Battery Energy Storage Systems – Fire Safety

Westchester County Dept. of Emergency Services

New battery technology issues in Westchester:

- Battery Cells/Batteries
  - From cell phones to micro-mobility devices to electric vehicles to BESS
- Battery Energy Storage Systems (BESS)
  - From lead Acid to Lithium and beyond

- Both provide large amounts of energy in a relatively small space

Battery Energy Storage Systems

Have been around for a very long time

Generally safe with little issues

Lithium is the go to due to energy density

Battery Energy Storage System

- Parts of a BESS
  - Inverter/power conversion System (PCS)
  - Cells/Modules/Packs/Units
  - Battery management system (BMS)
  - Energy management system (EMS)

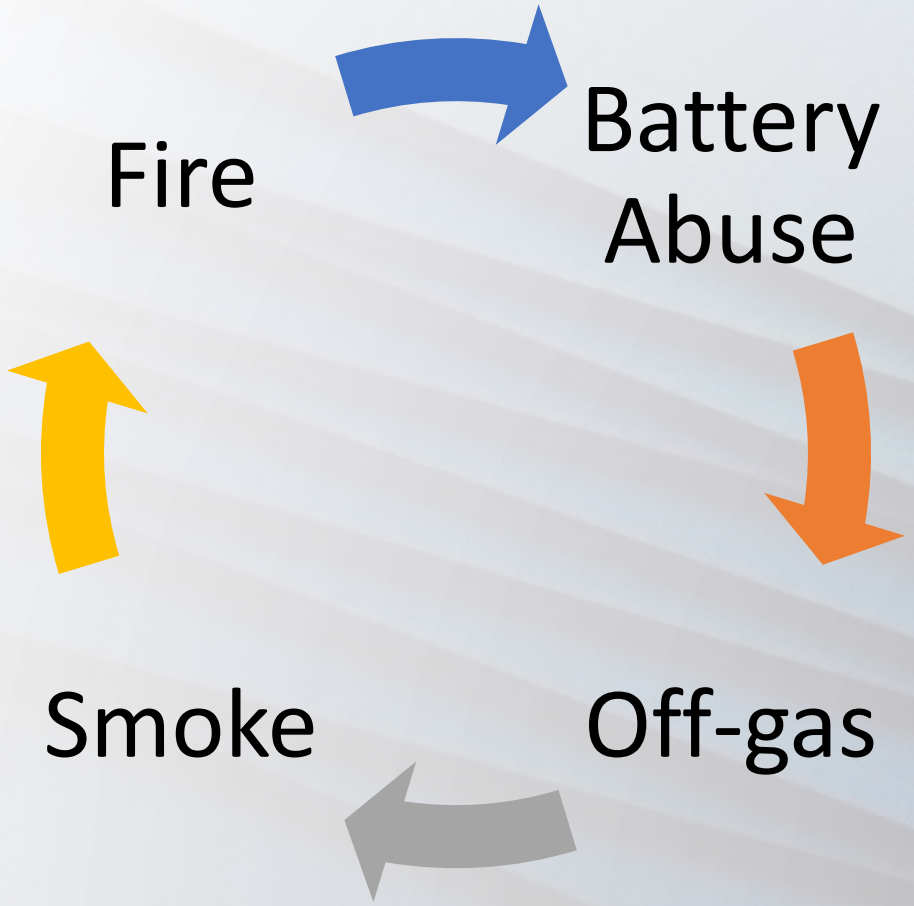
BESS Systems

Preventative Systems

Containment Systems

- Smoke Detection
- LFL Gas Detection
- Exhaust/Deflagration Venting
- Fire Suppression
- Intumescent materials
- Separation distances
- Non-propagation Design

Pathway to Trouble



BESS Installations

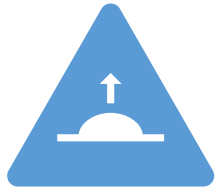
Before the Meter – Transmission and Distribution Grid Services

- Distribution and Transmission Deferral
- Energy Arbitrage
- Black Start
- Energy Reserves

After the Meter – Customer Services

- Backup Power
- Demand Charge Reduction and time of use bill management
- Vehicle chargers – Some, not all

Who is Involved??

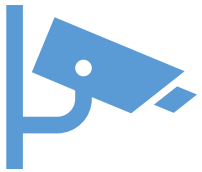


Owner

What are their capabilities for monitoring? response?

How long have they been in the business?

What is their track record with adverse events?

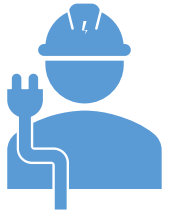


Manufacturer

What is their role for monitoring? response?

How long have they been in business?

What is their track record with adverse events?



Utility

What is their role for monitoring? response?

Are they the owner?

The few sites that have failed have done so spectacularly.

Concern with BESS

Present a large concern to neighboring communities

Smoke –

11+ different chemicals from the batteries

Never mind what comes from the components of the cabinets

Runoff from firefighting actions

Water doesn’t stop the Thermal Runaway reaction

Water may not get to the cells due to the construction of the BESS

Water used to keep radiant and conductive heating from igniting other components

Electrocution/Electrical Shock are major concerns

Here in NY so far 4 failures

East Hampton, 5MW, Operational, Unknown cause, 4.8 years

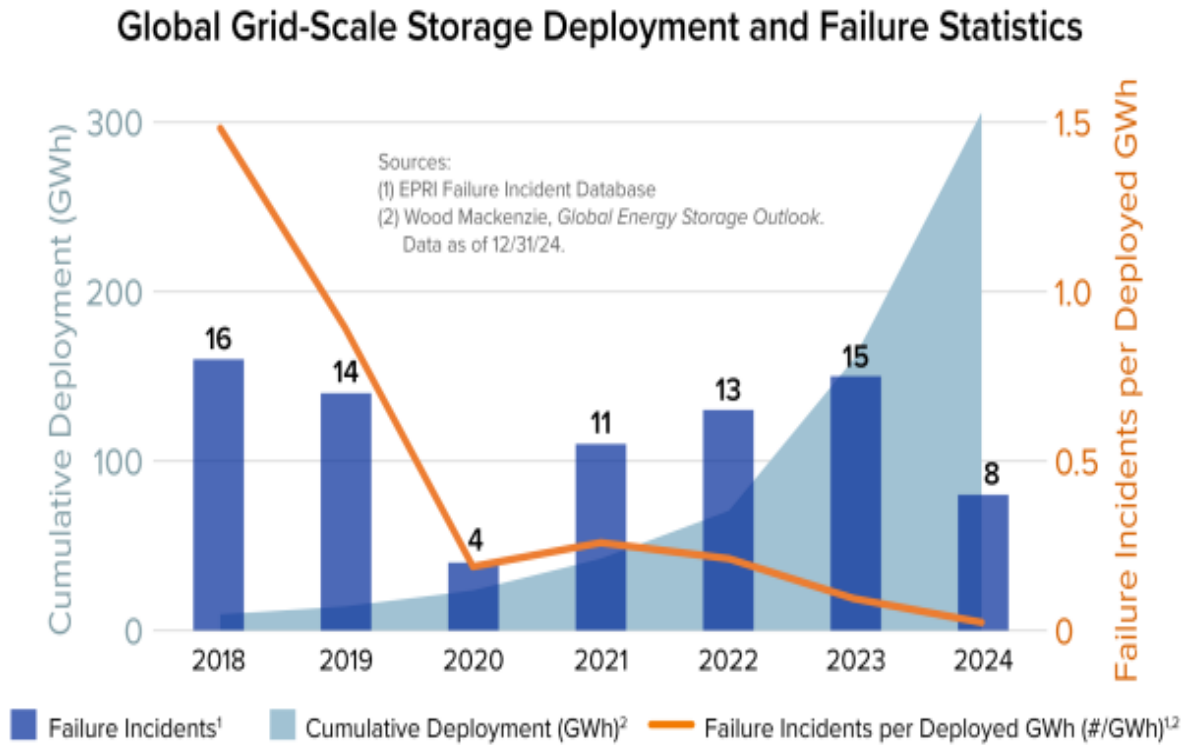
Warwick, 4MW, In-commissioning, Storm/Design, 1 month

Warwick 8MW, Operational?, Storm/Design, 1 month

Chaumont, 5MW, Operational, Design, 4 months

The few that have failed have done so spectacularly.

- 41 failures in the US to date
- 130 worldwide
  - This includes mfg., transport, storage and recycling.



Chaumont, NY

Present a large concern to neighboring communities

- What has to occur after the fire is out?
- How long does it take to secure the unit(s) and Site?
- Limited response team capabilities of the industry
- Permitting processes for transport of damaged batteries
- Increased expenditures to the municipality over an extended time
  - Overtime
  - Volunteer hours spent

Planning for BESS

- New York State
  - Building and Fire Codes
    - Some things there but more to come shortly
    - Things to consider
      - Placement of emergency shut offs
      - Remote shut offs operated by the utility company
      - Stacked multiple modes of power generation and distribution
      - Who do you call at 2am to handle electrical equipment that has been damaged?
      - Will your local Electrical Utility handle?

Planning for BESS

- Five key safety considerations when approving BESS systems and sites
    1. Invest in the right battery management system and energy management software.
        - BMS certified to IEC61508
    2. Thermal Runaway, Fires and Explosions
        - Insure extinguishing systems, monitoring systems are in place
        - Pressure/Blast panels
        - Safe distances
    3. Ergonomics and Emergency E-Stops
        - Module placement
        - Remote placement of the E-Stop

Planning for the BESS

- Five key safety considerations (continued)
    4. Cybersecurity
        - Limited access to the physical site
        - Limited access to the hardware and software through the internet.
    5. Decommissioning
        - Replacement
        - Complete Removal

What is Westchester DES doing?

We want to help facilitate conversations amongst all stakeholders

DES programs for Fire Departments

- Hosted outside awareness training from a nationally known Haz Mat Training group
- Hosted training from NYS OFPC on Lithium Battery response
- Created a program with WCDEF to teach FD's how to properly over-pack and transport damaged/defective batteries to the HMRF.
  - This is still available!
- Provide contact point for FD's to call for technical assistance with guidance from the County Haz Mat Team.
- Provide over-pack and transport of batteries to FD's from the County Haz Mat Team.

What are we doing?

Proposed Legislation

A bill is before the County Board of Legislature

- Requires municipalities to notify the Westchester County Dept. of Emergency Services of approved / modified installations of BESS for Commercial/industrial systems.
- The information will include location, size, emergency contacts
- We will notify the FD when incidents are dispatched to that location

Public Hearing and vote to take place March 24, 2025

Evaluating

Evaluating the Proposed NYS Fire and Building Code amendments

- Based on recommendations from the working group
- The open comment period closed 9/24/2024
- Awaiting the report on the comment period

What are we doing?

Evaluating

Evaluating NYSERDA resources

- Currently, it looks to us as a great resource and starting point in assisting you

Developing

List of issues with Residential installations of BESS

- Who is coming out in the middle of the night/weekends
- Training for the Fire Departments on BESS Systems for Residential use

Resources

- We are here to support you!
  - Lithium Ion Safety - https://emergencyservices.westchestergov.co lithium-ion-battery-safety

- Call us – (914) 231-1851
- Email us – Li-Ion@westchestercountyny.gov

Questions?