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Submitted On: 2/25/2026
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**Comments in response to ESRG -Technical Clarifications on
Modern Utility-Scale BESS Design, Safety and Emergency
Response**

Please accept these comments in response to ESRG -Technical Clarifications on Modern Utility-Scale BESS Design, Safety and Emergency Response submitted on 2-19-26

Additional submitted attachment is included below.

BESS Failure Incident Database

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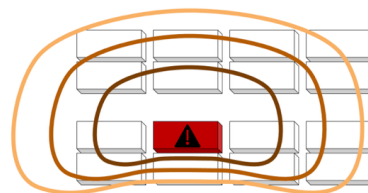
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Stationary Energy Storage Failure Incidents

Other Energy Storage Failure Incidents



About EPRI's Battery Energy Storage System Failure Incident Database

The database compiles information about stationary battery energy storage system (BESS) failure incidents. There are two tables in this database:

- Stationary Energy Storage Failure Incidents – this table tracks utility-scale and commercial and industrial (C&I) failures.
- Other Storage Failure Incidents – this table tracks incidents that do not fit the criteria for the first table. This could include failures involving the manufacturing, transportation, storage, and recycling of energy storage.

Residential energy storage system failures are not currently tracked.

If you would like to be notified when a new event is added to this database or are interested in other EPRI energy storage safety research resources and opportunities please reach out to Storage-Safety@epri.com (mailto:Storage-Safety@epri.com). For more information on energy storage safety, visit the [Storage Safety Wiki Page](https://storagewiki.epri.com/index.php/Storage_Safety) (https://storagewiki.epri.com/index.php/Storage_Safety).

About the BESS Failure Incident Database

The BESS Failure Incident Database^[1] was initiated in 2021 as part of a wider suite of BESS safety research after the concentration of lithium ion BESS fires in South Korea and the Surprise, AZ, incident in the US. The database was created to inform energy storage industry stakeholders and the public on BESS failures.

Tracking information about systems that have experienced an incident, including age, manufacturer, chemistry, and application, could inform R&D actions taken by the industry to improve storage safety. The focus of the database is on incidents that had a wider public health and safety impact, rather than on operational failures. Some helpful definitions follow:

- BESS: A stationary energy storage system using battery technology. The focus of the database is on lithium ion technologies, but other battery technology failure incidents are included.
- Failure incident: An occurrence caused by a BESS system or component failure which resulted in increased safety risk. For lithium ion BESS, this is typically a thermal risk such as fire or explosion.
- Utility-scale: This refers to systems and projects that are interconnected to the grid.
- C&I: This includes systems and projects that are behind-the-meter installations. Residential system failures are not currently tracked. Note that the Stationary Energy Storage Failure Incidents table tracks both utility-scale and C&I system failures.

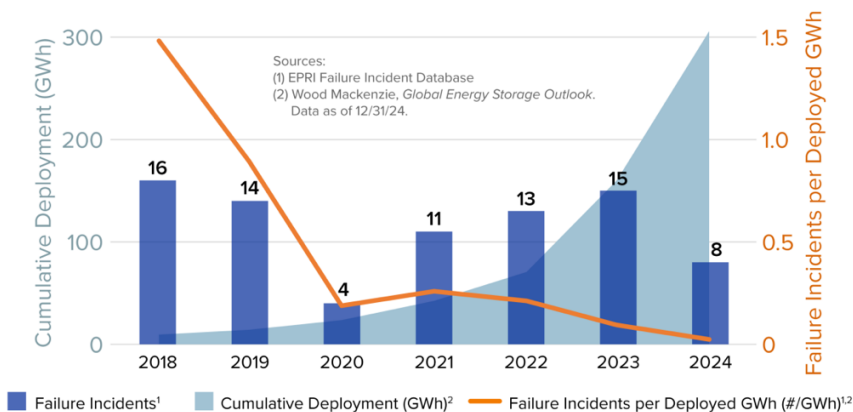
The Data in Context

It is instructive to compare the number of failure incidents over time against the deployment of BESS. The graph to the right looks at the failure rate per cumulative deployed capacity, up to 12/31/2024. Note, this graph utilizes GWh units for the deployment and failure rate, unlike the previous version of the graph which utilized GW units. The global installed capacity of utility-scale BESS has dramatically

increased over the last five years, and while failure incidents continue to occur, the overall rate of incidents has sharply decreased. The failure rate dropped by 98% from 2018 to 2024 as lessons learned from early failures have been incorporated into the latest designs and best practices.

The battery industry continues to engage in R&D activities to improve risk reduction measures.

Global Grid-Scale Storage Deployment and Failure Statistics



Root Cause Categorization

The database includes the cause of failure for each incident, where available. EPRI, TWAICE, and the Pacific Northwest National Laboratory (PNNL) collaborated on an effort to classify the root cause of each incident in the database. The team used the best available information to categorize root cause (e.g., design; manufacturing; integration, assembly & construction; operation; or combination thereof) and the physical location of failure (e.g., cell/module, controls, balance-of-system equipment) to broadly classify the incidents for later comparison and contrast. These are based on technical details in the publicly available reporting, personal communications with entities involved and engineering judgement by industry experts. The published report [Insights from EPRI's Battery Energy Storage Systems \(BESS\) Failure Incident Database: Analysis of Failure Root Cause](https://www.epri.com/research/products/00000003002030360) (<https://www.epri.com/research/products/00000003002030360>) contains the methodology and results of this root cause analysis.

Database Methodology

The information in this database is gathered from media reports and other public documents, such as released root cause analyses (RCA) or corporate press releases. Source documents are identified by active searching of global English-language media, and passive collection of reports through keyword flagging on internet websites and RSS feeds. Crowdsourced information that can be verified through publicly available documentation is also incorporated.

All linked citations have been downloaded (or subsequently re-located on InternetArchive or WayBackMachine after removal), to preserve the available information from each incident.

The database was begun in 2021, though it includes incidents as far back as 2011. EPRI engages in every effort to ensure that the information in the database is complete and accurate. Outside of online media, EPRI has used academic publications and collaborated with other organizations tracking failures to ensure all known incidents are captured. However, many incidents are not reported in news media, especially before 2018-19 when there was a renewed industry focus on safety. EPRI cannot guarantee that the database captures every relevant BESS failure incident, nor can we guarantee that all project data related to an incident is captured. If you are aware of missing data, please contact our Storage-Safety@epri.com (<mailto:Storage-Safety@epri.com>).

Once an incident is identified, EPRI reaches out to involved parties for interviews whenever possible, and then links to formal reports released by any investigative entities once they are published. EPRI is also occasionally involved in RCAs or technical evaluations of incidents directly. For example, EPRI provided technical support for the investigation of the Carnegie Road, UK incident (https://storagewik.i.epri.com/index.php/Failure_Event_-_UK,_Liverpool_-_15_Sep_2020) in 2020, and published a report (<https://www.epri.com/research/products/00000003002026396>) on the findings.

The included incidents are intended to reflect global activity. As of January 2024 for example, 2 from China and 2 from Taiwan, 9 from Europe, and tens of incidents from South Korea, including 4 in 2022, are currently included. However, the database is necessarily limited to public reporting, and may have missed incidents with minimal or local-only media coverage. Our automated alerts may not capture local language sources, which is why we engage in outreach and publicizing of the database. EPRI has reports from several recent incidents in Taiwan and South Korea that use local language sources and have paid to get translations where applicable. Substantial time has been spent to make sure incident information is accurate, and EPRI continues to corroborate incidents using other sources and update incidents (both new and old) regularly.

Database Citation

You are welcome and encouraged to use this database and cite it; the preferred format is below:

EPRI BESS Failure Incident Database. Accessed MM/DD/YYYY.
https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database.

If the database is the centerpiece of an analysis, we request that you reach out to EPRI at Storage-Safety@epri.com (mailto:Storage-Safety@epri.com) for review of the data application. We have a wealth of information on many BESS safety topics (https://storagewiki.epri.com/index.php/Storage_Safety) that can bolster your study and provide needed context. We are also tracking applications of the database to solicit continued EPRI support for maintenance. If you find this useful, please let us know!

Stationary Energy Storage Failure Incidents

This table tracks utility and C&I scale energy storage failure incidents with publicly available information.

- Click here to download a csv version of the data in this table. (https://storagewiki.epri.com/resources/assets/BESS_Failure_Database/Failure_DB_List.csv)

Note: Missing values in this table reflect unknowns.

Show 10 entries Search: Export

Location	Energy (MWh)	Power (MW)	Module Type	Application	Installation	Event Date	System Age (yr)	State During Accident	Source
US, CA, San Marcos			Li ion	EV charging	Parking lot	21 January 2026			San Diego Union-Tribune (https://www.sandiegouniontribune.com/2026/01/21/fire-damages-battery-storage-system-that-powers-tesla-chargers-in-san-marcos/)
US, NY, Warwick	17.9	4	Li ion	Peak shaving		19 December 2025			Village of Warwick (https://villageofwarwickny.gov/28-church-street-west-warwick-3-battery-energy-storage-site-fire-information-updates/)
US, AZ, Peoria	100	25	Li ion	Peak shaving	Substation	1 October 2025	4	Operational	AZ Family (https://www.azfamily.com/2025/10/02/multiple-agencies-fighting-fire-battery-storage-facility-glendale/)

<u>US, NV, Boulder City</u>	360	90	Li ion	Solar shifting	Solar + storage	23 September 2025	3.8	KTNV (https://www.ktnv.com/news/fire-breaks-out-at-townsite-solar-in-boulder-city)
<u>US, CA, Parkfield</u>	240	60	NMC	Solar integration	Solar + storage	30 August 2025	4	Monterey County Sheriff's Office (https://mcsocoountyofmonterey.gov/press-releases/press-release-evacuation-order-lifted-for-area-southeast-of-parkfield-california)
<u>Netherlands, Almelo</u>					Commercial	4 August 2025		112 Nieuws (https://112nieuws.net/2025/08/04/uitslaande-brand-in-accupakket-meerdere-brandweerwagens-ter-plaatse/?feed_id=28524&_unique_id=6890f306a9e62)
<u>South Korea, Gyeongsangbuk-do, Songdong-ri</u>				Industrial	Indoor	16 June 2025		News1 (https://www.news1.kr/local/dae-gyeon-gbuk/5816697)
<u>South Korea, Gyeongsangbuk-do, Pohang City</u>			Li ion	Industrial	Building	16 June 2025	Operational	Yonhap News Agency (https://www.yonhapnewsagency.com/view/16062651053?site=map_ping_related)
<u>US, OR, Hillsboro</u>				Data center	Data center	22 May 2025		Fox 12 (https://www.kptv.com/2025/05/23/fire-hillsboro-data-

England,
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Li ion

Solar shifting

Solar +
storage

28 March
2025

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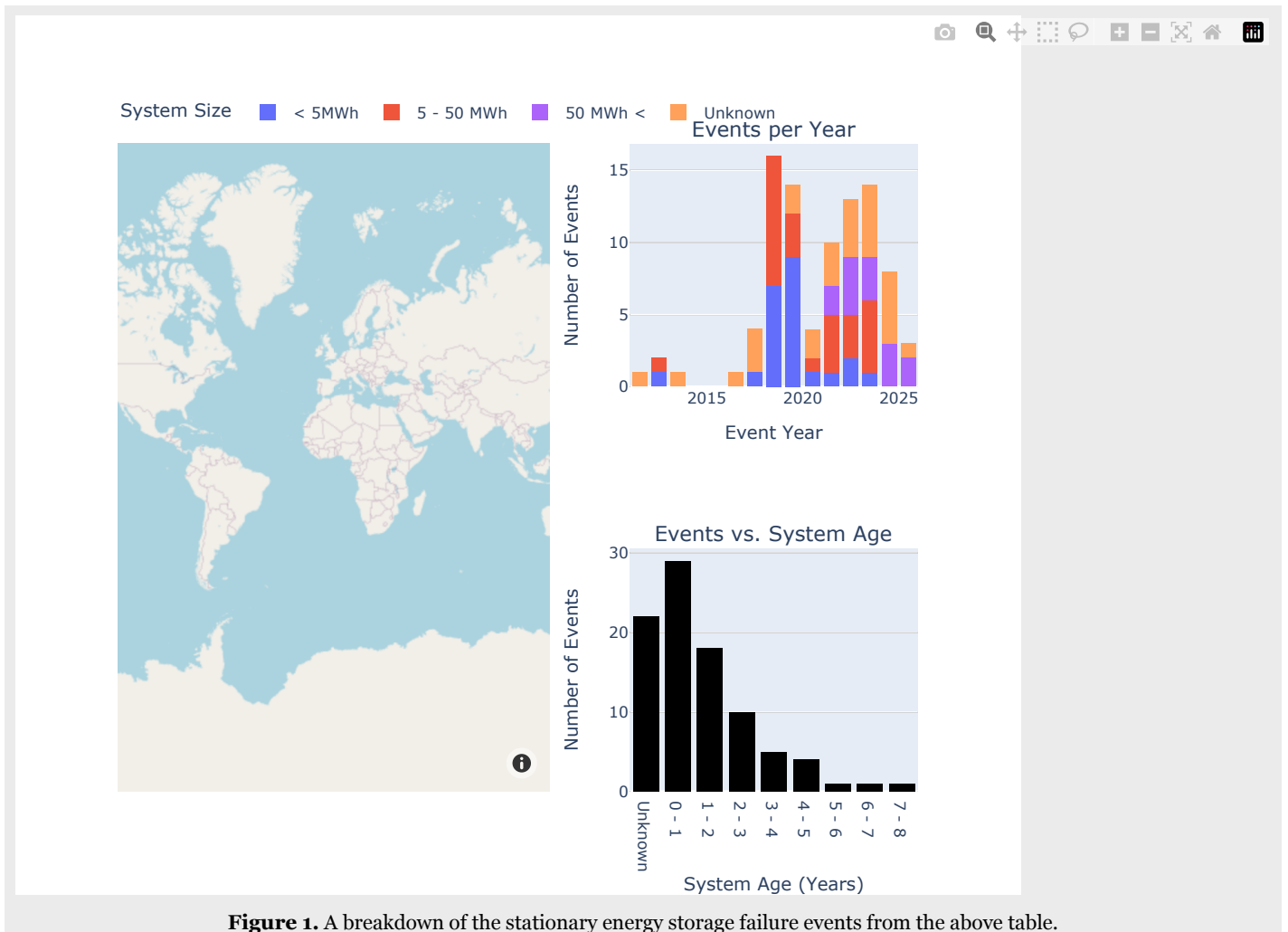


Figure 1. A breakdown of the stationary energy storage failure events from the above table.

Other Energy Storage Failure Incidents

This table tracks other energy storage failure incidents for scenarios that do not fit the criteria of the table above. This could include energy storage failures in settings like electric transportation, recycling, manufacturing, etc.

Note: Missing values in this table reflect unknowns.

Show 10 entries

<u>Location</u>	<u>Setting</u>	<u>Capacity (MWh)</u>	<u>Capacity (MW)</u>	<u>Operator / Integrator</u>	<u>Event Date</u>	<u>System Age (yr)</u>	<u>State During Accident</u>	<u>Description</u>	<u>Source</u>
<u>Ireland, Claregalway</u>	Battery manufacturer			Xerotech	29 January 2025		Stored in container	Fire started in a shipping container used to store battery modules at Xerotech battery facility. Damaged batteries were isolated to prevent spread to other parts of facility. Crews have been using water to moderate overheating. Water is being recirculated to prevent runoff contamination.	<u>Connacht Tribune (https://connachttribune.ie/battery-fire-incident-in-claregalway-now-contained/)</u>
<u>US, MO, Fredericktown</u>	Battery recycling			Critical Mineral	30 October			A fire and explosion occurred at a lithium ion battery recycling plant. Residents north and west of Fredericktown were told to evacuate if they could smell smoke. The evacuation order was revised within a couple hours to cover only residents (approx. 25 homes) living on the same road as the recycling plant. Other residents were asked to shelter in-place. The fire was controlled	<u>Missouri Independent (https://missouriindependent.com/briefs/fire-erupts-in-southe</u>

<p>plant</p>	<p>Recovery</p>	<p>2024</p>	<p>after 3 days and hot spots requiring fire suppression remained 8 days later. The EPA conducted air monitoring and found that concentrations of contaminants remained below thresholds. 2 days after the fire broke out, a 3 mile fish kill was discovered in Little St. Francis River. Firefighting foam is hypothesized to be the cause. Drinking water was not affected.</p>
<p><u>US, CA, San Pedro</u></p> <p>On road during transport</p>	<p>26 September 2024</p>	<p>In transit</p>	<p>A truck hauling 60,000 lbs of lithium ion batteries overturned and resulted in a deflagration and a fire. The freeway and bridge were shut down along with 6 port terminals. Firefighters utilized a defensive firefighting strategy to monitor and contain the fire. After 24 hours, the smoldering container was moved off the road to an open lot for monitoring, and the roads were re-opened after</p> <p><u>LB Post (https://lbpost.com/news/truck-batteries-bridge-long-beach-los-angeles-port-fire-how-long/)</u></p>

				hazardous materials were cleared.	
<u>Canada, Montreal</u>	Temporary storage at a port	23 September 2024		A container storing 15,000 lbs of lithium ion batteries on land caught fire at the Port of Montreal. Firefighters sprayed the container with water to cool it without opening the container. The City of Montreal ordered a lockdown for nearby residents due to concerns about the smoke.	CTV News
<u>US, NV, Nye County</u>	On highway during transport	17 September 2024	In transit	A semi-truck hauling lithium ion batteries sideswiped another semi-truck headed in the opposite direction, shortly after midnight on I-95. The resulting fire was extinguished and the road cleared by a HAZMAT crew. The road was reopened approximately 18h after the crash was reported.	Review Journal (https://www.reviewjournal.com/local/local-nevada/semi-carrying-31k-pounds-of-lithium-batteries-catches-fire-outputs-las-vegas-3171230/)
				A group of batteries that was intended for disposal and was being temporarily stored at the site caught fire. An employee used a forklift to move the	PV Magazine (https://www.pv)

<u>Germany, Thuringia</u>	Temporary storage	Suncycle	11 August 2024	Temporarily stored onsite; not interconnected	burning storage unit to prevent propagation, and was suffered minor injuries due to the fumes and smoke. This incident is the third in a series of incidents at the Suncycle site.	v-magazine.com/2024/08/13/third-battery-fire-at-the-same-site-in-germany/
<u>US, South Carolina, Seneca</u>	Manufacturing	BorgWarner	8 August 2024	Battery on assembly line	A lithium ion battery caught fire on the assembly line at a manufacturing facility. The fire department got the fire under control after 2.5 hours.	WSPA
<u>US, CA, Baker</u>	On highway during transport		26 July 2024	In transit	A truck hauling lithium ion batteries was involved in a crash, overturning the truck and resulting in a fire. The I-15 freeway, a major artery between South California and Las Vegas, was shut down for two days. Several drivers stuck in the resulting traffic and high temperatures of the day experienced heat-related medical issues.	CBS (https://www.cbsnews.com/losangeles/news/hazmat-fire-15-freeway-shutdown-in-baker-leads-to-heat/)
					This incident is the second in a series of incidents at the Suncycle	

<p><u>Germany, Thuringia</u></p>	<p>Suncycle</p>	<p>30 June 2024</p>	<p>site. The fire department used a controlled burn approach to avoid costly disposal of contaminated firewater. The fire was extinguished after 12 hours. Nearby residents were advised to keep windows closed due to smoke.</p> <p>MDR.DE (https://www.mdr.de/nachrichten/thueringen/mitte-tueringen/arpolda-weimarer-land/issroda-container-brand-feuer-102.html)</p>
<p><u>South Korea, Hwaseong</u></p>	<p>Manufacturing</p>	<p>Aricell</p>	<p>A single battery cell in the factory caught fire and spread to the 35,000 battery cells stored on the factory's second floor, producing a series of explosions. 22 workers were killed and 8 were injured in the fire.</p> <p>New York Times (https://www.nytimes.com/2024/06/24/world/asia/lithium-battery-fire-south-korea.html)</p>

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1. This database was formerly known as the BESS Failure Event Database. It has been renamed to the BESS Failure Incident Database to align with language used by the emergency response community. An 'incident' according to the Federal Emergency Management Agency (FEMA) is an occurrence, natural or man-made, that requires an emergency response to protect life or property, while an 'event' is a planned, non-emergency activity. The use of incident is prevalent, for example, in referring to the Incident Command, or Incident Command System used by public and private agencies to coordinate incident management operations. See <https://www.fema.gov/pdf/emergency/nrf/nrf-glossary.pdf>

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