Utility-Scale Battery Storage & Grid Modernization

New Mexico Science, Technology, & Telecommunications Interim Committee Hearing

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September 1, 2023

NextEra Energy is a leading clean energy and utility infrastructure company active across North America.

A growing, diversified and financially strong company

1) As of December 2, 2022
2) As of September 30, 2022

Source: S&P Capital IQ

NextEra in New Mexico

Route 66 Solar Energy Center in Cibola County

5 wind energy centers in operation

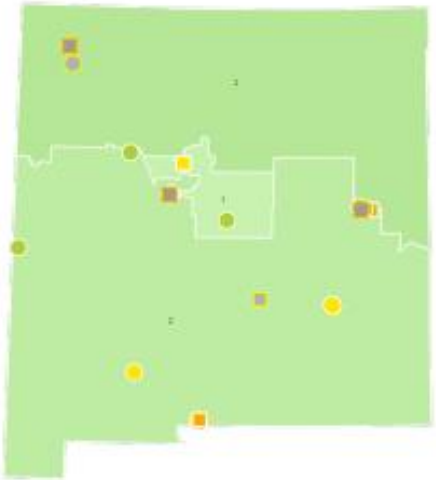
6 utility-scale solar energy centers in operation

1 distributed energy resource in operation

2 energy storage system in operation

3 energy storage systems in development

3 utility-scale solar projects in development



Legend: Wind · Utility-Scale Solar · Distributed Energy Resources · Battery Energy Storage · Development/Construction

Approximately
$1.5 billion
total capital investment

Approximately
$7.2 million
annual payroll

$2.7 million
annual land payments

$3.3 million
in property taxes, 2022*

*** Annual Property Taxes:** Includes property tax and other indirect taxes. Internal data based on 2022 full year.

NextEra Energy Resources' New Mexico Wind Energy Centers

Name	County	# Turbines	MW
Borderlands	Catron	34	100.1*
Casa Mesa	De Baca, Quay	21	50.9
High Lonesome Mesa	Torrance	40	99.4
New Mexico	De Baca, Quay	136	204
Red Mesa	Cibola	64	102.4

NextEra Energy Resources' New Mexico Utility-Scale Solar Energy Centers

Name	County	MW
Bisti (development/construction)	San Juan	100
Buena Vista	Otero	120
Chaves	Chaves	70
Chaves II	Chaves	30
Hatch	Doña Ana	5*
Roswell	Chaves	70*
Route 66	Cibola	49.5
Sky Ranch (development/construction)	Valencia	190
Windy Lane (development/construction)	De Baca, Quay	90

NextEra Energy Resources' New Mexico Distributed Energy Resources

Name	County	MW
ABC Solar	Bernalillo	1.6*

NextEra Energy Resources' New Mexico Battery Energy Storage Systems

Name	County	MW
Bisti (development/construction)	San Juan	49.5
Buena Vista	Otero	50
Casa Mesa	De Baca, Quay	1
Route 66 (development/construction)	Cibola	50
Sky Ranch (development/construction)	Valencia	50
Sky Ranch III (development/construction)	Valencia	100
Windy Lane (development/construction)	De Baca & Quay	68

**Includes megawatts associated with noncontrolling interests related to NextEra Energy Partners, LP.*

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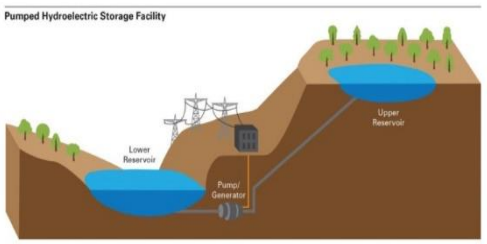
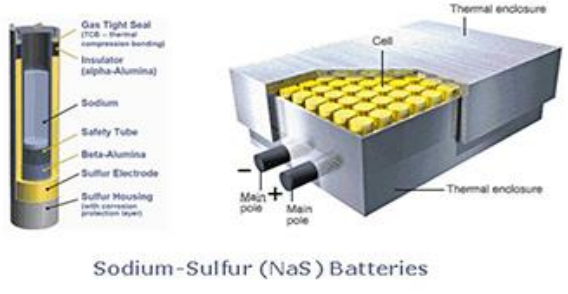
Energy storage technologies: some commercially available today, others early-stage design or pilot stages

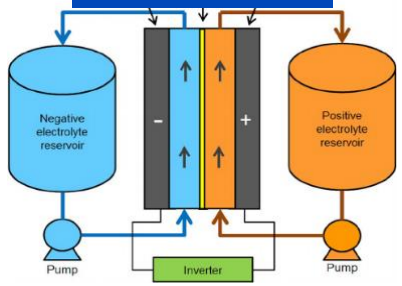
Pumped Hydro



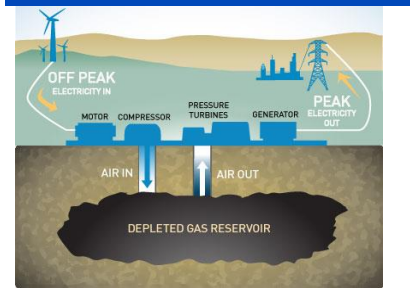
Sodium Sulphur Batteries



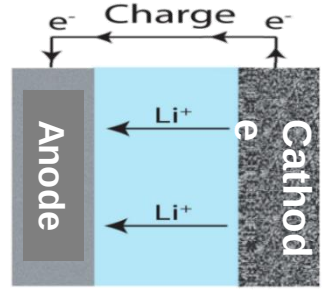
Flow Batteries



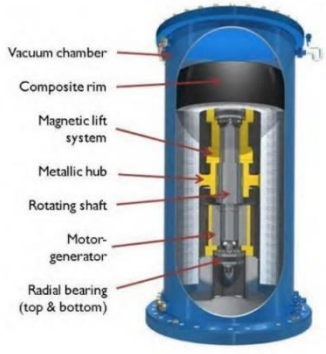
Compressed Air



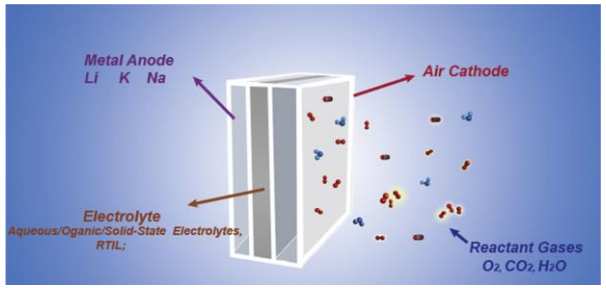
Li-ion Batteries



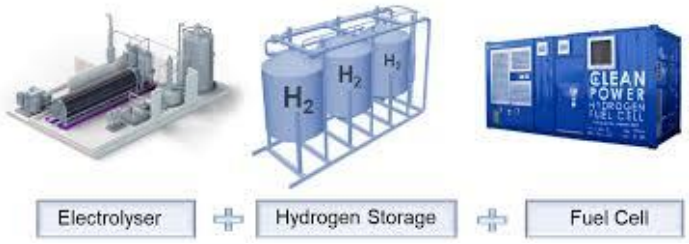
Flywheel



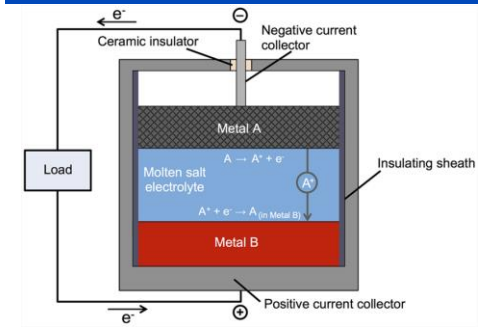
Metal-Air Batteries



Hydrogen Storage



Liquid Metal Battery



Recent market and technology advancements have allowed a rapid increase in lithium-ion based project deployments.

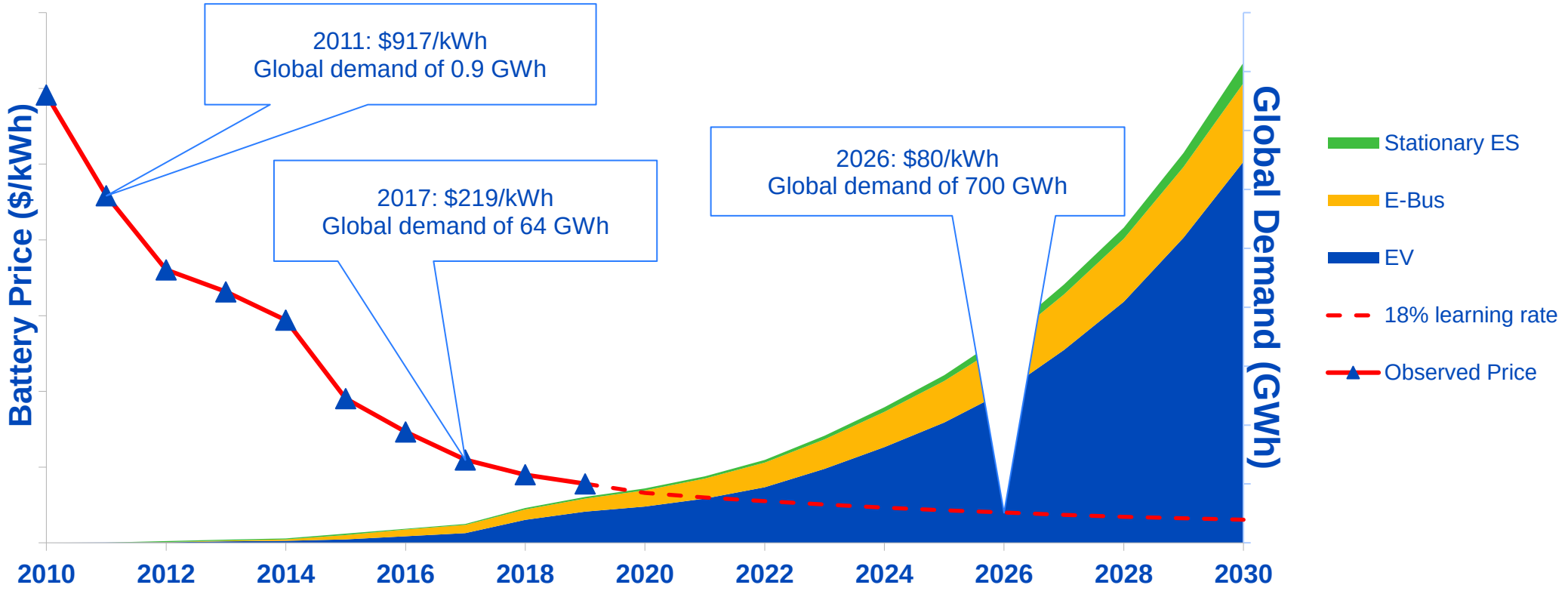
Lithium-ion battery cells are connected to form battery modules. Multiple battery modules are stacked into battery racks. Several racks are built within containers or buildings.

Battery Cell	Battery Module	Battery Racks	Battery Containers

~7 MWh Energy:
40-foot Container

Total system includes containers, HVAC, power controls, inverters, and transformers - most often provided by different suppliers and integrated by a single system provider.

Electric Vehicle (EV) market demand is the primary driver in reducing lithium-ion battery costs for utility storage applications.(1)



[NEED TO CONFIRM STILL THE CASE] Due in part to these cost declines, the economics of pairing storage with solar to provide a near firm product are now favorable in many regions.

1) Source: Bloomberg New Energy Finance

In many regions, near-term demand for storage is being driven by resource adequacy procurements and renewable integration needs.

Western Region

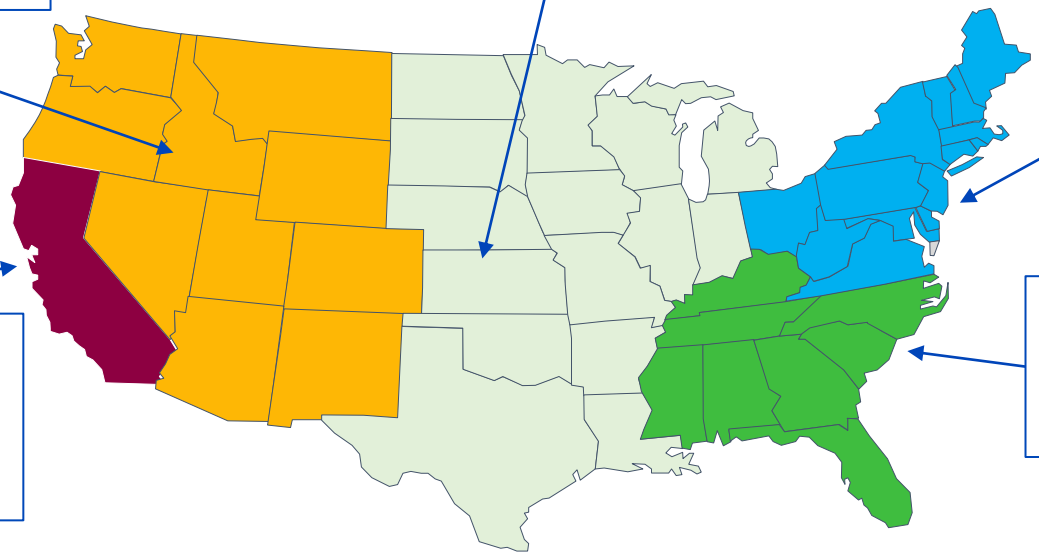
Demand driven by flexible capacity need and aggressive state level renewable targets

Midwest / Texas

Demand driven by seasonal capacity needs, utility rate base opportunities and merchant investments (Texas)

Northeast

Demand driven by C&Is, state policies (VA, NJ, NY and MA), offshore wind integration and merchant projects in PJM



California

Demand driven by mandates, increasing flexible capacity needs and fossil retirements

Southeast

Demand driven by capacity needs and solar integration requirements

[NEED TO UPDATE FOR 2022/23, IF POSSIBLE] Over 4.3 GW of battery storage facilities are now in operation across the U.S.; ~1.5 GW of these have come online this year alone, while nearly 5 GW add'l are expected to come online in 2022(1)

1) Wood Mackenzie Operational US Battery Storage Project Database as of 11-7-2021 and Wood MacKenzie U.S. Energy Storage Monitor Q4 2020

New Mexico's Energy Transition Act & Energy Storage

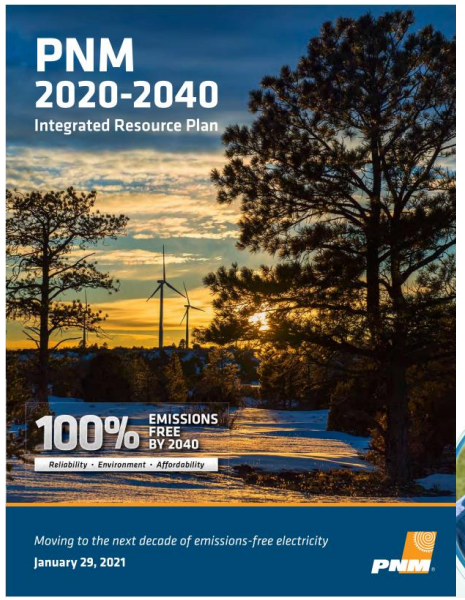
- **Energy Transition Act of 2019**
  - Utilities 50% renewables by 2030, 80% by 2040 (2050 for coops)

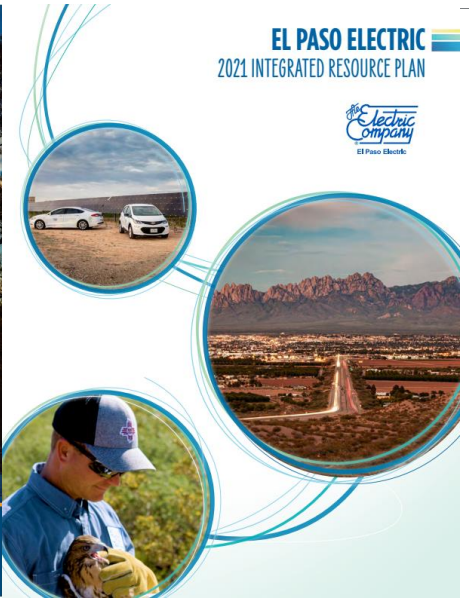
- **HB 233 (2020): Energy Grid Modernization Roadmap Act, Grid Modernization Advisory Group, Whitepaper #11 - Storage**
  - "It is critical to realize that firm, fossil-based, energy resource is being replaced by the renewable resources that are so abundant in NM. Storage provides a non-fossil, firming, resource. Strategically located, storage can be a non-wires alternative and add local resilience."
  - "Battery based storage, both grid- and customer-scale, appears, at least for now, to be the most feasible storage option for grid modernization in New Mexico."
  - "**We recommend that New Mexico commit to adding 100MW/800 MWH of storage each year to achieve adequate capacity to decarbonize by 2050**."

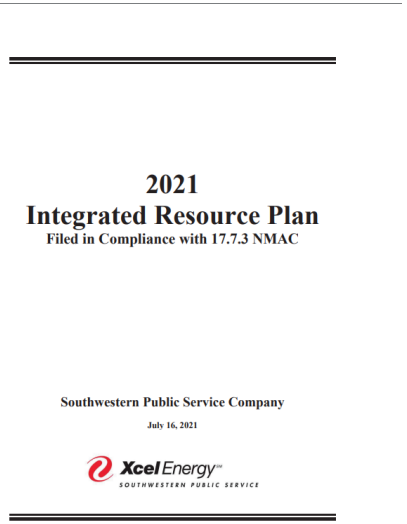
As utilities and coops achieve higher levels of renewables, there is a greater need for energy storage to "firm" renewables.

New Mexico's Energy Transition Act & Energy Storage Utilities' Integrated Resource Plans (IRPs)

- **PNM 2020-2040 IRP**
  - Need for 523 MW of new storage by 2025 under Technology Neutral Scenario
  - Need for 807 MW of new storage by 2025 under No New Combustion Scenario
- **El Paso Electric/NM 2021-2040 IRP**
  - Preferred Plan Need for 94 MW of incremental storage in 2025, 51 MW in 2031, 192 MW in 2035, 101 MW in 2040, and 352 MW in 2045.
- **SPS/NM 2022-2041 IRP**
  - [NEED DATA HERE]







As utilities and coops achieve higher levels of renewables, there is a greater need for energy storage to "firm" renewables.

New Mexico will need to attract a lot more investment in energy storage to achieve ETA supporting grid modernization.

- **Potential legislation to extend industrial revenue bond authority (IRB) to standalone energy storage**
  - Currently, some storage co-sited with renewables qualifies for IRB incentives
  - As grid power is more renewable (i.e. PNM at 40% renewable/55% carbon-free in 2022), there is an increasing need for non-solar paired T&D storage projects that store increasingly renewable grid power.
  - Incentives will facilitate deployment of non-solar-paired T&D storage projects.

IRB standalone storage incentives support the investments needed in battery storage to reach ETA goals and maintain reliability.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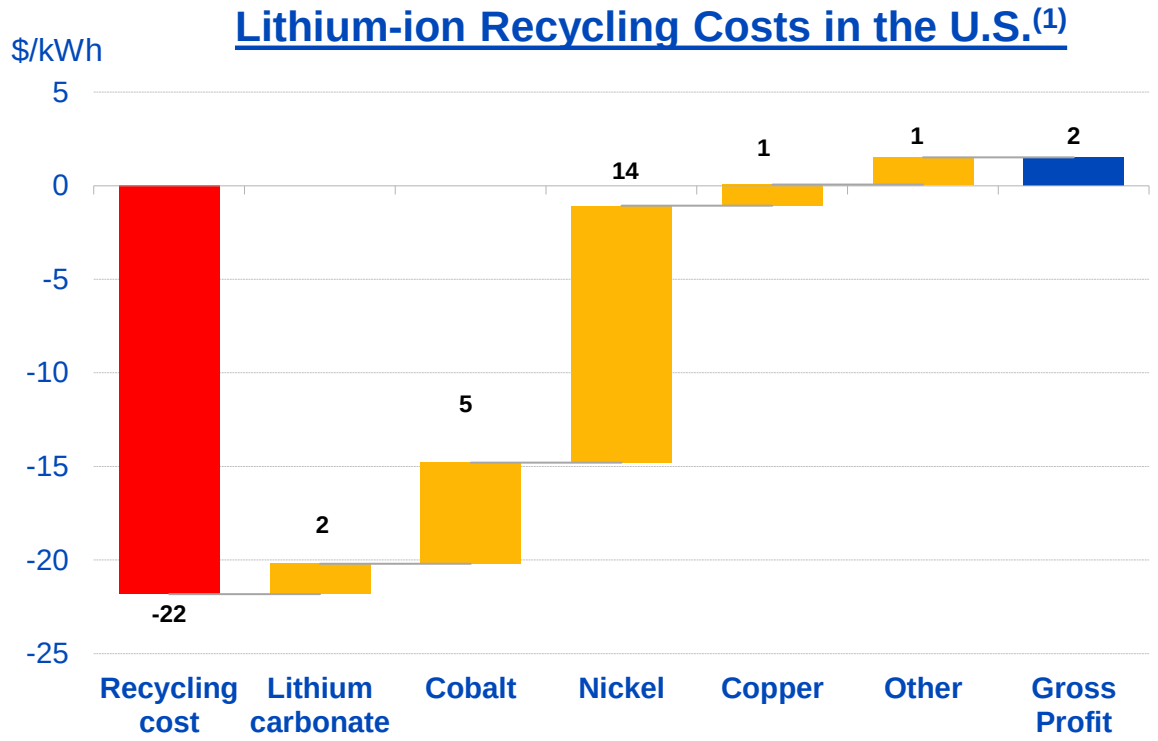
Appendix

Electric Vehicle market demand has also driven investment in recycling technologies, to provide alternative sources for battery raw materials

Battery End-of-Life Considerations

- **Most "end-of-life" lithium-ion batteries still contain material that can be extracted and reused in various applications**
  - Recycled materials include nickel, lithium, copper, cobalt, etc.
  - Can be repurposed in new batteries, or other industrial products
- **Diversifying raw material sources can stabilize future battery costs**
  - Use of recycled materials can also support battery manufacturer sustainability goals



Expectations are that recycling costs for lithium-ion batteries will be cost neutral or slightly profitable over the near term, with potential upside as recycling technology improves

1) Assumes 100kWh NCA battery pack at a 10,000 tons per year volume; BloombergNEF Battery Recycling Technology Primer dated 4 /19/2021

Although rare, lithium-ion battery fires in both EV's and utility installations have occurred. Proper design considerations and active monitoring is key for safety.

Battery Design	• UL9540A testing by battery suppliers informs on fire risk and mitigation approaches
Environmental Conditions	• Heating and cooling designed to maintain required ambient conditions
Container Ventilation	• Container ventilation can be used to remove flammable gases in the event of a fire
Fire Suppression System	• Fire suppression agent and overall system design are based on battery design
Emergency Response Plans	• Procedures for first responders to follow, contact information and related safety plans

Robust industry standards have been developed for energy storage facility safety over the past few years, many based on past learnings.