



# Stored Energy Fire Suppression System

What is battery energy storage fire prevention & mitigation?

In 2019, EPRI began the Battery Energy Storage Fire Prevention and Mitigation - Phase I research project, convened a group of experts, and conducted a series of energy storage site surveys and industry workshops to identify critical research and development (R&D) needs regarding battery safety.

What should first responders know about energy storage systems?

This document provides guidance to first responders for incidents involving energy storage systems (ESS). The guidance is specific to ESS with lithium-ion (Li-ion) batteries, but some elements may apply to other technologies also. Hazards addressed include fire, explosion, arc flash, shock, and toxic chemicals.

How do ESS fire protection systems work?

While these layers of protection help prevent damage to the system, they can also block water from accessing the seat of the fire. So, large amounts of water are needed to effectively combat the heat generated from ESS fires, and cooling the hottest part of the fire is often difficult.

Where can I find information on energy storage failures?

For up-to-date public data on energy storage failures, see the EPRI BESS Failure Event Database.<sup>2</sup> The Energy Storage Integration Council (ESIC) Energy Storage Reference Fire Hazard Mitigation Analysis (ESIC Reference HMA),<sup>3</sup> illustrates the complexity of achieving safe storage systems.

Are battery energy storage systems safe?

Owners of energy storage need to be sure that they can deploy systems safely. Over a recent 18-month period ending in early 2020, over two dozen large-scale battery energy storage sites around the world had experienced failures that resulted in destructive fires. In total, more than 180 MWh were involved in the fires.

Why is fire suppression a last line of Defense?

Fire suppression is the last line of defense. The discharge of agent means that all other interventions have failed. However, the nature in which batteries fail and their very design make total extinguishment challenging. After gas detection, the next opportunity for fire detection is by the production of smoke.

a fire suppression system that effectively extinguishes the battery fire and 2) incorporating explosion vents to release burning gases and avoid over-pressurization of enclosures upon ...

Energy Storage Systems Fire Protection NFPA 855 - Energy Storage Systems (ESS) - Are You Prepared?  
Energy Storage Systems (ESS) utilizing lithium-ion (Li-ion) batteries are the primary infrastructure for wind turbine farms, solar ...

Relying on these gauges to indicate the readiness of the system would be risky. The working condition of a

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fire suppression system cannot be revealed simply by the status of a pressure gauge. The condition of the ...

CAFS can be used in a variety of ways, but is most commonly used in a stored-energy assembly; truck-mounted & response vehicle units, and fixed installations. Burner Fire Control ...

This animation shows how a Stat-X &#174; condensed aerosol fire suppression system functions and suppresses a fire in an energy storage system (ESS) or battery energy storage systems (BESS) application with our electrically operated ...

NFPA 855 requires that any facility with a lithium-ion battery energy storage system should be equipped with an adequate special hazard fire protection system, namely an explosion protection device. While there are a ...

Given the special hazard nature of lithium-ion BESSs, special fire suppression systems are in order. Traditional fire suppression systems are often ineffective or inefficient. Take sprinkler ...

CAFS Compressed Air Foam Systems are self contained stored-energy fire suppression units which have the added ability to inject compressed air into the foam solution to generate a powerful fire attacking and suppression foam. This ...

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