03/handlungsempfehlung_gasmangellage_v1.2_230223.pdf)

Hessian Ministry of the Interior and Sport. (n. d.). Rahmenempfehlungen zur Einsatzplanung des Brand- und Katastrophenschutzes bei flächen-deckendem, langandauerndem Stromausfall.

Holenstein, M. & Köng, A.-L. (2014, 1 January). Das Verhalten der Bevölkerung in Katastrophen und Notlagen. Literature study commissioned by the Swiss Federal Office for Civil Protection. Zurich: Risk Dialogue Foundation.

Kaczmarek, S. & Bohne, P. (2015). Überblick (Forschung für die zivile Sicherheit). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 8-9). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Kircher, F., Wienert, J. & Kaczmarek, (2016). *Kat-Leuchttürme. Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen*. Final report with brochure in sub-project: Konzipierung und Demonstration von Katastrophenschutz-Leuchttürmen bei der Berliner Feuerwehr. Berlin: Berliner Feuerwehr.



- Künzer, L. & Tomczyk, S. (eds.). (2022). *Sozialwissenschaftliche Aspekte der Warnung der Bevölkerung: Ergebnisse aus dem Forschungsprojekt SAWaB* (Forschung im Bevölkerungsschutz) (Vol. 29). Available under: [https://www.bbk.bund.de/SharedDocs/Downloads/DE/Mediathek/Publikationen/FiB/FiB-29-sozialwissenschaftliche-aspekte-warnung.pdf?\\_\\_blob=publicationFile&v=8](https://www.bbk.bund.de/SharedDocs/Downloads/DE/Mediathek/Publikationen/FiB/FiB-29-sozialwissenschaftliche-aspekte-warnung.pdf?__blob=publicationFile&v=8)
- Landtag of Baden-Württemberg, 17th legislative period (eds.). (2024, 5 June). Report and recommendations of the Study Commission “Krisenfeste Gesellschaft” (Crisis-proof society). Study Commission “Krisenfeste Gesellschaft”.
- Lawrenz, C. & Surma, M. (2015a). Der stationäre Katastrophenschutz-Leuchtturm (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 10-11). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.
- Lawrenz, C. & Surma, M. (2015b). Infrastruktur (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 20-21). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.
- Lorenz, D. (2010). *Kritische Infrastrukturen aus Sicht der Bevölkerung* (Sicherheit publication series) (Vol. 3). Berlin: Forschungsforum Öffentliche Sicherheit.
- Lukas, T. & Tackenberg, B. (2023). Sozialraumorientierung im Bevölkerungsschutz: Community Resilience und soziale Anpassung in Krisen und Katastrophen. In G.R. Wollinger (eds.), *Krisen & Prävention: Expertises 28th German Prevention Congress* (pp. 203-219). Hanover.
- Maduz, L., Prior, T., Roth, F. & Wolf, A. (2018). *Individuelle Katastrophenvorsorge: Gefährdungswahrnehmung, Kenntnisse und Informationsbedürfnisse der Schweizer Bevölkerung*. Zurich: Center for Security Studies (CSS), ETH Zurich. <https://doi.org/10.3929/ETHZ-B-000314533>
- Mähler, M., Hofinger, G., Becker, C. & Künzer, L. (2023). *Das Lagebild Bevölkerungsverhalten in der Stabsarbeit: Ergebnisse eines Forschungsprojekts* (Forschung für den Bevölkerungsschutz) (Vol. 34). Bonn: BBK. Available under: [https://www.bbk.bund.de/SharedDocs/Downloads/DE/Mediathek/Publikationen/FiB/FiB-34-labs.pdf?\\_\\_blob=publicationFile&v=3](https://www.bbk.bund.de/SharedDocs/Downloads/DE/Mediathek/Publikationen/FiB/FiB-34-labs.pdf?__blob=publicationFile&v=3)
- Mayring, P. (2016). *Einführung in die qualitative Sozialforschung: Eine Anleitung zu qualitativem Denken* (Pädagogik) (6., überarbeitete Auflage.). Weinheim, Basel: Beltz.
- Ministry of the Interior, for Digitalisation and Municipalities Baden-Württemberg. (2022, 9 September). Rahmenempfehlung für die Planung und den Betrieb von Notfalltreffpunkten für die Bevölkerung in Baden-Württemberg.
- Ministry of the Interior of the State of North Rhine-Westphalia. (2022, 29 July). Brand- und Katastrophenschutz. Vorbereitende Maßnahmen im Rahmen einer möglichen Gas-/Energiemangellage.
- Ministry of the Interior and Municipal Affairs of the State of Brandenburg. (2024a). Unterstützung der Einrichtung von Katastrophenschutz-Leuchttürmen in den Kommunen. Accessed on 17/10/2024. Available under: <https://mik.brandenburg.de/mik/de/themen/brandenburg-paket/kat-leuchttuerme/>
- Ministry of the Interior and Municipal Affairs of the State of Brandenburg. (2024b). *Katastrophenschutz-Leuchttürme (KatS-LT)*. Available under: <https://mik.brandenburg.de/mik/de/innere-sicherheit/brand-katastrophenschutz/kats-lt/#>
- Ministry of the Interior and Sport of the State of Rhineland-Palatinate. (2013, 10 April). Einsatzmaßnahmen bei Stromausfall.
- Ministry of the Interior, Construction and Digitalization of the State of Mecklenburg-Western Pomerania. (2023, 3 April). Fachliche Weisung: Abschluss der Vorbereitungen auf eine mögliche Energiemangellage.

Ministry of the Interior, Municipalities, Housing and Sport Schleswig-Holstein (eds.). (2014, 5 December). Planungshilfe für die Landesregierung und die unteren Katastrophenschutzbehörden zur Folgenbewältigung am Beispiel Stromausfall.

Ministry of the Interior, Municipalities, Housing and Sport Schleswig-Holstein. (2024a). Rahmenempfehlung für die Einrichtung von Notfallinfopunkten.

Ministry of the Interior, Municipalities, Housing and Sport Schleswig-Holstein. (2024b). Richtlinie zur Förderung von Maßnahmen auf dem Gebiet der Risiko- und Krisenkommunikation.

Nagel, R. & Barsuhn, H. (2015). Beschreibung der Software (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 18-19). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Netzwerk bürgerschaftliches Engagement in NRW. (2024). Anhörung von Sachverständigen. Held at the meeting “Gesellschaftlicher Zusammenhalt (Bürgerschaftliches Engagement im Krisenfall)” on 7 October 2024, Study Commission II “Krisen- und Notfallmanagement – durch die Lehren der Vergangenheit die Zukunft sicher gestalten”.

Ohder, C. (2018). KatLeuchttürme – Bevölkerungsnaher Katastrophenschutz. Hilfebedarfe, Hilfeerwartung und Hilfbereitschaft der Bevölkerung in Katastrophensituationen. In Federal Office of Civil Protection and Disaster Assistance (eds.), *LÜKEX 2018 conference transcript: Theme Day 2: Bedeutung einer längerfristigen Unterbrechung der Gasversorgung für den Bevölkerungsschutz* (pp. 68-77). Bonn: Federal Office of Civil Protection and Disaster Assistance (BBK).

Ohder, C., Röpcke, J., Sticher, B., Geißler, S. & Schweer, B. (2014). *Hilfebedarf und Hilfbereitschaft bei anhaltendem Stromausfall: Ergebnisse einer Bürgerbefragung in drei Berliner Bezirken*. Research report in the LESH Project. Berlin.

Ohder, C., Sticher, B., Geißler, S. & Schweer, B. (2015a). *Bürgernaher Katastrophenschutz aus sozialwissenschaftlicher und rechtlicher Perspektive: Bericht der Hochschule für Wirtschaft und Recht Berlin zum Forschungsprojekt „Katastrophenschutz-Leuchttürme als Anlaufstellen für die Bevölkerung in Krisensituationen“ (Kat-Leuchttürme)*. Final report of the project Bürgernahes Krisenmanagement aus sozialwissenschaftlicher und rechtlicher Perspektive. Berlin.

Ohder, C., Sticher, B., Geißler, S. & Schweer, B. (2015b). Sozialwissenschaftliche Erkenntnisse (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt*. Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Ohder, C., Sticher, B., Geißler, S. & Schweer, B. (2015c). Der Katastrophenschutz-Informations- und Interaktionspunkt (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 14-15). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Ohder, C., Sticher, B., Geißler, S. & Schweer, B. (2015d). *Kat-I Handbuch. Konzept, Zuständigkeiten, Kommunikationstools: Katastrophenschutz-Informations- und Interaktionspunkte als Element des bürgernahen Katastrophenschutzes*. Manual. Berlin.

Petermann, T., Bradke, H., Lüllmann, A., Poetzsch, M. & Riehm, U. (2011). *Was bei einem Blackout geschieht: Folgen eines langandauernden und großflächigen Stromausfalls* (studies by the Büro für Technikfolgen-Abschätzung (TAB) of the Deutsche Bundestag). (T. Petermann, ed.) (Vol. 33). Berlin: edition sigma.

- Pütz, T. (2024). Statement 18/1841: Anhörung als Sachverständiger (Expert hearing). Held at Study Commission II “Krisen- und Notfallmanagement – durch die Lehren der Vergangenheit die Zukunft sicher gestalten”, Landtag North Rhine-Westphalia 18th legislative period.
- Reuber, W. (2024). Praktische Erprobung des Einsatzplanes für die Bewältigung eines möglichen Blackouts im Hochtaunuskreis. Einbindung aller Kommunen und Einrichtungen bei einer Vollübung. *BrandSchutz*, 78(4), 238-244.
- Richwin, R. & Schopp, N. (2019). *Warnbedarf und Warnreaktion: Warnung der Bevölkerung aus gesellschaftswissenschaftlicher Perspektive*. (Vol. 20). Bonn.
- Richwin, R., Schopp, N. & Helmerichs, J. (2019). Der blinde Fleck: Bevölkerungsverhalten in Krisen und Katastrophen. *Bevölkerungsschutz*, (3), 29-31.
- Rick, J. (2023). Problemzentrierte Interviews online und offline: eine methodische Reflexion. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*.
- Schedel, J. (2023). Katastrophenschutz-Leuchttürme. Vom abstrakten Begriff zum gebrauchstauglichen Konzept. *brandwacht*, 2023(4), 164-167.
- Schnell, R., Hill, P. B. & Esser, E. (2008). *Methoden der empirischen Sozialforschung* (8. Auflage). Munich, Vienna: Oldenbourg Verlag.
- Schnurr, S. (2011). Vignetten in quantitativen und qualitativen Forschungsdesigns. *Empirische Forschung und Soziale Arbeit: ein Studienbuch* (1. Aufl., pp. 393-400). Wiesbaden: VS-Verl.
- Schopp, N. (2016, 15 January). *Bevölkerungsverhalten im Krisenfall: Deutungsmuster und Handlungsfolgen aus Sicht der Feuerwehren*. Master of Social Management thesis. Ostfalia University of Applied Sciences Salzgitter, Suderburg, Wolfsburg: Ostfalia University of Applied Sciences.
- Schopp, N., Fröschke, K. & Rüter, E. (2024). *Lokale Warnkonzepte: Leitfaden zum Erstellen lokaler Warnkonzepte im Bevölkerungsschutz mit Beispielen aus Mannheim und Ludwigshafen am Rhein*. Bonn: Federal Office of Civil Protection and Disaster Assistance (BBK).
- Schopp, N., Schüler, C., Schüller, L., Hahn, T., Richwin, R. & Tondorf, V. (2022). Keine Krisenbewältigung ohne Bevölkerung: Das „Lagebild Bevölkerungsverhalten“ für ein effektives Krisenmanagement. *Crisis Prevention*, (4), 36-39.
- Schuchardt, A., Peperhove, R. & Gerhold, L. (eds.). (2017). *Situationsbezogene Helferkonzepte zur verbesserten Krisenbewältigung. Ergebnisse aus dem Forschungsverbund ENSURE* (Sicherheit publication series) (Vol. 22). Berlin: Freie Universität Berlin.
- Schulze, K., Lorenz, D. & Voss, M. (2017). Menschliches Verhalten bei Katastrophen (Sicherheit publication series). In A. Schuchardt, R. Peperhove & L. Gerhold (eds.), *Situationsbezogene Helferkonzepte zur verbesserten Krisenbewältigung. Ergebnisse aus dem Forschungsverbund ENSURE* (Vol. 22, pp. 13-49). Berlin: Freie Universität Berlin.
- Schweizer, P.-J. (2023). Systemic risks. In G.R. Wollinger (eds.), *Krisen & Prävention: Expertises 28th German Prevention Congress* (pp. 39-55). Hanover.
- Schwenzien, I. (2015). Beschreibung der Hardware (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 16-17). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.
- Sticher, B. (2024, 25 June). *Katastrophenschutz-Leuchttürme: Konzept, Hintergründe und Entwicklungen aus Sicht der Sozialwissenschaftlichen Forschung*.

Stoephasius, H.-P. von, Dittes, E. & Schweer, B. (2015a). *Rechtliches Handbuch für das Katastrophenschutz-Leuchtturm-System*. Report on the research project “Katastrophenschutz-Leuchttürme als Anlaufstellen für die Bevölkerung in Krisensituationen” No. 14/2015. Berlin: Berlin School of Economics and Law.

Stoephasius, H.-P. von, Dittes, E. & Schweer, B. (2015b). Rechtswissenschaftliche Erkenntnisse (Research for civil security). In Berliner Feuerwehr, Bereich Forschungsprojekte (eds.), *Katastrophenschutz-Leuchttürme als Anlaufstelle für die Bevölkerung in Krisensituationen – ein Forschungsprojekt* (pp. 24-25). Berlin: Berliner Feuerwehr, Bereich Forschungsprojekte.

Tondorf, V. (2024, 7 October). Statement 18/1833 at the meeting “Gesellschaftlicher Zusammenhalt (Bürgerschaftliches Engagement im Krisenfall)”. Held at Study Commission II “Krisen- und Notfallmanagement – durch die Lehren der Vergangenheit die Zukunft sicher gestalten”, Landtag North Rhine-Westphalia 18th legislative period.

Wieser, P. (2023). Vorbereitet für den »Blackout«. *brandwacht*, 2023(1), 14-16.



**Co-funded by  
the European Union**