

<b>DOCKETED</b>	
<b>Docket Number:</b>	24-OPT-05
<b>Project Title:</b>	Corby Battery Energy Storage System Project
<b>TN #:</b>	260474
<b>Document Title:</b>	Wendy Breckon Comments - Comment Opposing Approval of Corby BESS opt-in Application
<b>Description:</b>	N/A
<b>Filer:</b>	System
<b>Organization:</b>	Wendy Breckon
<b>Submitter Role:</b>	Public
<b>Submission Date:</b>	12/4/2024 4:48:11 PM
<b>Docketed Date:</b>	12/4/2024

*Comment Received From: Wendy Breckon  
Submitted On: 12/4/2024  
Docket Number: 24-OPT-05*

## **Comment Opposing Approval of Corby BESS opt-in Application**

Attaching NFPA document entitled, "Risk of Lithium Battery Storage Systems". There are no safe methods of preventing thermal fire and the release of toxics in Lithium-Ion Battery Storage Systems. There are safer alternative battery storage systems that have not been considered.

*Additional submitted attachment is included below.*

# Risks of Lithium-ion Battery Energy Storage Systems (BESS)

## What are the hazards associated with lithium-ion BESS?

### Thermal Runaway/Failures (Battery Fires)

Rapid uncontrolled release of heat energy from a battery cell; it is a condition when a battery creates more heat than it can effectively dissipate. Thermal runaway in a single cell can result in a chain reaction that heats up neighboring cells. As this process continues, it can result in a **battery fire or explosion**. This can often be the ignition source for larger battery fires.

### Toxic and Flammable Gases Generated

Most batteries create **toxic and flammable gases** when they undergo thermal runaway. If the gases do not ignite before the lower explosive limit is reached, it can lead to the creation of an explosive atmosphere inside of the ESS room or container.

### Fires can burn for days and can reignite later

Additionally, there could also be stranded energy. As with most electrical equipment there is a shock hazard present, but what is unique about ESS is that often, even after being involved in a fire, there is still energy within the ESS. This is difficult to discharge since the terminals are often damaged and presents a hazard to those performing overhaul after a fire. Stranded energy can also cause **reignition of the fire hours or even days later.**

Source: NFPA (<https://www.nfpa.org/forms/energy-storage-systems-safety-fact-sheet> )

## What toxins could be in the smoke from a lithium battery fire?

“They can feature high percentages of hydrogen, and compounds of hydrogen, including hydrogen fluoride, hydrogen chloride and hydrogen cyanide, as well as carbon monoxide, sulphur dioxide and methane, among other dangerous chemicals. In terms of hazards to the well-being of those in the vicinity of such an incident, one particularly problematic component is hydrogen fluoride (HF).

Although HF is lighter than air and would disperse when released, a cloud of vapor and aerosol that is heavier than air may be formed (EPA 1993). On exposure to skin or by inhaling, HF can result in skin burns and lung damage that can take time (hours to weeks) to develop following exposure. HF will be quickly absorbed by the body via skin and lungs depleting vital calcium and magnesium levels in tissues, which can result in severe and possibly fatal systemic effects.

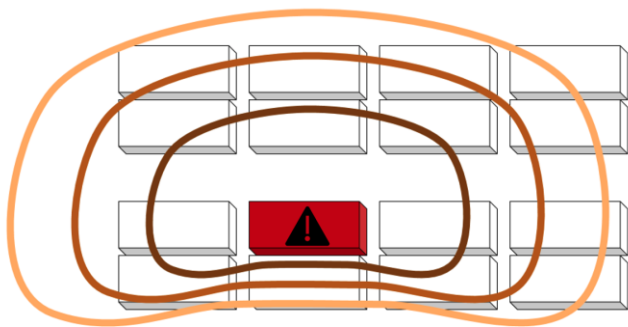
The hydrogen content of the released gases can give rise to vapor cloud explosion risks which have the potential to cause significant damage.” Source: <https://www.strategic-risk-global.com/catastrophe-risk/spotlight-on-health-risks-from-gases-released-in-lithium-ion-battery-fires/1445595.article>

## How often does this happen?

Since 2018, there have been 75 documented large scale battery storage fires worldwide and 21 battery storage fires in the USA and the numbers are increasing.

National Electric Power Research Institute (NEPRI) has created a database that documents these incidents in one place. The database has the location, size of system, age of system and an accompanying news article attached. See link:

Source: National Electric Power Research Institute Database on BESS fires:  
[https://storagewiki.epri.com/index.php/BESS\\_Failure\\_Event\\_Database](https://storagewiki.epri.com/index.php/BESS_Failure_Event_Database)



## Additional Information

“A six-year audit by Denver-based consultancy Clean Energy Associates (CEA) found quality issues in components that identify and suppress fire in 26% of battery energy storage systems (BESS) and defective components that manage temperature in 18%.”

(Source: <https://www.rechargenews.com/energy-transition/fire-safety-tech-manufacturing-defects-in-more-than-a-quarter-of-grid-battery-storage-systems-study/2-1-1607937>)

A newer battery type, lithium iron phosphate (LFP) has a slightly higher temperature tolerance and is frequently being used instead of lithium-ion chemistry for large scale BESS. (Source examples: manufacturer fact sheet for lithium-ion Batteries: Fluence 113 F, vs. Powin manufacturer fact sheet for LFP batteries 122 F)

*However*, there have been recent battery failure events using LFP as noted in the EPRI database as recent as October 2023. **Five out of the seven** lithium BESS fires that occurred in 2023 were LFP chemistry. Four out of five of those systems *were less than two years old*.

Source: Source: National Electric Power Research Institute Database on BESS fires:  
[https://storagewiki.epri.com/index.php/BESS\\_Failure\\_Event\\_Database](https://storagewiki.epri.com/index.php/BESS_Failure_Event_Database)


# Historically, what has happened?

Residents living or working in proximity to lithium BESS have been ordered to **evacuate or shelter in place** during incidents of failure or fire events due to the toxins in smoke. Roads and/or highways can be **closed** due to hazmat conditions. Fires can burn for multiple days.

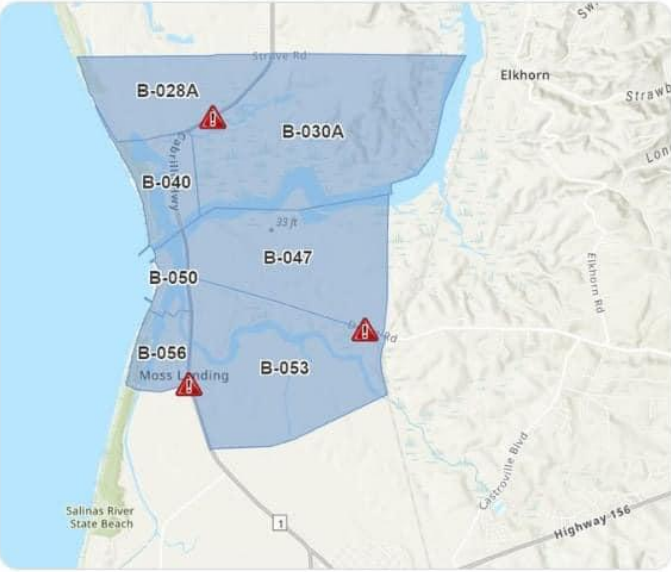
Here are some examples of documented battery fires:

## MOSS LANDING, CA SEPTEMBER 20, 2022 AT 1:30AM

- 1:30 a.m. battery fire started
- 6:59 a.m. Closed 8 mile stretch on Hwy 1 for 12 hours
- 9:18 a.m. Residents in a 4 mile radius were ordered to shelter in place close windows and ventilation systems to outside air
- Fire burned for more than 12 hours and continued to smolder
- 5:00 p.m. The EPA started air quality test
- 6:50 p.m. shelter in place lifted and roads opened
- Because of delays in notifying residents- State Bill 38 was created and requires BESS to establish safety and communication protocols
- Sources: [Highway 1 in Moss Landing shut down for hours due to PG&E battery plant fire \(ktvu.com\)](https://www.ktvu.com/highway-1-in-Moss-Landing-shut-down-for-hours-due-to-PG&E-battery-plant-fire)  
<https://www.ksbw.com/article/highway-1-reopened-near-moss-landing-shelter-in-place-lifted/41302918>

 **MontereyCoInfo**  
@MontereyCoInfo

Shelter in Place Advisory zones in Moss Landing are now available on an interactive map, please, visit the direct interactive map for easier viewing: [tinyurl.com/mryyf5f5](https://tinyurl.com/mryyf5f5)  
#MossLandingIncident



12:04 PM · Sep 20, 2022

31 Retweets 5 Quotes 29 Likes 2 Bookmarks



## EAST HAMPTON, NY – MAY 31ST 2023 - BATTERY STORAGE SMOLDERING

- Caused trains to halt and closed roads due to hazmat conditions
- Internal sprinklers turned on to contain fire for roughly 30 hrs
- Soil testing was done by BESS owner to screen for groundwater pollution

Source : [Roads Closed, Trains Halted Over 'Smoldering Battery' | The East Hampton Star](#)



## WARWICK, NY JUNE 2023- BATTERY STORAGE FIRE AT A SCHOOL

- Evacuations and shelter in place orders for ¼ mile from site
- Fire burned 3 days duration, continued to smolder for several days
- Bitter smell reported for miles

Source: [https://hudsonvalley.news12.com/fire-at-battery-storage-facility-burns-off-combustible-material?fbclid=IwZXh0bgNhZW0CMTAAR3hcf8ctQTc1NTWMMpzZR0k04iYPAE0fp2WU0v3uRzhnv3f9epg5qKXVXQ\\_aem\\_AfkDG0inVHNjmeYANGH662-pHLLt2ygbyRQUwRLkJA8xPYM1oIPKsVWXmCmNebtFgsW4titxoeD2VZwGKtL4d-R](https://hudsonvalley.news12.com/fire-at-battery-storage-facility-burns-off-combustible-material?fbclid=IwZXh0bgNhZW0CMTAAR3hcf8ctQTc1NTWMMpzZR0k04iYPAE0fp2WU0v3uRzhnv3f9epg5qKXVXQ_aem_AfkDG0inVHNjmeYANGH662-pHLLt2ygbyRQUwRLkJA8xPYM1oIPKsVWXmCmNebtFgsW4titxoeD2VZwGKtL4d-R)



## CHAUMONT, NY – JULY 27<sup>TH</sup> 2023

- Battery fire at solar farm
- Residents within 1 mile were ordered to shelter in place
- Firefighters used water to cool burning units
- Fire burned for 4 days
- After multiple BESS fires in 2023, the Governor of NY launched a working group to address safety

Sources: [Residents told to shelter in place due to potentially toxic smoke from solar farm fire \(wnny.com\)](https://www.wnny.com/news/local/Residents-told-to-shelter-in-place-due-to-potentially-toxic-smoke-from-solar-farm-fire)

[4-day-long N.Y. solar farm fire contained \(firerescue1.com\)](https://www.firerescue1.com/news/4-day-long-N.Y.-solar-farm-fire-contained)



## VALLEY CENTER, CA - SEPTEMBER 18, 2023 BATTERY FIRE

- Residents within ¼ mile evacuated
- Residents within ½ mile ordered to shelter in place
- Fire burned for one day
- Roads closed for 3 hours

Source: [https://www.valleycenter.com/articles/unit-burns-at-terragen-battery-storage/?fbclid=IwZXh0bgNhZW0CMTEAAR0JCdxqR-fsaGSAvV28lnjxvj8dlbTr9jFdd2E5CKTj7fnFQIZM2xSFepE\\_aem\\_AZzBn\\_tqd5SvIKkN5-xtORGovNTfk8-7vMCIRbfbP15zfvEk7WX2B6wkTZzN5VC9EG4lr37u6G5Qe30I-y1nfcfv](https://www.valleycenter.com/articles/unit-burns-at-terragen-battery-storage/?fbclid=IwZXh0bgNhZW0CMTEAAR0JCdxqR-fsaGSAvV28lnjxvj8dlbTr9jFdd2E5CKTj7fnFQIZM2xSFepE_aem_AZzBn_tqd5SvIKkN5-xtORGovNTfk8-7vMCIRbfbP15zfvEk7WX2B6wkTZzN5VC9EG4lr37u6G5Qe30I-y1nfcfv)

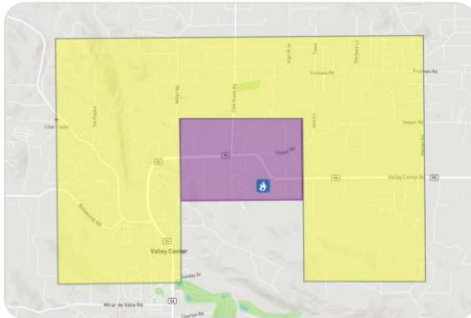


San Diego Sheriff  
@SDSheriff

Follow

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Here is a map of the areas being affected by the fire in Valley Center. The purple area is under an evacuation order. The yellow area is under a shelter-in-place order. Please follow [@AlertSanDiegoCo](#) for the latest map information. [@SDSOValleyCtr](#) [@vcfpd](#) [@valleycenter](#)



7:05 PM · Sep 18, 2023 · 4,001 Views

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## MELBA, ID OCTOBER 2, 2023

- 5:20 a.m. - Battery storage fire caused residents to evacuate
- Nearby road was closed for 7 miles
- Air testing started at 11a.m.
- Fire burned for 3 days

News Source: [Update: Battery fire still burning at Idaho Power substation in Melba | ktvb.com](#)

Incident report: <https://agenda.canyoncounty.id.gov/SupportDoc/GetSupportingDoc?supportDocID=1526>



## What are the causes of these events?

Here are some of the reasons that these batteries can fail, often leading to thermal runaway and subsequent fires or explosions:

- **Mechanical Abuse** - Mechanical abuse is when a battery is physically compromised by either being dropped, crushed, or penetrated.
- **Thermal Abuse** - Thermal abuse can occur when a battery is exposed to external heat sources.
- **Electrical Abuse** - Electrical abuse can happen when the battery is overcharged, charged too rapidly or at high voltage, or discharged too rapidly.
- **Environmental Impacts** - Seismic activity, rodent damage to wiring, extreme heat, and floods can lead to battery failure.

## Here are some examples of causes of recent BESS fires:

1) September 2021 - Moss Landing, CA

A faulty smoke detector went off and sprayed water on the battery racks causing short circuiting and a fire resulted.

2) September 2022 Moss Landing, CA

A vent shield was incorrectly installed and water entered causing a fire.

3) April 2022 Valley Center, CA

Small electrical failure triggered a smoke detector and sprayed water on batteries, which resulted in a fire.

4) June 26<sup>th</sup> 2023 Warwick, NY

Water seepage into battery containers during a rainstorm resulting in an electrical shortage and fire.

5) June 27<sup>th</sup> 2023 Warwick, NY (seperate location)

Water seepage into battery containers during a rainstorm resulting in an electrical shortage and fire.

6) July 2023 Chaumont, NY

Fire ensued due to mechanical failure.

7) September 2023 Austrailia

Fire broke out due to a cooling system leak.

8) October 2023 Melba, Idaho

Water intrusion caused a short circuit which caused a fire.

(Sources: incident reports and various news articles)

## Emergency Response Requirements

An emergency response plan is now required in California for BESS.

New in 2023 -Senate Bill 38, authored by State Sen. John Laird, D-Santa Cruz, requires battery storage facilities to develop an emergency response plan, in close coordination with local emergency response agencies, to establish a notification and communication procedure, and consider potential off-site impacts to the surrounding community and environment. Plans will be submitted to the county and city where the facility is located. (James Herrera/Monterey Herald)

Source: <https://www.montereyherald.com/2023/10/11/governor-signs-sen-laird-bill-prompted-by-moss-landing-bess-incidents/>

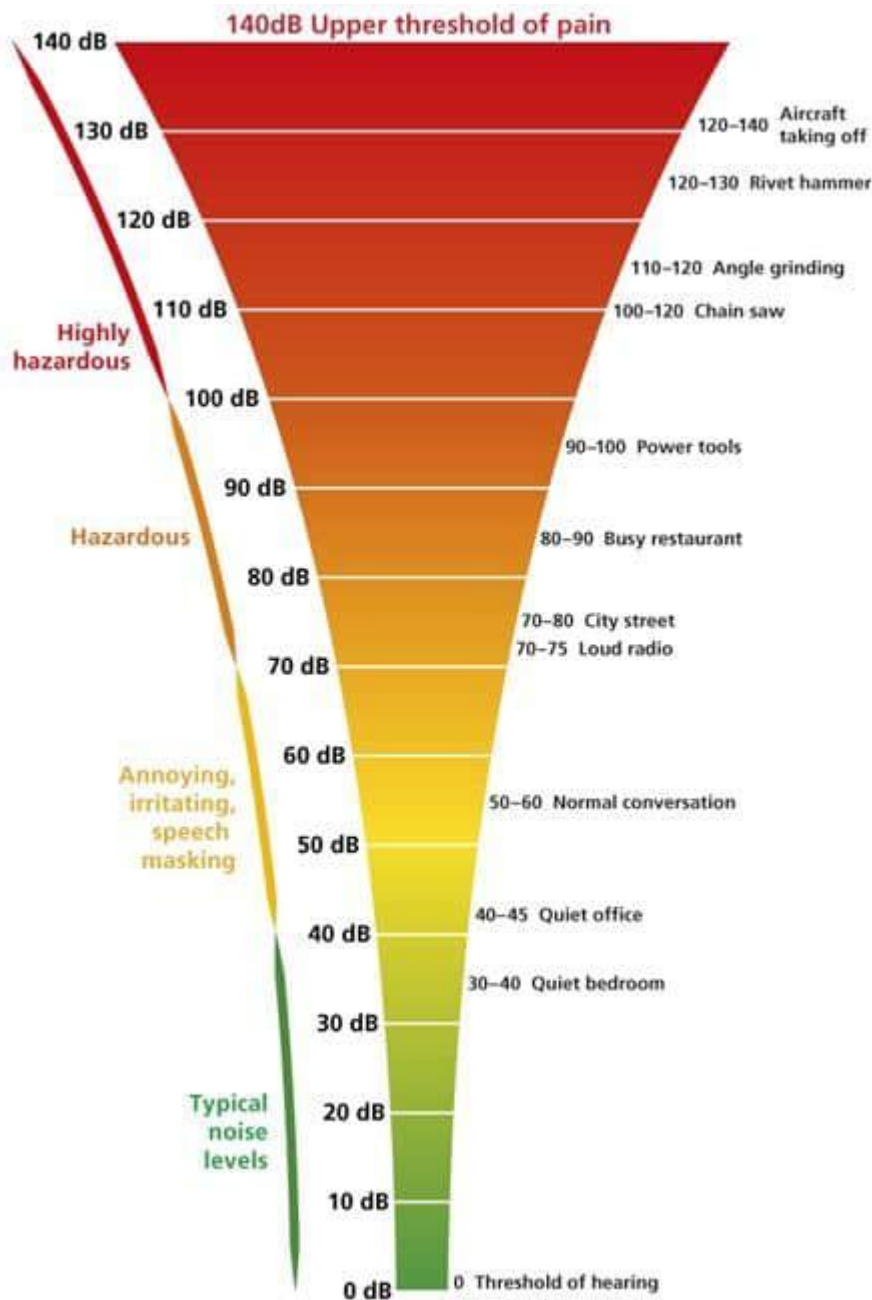
News clip :<https://www.ksbw.com/article/new-law-protects-those-living-around-battery-storage-facilities/45497638>

# Noise

Lithium ion battery energy storage systems produce a significant amount of noise. Here are the components of the BESS that generate noise:

1. Step-up Transformer
2. Inverter
3. Battery containers each with separate HVAC systems used to cool batteries
4. Substation Transformer

## Typical unmitigated noise levels vary between 80-100 db



## Here are some example sound studies on BESS:

**106db-** in E. Washington: [https://www.efsec.wa.gov/.../Wautoma\\_ASC%20Attachment%20O...](https://www.efsec.wa.gov/.../Wautoma_ASC%20Attachment%20O...)

Max **97db-** closest home is 1.06 miles away (1620meters away)

[[https://www.tiltrenewables.com/.../Monash\\_Way\\_Morwell...](https://www.tiltrenewables.com/.../Monash_Way_Morwell...)]([https://www.tiltrenewables.com/.../Monash\\_Way\\_Morwell...](https://www.tiltrenewables.com/.../Monash_Way_Morwell...))

**97db** Max if un-mitigated [<https://www.garnetenergycenter.com/.../Exhibit-19.-Noise...>](<https://www.garnetenergycenter.com/.../Exhibit-19.-Noise...>)

**96db-**

[[https://infrastructure.planninginspectorate.gov.uk/...](https://infrastructure.planninginspectorate.gov.uk/.../)]([https://infrastructure.planninginspectorate.gov.uk/...](https://infrastructure.planninginspectorate.gov.uk/.../))

**95 Db** max - future residential development 1640ft away (more than ¼ mile 500m away)- circuit breaker puts out 117db [<https://www.planning.act.gov.au/.../Appendix-F8-Noise-and...>](<https://www.planning.act.gov.au/.../Appendix-F8-Noise-and...>)

**Max 94db-** closest home is 656ft away (200m away)

[[https://www.tiltrenewables.com/.../PA2201537\\_DBT\\_Appendix...](https://www.tiltrenewables.com/.../PA2201537_DBT_Appendix...)]([https://www.tiltrenewables.com/.../PA2201537\\_DBT\\_Appendix...](https://www.tiltrenewables.com/.../PA2201537_DBT_Appendix...))

**94.4db max-** closest home is 400m away

[<https://wwwtest.barnsley.gov.uk/.../01GEE4NB43RQR2DSZHNRD...>](<https://wwwtest.barnsley.gov.uk/.../01GEE4NB43RQR2DSZHNRD...>)

**93db-** [[https://www.innergex.com/.../Appendix-D\\_Updated-Acoustic...](https://www.innergex.com/.../Appendix-D_Updated-Acoustic...)]([https://www.innergex.com/.../Appendix-D\\_Updated-Acoustic...](https://www.innergex.com/.../Appendix-D_Updated-Acoustic...))

**92db-** with 10ft and 13ft sound barriers

[[https://www.statkraft.co.uk/.../chapter\\_6\\_noise\\_impact...](https://www.statkraft.co.uk/.../chapter_6_noise_impact...)]([https://www.statkraft.co.uk/.../chapter\\_6\\_noise\\_impact...](https://www.statkraft.co.uk/.../chapter_6_noise_impact...))

**Max 90db-** closest home is 984ft away (300M away)

[<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-35160796%2120220906T051215.997%20GMT>](<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-35160796!20220906T051215.997%20GMT>)

## Project Abandonment, Sale and Decommissioning

Most BESS projects are limited liability corporations (LLCs). It is common for owners and operators to create a separate LLC for each standalone project. A potential risk is project abandonment.

A battery storage system LLC could also be sold to another company to manage.

Decommissioning of BESS would require special equipment to remove the very heavy batteries. Damage to the batteries poses a thermal runaway threat. Retired batteries have a risk of leaking.

BESS may need special consideration for cleanup and restoration of the site to the original form.

EPA considers Moss Landing BESS a “superfund site” due to lithium. (Superfund sites are locations polluted with hazardous materials. Superfund is the name given to the environmental program established to address abandoned hazardous waste sites.)

EPA may help with enforcement of cleanup.

Source: <https://cumulis.epa.gov/supercpad/CurSites/ccontinfo.cfm?id=0921204>

## Vandalism and Theft

A BESS in Valley Center, CA had lithium batteries stolen after their system was taken offline because of the first fire at the facility in 2022. A quote from a news article reads:

*“As we reported last week, the battery packs were taken from the site after having been decommissioned and placed on pallets awaiting transportation. While this resolved the question around how they were taken in the first place, it raised the arguably as-important issue of why they were taken offline just a year or less after the system was deployed.”*

Source: <https://www.energy-storage.news/terra-gen-faulty-sprinkler-system-forced-the-decommissioning-of-stolen-valley-center-lg-batteries/>

Tampering with lithium-ion batteries poses a fire hazard or explosion risk and is a liability.

\$300,000 of Batteries Stolen in Valley Center Could Explode If Incorrectly Installed: Deputies

Source: <https://www.nbcsandiego.com/news/local/300000-of-batteries-stolen-in-valley-center-could-explode-if-incorrectly-installed-deputies/3170059/>



## Threat of Cyber Attacks

It has recently been brought to light that battery management system software could be remotely hacked and lithium batteries could be purposely made to overheat and weaponized.

Article: Duke Energy has decided to remove batteries manufactured in China from Camp Lejeune due to potential cybersecurity threats.

Source: [https://www.wral.com/amp/21276994/?fbclid=IwZXh0bgNhZW0CMTEAAR0qtQ9NLANpr1u78VW\\_ummPJ45aIxDGuMbOHw-H6UGJ7drhETgryVhfFcl\\_aem\\_Afl9\\_PrzwiCp2mhyz1QybgWYhq7vk\\_dr6m9V3UqKCLDKHYh2k\\_vpQViXk2ED4y87L6tuwzSlSKGhNsl3WTY7d5Xe](https://www.wral.com/amp/21276994/?fbclid=IwZXh0bgNhZW0CMTEAAR0qtQ9NLANpr1u78VW_ummPJ45aIxDGuMbOHw-H6UGJ7drhETgryVhfFcl_aem_Afl9_PrzwiCp2mhyz1QybgWYhq7vk_dr6m9V3UqKCLDKHYh2k_vpQViXk2ED4y87L6tuwzSlSKGhNsl3WTY7d5Xe)

U.S. Department of Defense is proactively eliminating Chinese battery energy storage systems from use due to foreign threat risks.

Source: <https://www.notebookcheck.net/U-S-Department-of-Defense-proactively-eliminating-Chinese-battery-energy-storage-systems-from-use-due-to-foreign-threat-risks.827400.0.html>