

13.10.2025, 18:00



FIRE SAFETY, WATER PROTECTION, PERMITTING

THE UNDERESTIMATED PITFALLS IN PLANNING BESS

Large-scale battery energy storage systems (BESS) are no longer just pilot projects – they are becoming the backbone of a stable and flexible energy supply. Yet, while photovoltaic and wind installations increasingly follow well-established permitting procedures, battery storage projects often encounter uncertainties. The reason: a patchwork of regulations that vary not only from federal state to federal state in Germany but also depending on the specific site.

For developers, operators, and investors, this means: failing to address these special requirements from the outset risks delays, additional costs – or in the worst case, operational interruptions, restrictions, or even legal claims after commissioning.

Fire Safety as a Key Factor

One of the central aspects in planning BESS is fire protection (Brandschutz). Modern lithium-ion systems (Lithium-Ionen-Batterien, LIB) are very safe today, but in case of failure, they can pose significant risks – from thermal runaway (thermisches Durchgehen) to fires.

Binding, uniform regulations are still lacking. Guidance can be found in, among others:

- The leaflet “**Erkenntnisse zu Batteriespeicheranlagen mit Lithium-Ionen-Batterien**” from the Technical-Scientific Advisory Board (Technisch-Wissenschaftlicher Beirat, TWB) of the Association for the Promotion of Fire Protection (Vereinigung zur Förderung des Deutschen Brandschutzes e.V., vfdb).
- The leaflet on handling lithium-ion batteries according to the German Ordinance on Installations Handling Water-Endangering Substances (AwSV – Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen), developed by the Federal-State Working Group (Bund-Länder-Arbeitskreis).

These guides provide recommendations for:

- Evaluation of primary safety measures
- Classification according to hazardous materials classes (Gefahrgutklassen)
- General preventive fire protection measures
- Clearance distances (Abstandsflächen)
- Containment of leaks
- Containment of firefighting water
- Etc.

However, which measures must be implemented depends heavily on site-specific conditions – a storage facility in a water protection area (Wasserschutzgebiet) has different requirements than a project in an industrial zone.

Legal and Permitting Gray Areas

Unlike traditional power plants, regulations for battery storage are not yet fully standardized. For operators, this entails:

- Different requirements depending on federal state, county, or even the specific site
- Individual conditions in building permits (Bauantragsauflagen) with varying emphasis
- Legal uncertainties due to norms not yet harmonized nationwide

These gray areas pose risks for project planning – especially when financial commitments (e.g., PPA contracts) are based on fixed commissioning dates.

Best Practices for Planning:

To ensure that large-scale BESS are reliably permitted and operated safely, the following steps are recommended:

1. **Early coordination with authorities and experts** – to clarify site-specific requirements for fire safety, water protection, or noise regulations.
2. **Integration of multi-layered safety concepts** – most manufacturers now offer comprehensive, multi-stage safety measures to minimize risks, from continuous cell monitoring and high-temperature-resistant spacers between cells to aerosol and water-based fire suppression systems.

3. **Choosing the right manufacturer/system** – only solutions that meet all relevant fire safety requirements are future-proof. Given the variety of manufacturers and highly site-dependent conditions, a thorough evaluation of the offered solutions is crucial.
4. **Engaging specialized expertise** – technical advice and, if necessary, legal support take specific customer requirements into account and help streamline procedures while reducing liability risks.

Responsibility Beyond the Project Fence

Large-scale BESS do not exist in isolation. Operators bear responsibility toward the environment, residents, and public perception. A fire incident can have far-reaching consequences for nature, safety, and societal acceptance alike.

This is why the extra effort for robust, comprehensive concepts pays off: projects that proactively consider all relevant aspects gain permitting certainty and build trust with authorities, investors, and the public.

Conclusion: Guidance Instead of Uncertainty

The market for battery storage is growing rapidly – yet permitting practices lag behind. Until nationwide uniform regulations are established, it is the responsibility of developers and operators to provide orientation: through meticulous planning, engagement with fire and environmental experts, and legally sound concepts.

This approach transforms the regulatory patchwork from a stumbling block into a manageable framework for sustainable, safe, and economically successful large-scale battery energy storage projects.

Note: *This article reflects our practical experience and is not a substitute for legal advice.*

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