LITHIUM-ION BATTERY DOCUMENTATION


See page 35 (Lithium battery warehouse goes up in flames, by Vivian Song, 18 February 2024. A warehouse in France storing lithium batteries caught fire on Saturday, amid growing fears over their safety.)

Presented here are articles in the following categories:



## Peer-reviewed Scientific

Lithium Battery Safety References

Here are a few articles from peer-reviewed science journals that may be of some help. Fires, explosions, and toxic pollution are well-recognized risks of lithium-ion batteries in the scientific Literature.

https://doi.org/10.1016/j.jechem.2020.10.017

Chen, Y., Kang, Y., et al. 2021. **A review of lithium-ion battery safety concerns: The issues, strategies, and testing strategies.** Journal of Energy Chemistry 59: 83-99.

From the abstract: “Lithium-ion batteries (LIBs) ... are widely used … but frequent fires and explosions limit their further and more widespread applications. This review summarizes aspects of LIB safety and discusses the related issues, strategies, and testing standards.”

Larson, F., Andersson, P., Blomqvis, P., and Mellander, B.-E. 2017. **Toxic fluoride gas emissions from lithium ion battery fires.** Scientific Reports 7: 10018. DOI: 10.1038/s41598017-09784-z

https://www.nature.com/articles/s41598-017-09784-z
From the abstract: "Lithium-ion battery fires generate intense heat and considerable amounts of gas and smoke. Although the emission toxic gases can be a larger threat than the heat, the knowledge of such emissions is limited. This paper presents quantitative measurements of heat release and fluoride gas emissions during battery fires for seven different types of commercial lithium-ion batteries. … Fluoride gas emission can pose a serious toxic threat and the results are crucial findings for risk assessment and management, especially for large Li-ion battery packs."

Liu, K., Liu, Y., et al. 2018. **Materials for lithium-ion battery safety**. Science Advances 4: eaas9820.
https://www.science.org/doi/10.1126/sciadv.aas9820
From the abstract: "Lithium-ion batteries (LIBs) are considered to be one of the most important energy storage technologies. As the energy density of batteries increases, battery safety becomes even more critical if the energy is released unintentionally. Accidents related to fires and explosions of LIBs occur frequently worldwide. Some have caused serious threats to human life and health and have led to numerous product recalls by manufacturers. These incidents are reminders that safety is a prerequisite for batteries, and serious issues need to be resolved before the future application of high-energy battery systems. This Review aims to summarize the fundamentals of the origins of LIB safety issues … "

Other articles may be found at:
https://www.sciencedirect.com/topics/chemistry/thermal-runaway

February 2023

Jens Conzen, Sunil Lakshmipathy, Anil Kapahi, Stefan Kraft, Matthew DiDomizio.
Journal of Loss Prevention in the Process Industries
Volume 81, February 2023, 104932.
**Lithium ion battery energy storage systems (BESS) hazards**
https://www.sciencedirect.com/science/article/abs/pii/S095042302200208X?via%3Dihub
https://doi.org/10.1016/j.jlp.2022.104932

From the abstract:
As the number of installed systems is increasing, the industry has also been observing more field failures that resulted in fires and explosions. Lithium-ion batteries contain

flammable electrolytes, which can create unique hazards when the battery cell becomes compromised and enters thermal runaway. The initiating event is frequently a short circuit which may be a result of overcharging, overheating, or mechanical abuse. During the exothermic reaction process (i.e., thermal runaway), large amounts of flammable and potentially toxic battery gas will be generated. The released gas largely contains hydrogen, which is highly flammable under a wide range of conditions. This may create an explosive atmosphere in the battery room or storage container. As a result, a number of the recent incidents resulted in significant consequences highlighting the difficulties on how to safely deal with the hazard. This paper identifies fire and explosion hazards that exist in commercial/industrial BESS applications and presents mitigation measures. Common threats, barriers, and consequences are conceptually shown and how they would be identified in a hazard mitigation analysis (HMA). Mitigation measures that can be implemented to reduce the risk of a fire or an explosion are discussed. The presented information is intended to provide practical information to professionals and authorities in this fairly new industry to assure that prevention and mitigation strategies can be effectively implemented and that the regulatory requirement of the HMA can be met.
May 20, 2024

BESS Failure Event Database (EPRI)

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.

https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database shows 25 entries. 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.

December 3, 2021

Battery Energy Storage Hazards and Failure Modes (National Fire Protection Agency)
**Battery Energy Storage Hazards and Failure Modes (National Fire Protection Agency)**
By Brian O'Connor 03-Dec-2021
https://www.nfpa.org/news-blogs-and-articles/blogs/2021/12/03/battery-energy-storage-hazards-and-failure-modes

From the abstract: There are a lot of benefits that energy storage systems (ESS) can provide, but along with those benefits come some hazards that need to be considered. This blog will talk about a handful of hazards that are unique to energy storage systems as well as the failure modes that can lead to those hazards. …focus on the lithium-ion family of battery energy storage systems.
HAZARDS
As with most electrical equipment there are common hazards that need to be addressed as part of operation and maintenance such as a potential for electrical shock and arc flash. These should always be accounted for when working in and around energy storage systems. More information on how to work with electrical equipment safely can be found in NFPA 70E, Standard for Electrical Safety in the Workplace.
Thermal Runaway – Thermal runaway is the uncontrollable self-heating of a battery cell. It begins when the heat generated within a battery exceeds the amount of heat that can be dissipated to its surroundings. The initial overheated cell then generates flammable and toxic gasses and can reach a heat high enough to ignite those gasses. This phenomenon can cascade to adjacent cells and progress through the ESS, thus the term “runaway”.
Off Gassing – The gasses that are released from battery energy storage systems are highly flammable and toxic. The type of gas released depends on the battery chemistry involved but typically includes gasses such as: carbon monoxide, carbon dioxide, hydrogen, methane, ethane, and other hydrocarbons. If the gas is able to reach its

lower explosive limit before finding an ignition source then there is the potential for an explosion. An example of this occurred in Surprise, Arizona back in 2019.

Stranded Energy – Standard energy is the term used for when a battery has no safe way of discharging its stored energy. This commonly occurs after an ESS fire has been extinguished and the battery terminals have been damaged. This is a shock hazard to those working with the damaged ESS since it still contains an unknown amount of electrical energy. Stranded energy can also lead to reignition of a fire within minutes, hours, or even days after the initial event.

FAILURE MODES

There are several ways in which batteries can fail, often resulting in fires, explosions and/or the release of toxic gasses.

Thermal Abuse – Energy storage systems have a set range of temperatures in which they are designed to operate, which is usually provided by the manufacturer. If operating outside an acceptable temperature range, the ESS may not work as intended, may result in premature aging of the battery, and can even cause a complete failure that can lead to fire and explosions. Thermal abuse is caused by external sources, it is the result of contact with burning or overheated adjacent cells, elevated temperatures, or exposure to other external heat sources associated with both storage of the cells or the environment in which the ESS is installed.

Electrical Abuse – Electrical abuse takes place when a battery is overcharged, charged too rapidly, or externally short-circuited. This can also occur if the battery is discharged too rapidly or if the battery is over discharged below its specified end voltage. Electrical abuse can lead to an inoperable ESS, overheating, fire, and explosion.

Mechanical Abuse – Mechanical abuse occurs if the battery is physically compromised when the battery is crushed, dropped, penetrated, or otherwise distorted to failure by mechanical force.

Internal Faults – Internal faults can result from inadequate design, the use of low-quality materials, or deficiencies in the manufacturing process. It might be worth noting that the failure rate for lithium-ion cells is said to be on the order of one in a million.

Environmental Impacts – Environmental impacts can lead to battery failure. This can be the result of ambient temperature extremes, seismic activity, floods, ingress of debris or corrosive mists such as dust (deserts) or salt fog (marine locations), or rodent damage to wiring. Some locations subjected to rapid temperature variations such as in the mountains can experience dewing leading to damage within the ESS located outdoors if not well-controlled.

While there are numerous applications and advantages to using battery energy storage systems it is important to keep in mind that there are hazards associated with these installations. Understanding the hazards and what leads to those hazards is just the first step in protecting against them. Strategies to mitigate these hazards and failure modes can be found in NFPA 855, Standard for the installation of Energy Storage Systems.

NFPA also has a number of other energy storage system resources including the following:

- Fact sheet on ESS
- PV and ESS training
- ESS resource page
- Blog on residential ESS

February 16, 2024

**Fire service leaders testify before Congress about Li-ion battery hazards**
The U.S. fire administrator, FDNY chief fire marshal, IAFC president and FSRI executive director detailed lithium-ion battery dangers facing firefighters and the general public.

February 16, 2024 07:17 PM • Michael Kirby

The U.S. fire administrator, FDNY chief fire marshal, IAFC president and FSRI executive director provided testimony on Thursday to members of the House Homeland Security Subcommittee on Emergency Management and Technology on the dangers posed by lithium-ion batteries.

The hearing – "Examining Fire Hazards: Lithium-Ion Batteries and Other Threats to Fire Safety" – was led by Subcommittee Chairman Anthony D'Esposito (D-N.Y.), who stated that in 2023, the FDNY responded to 268 such battery fires, which caused 150 injuries and 18 deaths.

U.S. Fire Administrator Dr. Lori Moore-Merrell reminded the subcommittee that these batteries are now found in common, everyday devices – items such as cell phones, computers, e-bikes, e-scooters and, of course, electric vehicles.

"Fire risk from these devices occurs when an ordinarily stable electromechanical system is destabilized and the batteries become damaged, used, stored or charged incorrectly," Moore-Merrell explained, adding this alarming statistic: "In fires where these devices are involved, there is often only 15 seconds from the first sign of smoke to thermal runaway and explosion, with windows blown out and fire burning in homes, apartments and businesses."

Underscoring the fast-moving nature of these fires, FDNY Chief Fire Marshal Daniel Flynn added that many of the deadliest fires in New York City have been caused by e-devices being kept in residential homes and apartments.

IAFC President John Butler highlighted the unpredictable nature of these fires given their rapid and intense heat release in volatility. Stressing situational awareness, Butler said incident commanders should consider a new tactical decision-making paradigm when they learn such batteries are present. He cited not just products but the batteries' shipment and charging components as hazards.

Further, Butler said, officers should encourage simulation-based scenarios in regular training and investment in developing tailored firefighting tactics. Calling the National Fire Incident Reporting System "antiquated," he said it must be replaced by the National Emergency Response Information System: "As the nation deals with an increase in lithium-ion battery fires, we need to be able to track and better understand their occurrences."

In a call for enhanced training and protective measures, Stephen Kerber, executive director of UL's Fire Safety Research Institute (FSRI), told subcommittee members that first responders face predictable exposure to toxic gases but also the risk of battery explosions. Kerber supports uniform safety standards for making and transporting these batteries in addition to investment in more research and development of safer battery technologies alongside innovative firefighting techniques and equipment.

Moore-Merrell suggested public education and outreach efforts to raise awareness about the fire risks associated with the batteries and promote safe handling and disposal. Given the prevalence of these batteries, Butler said that kind of campaign is timely.

With regard to EV fires, Moore-Merrell noted, "We still don't know what we don't know, and [EVs require] a lot of water, a lot of resources for a protracted amount of time." She stated that incidents are currently being tracked either as hazardous materials or electrical fires while a new cloud-based system that can handle videos and photos directly from scenes nears rollout this year.

Flynn added: "Electrification technology is exciting, and there is no shortage of innovators striving to find better solutions. However, it is essential that we implement new technology in concert with an appropriate focus on public safety."

February 16, 2024

**Lithium-Ion Battery hazards bring Fire Service Leaders to Testify Before Congress**

Fire service leaders testify before Congress about Li-ion battery hazards
Lithium-ion battery fires
February 16, 2024 07:17 PM Michael Kirby

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https://www.firerescue1.com/lithium-ion-battery-fires/fire-service-leaders-testify-before-congress-about-lithium-ion-battery-hazards

Journal of Loss Prevention in the Process Industries
Volume 72, September 2021, 104560
Lithium-ion energy storage battery explosion incidents
Abstract, Sept. 2021
Utility-scale lithium-ion energy storage batteries are being installed at an accelerating rate in many parts of the world. Some of these batteries have experienced troubling fires and explosions. There have been two types of explosions; flammable gas explosions due to gases generated in battery thermal runaways, and electrical arc explosions leading to structural failure of battery electrical enclosures. The thermal runaway gas explosion scenarios, which can be initiated by various electrical faults, can be either prompt ignitions soon after a large flammable gas mixture is formed, or delayed ignitions associated with late entry of air and/or loss of gaseous fire suppression agent. The electrical explosions have entailed inadequate electrical protection to prevent high energy arcs within electrical boxes vulnerable to arc induced high pressures and thermal loads. Estimates of both deflagration pressures and arc explosion pressures are described along with their incident implications.

Thermal runaway gas explosion incidents

Various recent papers, for example Guo et al. (2018) and Li et al. (2019), describe how any one of several fault conditions, including electrical faults, overcharging, and particulate/moisture contamination, can lead to an escalated temperature in one lithium-ion cell, causing deterioration and eventual failure of the cell separator, with subsequent electrolyte decomposition and elevated vapor pressure. This leads to a thermochemical runaway venting in the cell that can then propagate to many

Arc flash explosion incidents

Several lithium-ion battery energy storage system incidents involved electrical faults producing an arc flash explosion. The arc flash in these incidents occurred within some type of electrical enclosure that could not withstand the thermal and pressure loads generated by the arc flash. One example of an electrical enclosure that is designed to withstand a limited/controlled arc flash is a DC contactor. Each rack in the ESS enclosure is usually equipped with at least one high-voltage DC

Conclusions

Several large-scale lithium-ion energy storage battery fire incidents have involved explosions. The large explosion incidents, in which battery system enclosures are damaged, are due to the deflagration of accumulated flammable gases generated during cell thermal runaways within one or more modules. Smaller explosions are often due to energetic arc flashes within modules or rack electrical protection enclosures. These smaller explosions can either initiate or exacerbate energy storage system

https://www.sciencedirect.com/science/article/abs/pii/S0950423021001686

Journal of Power Sources

Volume 446, 15 January 2020, 227257

Explosion hazards from lithium-ion battery vent gasJanuary 15, 2020

Abstract: Lithium-ion battery technology is rapidly being adopted in transportation applications and energy storage industries. Safety concerns, in particular, fire and explosion hazards, are threatening widespread adoption. In some failure events, lithium-ion cells can undergo thermal runaway, which can result in the release of flammable gases that pose fire and explosion hazards for the compartment housing the cells. However, there is little available information characterizing the flammability properties of the gases released after cell thermal runaway. In this paper, analytical and modeling methods to estimate explosion characteristics, such as lower flammability limit, laminar flame speed, and maximum over-pressure are evaluated for use in quantifying the effect of cell chemistry, state-of-charge and other parameters on the overall explosion hazard potential for confined cells.

Introduction

Fires and explosions from thermal runaway of lithium-ion batteries have been observed in consumer products, e-mobility vehicles, electric vehicles, and energy storage applications [1,2]. Large fire and explosion events have also occurred involving large

scale energy storage systems. In 2017, a containerized lithium-ion battery ESS burned at a utility plant near Brussels, Belgium. The Li-BESS in Belgium was equipped with fire detection and suppression equipment which failed to extinguish the fire [3]. In 2018, a cement plant in Jecheon, North Chungcheong Province of Korea experienced over $3 million in damage due to a Li-BESS fire. This was the 15th reported Li-BESS fire in Korea in 2018 [4]. In 2017, an explosion of a train car in Houston, Texas was attributed to lithium-ion batteries being transported to a recycling facility. The explosion was so violent that windows broke on buildings 500 feet away [5,6]. In April 2019, a 2 MW ESS system at a solar facility in Surprise, AZ exploded, resulting in 8 firefighters being injured [7]. In all these incidents, cell thermal runaway conditions produced a flammable atmosphere in a compartment or container that either resulted in a fire and/or an explosion.

Lithium-ion cell failures can result from a variety of sources including manufacturing defects, thermal abuse, electrical abuse, and mechanical damage. In some instances, these failures can lead to internal reactions, causing the cell to undergo thermal runaway. In a thermal runaway event, a series of exothermic reactions increases the cell temperature, resulting in internal generation of gases. These gases build within the cell and can ultimately lead to rupture of the cell and release of the gases. The gas mixture generated and released is flammable, consisting of various mixtures of hydrogen, carbon-monoxide, carbon-dioxide and various hydrocarbons including methane and propane. Ignition of these gases can result in fire or explosion scenarios like the ones discussed previously that pose a significant risk to surrounding life and property.

Lithium-ion battery use is rapidly expanding for energy storage in residential, commercial, industrial and transportation markets. In these applications, batteries several orders of magnitude larger than those in consumer products are required. Li-BESS designed for the residential and electric grid applications can be as large as tens of kilowatt-hours and megawatt-hours, respectively. In the design of these systems, engineers must balance criteria for performance, cost, size, weight, and safety. Achieving a high level of safety is especially important in applications in densely populated environments, such as indoor Li-BESS installations, where a thermal-runaway event is more likely to lead to high losses. While performance measures are generally well characterized for battery designers, safety aspects are not as well-defined. Safety guidelines and requirements for lithium-ion batteries required for applications such as energy storage are slowly emerging in current and proposed codes and standards. For example, requirements for Li-BESS installed in buildings have been added to NFPA (National Fire Protection Association) 1 Chapter 52 [8]. Additionally, an ESS specific standard, NFPA 855 [9], is currently under development. However, codes and standards specifically for lithium-ion battery systems are still evolving, and many of these codes and standards require performance-based analysis to ensure life safety.

https://www.sciencedirect.com/science/article/abs/pii/S0378775319312509

February 2024

Clean Energy Associates

BESS QUALITY RISKS

https://info.cea3.com/hubfs/CEA%20BESS%20Quality%20Risks%20Report.pdf

“The past several years have shown that thermal runaway poses a significant risk to the energy storage industry.”

CEA
Clean Energy Associates
INSIGHTS

# BESS Quality Risks

A summary of the most common Battery Energy Storage System manufacturing defects

*February 2024*

## The Past Several Years Have Shown That Thermal Runaway Poses a Significant Risk to the Energy Storage Industry

Data collected from CEA's factory quality inspections of BESS systems has found that these risks still exist:

**26%** of inspected energy storage systems had quality issues related to the fire detection and suppression system.

**18%** of inspected systems had quality issues related to the thermal management system.

***The following report highlights the safety issues above as well as a host of other quality concerns.***




## CEA Has Conducted Factory Quality Audits On Over 30 GWh of Lithium-on Energy Storage Projects

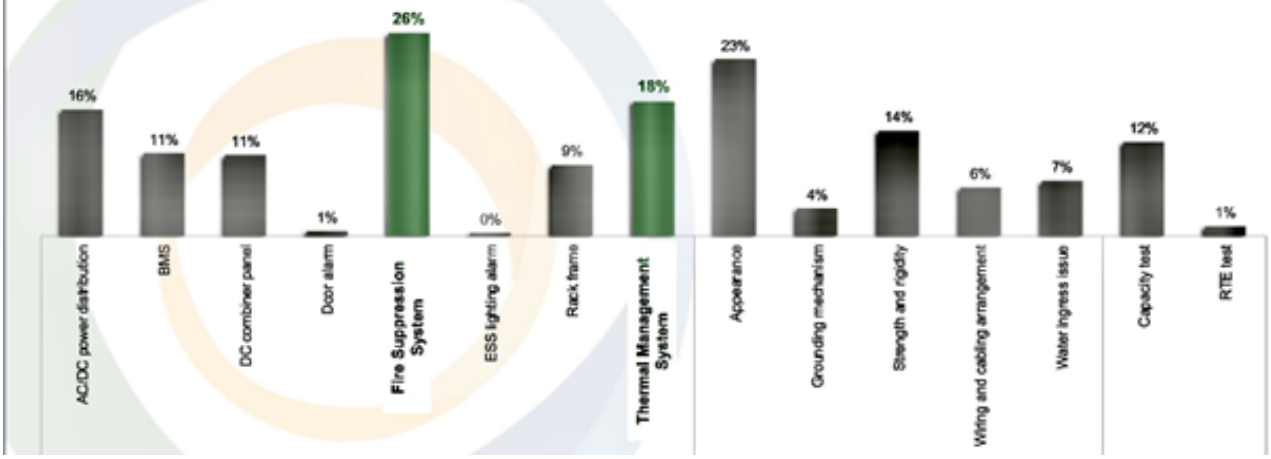
- 320+ inspections in 52+ Battery Energy Storage System (BESS) factories
- 64% of tier 1* BESS cell manufacturers audited worldwide
- 1300+ total manufacturing issues identified

System-Level

**26% of BESS units** that CEA inspected had defects in the **Fire Suppression System, while 18% of units** had **Thermal Management System** defects.

*Fire suppression and thermal management systems are critical for functional safety, and defects in these systems can lead to* ***increased risk of fire****.*

***Frequency of system-level BESS defects over total inspected units***

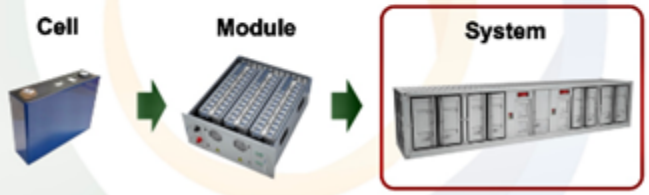


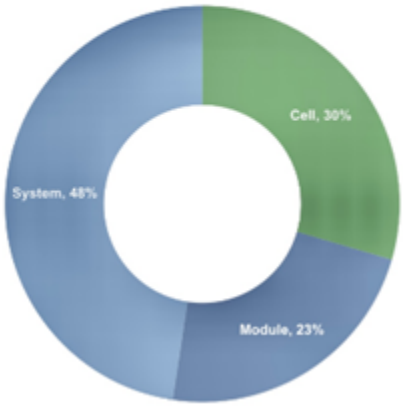

## Distribution of Total Findings

With so much industry attention focused on cell selection, system integration should not be overlooked as a potential source of problems. **System-level defects accounted for nearly 50% of our QA findings.**

The large number of system-level issues is mainly caused by the following two contributors:

- The BESS integration process is highly manual and labor-intensive, with less stringent quality control procedures.
- Systems are very complex and are vulnerable to underlying problems originating from defects in upstream components that were not caught during earlier quality checks.




***Distribution of all BESS Findings***

## Legal

September 29, 2022

**DIRECT PREFILED TESTIMONY OF JOHN HINCKLEY, Q.E.P. EFSB 21-02**
https://drive.google.com/file/d/1eVRqOuXbruvWlunvDZTx0PgPKn96641m/view?usp=drive_link
In the Energy Facilities Siting Board (EFSB) case 21-02 (Cranberry Point) a Qualified Energy professional testified: “There are five major risks posed by lithium-ion battery failures. They are electric shock, arc flash, fire, explosion, and the by-product from off-gassing. During failure, a lithium-ion battery may emit tens to hundreds of liters of gas, and larger failures may emit thousands of liters of gas…Lithium-ion batteries release flammable and toxic chemicals when subjected to electrical or physical damage, including fire. Chemical release can also pose an inhalation hazard.” The consultant concluded: “1) the risk of a thermal runaway event is not zero; (2) a thermal runaway event brings with it the risk of a fire and the release of air pollutants; such an event could release air pollutants at levels that workers and emergency responders at the Facility would need to wear SCBA equipment.”

September 29, 2022

**The Commonwealth of Massachusetts Energy Facilities Siting Board, EFSB 21-02**
**DIRECT PREFILED TESTIMONY OF MILOSH T. PUCHOVSKY**
https://drive.google.com/file/d/1nZKM1EI6ZKR-GwTHpoZAnNc6UIDuP2Bc/view?usp=sharing
In the EFSB 21-02, a Professor of Fire protection Engineering testified: “Lithium-ion batteries’ primary hazard is that there is a potential risk of thermal runaway resulting in fire or explosion. Once started, lithium-ion battery fires have proven difficult to extinguish and are known to produce dangerous gasses. The National Fire Protection Association (“NFPA”) ESS Safety Fact Sheet identifies thermal runaway, stranded energy, toxic and flammable gas generation and deep-seated fires as key hazards associated with ESS installations…First, it is hazardous to first responders and others who perform firefighting and related emergency response services at such a BESS installation. Second, the lingering, stranded energy can also cause reignition of the fire hours or even days after an initial fire or explosion. In other words, even when a BESS fire is contained and extinguished, it can unexpectedly reignite at a later time because of that stranded energy.”

July 28, 2023

**New York's Inter-Agency Fire Safety Working Group**
https://www.nyserda.ny.gov/All-Programs/Energy-Storage-Program/New-York-Inter-Agency-Fire-Safety-Working-Group

Inter-Agency Fire Safety Working Group

On July 28, 2023, Governor Kathy Hochul announced the creation of an Inter-Agency Fire Safety Working Group to ensure the safety and security of energy storage systems across the state, following fire incidents at facilities in Jefferson, Orange, and Suffolk Counties and directed the Division of Homeland Security and Emergency Services (DHSES), Office of Fire Prevention and Control (OFPC), New York State Energy Research and Development Authority (NYSERDA), New York State Department of Environmental Conservation (DEC), Department of Public Service (DPS), and the Department of State (DOS) to lead the Working Group to independently examine energy storage facility fires and safety standards.

The Working Group will gather information from incidents and advice from experts to help prevent fires and ensure emergency responders have the necessary training and information to prepare and deploy resources in the event of a fire.

Additionally, the Working Group has been collaborating with national labs and other nation-leading subject matter experts to review all existing codes and testing procedures pertinent to the development and electrification of battery energy storage systems.

The primary focus areas of the working group include:

1 Conduct an Incident Analysis for East Hampton, Warwick, and Chaumont incidents inclusive of:

a. Examining testing for contaminants and report out a summary of findings (complete, December 2023)

b. Reviewing emergency response actions and data (in progress)

c. Accessing and examining Root Cause Analysis (in progress)

d. Compile all preliminary Working Group findings, data, and other relevant materials and send to National Labs to review (in progress)

2 Conduct a full review of today's Codes, Standards, and Regulations and provide a summary of recommendations. (draft complete, January 2024)

3 Conduct field assessments of in-service commercial energy storage projects and revise NYSERDA inspection checklist with lessons learned. (in progress)

4 Create a final report that summarizes all the findings and recommendations of the Working Group. The findings and resulting recommendations will establish New York as a national and international leader in fire safety and stationary energy storage systems. (in progress)

JULY 28, 2023

Albany, NY

**Governor Hochul Convenes Inter-Agency Fire Safety Working Group Following Fires in Jefferson, Orange, and Suffolk Counties**

https://www.governor.ny.gov/news/governor-hochul-convenes-inter-agency-fire-safety-working-group-following-fires-jefferson

Governor Kathy Hochul today announced the creation of a new Inter-Agency Fire Safety Working Group to ensure the safety and security of energy storage systems across the state, following fire incidents at facilities in Jefferson, Orange, and Suffolk Counties this summer. State agencies will begin immediate inspections of energy storage sites, and the Working Group will help prevent fires and ensure emergency responders have the necessary training and information to prepare and deploy resources in the event of a fire.

“Following multiple fire safety incidents across New York, I've directed State agencies to immediately form the Inter-Agency Fire Safety Working Group to mobilize the personnel and resources necessary to keep New Yorkers safe,” Governor Hochul said. “The Working Group will collaborate with first responders and local leaders to identify best practices, address potential risks to public safety, and ensure energy storage sites across New York are safe and effective."

The New York State Division of Homeland Security and Emergency Services’ Office of Fire Prevention and Control (OFPC) staff and the Department of Environmental Conservation’s (DEC) Emergency Response Unit responded to the Jefferson County incident on Thursday and supported emergency response partners with performing precautionary air monitoring tests in the surrounding area of the fire. OFPC is deploying additional personnel to Jefferson County today to assist local fire officials in their investigation into what initially caused the fire. The Division’s Office of Emergency Management (OEM) and DEC continue to monitor the situation and are prepared to provide additional support on the ground in Jefferson County. An additional investigation is underway in Orange County from fires earlier this month.

While fires at energy storage facilities are exceedingly rare, Governor Hochul has directed the Division of Homeland Security and Emergency Services (DHSES) Office of Fire Prevention and Control, New York State Energy Research and Development Authority (NYSERDA), New York State Department of Environmental Conservation, Department of Public Service (DPS), and the Department of State (DOS) to lead the Working Group to independently examine energy storage facility fires and safety

standards. The Group will leverage nationally renowned experts and national laboratories in energy storage root cause and emergency response analyses to independently assess and identify common causes, air monitoring results or other community impacts, and other factors involved with energy storage fires.

The Working Group will thoroughly investigate the recent energy storage fires in New York and will conduct a comprehensive fire safety review, including emergency response analysis, of energy storage projects that experienced thermal runaway events across New York. Findings will include a list of recommendations for stationary energy storage equipment and installations. The Working Group would review energy storage system operations and operators as they: examine the condition of their batteries to verify operation within design parameters; remedy any deficiencies identified; verify operation of on-site fire suppression; and confirm fire suppression plans with local fire departments, among other best practices.

The findings and resulting recommendations will also be shared with the New York City Fire Department, National Fire Protection Association, International Code Council, the New York State Fire Prevention and Building Code Council, and Underwriters Laboratories, establishing New York as a national and international leader in fire safety and stationary energy storage systems.

Energy storage facilities play a critical role in the state's efforts to reduce the emissions that contribute to climate change and help the state achieve its ambitious climate goals under the Climate Leadership and Community Protection Act.

Department of Environmental Conservation Commissioner Basil Seggos said, "DEC applauds Governor Hochul for prioritizing New Yorkers' safety and ensuring the growth of this critical industry is advancing in a manner that is protective of our communities and the environment. DEC stands ready to work with our partners to analyze current practices and find ways to improve operations at energy storage facilities to set the gold standard for safe and responsible clean energy future."

New York State Energy Research and Development Authority President and CEO Doreen M. Harris said, "The safety of our communities is paramount, and State officials are immediately commencing a multi-pronged initiative to address these concerns today with the formation of an Inter-Agency Working Group to focus on the strategic and safe deployment of energy storage across New York coupled with on-site inspections of energy storage facilities. NYSERDA looks forward to expanding our collaboration with other state agencies, local officials, host communities and first responders, as well as

national laboratories and partners, to identify recommendations that can assist the State and industry in standardizing best practices."

Department of Public Service CEO Rory M. Christian said, "The Department will work to ensure safety comes first as we continue to see more and more batteries going into service. We will join the effort to do root cause analysis and follow-up with recommendations on what needs to change to mitigate the occurrence and impact of such events in the future."

Division of Homeland Security and Emergency Services Commissioner Jackie Bray said, "Keeping New Yorkers safe is our number one job, and our team quickly responded to the fire in Jefferson County conducting air monitoring to ensure nearby residents were not in immediate danger. We remain on the ground to address this fire and assist the investigation. These sites are essential to securing our climate future and Governor Hochul is taking action to ensure they are operated safely. We are working with our agency partners on long-term solutions to mitigate future energy-related fires throughout the state."

New York State Fire Administrator James Cable said, "The State Office of Fire Prevention and Control continues work alongside our local counterparts in Jefferson County to make sure residents are safe. While we work to assist investigations into recent fires, we are partnering with other agencies throughout the state to prevent these incidents from causing harm to New Yorkers."

New York State Secretary of State Robert J. Rodriguez said, "The safety of our community is priority one for the State and we are working with our partners in government to ensure that energy storage facilities are safely maintained across the state. The Department of State stands ready to assist and support Governor Hochul's Inter-Agency Working Group that will inspect energy storage sites in New York and make sure our communities are safe and served.

January 2024

**NEW YORK INTER AGENCY FIRE SAFETY WORKING GROUP**

https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Energy-Storage/Draft-New-York-State-Inter-Agency-Fire-Safety-Working-Group-Fire-Code-Recommendations.docx

FIRE CODE RECOMMENDATIONS

1. FCNYS 1206.8 PEER REVIEW

Require industry-funded independent peer reviews for all projects.

Local AHJs often lack the resources or expertise to understand and interpret critical BESS permitting documents, particularly the UL 9540A report, which contains product-level test data on which to base important siting decisions and requirements. This gap in AHJ expertise has led to incomplete or inadequate applications in which the requirements of FCNYS 1206 are not sufficiently met.

"Peer reviews" by experts in the field can assist local AHJs in their review and understanding of BESS permit applications and their compliance with existing Fire Code requirements. Currently, FCNYS 1206.8 Peer Review empowers local AHJs to require that BESS developers pay for an independent peer review of the developer's permit application. However, despite the benefits, peer reviews are rarely utilized.

As such, the WG recommends that peer reviews be required for all BESS installations exceeding energy capacity thresholds per FCNYS Table 1206.1 to ensure proper compliance and oversight for upcoming projects.

When identifying potential candidates qualified to conduct peer reviews, the use of third-party entities or insurers should be considered in order to provide a level of independence and transparency. Further, NYSERDA or another qualified entity could issue a rolling Request for Qualifications solicitation for firms qualified to conduct BESS peer reviews to establish a list of peer reviewers that BESS project developers can utilize.

2. FCNYS 1206.13.3 EXPLOSION CONTROL

Expand the requirement for explosion control to include BESS cabinets in addition to rooms, areas, and walk-in units. Additionally, provide design requirements or language for what constitutes a "passable" system.

A primary concern associated with lithium-ion BESS is the potential for explosion or deflagration due to accumulation of flammable off-gases within a confined space, such as a battery enclosure. Currently, FCNYS 1206.13.3 requires that explosion control be provided for lithium-ion BESS in rooms, areas, or walk-in energy storage units, and is therefore not required for non-enterable BESS units, also referred to as "cabinets". As such, the WG recommends that the requirement for explosion control is expanded to include BESS cabinets in addition to rooms, areas, and walk-in units.

The current code also does not include design requirements for what constitutes a "passable" explosion control system, which should be established in the next installment of the FCNYS. Currently, NFPA 855, and FDNY 3 RCNY 608-01 require that an explosion control system be provided in accordance with one of the following:

§ Explosion prevention in accordance with NFPA 69 Standard on Explosion Prevention Systems.

§ Deflagration vent panels in accordance with NFPA 68 Standard on Explosion Protection by Deflagration Venting.

Additionally, alternative explosion control systems currently exist, and language in the next edition of FCNYS should also include flexibility for other potential solutions outside of NFPA 69 and NFPA 68.

Current code also does not require that any substantiating documentation be provided to AHJs to demonstrate the effectiveness of the explosion control system to either mitigate against the impact of an explosion or prevent an explosion from occurring altogether (e.g., Computational Fluid Dynamics (CFD) analysis, sizing calculations, or physical testing of the explosion control system). This gap has been addressed in NFPA 855 and APS Appendix W and similar language is recommended for updates to the FCNYS.

The 2023 NFPA 855 also includes language which requires testing of deflagration mitigation measures when designed into BESS cabinets (9.1.5.1.4), with validation of the effectiveness of the system demonstrated through fire and explosion testing and engineering evaluation.

Additional language relating to explosion control systems is currently provided in 2023 NFPA 855, Arizona Public Service (APS) Appendix W, and FDNY 3 RCNY 608-01(h)(4) and should be consulted in developing the explosion requirements in the next edition of FCNYS.

Referenced Codes / Standards:

§ 2023 NFPA 855: 9.6.5.6 Explosion Control, 9.1.5 Fire and Explosion Testing, A.9.6.5.6, A.9.6.5.6.3, A.9.6.5.6.4

§ APS Appendix W: 2 Applicable Standards and Codes, 4 System Design/Layout, 6 Fire and Explosion Detection, Alarm, Control, and Suppression/Protection, 7 Modeling, 13 Documentation

§ FDNY 3 RCNY 608-01: (h)(4) Explosion Mitigation

3. FCNYS 1206.7.1 FIRE MITIGATION PERSONNEL

Require that qualified personnel are available for dispatch within 15 minutes and able to arrive on scene within four hours to provide support to local emergency responders. In the event of a BESS fire, it is critical that qualified personnel or representatives of the site owner/operator with knowledge of the BESS installation can be deployed on-site to support local emergency responders. Section 1207.1.8.1 of the upcoming 2024 IFC

requires that, where in the opinion of the fire code official it is essential that trained personnel be on-site, these personnel be dispatched within 15 minutes. The WG recommends that this is required for all projects–not only where deemed essential by the fire code official–and that these fire mitigation personnel are able to arrive on scene within four hours to provide expert guidance to local first responders. Additionally, the WG recommends that these personnel be familiar (e.g., successfully completed ICS-100, ICS-200, and IS-700B training courses) to effectively coordinate with local public emergency services during an event.

One way to address this recommendation may be to adopt a certification program similar to FDNY's B28 Certificate of Fitness. Exploring other approaches beyond code changes (e.g. legislation) may also help address these concerns effectively.

The WG also recommends that the Fire Code require a qualified person knowledgeable about the project and associated hazards be immediately available via phone. Additional information on this recommendation is in the "Systems Monitoring" recommendation below.

Referenced Codes / Standards:

§ 2023 NFPA 855: 9.6.6 Remediation Measures, C.1.1 Emergency Responder Pre-incident Planning

§ 2024 IFC: 1207.1.8.1 Fire Mitigation Personnel

§ FDNY 3 RCNY 608-01: (c)(5) Supervision, (i)(4) Technical Assistance, (i)(5) Emergency Management

4. FCNYS 1206.11.8 SIGNAGE

Extend safety signage requirements beyond the BESS unit itself to include perimeter fences or security barriers and include a map of the site, BESS enclosures, and associated equipment.

These signs should clearly display 24-hour emergency contact information and relevant hazard warnings, ensuring improved safety and clear communication for emergency responders and the public. All relevant hazard warnings indicated on signage or maps should identify and display isolation distances response personnel should maintain from BESS involved in fire or where there may be a risk of explosion or deflagration. It is critical that this information be accessible outside the project fence line for the health and safety of first responders.

a) The WG recommends the FCNYS directly include signage requirements and/or applicable NEC references for grid-interactive BESS operating in parallel with other power generating sources. The FCNYS requires compliance with all applicable NEC signage requirements, which can involve multiple different sections depending on the system design. Section 1207.4.8 of the 2024 IFC addresses signage for multiple energy systems.

b) Update the Fire Code to require clear and apparent identification of explosion control panels. This measure will help ensure that first responders can easily recognize

and stay clear of the respective hazard zones, reducing the risk of accidents and facilitating a more efficient and secure emergency response. Section 911.4.1 of the 2024 IFC addresses signage for deflagration venting, though this language may need to be expanded to include other methods of explosion control in addition to deflagration.

5. FCNYS 1206.9.2.1 SYSTEMS MONITORING

Update the Fire Code to ensure that Battery Management System (BMS) data is monitored by a 24/7 staffed Network Operations Center (NOC). Critical failure notifications should be immediately communicated to the site owner/operator to take corrective actions as necessary.

The WG recommends that the Fire Code require that Battery Management System (BMS) data be monitored 24/7 by a Network Operations Center (NOC) / Remote Operations Center (ROC), staffed by trained personnel with working knowledge of the BESS and sites under their purview. Additionally, the WG recommends that NOC/ROC staff be immediately available to relay relevant data to the local fire department to help guide emergency response if requested.

The NOC could fulfill the recommendation that a qualified person be available for immediate phone consultation found in the last paragraph of the Fire Mitigation Personnel recommendation section.

The NOC providing 24/7 remote monitoring of the BMS or Energy Storage Management System (ESMS) should have the ability to immediately relay alarm notifications indicative of a thermal runaway or other battery failure event to the system owner, O&M company, or other associated parties. Additional information and language for reference is available in 2023 NFPA 855 and FDNY 3 RCNY 608-01.

Referenced Codes / Standards:

§ 2023 NFPA 855: A.4.3.2.1.4(3)

§ FDNY 3 RCNY 608-01: (g)(2) Remote Monitoring, (i)(1) Remote Monitoring of Battery Management System and Reporting, (i)(3) Remote Monitoring at Constantly Attended On-Site Location

6. FCNYS 1206.11.9 SECURITY OF INSTALLATIONS

Update the Fire Code to incorporate requirements for closed-circuit television (CCTV) systems, specifying their intended use as both a continuous monitoring tool and a post-event analysis resource.

This update would be specific to New York, as it is not currently incorporated into NFPA 855 or the 2024 IFC. The WG has learned that CCTV systems can play a critical role in incident analysis, in addition to providing potentially useful real time monitoring capabilities, and therefore the WG recommends including a requirement for CCTV. Access to CCTV footage should be available to emergency responders during an incident in addition to being provided to the AHJ to assist with post-incident investigation.

7. FCNYS 1206.2 APPLICABILITY

Remove the Fire Code exemption for BESS projects owned or operated by electrical utilities

to ensure that all projects comply with the Fire Code.

The removal of this exemption can address concerns relating to access to critical information and jurisdictional authority, promoting safety and accountability. The suggested code revision should

be carried out in collaboration with relevant stakeholders to assess the extent of code enforcement authority for public utility projects, maintaining safety standards even in cases involving electric utilities. This recommendation aligns with the proposed language of section 1201.1 in the 2024 International Fire Code (IFC) and should be considered for inclusion, ensuring a consistent and thorough regulatory framework for all energy systems in the state.

Proposed Recommendations for Fire Code Additions

1. EMERGENCY RESPONSE PLANS and REGULAR FIRE DEPARTMENT TRAINING

Include a requirement for an Emergency Response Plan (ERP) and annual local first responder training for every BESS installation.

The WG strongly recommends that a site-specific Emergency Response Plan (ERP) be required in the Fire Code update to ensure that every BESS facility is equipped with a comprehensive strategy

for addressing potential emergencies 24 hours a day. While existing standards such as fire safety plans in FCNYS Section 403 and 2023 NFPA 855 Section 4.3.2.1 address emergency operations for facility personnel, these standards are not specifically written for first responders. As such, there should be a requirement for emergency response protocols specifically addressing the needs of first responders in the event of a fire, like 2023 NFPA 855 Appendix G.11.2. Appendix G.11.2 is supplemental information rather than a direct part of standard itself. The code should remove any ambiguity around the NFPA requirements and require that system owner/operators provide emergency response plans directed toward first responders and annual site-specific trainings to local fire departments.

This requirement should specify that the ERP must be accessible on-site and shared with the local fire department. Different fire departments may have specific requirements or conditions for presentation of ERPs (e.g., type of lockbox, etc.); therefore, the WG recommends that the FCNYS grant the AHJ the flexibility to determine the most suitable presentation of the ERP based on local fire department needs. This ERP should be developed in consultation with the local fire department to ensure it is in alignment with their operating procedures, capabilities, resources, etc. In all cases, a copy of the ERP must be maintained on-site outside the fence line of the project.

The WG also recommends requiring site-specific training to be provided for local fire departments to familiarize them with the project, hazards associated with BESS, and procedures outlined in the ERP. The WG recommends that annual trainings be provided to address potential turnover in fire department personnel, and that a log of training records be maintained. The AHJ would play a key role in overseeing and regulating the implementation of this requirement, ensuring that BESS installations are well-prepared for emergencies and that all response team members are adequately trained.
Referenced Codes / Standards:
§ 2023 NFPA 855: 4.3.2.1 Emergency Operations Plan, G.11.2 Emergency Responder Pre-incident and Emergency Operation Planning
§ 2020 FCNYS: 403 Emergency Preparedness Requirements

2. CENTRAL STATION MONITORING OF BESS FACILITIES

Include a Fire Code requirement for monitoring of fire detection systems by a central station service alarm system to ensure timely, proper notification to the local fire department in the event of a fire alarm.
The WG recommends that this requirement specify that the central monitoring station must comply with relevant requirements in NFPA 72. The code should also define criteria for triggering alarms and notifying first responders, ensuring that only critical incidents prompt a response from emergency services. The NOC should be available to assist in determining which incidents are critical enough to warrant a response from emergency services. Clarity in the definition and role of central station monitoring in BESS installations is essential to establish consistent and effective practices across different jurisdictions and facility types. The WG recommends referencing the language in section 1207.5.4 of the 2024 IFC.
Referenced Codes / Standards:
§ 2024 IFC: 1207.5.4 Fire detection
§ FDNY 3 RCNY 608-01: (i)(2) Central Station Monitoring of Fire Protection System
§ NFPA 72 Fire Alarm & Signaling Systems

3. FIRE STOPS, BARRIERS, or FIRE BREAKS

Mandate the installation of fire stops for all BESS enclosure penetrations to prevent the propagation of fires from one BESS unit to another through these pathways.
While this specific topic is currently not addressed in the 2024 IFC or NFPA 855, incorporating fire stops or barriers can be effective in limiting fire spread in various facilities. To ensure effectiveness of
this requirement, the WG recommends that the code update should include guidance on the installation and performance standards of these fire breaks or barriers to ensure there is no propagation of fire across BESS enclosures.

4. PERIODIC SPECIAL INSPECTIONS

Introduce a new provision in the Fire Code mandating industry-funded special inspections for BESS installations to ensure thorough safety and compliance.

The WG recommends requiring special inspections at a regular cadence. The FCNYS should specify a comprehensive scope of inspection criteria, including aspects such as verifying emergency response contacts, system layouts, signage, and other critical components relevant to BESS safety. The frequency of these special inspections should be established to correspond with the specific needs and risks associated with BESS installations. These inspections should be conducted by specialized, third-party experts who possess the necessary expertise in BESS systems.

## 5. CURRENT PERCEIVED EXEMPTIONS FOR BESS CABINETS

Include “cabinets” in all Fire Code requirements that pertain to rooms, areas, or walk-in units, except for fire suppression requirements, as they may be inappropriate for cabinets.

The 2020 FCNYS outlines requirements for outdoor BESS in §1206.15 and Table 1206.15 (Outdoor ESS Installations), including general requirements within §1206.11 (General Installation Requirements). However, the existing language of certain sections initially only appears to be applicable for indoor and outdoor walk-in BESS, as they do not directly address outdoor non-enterable, or cabinet, BESS–contradicting with Table 1206.15–causing uncertainty for the appropriate application and ensuing enforcement of requirements.

Although the Fire Code does state that “the most restrictive [requirement] shall govern” where there are conflicts between sections, the WG recommends removing any ambiguity of cabinet ESS applicability for the following requirements:

- §1206.6 Large-scale Fire Test
- §1206.11.9 Security of Installations
- §1206.12.2 Maximum Allowable Quantities of ESS (MAQ)
- §1206.12.4 Fire Detection

This can be accomplished by including “cabinet BESS units” directly into the identified sections, [while ensuring language can be carried over / aligns with the model 2024 IFC (during the NY code update process)] as can be seen below with recommended clarifications (in bold) within the existing 2020 FCNYS language:

The FCNYS defines an energy storage system cabinet as a cabinet containing components of the energy storage system that is included in the UL 9540 listing for the system. Personnel are not able to enter the cabinet, other than reaching inside to access components for maintenance purposes. Historically, cabinets were not directly addressed by several important regulations in the FCNYS. Upon incorporating energy storage system cabinets in existing requirements, it will be important to be clear that requirements apply to rooms, areas, walk-in units, or cabinets, eliminating misinterpretations that would result in redundant requirements (e.g., fire detection requirement in both the room and energy storage system cabinet).

Implementing the recommendations in the previous two sections will help to maintain New York’s status as a national and global leader in energy storage fire safety. After

months of lengthy discussion and document review among the WG participants, these concrete suggestions are recommended to the New York State Code Council.

Additional Considerations

1. ROOT CAUSE ANALYSIS

The WG concluded that the Fire Code may not be the appropriate place to require a Root Cause Analysis (RCA).

The WG identified a need to create a hard requirement for Original Equipment Manufacturers (OEMs) to disclose RCAs to relevant local and state authorities for analysis and evaluation with the intent of promoting continuous improvement of energy storage system fire safety. The WG concluded that the FCNYS may not be the appropriate mechanism to grant government access to RCAs resulting from past or future fires associated with a particular energy storage system product, as OEMs are not directly subject to Fire Code requirements unless they are also acting as project developers. To address potential gaps and establish a clear framework for this requirement, the following suggestions

should be considered:

a) Define the scope of the requirement to include faults that result in a fire or necessitate a response from first responders, making it clear that not all faults require an RCA.

b) Standardize the format of the RCA submission by creating a template that includes specific information, such as manufacturer and model numbers of components, system schematics, maintenance logs, operational data leading up to the incident, battery monitoring system logs, and details about fire suppression systems.

c) Set a deadline for providing the RCA information to the relevant authorities, specifying that it should be delivered within a defined number of days after the incident.

d) Offer flexibility in the choice of RCA methods and analysis entities but endorse a list of pre-qualified firms or methods to ensure consistency and reliability in the analysis.

e) Emphasize transparency in the process to facilitate effective communication between local authorities, operators, and OEMs. Transparency is essential for building trust and ensuring that all parties have access to the same data for a comprehensive understanding of the incident.

f) Consider the inclusion of a requirement for peer review of the RCA to ensure the accuracy and credibility of the analysis.

2. WATER SUPPLY

The WG recommends establishing guidance for water supply, including whether water is appropriate for different technologies, in an emergency response to a BESS fire and determining if more specific requirements are necessary.

Given the challenges associated with fully extinguishing BESS fires and the variability in system capacity and design, the code should consider the intended purpose of the water supply, whether it is for cooling, smoke control, preventing fire spread, or other

scenarios. Referencing Chapter 5 of the code and standards like NFPA 1142 may provide a starting point for establishing water supply guidance and requirements. The code should aim to define the specific conditions and scenarios where water supply is necessary and outline the minimum flow rates and water storage requirements, taking into account factors like distance from the water source and the capacity of fire departments for shuttle operations. This information should be detailed and explicit, acknowledging the complexities of BESS facilities and the unique challenges they pose for firefighting. Further discussions should be held by the code council, potentially including relevant subject matter experts, to ensure comprehensive guidelines for water supply in BESS facilities, including exceptions for systems to which water should not be applied in the event of fire.

Referenced Codes / Standards:

§ 2022 NFPA 1142: Standard on Water Supplies for Suburban and Rural Firefighting
§ 2023 NFPA 855: G.11.2 Emergency Responder Pre-incident and Emergency Operation Planning

3. TRANSFORMERS CONTAINING HIGHLY FLAMMABLE MATERIALS

Recommend that the Code Council have further discussions around clearance distances of oil-insulated transformers from BESS.

The WG notes that propagation of fire or heat flux from a BESS fire may pose great risk to non-dry-type (e.g., oil-insulated) transformers, which may exacerbate the impact of a BESS failure incident. FCNYS 1206.15.3 states that energy storage systems located outdoors shall be separated by a minimum of 10 feet from exposures such as lot lines, public ways, and buildings, as well as “other exposure hazards”, which oil-insulated transformers could fall under. However, it is not clear that this interpretation has been enforced by AHJs. The corresponding section of 2023 NFPA 855 (9.5.2.6.1), however, notes that BESS are separated by 10 feet from “other exposures not associated with electrical grid infrastructure”, implying that this does not need to apply for transformers. The WG recommends that the Code Council hold further discussions around clearance distance requirements be pursued to determine if clearance distance requirements should be explicitly enforced

for oil-insulated transformers in upcoming code. This discussion should include a review of potential updates to standards and requirements.

Referenced Codes / Standards:

§ 2024 IFC: 1207.8.3 Clearance to Exposures
§ 2023 NFPA 855: 9.5.2.6.1 Clearance to Exposures
§ FDNY 3 RCNY 608-01: (g)(1)(C) Separation Distances
§ FM Global Property Loss Prevention Data Sheets: 5-4 Transformers

CONCLUSION

After months of careful deliberation and a consensus-based process, the WG intends to submit the recommendations in this document to the Code Council for consideration in

the next code installment. The Working Group seeks comments from interested stakeholders on these proposed recommendations for incorporation into the final submission to the Code Council. While the most critical issues identified by the WG could be addressed by better enforcement and adherence to the existing code, the recommendations in this memo have been identified as ways to further improve the regulatory framework for BESS in New York.

February 6, 2024

**More Links to New York resources from Draft Fire Code Recommendations Report**

On February 6, 2024, NYSERDA requested public comment [PDF] from subject matter experts and interested stakeholders to evaluate and provide feedback on a draft Fire Code Recommendations Report [doc] produced by the Working Group.
The draft recommendations were also discussed at a public webinar on February 15, 2024. View the webinar recording to learn more about the working group's recommendations. Comments were due on Tuesday, March 5, 2024. The Code Council plans to release the updated recommendations for public comment again in June 2024 through the "Rule in Development" process for the Fire Code of New York State.
Any questions should be directed in writing to BESScodeupdates@nyserda.ny.gov.
Press Releases to Date:

- July 28, 2023: Governor Hochul Convenes Inter-Agency Fire Safety Working Group Following Fires in Jefferson, Orange, & Suffolk Counties
- December 21, 2023: Initial Findings Released From Inter-Agency Fire Safety Working Group On Emergency Response
- February 6, 2024: Governor Hochul Releases Initial Recommendations From Inter-Agency Fire Safety Working Group

Other Energy Storage and Safety Resources:

- Energy Storage Program: Learn about the different types of energy storage and how integrating storage in the electric grid will allow clean energy to be available when and where it is most needed.
- Energy Storage Innovation: Research and investment are driving innovation in energy storage technology and product development.
- Guidebooks, Resources, and Training for Local Governments: Access information, tools, and step-by-step instructions to support local governments managing battery energy storage system development in their communities.
- Lithium-Ion Battery Awareness Training : OFPC has made a course available on the DHSES E-Learning Management System for all first responders.

February 6, 2024

**Initial Recommendations Released from Inter-Agency Fire Safety Working Group**

https://www.nyserda.ny.gov/About/Newsroom/2023-Announcements/2023-12-21-Governor-Hochul-Announces-Results-of-Fire-Safety-Working-Group
Working Group Outlines Recommended Enhanced Safety Standards for Battery Energy Storage Systems
February 6, 2024 (excerpts)
Governor Kathy Hochul today released initial recommendations from the Inter-Agency Fire Safety Working Group, outlining enhanced safety standards for battery energy storage systems. The draft recommendations include potential updates to the Fire Code of New York State as well as a list of additional opportunities for defining and implementing best practices. If adopted, the changes will codify enhanced safety standards and continue to position New York as a national leader in responsible and reliable battery energy storage development.
“The battery energy storage industry is enabling communities across New York to transition to a clean energy future, and it is critical that we have the comprehensive safety standards in place,” Governor Hochul said. “Adopting the Working Group’s recommendations will ensure New York’s clean energy transition is done safely and responsibly.”
The 15 draft recommendations announced today are proposed by the Working Group, with guidance from nation leading subject matter experts, after completing a thorough examination of the existing Fire Code of New York State (FCNYS) and other energy storage fire safety standards. They address preventative and responsive measures as well as best practices, and include proposed requirements related to peer review of project permit application packages, emergency response planning, and local fire department training, among others. The recommendations identify ways to further improve the regulatory framework for BESS in New York, are intended to apply to lithium-ion BESS exceeding 600 kilowatt-hours (kWh).
The recommendations were developed with a focus on outdoor systems, BESS in dedicated use buildings, and other grid-scale battery energy storage systems. They will be considered by the New York State Code Council (Code Council) for inclusion in the next edition of the FCNYS to help improve deployment of safety standards in the State and potentially across the country. Interested stakeholders are encouraged to submit comments on these draft recommendations to the Working Group for incorporation into the final recommendations to be submitted to the Code Council for consideration.

## FIRES, EXPLOSIONS AND OTHER SAFETY ISSUES

Battery Thermal Runaway Risk & Prevention
By MoviTHERM
https://movitherm.com/blog/battery-thermal-runaway-risk-prevention/

**The Risk of Battery Thermal Runaway and How to Prevent It**
Battery thermal runaway is becoming a huge liability to companies that store and handle battery products. In recent years, battery storage, charging, and recycling centers have experienced increased fire activity caused by lithium ion battery thermal runaway.
One solution to reducing the risk of a battery fire are infrared cameras. Infrared fire detection systems monitor large areas and are able to detect heat releasing from battery packs or single batteries. Infrared cameras are the only device that are able to detect early signs of fire formation.
Risk of Thermal Runaway
Thermal runaway occurs in lithium ion batteries. Manufacturing defects or external misuse like overcharging, overheating, puncturing, or being crushed can lead to thermal runaway in lithium ion batteries. Thermal runaway occurs when the temperature of the li-ion battery reaches a critical state.
Lithium-Ion Battery Thermal Runaway Initiation Events
Internal causes of spontaneous ignition include coating defects at the electrode surface, contamination particles, and poor welds. Typically, these defects cause electrical shorts during operation that generate heat.
External causes include:

- Electrical abuse from overcharging.
- Mechanical abuse via crushing or puncture.
- Thermal abuse from exposure to high temperature environments.

External initiating events are related to each other. For example, mechanical abuse from a puncture of the battery cell causes a short circuit, which is electrical abuse. The electrical abuse creates heating, which increases the lithium ion cell temperature, causing thermal abuse, which can trigger thermal runaway.

**Emerging Hazards of Battery Energy Storage System Fires**

**Grant Number**: EMW-2016-FP-00833
**Principle Investigator:** Ofodike Ezekoye Ph.D., P.E.
University of Texas at Austin

In April 2019, an unexpected explosion of batteries on fire in an Arizona energy storage facility injured eight firefighters. More than a year before that fire, FEMA awarded a Fire Prevention

and Safety (FP&S), Research and Development (R&D) grant to the University of Texas at Austin to address firefighter concerns about safety when responding to fires in battery energy storage systems of all sizes. Professor O.A. ('DK') Ezekoye is working with other engineers, firefighters, and industry partners to develop a better understanding of the magnitude of the fire hazards.

There has been a dramatic increase in the use of battery energy storage systems (BESS) in the United States. These systems are used in residential, commercial, and utility scale applications. Most of these systems consist of multiple lithium-ion battery cells. A single battery cell (7 x 5 x 2 inches) can store 350 Whr of energy. Unfortunately, these lithium cells can experience thermal runaway which causes them to release very hot flammable, toxic gases. In large storage systems, failure of one lithium cell can cascade to include hundreds of individual cells. The hot flammable gases can result in an explosion, or a very difficult to extinguish fire.

Although the fire service routinely responds to explosive scenarios, such as those associated with natural gas leaks, standard operating procedures do not exist for scenarios like a battery energy storage system for which there is no way to cut off the gas supply. The fire service is unaware and inexperienced with the fire and explosion hazards of BESS.

The FP&S R&D study started with a laboratory test in which a single cell failed in one commercial storage module containing a total of 14 cells. In one of the early tests, when a single cell failed, smoke and gases were released that ignited and burned intensely for 12 seconds. Toxic smoke and gases filled the test space.

The research team has subsequently connected small-scale battery failure test results to large scale fire and explosion consequences associated with these systems. Through this research, one of the biggest lessons learned for the fire service is that the utilities and commercial entities that own large battery systems are equally unfamiliar with the potential fire hazards. As well, there remain many questions about the toxicity of the battery vent gas.

From 2014 to 2018, residential BESS installations have increased by 200% annually. Further research into residential BESS hazards is essential as BESS hazards could eventually become a regular part of dwelling fires.

According to Professor Ezekoye, the results of this study will lead to wider awareness of the BESS hazards, a greater understanding of the underlying fire behavior of these systems, and eventually the development of safe standard operating guidelines and procedures for firefighters.

Link: www.UTFireResearch.com

Data Center Fire Triggers Lithium Ion Battery Doubts for South Korea

**https://www.datacenterknowledge.com/business/data-center-fire-triggers-lithium-ion-battery-doubts-for-south-korea#**

South Korea's major data center fire was said to be triggered by lithium ion battery failure. With the country being a major producer of these batteries, their economy faces even more uncertainty.

Bloomberg) -- A major data center fire in South Korea that knocked out a wide range of key digital services for days — snarling banking, ride-sharing and online deliveries — is reigniting safety concerns in a nation that's a key global supplier of lithium-ion cells used in electric vehicles.

Even with SK C&C, the operator of the data center, still investigating the cause of the fire, the incident has stoked a new bout of concerns over battery safety. That's important for the electric car sector, given three South Korea-based companies — LG Energy Solution Ltd., SK On Co. and Samsung SDI Co. — rank among the top tier of global battery suppliers.

"Safety concerns are re-emerging over lithium-ion batteries, and the government needs to step in to prevent similar accidents from happening because once things go wrong with batteries, the impact is often unbearably significant," said Lee Hoguen, a professor of automotive engineering at Daeduk University.

June 24, 2024

**Blaze at South Korea lithium battery plant kills 22 workers**

https://www.reuters.com/world/asia-pacific/about-20-bodies-found-after-fire-south-korea-battery-plant-yonhap-reports-2024-06-24/

By Daewoung Kim, Hongji Kim and Hyunsu Yim
June 24, 20241:07 PM EDT

HWASEONG, South Korea, June 24 (Reuters) - A lithium battery factory in South Korea was set on fire after multiple batteries exploded on Monday, killing 22 workers, most of them Chinese nationals, fire officials said.

The fire and a series of explosions ripped through the factory run by primary battery manufacturer Aricell in Hwaseong, an industrial cluster southwest of the capital Seoul. The victims likely succumbed to extremely toxic gas within seconds of the blaze getting out of control, the officials said. It was unclear what caused the explosions and the fire was largely extinguished in about six hours.

Eighteen Chinese workers, two South Koreans and one Laotian were among the dead. The nationality of the other deceased worker was yet to be confirmed, Kim Jin-young,

an official at the Hwaseong fire service, told reporters, citing information from company officials.
The blaze was first reported at 10:31 a.m. (0131 GMT) after a series of battery cells exploded inside a warehouse of 35,000 batteries, Kim said.

A Reuters journalist saw firefighters moving up to six bodies out of the factory. Due to the intensity of the blaze, rescuers were finding it difficult to identify the dead, Kim said.
Two people were being treated for major burns, officials at the scene said.
Live TV footage showed firefighters spraying the damaged steel and concrete building. Parts of the upper level had collapsed, and large chunks of the building looked like they had been blown out into the street by explosions.
Aerial footage showed massive white smoke clouds billowing from the structure and explosions rolling through the building.
Gyeonggi province fire official Cho Sun-ho said most of the foreign workers killed were temporary hires, likely unfamiliar with the structure of the building. Smoke and the fire blaze spread within 15 seconds and the victims likely succumbed after taking one or two breaths, he said.
HIGHLY FLAMMABLE
Kim Jae-ho, Fire and Disaster Prevention professor at Daejeon University, said the fire had probably spread too quickly for workers to escape.
"Battery materials such as nickel are easily flammable," he said. "So often, there is not enough time to respond, compared to a fire caused by other materials."
South Korea's President Yoon Suk Yeol visited the scene of the accident later on Monday. Interior Minister Lee Sang-min called on local authorities to take steps to prevent any hazardous chemicals from contaminating the surrounding area.
Established in 2020, South Korea-based Aricell makes lithium primary batteries for sensors and radio communication devices. It has 48 employees, according to its latest regulatory filing and its Linkedin profile.
Battery production involves the use of highly toxic materials.
"The fact that there were so many casualties when this was on only the second floor is because of the toxic materials and not so much because of burns," said Park Chul-wan at Seojeong University.
South Korea is home to major producers of lithium-ion batteries that power electric vehicles (EVs) and to one of the world's biggest automakers, Hyundai Motor, and its affiliate Kia which are making a push to shift away from internal combustion cars to EVs.
Two years ago, South Korea brought in legislation to punish the executives of a company in the event of a fatal accident with possible jail terms after the country saw dozens of workers killed in industrial accidents each year.
Reporting by Hyonhee Shin, Ju-min Park, Joyce Lee, Heekyong Yang and Cynthia Kim, writing by Jack Kim; Editing by Miral Fahmy, Angus MacSwan and Susan Fenton.

**Fire at Lithium Battery Plant in South Korea Kills 22**

https://www.nytimes.com/2024/06/24/world/asia/lithium-battery-fire-south-korea.html?smid=em-share
It took only 15 seconds for the floor to be filled with smoke and flames, said a senior fire official, Jo Seon-ho, during a news briefing Monday. After trying in vain to put out the blaze with fire extinguishers, he said, the workers rushed to an area of the floor where there was no exit.

Fires can occur in lithium batteries when the inside layers are compressed, causing a short circuit. The layers can become compressed by a sudden impact, such as during a vehicle collision, or by gradual swelling of the batteries through regular use.

Lithium is a metal that can store large amounts of energy in a small space, which is why it is attractive as a battery material. But that also means there is much energy available to turn into heat and even flames in case of a short circuit. Lithium battery fires have been a growing problem in the United States and elsewhere, and fires are an industry-wide concern for battery manufacturers.

**Data Center Fire Triggers Lithium Ion Battery Doubts for South Korea**
https://www.datacenterknowledge.com/business/data-center-fire-triggers-lithium-ion-battery-doubts-for-south-korea#
Oct 24,2022
South Korea's major data center fire was said to be triggered by lithium ion battery failure. With the country being a major producer of these batteries, their economy faces even more uncertainty.
Bloomberg) -- A major data center fire in South Korea that knocked out a wide range of key digital services for days — snarling banking, ride-sharing and online deliveries — is reigniting safety concerns in a nation that’s a key global supplier of lithium-ion cells used in electric vehicles.
Even with SK C&C, the operator of the data center, still investigating the cause of the fire, the incident has stoked a new bout of concerns over battery safety. That’s important for the electric car sector, given three South Korea-based companies — LG Energy Solution Ltd., SK On Co. and Samsung SDI Co. — rank among the top tier of global battery suppliers.
“Safety concerns are re-emerging over lithium-ion batteries, and the government needs to step in to prevent similar accidents from happening because once things go wrong with batteries, the impact is often unbearably significant,” said Lee Hoguen, a professor of automotive engineering at Daeduk University.

February 18, 2024

**French Lithium Battery Warehouse Explodes In Terrifying Toxic Fireball**
https://stopthesethings.com/2024/03/07/french-lithium-battery-warehouse-explodes-in-terrifying-toxic-fireball/

Self-immolating lithium-ion batteries spewing toxic smoke is just another part of our grand wind and solar transition.

And it's not just those in service providing deadly pyrotechnic displays (see above the giant Tesla that burned for days in Victoria). Those past their use by dates are also giving thrilling thermal displays, as they turn their bevy of heavy metals and rare earths into impossible-to-control fires (they can't be extinguished) and threaten the lives of neighbours for miles around. This time, the incendiary action is in France.

February 18, 2024

**Lithium battery warehouse goes up in flames**
By Vivian Song
18 February 2024

A warehouse in France storing lithium batteries caught fire on Saturday, amid growing fears over their safety.

The fire on Saturday afternoon occurred at a storehouse in the southern town of Viviez, in Aveyron, where 900 tons of lithium batteries were waiting to be recycled.

Authorities ordered residents to stay indoors and keep their windows closed as thick smoke billowed over the town. No injuries or deaths were reported and the cause of the fire has yet to be established.

Lithium batteries, found in electric scooters and vacuum cleaners, are known to spontaneously combust if they overheat or become damaged. Their dangers have raised concerns in countries where e-bikes have been promoted as a climate-friendly mode of transportation.

**Questions raised**
Jean-Louis Denoit, the mayor of Viviez, called Saturday's fire "shocking" and told

French news channel BFMTV: “Behind all this, there is indeed reason to ask questions about the function of electric vehicles and lithium batteries.”

It took 70 firefighters to put the fire under control, after which air quality tests were conducted and the lockdown order lifted.

France has moved to promote cycling since the pandemic, with e-bikes becoming hugely popular in cities like Paris. However irresponsible behaviour and a rising number of accidents has led to criticism around their use, and how to store their batteries safely.

In the UK, a proposal to build one of Europe’s largest battery storage facilities near the village of Granborough, in Buckinghamshire, was met with fierce opposition by locals who have expressed environmental and safety concerns.

The plan, by the energy company Statera, calls for a 500 MW battery energy storage system that would span 26 acres of land.

Responding to the plans, the Claydon Solar Action Group wrote on social media: “Unacceptable risks of fire, explosion, air and water pollution, a major accident waiting to happen just 500 metres away from residential properties.”
https://www.telegraph.co.uk/world-news/2024/02/18/lithium-battery-warehouse-flames-recycle-plant/

May 30, 2024

Journal of Energy Storage Volume 88, 30 May 2024, 111532
https://www.sciencedirect.com/science/article/abs/pii/S2352152X24011174

Insights into extreme thermal runaway scenarios of lithium-ion batteries fire and explosion: A critical review

Abstract: The safety issues of lithium-ion batteries (LIBs) caused by thermal runaway (TR) have been a worldwide hot topic in the current research as their large-scale application in the fields of transportation and energy storage. Under abusive conditions, LIBs are susceptible to severe TR incidents, such as rupture, fire and explosion, posing significant risks to safety and property. This study aims to interpret extreme TR hazards of LIBs throughout the entire evolution process by reviewing manifestation forms, evolution mechanisms, assessment parameters and modeling methods. Additionally, the corresponding state-of-the-art countermeasures for TR hazards were analyzed. Then this review discussed the challenges and prospects for future research, focusing

on intrinsic research of TR, TR hazards modeling and the safety measures. Further, a multi-field, multi-dimensional and multi-physics modeling framework was developed to fully describe extreme TR scenarios. This study provides a comprehensive understanding of TR scenarios and reveals the evolution mechanism between different hazard forms. Insights from this review serve as scientific guidance for the design of next-generation battery safety systems, towards addressing thermal safety issues of LIBs from a new interdisciplinary perspective.

May 29, 2024

Otay Mesa battery facility fire could take weeks to put out entirely
California | filed May 29, 2024
Credit: Kasia Gregorczyk, May 22, 2024 | fox5sandiego.com

A stubborn fire at a battery storage site in Otay Mesa is burning for a sixth day. Fire officials are preparing for it to potentially take weeks to put out.
“We’re not sure. We’re preparing for the worst and making plans to be here for a long time, two to four weeks and will reevaluate then,” said Captain Brent Pascua with Cal Fire San Diego.
The fire began last Wednesday at the Gateway Energy Storage facility and flare-ups over the weekend put evacuations warnings for the surrounding area back in place. Pascua said things began to reignite Friday night.
“You have to put water on it to keep the fire confined, but that water damages the batteries also allowing them to arc starting another fire. We’re just trying to keep the public safe and keep the fire contained to the building,” he said.
The chain reaction can happen when a lithium-ion battery creates heat faster than it can dissipate. That rapid increase of temperature can then turn to fire.
Cal Fire reports there is now major damage to the building, including the roof.
“Here in the middle of nowhere and it’s still dangerous. The facility being proposed in La Mesa is in a highly concentrated urban area,” said La Mesa Vice Mayor Laura Lothian.
The fire has captured the attention of North County residents opposing the Seguro battery storage site and now those living in La Mesa where another battery facility is in the works.
“Hasty to say the least to be building these things without thinking it all the way through,” Lothian said.
According to the Murray Project website, the La Mesa project would use lithium iron phosphate batteries, a reportedly safer option that is emissions free and non-toxic.

In Otay Mesa, officials continue to monitor the air quality and the water runoff to make sure it's safe for crews to be near. Fire crews are focusing on keeping the fire from spreading to any of the neighboring buildings which also house batteries.
The company operating the Gateway site, Rev Renewables, declined an interview, but said it is continuing to work with fire officials.

## Alternatives

May 30, 2024

**Startup debuts first full-scale plant for batteries that could replace lithium-ion — with cheaper materials, faster production times, and more safety**

"The electrification of our economy is dependent on the development and production of new, innovative energy storage solutions."

By Talia Resnick
"The electrification of our economy is dependent on the development and production of new, innovative energy storage solutions."
Lithium-ion batteries are facing new competition with another type of electric battery ready to hit the market. As reported by Bloomberg, sodium-ion batteries are in production and have the potential to be cheaper and safer than lithium-ion batteries.
Lithium-ion batteries have been used for years now, powering our smartphones, electric cars, and more. However, lithium-ion batteries have some downsides. These include cobalt mining, which often happens at the expense of child labor; the lack of abundance of lithium; and its fire risk, as per the Bloomberg report.
Sodium-ion batteries, though they don't have the same energy density as lithium-ion batteries, offer large-scale electric products a cheaper and safer electric option. Natron Energy, a United States-based tech company, unveiled its sodium-ion battery plant in April. It was partially funded by a $20 million federal grant, as reported on its website.
Natron is not the only sodium-ion battery plant popping up. Companies in China and Sweden are also putting money into pushing out sodium-ion batteries to be used as soon as possible, Bloomberg reported.
Read in The Cool Down: https://apple.news/AcdT5ZfRzQ8Owe-OruUIgVw

June 2024

New Energy Storage Systems From Thin (Compressed) Air Can Compete With Li-Ion Batteries

Compressed air energy storage systems were practically non-existent just a few years ago. Now energy planners are beginning to take notice, attracted by the ability of compressed air to provide the kind of scaled-up, long duration storage capacity needed for a global economy saturated with wind and solar energy. The sticky wicket is cost, but a new analysis indicates that issue has already begun to fade from view.

https://cleantechnica.com/2024/06/03/new-energy-storage-systems-from-thin-compressed-air-can-compete-with-li-ion-batteries/

June 4, 2024

Lithium-Ion's Grip on Storage Faces Wave of Novel Technologies

By Evelina Stoikou, Energy Storage, BloombergNEF

The domination of lithium-ion batteries in energy storage may soon be challenged by a group of novel technologies aimed at storing energy for very long hours. BloombergNEF's inaugural Long-Duration Energy Storage Cost Survey shows that while most of these technologies are still early stage and costly, some already achieve lower costs than lithium-ion for longer durations.

The need for long-duration energy storage or LDES is rising, as renewable energy generation grows. This increases the need for storing energy for longer periods of time to address intermittency. Thermal energy storage and compressed air storage are the least expensive LDES technologies, at $232 per kilowatt-hour and $293 per kWh of capex, respectively, data from the survey shows. For comparison, lithium-ion systems had an average capex of $304/kWh for four-hour duration systems in 2023.

https://about.bnef.com/blog/lithium-ions-grip-on-storage-faces-wave-of-novel-technologies/

## Communications

GREENFIELD RECORDER COLUMN
November 11, 2023
Assault and batteries in Wendell

On April 19, 2019, a HAZMAT team was called to an energy facility in Surprise, Arizona. A large metal container was leaking milky white smoke. It was a 2-megawatt

battery energy storage system (BESS). According to one account by the National Fire Protection Association, “Hundreds of the system’s lithium-ion battery cells had experienced a catastrophic failure and were in a dangerous state known as thermal runaway.”

When the HAZMAT team opened the container door, “a sudden explosion rocked the facility, a jet of flame extended 75 feet outward and 20 feet vertically. ” The explosion force blew the HAZMAT captain 70 feet from the container door. A fire engineer was thrown violently 30 feet. Two nearby firefighters were knocked unconscious, their breathing apparatus and helmets ripped away. The captain and fire engineer suffered traumatic brain injuries, and thermal and chemical burns.

The massive explosion “confirmed for some a long-simmering fear: that the fire service and safety community are unprepared to deal with this burgeoning technology … battery incidents are so challenging for first responders,” the fire protection association article concluded. There were 28 BESS fires in South Korea between 2017 and 2019. According to the industry publication pv magazine, “The Korean government changed storage policies from unusually strong support to zero support [citing] a deterioration in the profitability of the batteries which acted as an obstacle to industrial growth, along with the fire risk.” In December of 2020, Borrego Solar Systems of Lowell sought support from the Wendell Planning Board to apply to the state Department of Public Utilities for a zoning exemption order from all Wendell zoning rules. Borrego wanted to construct a 105-megawatt battery system on Wendell Depot Road, using lithium-ion batteries in above-ground enclosures on a 51-acre lot of which 11.1 acres of the wooded site would be clearcut.

The site would have an 8-foot-high security fence and a 25-foot-high sound barrier wall. It has no solar panels, and generates no solar energy. The batteries are charged by electricity from the grid, which is transmitted back during times of peak demand to “Eastern zone centers.” In 2022, ECP, a New Jersey investor, acquired Borrego’s development arm, and created New Leaf Energy, which in turn, created Wendell Energy Storage 1 LLC suggesting other facilities will follow.

The Wendell Planning Board voted to support Borrego in April 2021, but four weeks later sent a letter to Borrego saying: “The Planning Board does not possess the

expertise to evaluate the potential impact of a battery project" on a "critical natural habitat" on the property.

The Planning Board also notified the DPU that its support letter was "premature," and rescinded "any specific or perceived support of this project." The board said the project had too much impervious area, and told Borrego: "Members of our community are upset at the thought that the Planning Board would diminish our local control."

Wendell Town Meeting voted in 2021 to impose a moratorium on BESS, but the amendment was never received at the state attorney general's office, and had no lawful effect. Wendell's Conservation Commission denied the New Leaf application based on noise impacts on the 50-foot conservation zone.

Town Meeting voted in 2022 to amend its zoning to prohibit standalone battery energy storage facilities" — but the AG ruled that the ordinance violates a state law that prohibits unreasonable regulation of "structures that facilitate the collection of solar energy"— except to protect public health, safety and welfare.

"No Nukes" author and activist Anna Gyorgy, a Wendell resident, listed citizen concerns: deforestation; destruction and disturbance of critical wildlife and wetland habitats; noise, light and chemical pollution; preference for conservation to reduce peak demand; and environmental problems with lithium extraction and waste. "Like the Northfield Mountain Pump Storage project, New Leaf's big battery center doesn't produce or store renewable energy. It's a 'buy cheap, sell dear' scheme to store and resell dirty energy, sacrificing forests and fish for corporate profits," Gyorgy wrote.

The DPU has not scheduled a public comment hearing yet on the Wendell project. The town will have a window of four weeks to decide if it wants to be an intervenor, which allows it to participate in evidentiary proceedings, and to appeal the final decision.

Borrego told Wendell it's "committed to addressing concerns of town officials," yet it seeks total exemptions from all local zoning. But Wendell, population 921, is not equipped to respond to a thermal runaway.

This project has an operating life of only 20 years. Batteries degrade, the storage system will be decommissioned and removed. The curse of living in a rural landscape like Wendell is having to endure unreasonable corporate development assaults.

*Al Norman's Pushback column appears in the Recorder every third Wednesday of the month. He is an author and activist who lives in Greenfield. The group No Assaultin' Battery can be reached at: NABWendell@crocker.com.*

AL NORMAN

PUSHBACK

## Counsel to report on battery bylaw

Public comment session on storage facilities scheduled for Monday
By DOMENIC POLI
Greenfield Recorder, March 23,2034
Staff Writer
WENDELL — The Selectboard is waiting to hear from town counsel before taking a stance on a potential bylaw submitted by a citizens group opposing a 105-megawatt battery storage facility proposed for the center of town.
Selectboard members say they have not received input from Kopelman & Paige regarding the bylaw that No Assault & Batteries (NAB) wants adopted to define various terms and designate the Selectboard as voting members of a Licensing Board, which would convene to review applications submitted for a battery energy storage system license. Selectboard Chair Laurie DiDonato said at a meeting Wednesday that she would reach out to town counsel again.
A bylaw must be approved by voters at a Town Meeting. NAB member Nina Keller, who attended Wednesday's meeting virtually, mentioned that hearing from a lawyer "sometimes takes longer than anticipated." She also said NAB members are strongly considering proposing two bylaws — one endorsed by town counsel and one that has not been filtered by a lawyer — on a Town Meeting warrant, as the town of Carver is doing.

Under the proposed bylaw, the Licensing Board's voting members would act as the granting authority for licenses. This board would also have one member each appointed from the Conservation Commission, Board of Health, Planning Board, Zoning Board of Appeals, Energy Committee, Municipal Light Board and Finance Committee. The Selectboard would designate one person to oversee and coordinate the Licensing Board's application review process.

The proposed bylaw also lists various definitions, licensing requirements and safety regulations. A battery energy storage system, or BESS, would be defined as "an energy storage system that uses rechargeable batteries, which harness reversible electrochemical processes to store electrical energy using any battery chemistry, including lithium ion, lithium iron phosphate and many others." A BESS is a stationary installation that may receive electrical energy to be stored directly from a generating facility, or from the electrical grid, or both. It must include rechargeable batteries and any related equipment or structures.

The bylaw also would require any applicant to have proof of $100 million in liability insurance to cover loss or damage to people and structures caused by the use or failure of any BESS facility. This would include coverage for fires, explosions and flooding events.

New Leaf Energy's intent is to construct an industrial-size, lithium-ion battery storage project at 68 Wendell Depot Road.

"This project is just so inappropriate, even if it worked and wasn't incredibly dangerous," NAB member Anna Gyorgy said at a previous meeting.

Due to the noise disruption to wildlife, the Wendell Conservation Commission refused to permit the project, which has been in development since 2020. However, in January 2023, New Leaf applied to the state Department of Public Utilities for a permit to proceed. According to New Leaf Energy's project website, it is sited adjacent to existing electrical infrastructure and is an optimal location for new energy infrastructure.

In response to this proposal, the Wendell Board of Health is working to draft regulations concerning utility-scale battery energy storage systems and wants the public's input. Chair Barbara Craddock said it is important to hear what residents want, though any regulation must be within the health board's authority.

According to a statement from the board, thermal runaway fires and the potential release of toxic chemicals from utility-scale BESScould harm the local drinking water supply, air quality and the physical safety of Wendell residents. The town has no municipal water system, relies entirely on local aquifers for drinking water, and has limited emergency response capacity to handle large-scale battery fires or the release of hazardous chemicals.

"The problem is, our town has had experience with contamination before," Craddock said, referring to the issue of forever chemicals in Swift River School's drinking water

and a former landfill on Mormon Hollow Road. “Basically, we want to protect our air and water.”

According to the board’s statement, state law gives local boards of health the authority to enact reasonable regulations to protect public health, safety and welfare that expand upon existing state or local statutes. The Wendell board will consider requiring annual operating permits, periodic inspections, environmental monitoring and other conditions for utility-scale BESS.

“As a physician, I am particularly concerned about the potential human health hazards posed by large-scale lithium battery storage facilities,” said Wendell Board of Health member James Frank. “While my family and I are committed to personal efforts to reduce our carbon footprint in addressing the threats of climate change, we do not feel it should be done at the risk of compromising the well-being of residents of this small rural community.”

The public is invited to provide input by emailing boardofhealth@wendellmass.us.

A public input session is scheduled during the board’s March 25 meeting at 5:30 p.m. This will be a hybrid meeting, held in-person and via Zoom. Those wishing to speak during the public input session should email the board to register ahead of time. Information on how to join the meeting can be found on the board’s web page at tinyurl.com/yc33wvch and posted at the town office building at 9 Morse Village Road.

Reach Domenic Poli at: dpoli@recorder.com or 413-930-4120.

GREENFIELD RECORDER COLUMN

March 29, 2024

## Canadian power play abetted by state aims

Our rural Franklin County landscape has attracted large energy companies — from Tenneco in the 1970s to FirstLight today — seeking to own our woods and rivers to make electric power. Each of these corporations has greenwashed their mission. FirstLight says it owns “hundreds of miles of shoreline along some of the most beautiful rivers and lakes in North America,” including major power facilities in Franklin County. FirstLight was created in 2006 by a New Jersey investment firm, Energy Capital Partners (ECP), which sold it to a North American subsidiary of the French GDF Suez in 2008, which sold it to the Canadian Public Sector Pension Investment Board (PSP) in 2016. PSP invests the savings of public pensioners in Canada. Their pension funds are underwriting plans like the lithium-ion battery energy storage system (BESS) being fought in Wendell. FirstLight has created a strategic partnership with a company called New Leaf to develop battery projects.

New Leaf created the Wendell Energy Storage 1 LLC and filed a petition with the Massachusetts Department of Public Utilities to override all local zoning laws to build a huge, 105 megawatt lithium ion BESS on 11 acres of mostly woodlot in Wendell. New

Leaf was created in 2022 by ECP, the same company that created FirstLight 16 years earlier.

First Light acquired 15 power plants of mostly hydro generating capacity, including the 1,168 megawatt Northfield Mountain pump hydro storage facility. FirstLight wants to "accelerate the decarbonization of the electric grid," and last month, FirstLight acquired 10 hydropower stations in Canada.

PSP, another Canadian investor, was founded in 1999, and is one of Canada's largest pension investment managers. It invests funds from the Canadian Forces, and the Royal Mounted Police and the Reserve Force. FirstLight (PSP owned) has entered into an agreement with New Leaf (ECP owned), to build a battery storage project in Preston, Connecticut, but its only one-sixth (17 megawatts) the size of the Wendell battery project. FirstLight and PSP are the Canadian power players.

Massachusetts government is also twisting arms for battery projects. Seven months ago, Gov. Maura Healey created a temporary Commission on Energy Infrastructure Siting and Permitting to clear-cut local zoning, seen as the "major obstacle" facing energy developers. The commission is mandated to build energy infrastructure "in a responsible manner, which is protective of natural and working lands … while ensuring that communities have adequate input into the siting and permitting processes."

At two listening sessions in early March, the commission heard residents across the state criticize the siting commission as a power grab by the state to sweep local communities aside. Activists said local zoning is the "adequate input" they need, but the governor's plan treats municipalities as a problem, not a partner.

I presented the commission with the following siting reforms: 1. Eliminate "protected" status for PV and battery storage to make them adhere to local zoning bylaws.

2. Create an "intervention fund" so local communities can challenge an energy siting decision before state regulators. The cost of legal and technical experts can easily exceed $100,000.

3. Promulgate enhanced fire safety code regulations like ones being vetted in New York State: industry-funded independent peer reviews for all projects; creating BESS design requirements for what constitutes a "passable" system; requiring qualified emergency fire responders to support local fire departments; prohibiting BESS from being sited on forestland.

The federal government is developing "virtual power plants" — aggregated rooftop solar/home storage batteries to collect and store energy for sale back to the grid instead of industrial utility-scale batteries. We should require new and existing private commercial and industrial buildings to have a rooftop- or ground-mounted PV installation — or demonstrate why such PV is not-feasible.

Wendell residents are not seeking "complete prohibition" of stand-alone battery storage, just putting a size limit on utility-scale projects. Towns like Wendell, Carver and

Shutesbury are pushing back on unstable lithium-ion technology. They want enhanced energy conservation first, not just chasing higher and higher “peak power” capacity.
Legislation on Beacon Hill would stop Canadian investors from overpowering local zoning by removing solar panels/battery storage projects from “protected” zoning status. Call the State House switchboard at 617-722-2000. Tell your state representative and state senator: “Energy siting and permitting should be a local power. Pass S. 1319 and H. 2082 to make local zoning a powerful form of home rule.”
No Assault & Batteries continues to work with the Wendell Selectboard to ensure that energy permitting brings “power to the people” in a safe, responsible way.
Al Norman’s Pushback column appears twice monthly in the Recorder. He is a member of the group No Assault & Batteries.

AL NORMAN

WENDELL

## Voters to decide battery storage bylaw

Article comes in response to proposed 105-megawatt battery storage facility
By DOMENIC POLI
GREENFIELD RECORDER, April 30, 2024
Staff Writer
WENDELL — Residents will convene at Town Hall on Wednesday to have their voices heard on a proposed bylaw brought by citizens to regulate battery energy storage systems.
A Special Town Meeting is slated to begin at 7 p.m., with two articles on the warrant — one pertaining to battery energy and the other having to do with “any other legal business that may come,” before the meeting adjourns.
The main article was crafted by members of No Assault & Batteries, a local citizens’ committee formed in opposition to the 105 megawatt battery storage facility that Lowell-based New Leaf Energy has proposed for 68 Wendell Depot Road. Adoption of the article would add a general bylaw to deal with the licensing of battery energy storage systems, including those powered by lithium-ion batteries. Members of the committee fear the project is unsafe and not suited for a town of Wendell’s size. They hope adoption of the bylaw will stop the proposed project.
“This is something that has been worked on, really, since January. And it’s gone through changes because we want to make sure that it focuses on the key topics of health and

safety," No Assault & Batteries member Anna Gyorgy said, noting that this is not a zoning bylaw. "We have learned not just the danger of storing lithium, but the inappropriate nature of siting battery storage separate from production and on this scale. It's just way too big."

Gyorgy has said the proposed project would disturb 50 acres of forest and clearcut 11.1 acres to install 25-foot walls and constant air conditioning to protect 786 lithium ion batteries. One of the proposed bylaw's regulations would require that the clearcutting of forest be limited to less than a half-acre.

Another requirement would be a 5 acre limit for any battery energy storage system, and construction on undeveloped land must be minimized to the extent possible.

The bylaw would designate the Selectboard as voting members of a Licensing Board, which would convene to review applications submitted for a battery energy storage system license. The Licensing Board's voting members would act as the granting authority for licenses. The board would have one member appointed from the Conservation Commission, Board of Health, Planning Board, Zoning Board of Appeals, Energy Committee, Municipal Light Board and Finance Committee. The Selectboard would designate one person to oversee and coordinate the Licensing Board's application review process.

Wendell's vote comes just days after voters at the Sunderland and Shutesbury Annual Town Meetings approved their own battery storage bylaws.

Wendell's proposed bylaw was reviewed by Kopelman & Paige, Wendell's legal counsel, and according to Gyorgy, was returned with numerous corrections on it. Nevertheless, No Assault & Batteries members decided to move forward with the version submitted by a petition of 111 registered voters.

"It's long, six pages," she said. "We are going to present it Wednesday night in a way that is digestible and clear."

No Assault & Batteries member Nina Keller said she contacted the town's Police Department, Fire Department, Selectboard, Planning Board and Board of Health to ensure their members knew about the proposed bylaw and to get input on it.

"I have a few major concerns," she said. "One I call a moral imperative."

Keller said she is worried about the waste that will be produced and possibly sent to other countries. She mentioned the cargo ship that crashed into the Francis Scott Key Bridge in Baltimore, killing at least four people, was carrying corrosive chemicals, lithium-ion batteries and other materials to Sri Lanka. Keller also is fearful of destruction of natural habitat and the potential for massive fires. According to the National Fire Protection Association, lithium-ion battery fires occur for a variety of reasons, such as physical damage, electrical damage, exposure to extreme temperatures and product defects.

Citing all the passion and emotions this issue can generate, Keller said she hopes the Special Town Meeting remains respectful.

“There’s enough war in this world without hating our neighbors who disagree with us,” she said.
The proposed bylaw’s text can be viewed at: tinyurl.com/ Wendell Bylaw.
Reach Domenic Poli at: dpoli@recorder.com or 413-930-4120.

GREENFIELD RECORDER COLUMN MAY 1, 2024

## Your home’s power plant could save our energy grid

Tonight, voters in Wendell will act on a new general bylaw regarding licensing requirements for battery energy storage systems. Last Saturday, Shutesbury voters adopted a very similar bylaw. By voting “yes” on this bylaw, Wendell residents will generate a powerful message to both energy companies who are pushing for industrial-scale projects and faster permitting, and to the governor and state officials who view small, home rule governments as “barriers to responsible clean energy infrastructure development.” Two governors, the state Legislature, and the Supreme Judicial Court are all promoting one path for how to achieve clean energy goals. In 1985, the Legislature passed a law granting solar facilities “protection” from local zoning bylaws. In 2018, Gov. Charlie Baker signed a law establishing a 1,000 megawatt-hour energy storage target by the end of 2025.
In 2020, the Executive Office of Energy and Environmental Affairs created a “2050 Decarbonization Roadmap” saying the amount of solar power needed by 2050 “exceeds the full technical potential in the Commonwealth for rooftop solar.”
In 2022, the Supreme Judicial Court ruled that “large scale systems are key to promoting solar energy.” In 2023, Gov. Maura Healey signed an executive order creating a commission to “accelerate siting and permitting of clean energy infrastructure … to swiftly remove barriers” to the development of clean energy projects.
“The clean energy transition can’t wait,” Healey said. “We’re going to need a lot of new infrastructure, and we’re going to need it fast,” added Lt. Gov. Kim Driscoll.
These state policies reinforce the mantra that the only way for Massachusetts to decarbonize is to build large, and build fast. By promoting “expedited permitting,” the governor has left local communities no permitting power. It is these very communities which could play a significant role in meeting the state’s energy goals. You don’t hear public officials talking about “Virtual Power Plants” (VPP), but you will.
According to the MIT Technology Review, “A virtual power plant is a system of distributed energy resources — like rooftop solar, electric vehicle chargers, smart water heaters — that work together to balance energy supply and demand. A VPP is a way of ‘stitching together ’ a portfolio of small resources, while reducing the energy system’s carbon footprint. The ‘virtual’ network has no central physical facility.”
Conventional power plants have no way to communicate with distributed energy resources — the end users — like the home with rooftop solar, a Powerwall battery in

the basement, and an EV charger. Grid operators shave peak demand by controlling networks of smart thermostats that pre-cool homes on days before peak surges occur. Wi-Fi, Bluetooth, and cellular services can coordinate hundreds of thousands of distributed devices, increasing grid reliability.

Green Mountain Power, the Vermont utility company, has operated a VPP for seven years. Customers can lease two Tesla Powerwall batteries for 10 years at half the retail cost. Green Mountain Power gets a source of stored power it can draw from during peak demand. Customers can enroll in a “Bring Your Own Device” program, selling a level of their battery capacity for cash.

Four thousand customers and 18 megawatts of energy storage from small batteries are enrolled in the program. The utility saved $3 million in energy peaks in 2020 due to VPP. Eversource also has a ConnectedSolutions program that rewards customers for allowing the company “to use the energy stored in their battery at times of high demand.”

In a New Yorker article six months ago, environmentalist Bill McKibbon quoted the federal Department of Energy as predicting VPPs could be handling 20% of peak power demand across the country by 2030, at a cost 40% to 60% below current plants. Customers could save 20% on their bills.

“With the advent of the Internet, every person became a potential content producer, ” McKibbon writes, “and was connected laterally to everyone else. Now the electric grid is belatedly starting to follow that model, with millions of homes and businesses becoming energy suppliers and storage nodes.”

Urban expropriation of our rural resources is not new. In 1938, four towns were flooded to send water to eastern Massachusetts. In 1972, the Northfield Mountain pumped storage plant opened to meet peak power needs of the metro grid. In 1974, the proposed twin nukes in Montague, and in 2014, the Kinder Morgan gas pipeline used our county as an energy passthrough.

The battery system on Wendell forestland will ship its power to greater Boston. Dispossession by government/corporate fiat is a “barrier” to our energy future. A house-to-house infrastructure of thousands of end users is local power that “can’t wait.”

Al Norman’s Pushback column appears twice per month in the Recorder.

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AL NORMAN, PUSHBACK

WENDELL

## Battery storage bylaw approved

Only one vote in opposition to article proposed by No Assault & Batteries

By DOMENIC POLI

Greenfield Recorder, May 3, 2024

Staff Writer

WENDELL — Town Hall was packed Wednesday night with 102 registered voters eager to have their voices heard on a bylaw regulating battery energy storage systems, which was overwhelmingly approved.

The Special Town Meeting warrant article was proposed by No Assault & Batteries, a local citizens' committee formed in opposition to the 105-megawatt battery storage facility that Lowellbased New Leaf Energy has proposed for 68 Wendell Depot Road.

Wednesday's vote adds a general bylaw to deal with the licensing of battery energy storage systems, including those powered by lithium-ion batteries. Members of No Assault & Batteries hope adoption of the bylaw will stop the New Leaf Energy project.

The only approved amendment — adopted unanimously — altered some language pertaining to license approval without affecting the specified requirements. Any battery energy storage system with a power rating greater than 1 megawatt and no more than 10 megawatts will require approval from the Wendell Licensing Board, which will be made up of Selectboard members as well as one member appointed from the Conservation Commission, Board of Health, Planning Board, Zoning Board of Appeals, Energy Committee, Municipal Light Board and Finance Committee. The bylaw also states that no battery energy storage proposal greater than 10 megawatts will be licensed.

Members of No Assault & Batteries started the Special Town Meeting by explaining different aspects of the proposed bylaw and their opposition to the potential project.

Nina Keller joked that the Licensing Board will be made up of "the bigwigs in our town."

Debbie Lynangale explained members of the citizens' committee believe the proposed project — including its size — is unsafe and not suited for a town like Wendell.

"We, as a group, encourage … solar installations," she said, adding that the proposed 105 megawatt battery energy storage system is simply much too large.

Christopher Queen mentioned recent lithium ion fires in Arizona and Long Island.

Due to the noise disruption to wildlife, the Wendell Conservation Commission has refused to permit the project. In January 2023,however, New Leaf Energy applied to the state Department of Public Utilities for a permit to proceed.

Bill Stubblefield, who holds a doctorate in biology from Harvard University, spoke passionately about the dangers of lithium-ion batteries and his opposition to this small town getting bullied by a corporation.

“This is a steamroller that’s coming after us,” he said, generating roaring applause. “This is our town. This is our land. This is our future.”
Myron Becker stressed the importance of being in contact with public servants serving the town at the state level, and Selectboard Chair Laurie DiDonato said that has not been a problem.
Residents rejected Edward Hines’ proposed amendment to add the words “current and future projects” to the language. One woman stood up to say she felt that addition was unnecessary.
Finance Committee member Thomas Richardson, who sat at the front of the room with the Selectboard, Moderator Kathleen Nolan and fellow Finance Committee member Al MacIntyre, said he felt it was unwise to adopt a bylaw that is aimed at one particular project. He said energy technology will improve greatly within a handful of years and the town might then decide it wants a battery energy storage system. He said the bylaw, as written, could hamper the town’s ability to ever allow the project. He was the only person to vote against the bylaw.
No Assault & Batteries member Anna Gyorgy previously said New Leaf Energy ’s proposed project would disturb 50 acres of forest and clear-cut 11.1 acres to install 25-foot walls and constant air conditioning to protect 786 lithium ion batteries. One of the bylaw ’s regulations requires that the clear-cutting of forest land be limited to less than a half-acre.Reach Domenic Poli at: dpoli@recorder.com or 413-930-4120.

JUNE 23, 6:05 pm

From: Al Norman
To: Senator Jo Comerford

MUNICIPAL AGGREGATION
AMENDMENT BACKGROUND:

Dear Senator Comerford,

I am forwarding to you an amendment to the Senate UPGRADING THE GRID bill, which I believe should be part of any “clean energy revolution” you have advocated.

This amendment could appropriately be called “the local power amendment,” because it advances the role of the 168 Municipal Aggregators—including many of the towns in your District.

This amendment was written by Paul Fenn, who was a senate energy committee staffer in 1997 when he helped write chapter 164 section 134 on municipal load aggregation programs.

Yes, I know the window for amendments is closed. Yes, I know the Senate is in a big hurry to get this energy bill passed. But this amendment should be read, and acted upon, because it treats cities and towns as part of the solution, rather than as part of the permit problem.

I hope we can open a window of opportunity  at some point to give “Municipal Power” to actually help create a clean energy future that is not dominated solely by investor owned utilities. 45 years ago I spoke with the founder of the Massachusetts Municipal Wholesale Electric Company (MMWEC) , signed into law by Governor Mike Dukakis, which was based in Holyoke. I became a strong believer in “municipal power“ as a viable alternative to the private corporations that propose projects like the Wendell energy storage mega battery and the Northfield mountain pump storage peak plant. We need a clean energy revolution.

Paul Fenn  has provided a short background to the amendment, followed by the text of the amendment, and finally the existing statute that deals with municipal load aggregation.

I hope you will share this amendment with Senate leadership, and keep the windows to the future open long enough to accept projects that truly “give power to the people.”

My sincere thanks for your work,

Al Norman
413-834-4284

**MUNICIPAL AGGREGATION**
**AMENDMENT BACKGROUND:**

This amendment expands the state’s Municipal Aggregator law  chapter which has been adopted by 168 communities since its inception in 1997. Under Chapter 164, s.134, cities and towns which are Municipal Aggregators, are “authorized to aggregate the electrical load of interested electricity consumers within its boundaries.”

Municipalities over the years have been disempowered as energy facility permitting entities, but they can be empowered to take positive action to reduce the need for new grid resources.

This local power is achieved in two ways, (1) by developing Distributed Energy Resources (DERs)— like solar plus battery storage in residential homes, commercial buildings locally—and (2) by making these buildings more efficient.

Both of these sections add new language at the end of sections 134a and 134 b of Chapter 164.

The first part of this amendment expedites “interconnect permits” for customers of Municipal Aggregators that install DERs designed not to “export” power onto the grid. These DERs in homes and buildings will use the energy onsite, in order to reduce grid demand. Currently, such systems are subject to the same process, costs, and delays imposed on systems that do require the grid to accommodate their exports, and which do impose costs on all ratepayers. This amendment would exempt DERs in Municipal Aggregators that don't need to export, and set up an expedited approval process, so that Municipal Aggregators are finally able to develop non-grid alternatives to industrial m-scale solar, megabatteries and transmission lines. Utilities would no longer use their bureaucratic “interconnect permit” approval processes to delay and discourage DER projects by customers of a Municipal Aggregation program.

The second part of this amendment would set a minimum timeline for the DPU to approve petitions by Municipal Aggregators to administer energy efficiency funds paid by their residents and businesses. Current law, the Municipal Aggregation Law, enables Municipal Aggregators to administer a pro rata share of these funds, and one was in fact allowed to do so (The Cape Light Compact) —but the DPU has ignored the petitions of municipalities since then in spite of the law - for years at a time. This section merely adds minimum DPU approval time and a rejection appeal procedure so that the DPU can no longer violate state law.

**THE PROPOSED AMENDMENT**

1. Chapter 164 of the General Laws is hereby further amended by adding at the end of Section 134(a) the following new language:
Municipalities authorizing Municipal Aggregations, known as Community Choice Aggregation programs, shall receive special accommodation and support from investor-owned utilities and the Department of Public Utilities (DPU) for the purpose of building renewable Distributed Energy Resources..

The DPU's support shall consist of providing access to ratepayer energy efficiency funds and access to non-exporting interconnect permits.

The DPU shall require the utilities, within three months of the signing of this law, to create a non-export interconnect permit tariff for customers of a Municipal Aggregation within three subsequent months. The investor-owned utility shall provide a customer of a Municipal Aggregation with a non-export interconnect permit within three months of receiving the application for the permit, shall not charge a fee for the permit, and shall not require studies or otherwise charge or delay issuance of the permit to a customer of a Municipal Aggregation whose municipal government is seeking to build renewable Distributed Energy Resources, or enable its residents and businesses who are enrolled in its Municipal Aggregation program, within its jurisdictional boundaries.

2. Chapter 164 of the General Laws is hereby further amended by adding at the end of Section 134(b) the following new language:
The DPU shall approve or reject, within three months the petition of a municipality to administer a pro rata share of the Massachusetts Public Benefit Funds for Energy Efficiency paid by their residents, businesses and municipal accounts under Section 134. (b). Failure to approve or reject after three months shall constitute approval. Rejection shall state the specific provisions of the municipality's application that do not comply with state policy, but shall not place conditions on the use of the funds, or the design of municipal energy efficiency programs, provided that they are spent only on energy efficiency and conservation measures. Furthermore, municipal governments with approved petitions, as a Municipal Aggregator, to administer these energy efficiency funds shall be provided a pro rata share of those funds within one year of approval.
EXISTING STATUTE ON LOAD AGGREGATION PROGRAMS, CHAPTER 164

Section 134: Load aggregation programs

Section 134. (a) Any municipality or any group of municipalities acting together within the commonwealth is hereby authorized to aggregate the electrical load of interested electricity consumers within its boundaries; provided, however, that such municipality or group of municipalities shall not aggregate electrical load if such are served by an existing municipal lighting plant. Such municipality or group of municipalities may group retail electricity customers to solicit bids, broker, and contract for electric power and energy services for such customers. Such municipality or group of municipalities may enter into agreements for services to facilitate the sale and purchase of electric energy and other related services including renewable energy credits, which may be considered contracts for energy or energy-related services under clause (33) of subsection (b) of section 1 of chapter 30B. Such service agreements may be entered into by a single city, town, county, or by a group of cities, towns, or counties.

A municipality or group of municipalities which aggregates its electrical load and operates pursuant to the provisions of this section shall not be considered a utility engaging in the wholesale purchase and resale of electric power. Providing electric power or energy services to aggregated customers within a municipality or group of municipalities shall not be considered a wholesale utility transaction. The provision of aggregated electric power and energy services as authorized by this section shall be regulated by any applicable laws or regulations which govern aggregated electric power and energy services in competitive markets.

A town may initiate a process to aggregate electrical load upon authorization by a majority vote of town meeting or town council. A city may initiate a process to authorize aggregation by a majority vote of the city council, with the approval of the mayor, or the city manager in a Plan D or Plan E city. Two or more municipalities may as a group initiate a process jointly to authorize aggregation by a majority vote of each particular municipality as herein required.

Upon an affirmative vote to initiate said process, a municipality or group of municipalities establishing load aggregation pursuant to this section shall, in consultation with the department of energy resources, pursuant to section 6 of chapter 25A, develop a plan, for review by its citizens, detailing the process and consequences of aggregation. Any municipal load aggregation plan established pursuant to this section shall provide for universal access, reliability, and equitable treatment of all classes of customers and shall meet any requirements established by law or the department concerning aggregated service. Said plan shall be filed with the department, for its final review and approval, and shall include, without limitation, an organizational structure of the program, its operations, and its funding; rate setting and other costs to participants; the methods for entering and terminating agreements with other entities; the rights and responsibilities of program participants; and termination of the program. Prior to its decision, the department shall conduct a public hearing.

Participation by any retail customer in a municipal or group aggregation program shall be voluntary. If such aggregated entity is not fully operational on the retail access date, any ratepayer to be automatically enrolled therein shall receive basic service unless affirmatively electing not to do so. Within 30 days of the date the aggregated entity is fully operational, such ratepayers shall be transferred to the aggregated entity according to an opt-out provision herein. Following adoption of aggregation through the votes specified above, such program shall allow any retail customer to opt-out and choose any supplier or provider such retail customer wishes. Once enrolled in the aggregated entity, any ratepayer choosing to opt-out within 180 days shall do so without penalty and shall be entitled to receive basic service as if he was originally enrolled therein. After the initial automatic enrollment of customers upon the establishment of a load aggregation

program in accordance with this subsection, the subsequent enrollment of new customers or accounts in the service territory of the aggregator shall be governed by the terms for enrollment set forth in the aggregator's plan; provided, however, that the terms are consistent with the requirements established by the department. Nothing in this section shall be construed as authorizing any city or town or any municipal retail load aggregator to restrict the ability of retail electric customers to obtain or receive service from any authorized provider thereof.

It shall be the duty of the aggregated entity to fully inform participating ratepayers in advance of automatic enrollment that they are to be automatically enrolled and that they have the right to opt-out of the aggregated entity without penalty. In addition, such disclosure shall prominently state all charges to be made and shall include full disclosure of the basic service rate, how to access it, and the fact that it is available to them without penalty. The department of energy resources shall furnish, without charge, to any citizen a list of all other supply options available to them in a meaningful format that shall enable comparison of price and product. To facilitate the automatic enrollment and ratepayer notification, the electric distribution company shall provide to each municipality the name and mailing addresses of all electric accounts within the municipality that are not otherwise receiving generation service from a competitive supplier; provided, however, that any customer may request that their name, mailing address and account number not be shared with the municipality.

(b) A municipality or group of municipalities establishing a load aggregation program pursuant to subsection (a) may, by a vote of its town meeting or legislative body, whichever is applicable, adopt an energy plan which shall define the manner in which the municipality or municipalities may implement demand side management programs and renewable energy programs that are consistent with any state energy conservation goals developed pursuant to chapter 25A or chapter 164. After adoption of the energy plan by such town meeting or other legislative body, the city or town clerk shall submit the plan to the department to certify that it is consistent with any such state energy conservation goals. If the plan is certified by the department, the municipality or group of municipalities may apply to the Massachusetts clean energy technology center for monies from the Massachusetts Renewable Energy Trust Fund, established pursuant to section 9 of chapter 23J, and receive, and if approved, expend moneys from the demand side management system benefit charges or line charges in an amount not to exceed that contributed by retail customers within said municipality or group municipalities. This will not prevent said municipality or municipalities from applying to the Massachusetts clean energy technology center for additional funds. If the department determines that the energy plan is not consistent with any such state-wide goals, it shall inform the municipality or group of municipalities within six months by written notice the reasons why it is not consistent with any such state-wide goals. The

municipality or group of municipalities may re-apply at any time with an amended version of the energy plan.

The municipality or group of municipalities shall not be prohibited from proposing for certification an energy plan which is more specific, detailed, or comprehensive or which covers additional subject areas than any such state-wide conservation goals. This subsection shall not prohibit a municipality or group of municipalities from considering, adopting, enforcing, or in any other way administering an energy plan which does not comply with any such state-wide conservation goals so long as it does not violate the laws of the commonwealth.

The municipality or group of municipalities shall, within two years of approval of its plan or such further time as the department may allow, provide written notice to the department that its plan is implemented. The department may revoke certification of the energy plan if the municipality or group of municipalities fails to substantially implement the plan or if it is determined by independent audit that the funds were misspent within the time allowed under this subsection.

Many thanks to those who worked on this compilation of resources: Al Norman, Laurel Facey, J. William Stubblefield, and Gwyn Peterdi, members of No Assault & Batteries, as well as the many who brought articles to our attention.

July 1, 2024