

## Resources for the Energy Industry

# Lithium-Ion Battery Energy Storage Systems (BESS) Risks



By Travelers

⌚ 57 minutes



There is growing demand for lithium-ion battery energy storage systems (BESS), and for good reason. Consumers, businesses and public and private organizations can benefit greatly from BESS. Benefits include cost savings through time-shifting (i.e., storing energy when the cost is low for use during times when energy is expensive), improved quality of power supply and availability of emergency backup power.

According to the U.S. Department of Energy, the lithium-ion battery energy storage segment is the fastest-growing rechargeable battery segment worldwide and is projected to make up the majority of energy storage growth across the stationary, transportation and consumer electronics markets by 2030.<sup>1</sup>

## What is a BESS?

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# What are the hazards of lithium-ion battery energy storage?

While lithium-ion BESS offer multiple benefits, they can also present significant hazards. Understanding the risks and having a plan in place to address them is an important consideration when adding a BESS to your home or business electrical system.

## Fire hazards

Understanding the unique fire risks presented by BESS is critical. Some fire suppression systems may be ineffective, and improper firefighting techniques can worsen the outcome, potentially causing additional harm to people and property.

A battery fire can generate chemical gases with potential to cause an explosion, especially if they are not properly ventilated. If a fire occurs, emergency response efforts must be tailored for the individual BESS site.

Fires in a BESS are often a result of a process called thermal runaway. This occurs when a battery cell creates heat that it cannot adequately dissipate. The resulting dynamic temperature increase in the cell and adjacent cells creates a cascading effect. This phenomenon can occur in a battery cell that has internal defects or mechanical damage, been exposed to heat from an external source or been overcharged, or it may be due to a battery management system failure and/or malfunction.

Key controls for BESS owners to prevent and/or mitigate fire losses include:

- Proper handling and installation.
- Effective operations and maintenance (O&M) performed by qualified personnel.
- Adequate protection from vehicle/equipment damage (e.g., bollards).
- Collaboration with the fire department to develop a fire response plan that accounts for:
  - BESS chemistry
  - Location
  - Protective features (such as fire suppression and explosion venting)
- Knowledge of manufacturer-specific requirements (e.g., maintenance frequency/intervals).
- Effective battery management system (BMS) monitoring.
- Other site-specific considerations.

## Chemical release hazards

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## Chemical release hazards

Chemicals contained within a battery can be released during a fire and may create an explosion. Chemical releases can also contribute to liquid pollution when mixed with firefighting water, potentially contaminating soil or groundwater.

Key controls to help prevent losses related to chemical release include:

- Proper site design that contemplates water management (e.g., berms, dikes, drainage) and equipment location.
- Proactively developing proper containment systems.
- Thorough emergency preplanning.

## Stranded energy hazards

When batteries are damaged, they can still contain energy. This “stranded” energy should be dissipated prior to interaction with or removal of impacted cells. If not handled properly, the damaged batteries could cause injury, including electrical shock.

**Only qualified personnel should perform maintenance and repair work on BESS.** BESS owners consider the following for preventing stranded energy-related losses:

- Proper contractor selection for installation and ongoing O&M (e.g., proper high-voltage training where applicable, effective lockout/tag-out protocols).
- Preventing unauthorized personnel from accessing BESS.

## How might lithium-ion BESS hazards affect your organization?

As you weigh the benefits and costs associated with owning and operating a BESS, it's important to consider the potential exposures and how they may impact your organization's personnel and property. Consider working with an insurance carrier that has in-depth experience in the renewable energy industry.

Travelers works with customers across the United States who own and operate battery energy storage systems. Our experienced team of Risk Control professionals is well-versed in both battery risks and fire protection. Through collaboration, we provide customers with tailor-made solutions and services addressing renewable risks and exposures.

Learn more about Travelers' expertise in [renewable energy](#). Ask your insurance agent how a robust insurance program from Travelers can help protect your organization.

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