

NYSERDA Presents:

*Battery Energy Storage Systems –
Key Considerations for Local Governments*

**Webinar #1:
Battery Energy
Storage Systems 101**



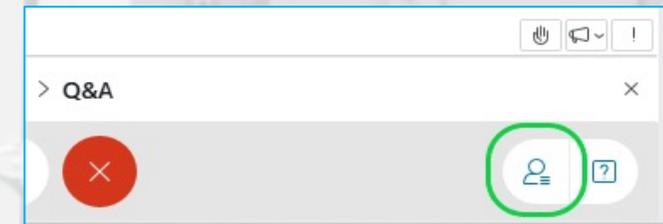
NYSERDA

May 5, 2021

Meeting Procedures:

- Members of the public are muted upon entry
- Questions and comments may be submitted in writing through the Q&A feature at any time during the event
- The chat feature is disabled
- Today's materials, along with a recording of the webinar, will be posted to www.nyserda.ny.gov/StorageGuidebook
- If technical problems arise, please contact Sal.Graven@nyserda.ny.gov

You'll see  when your microphone is muted



Coming Webinars:

Wednesday, May 19th: Fire Safety

Featured Speakers: NYS Office of Fire Prevention and Control; Energy Safety Response Group

Wednesday, June 2nd: Zoning and Permitting

Featured Speakers: NYSERDA's Clean Energy Siting Team

Wednesday, June 16th: Decommissioning and End-of-Life Considerations

Featured Speakers: DNV; Li-Cycle

Wednesday, June 30th: Taxation and Assessments

Featured Speakers: Hodgson Russ LLP

Agenda:

- **Introduction to NYS Goals, Programs, and Resources**
- **Battery Energy Storage Systems 101**
- **BESS Fact vs. Fiction**
- **Q&A**

Speakers:

- **Jason Doling**
NYSERDA



- **Dr. Stanley Whittingham**
Distinguished Professor of Chemistry,
Binghamton University (SUNY);
2019 Nobel Laureate for Chemistry



A row of white electrical enclosures, likely for renewable energy, is shown on a gravel pad. The enclosures are connected by a metal rail system. The background is a clear blue sky.

Introduction to NYS Goals, Programs, and Resources

The Climate Leadership and Community Protection Act (Climate Act)

Signed into law in 2019, the nation-leading Climate Act demonstrates New York's commitment to **fighting climate change, transforming our economy, and building resilient communities.**

The Climate Act:

- Most aggressive greenhouse gas reduction goals of any major economy: **40% by 2030, 85% by 2050**
- **70% renewable energy by 2030; 100% zero-emission electricity by 2040**
- Established a path toward achieving carbon neutrality
- Created the Climate Action Council

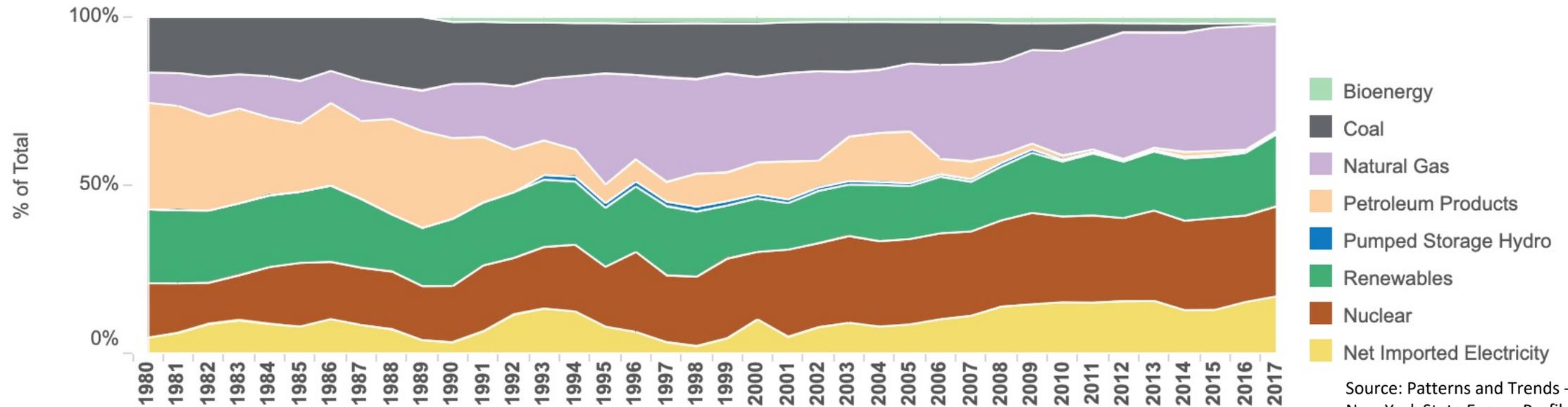
Climate Act: By the Numbers

At-Large Goals:

- 70% Renewable Electricity by 2030
- 100% Emissions-Free Grid by 2040

Technology-Specific Goals:

- 6,000 MW Distributed Solar by 2025
- 9,000 MW Offshore Wind by 2035
- 1,500 MW Energy Storage by 2025, and 3,000 MW by 2030



NYSERDA Energy Storage Initiative

Provides incentives & technical assistance to support deployment of advanced energy storage technologies

- **Retail Energy Storage Incentives:**
 - For residential through commercial-scale storage projects < 5 megawatts (MW)
 - Incentives vary based on region and megawatt-hour (MWh) block allocation
 - Over \$161 million allocated; \$16.4 million remaining for residential, commercial projects on Long Island and Con Edison
- **Bulk Energy Storage Incentives:**
 - For storage projects > 5 MW
 - Incentives vary based on project size and year of interconnection
 - Funding is fully allocated

www.nyserda.ny.gov/EnergyStorage

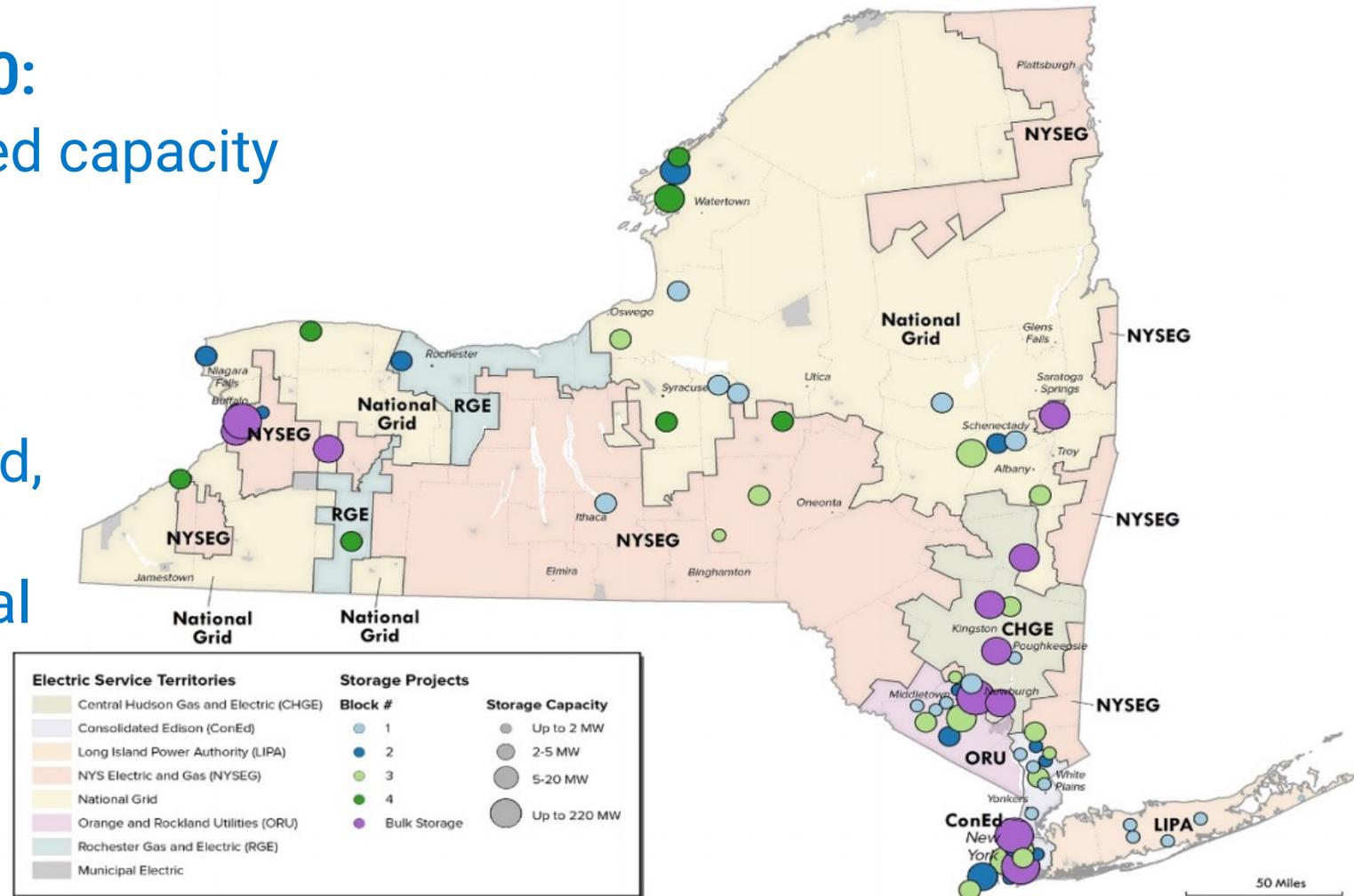
Energy Storage Deployment in NYS

As of October 31, 2020:

- 96.43 MW of installed capacity
- 561 projects

As of April 30, 2021:

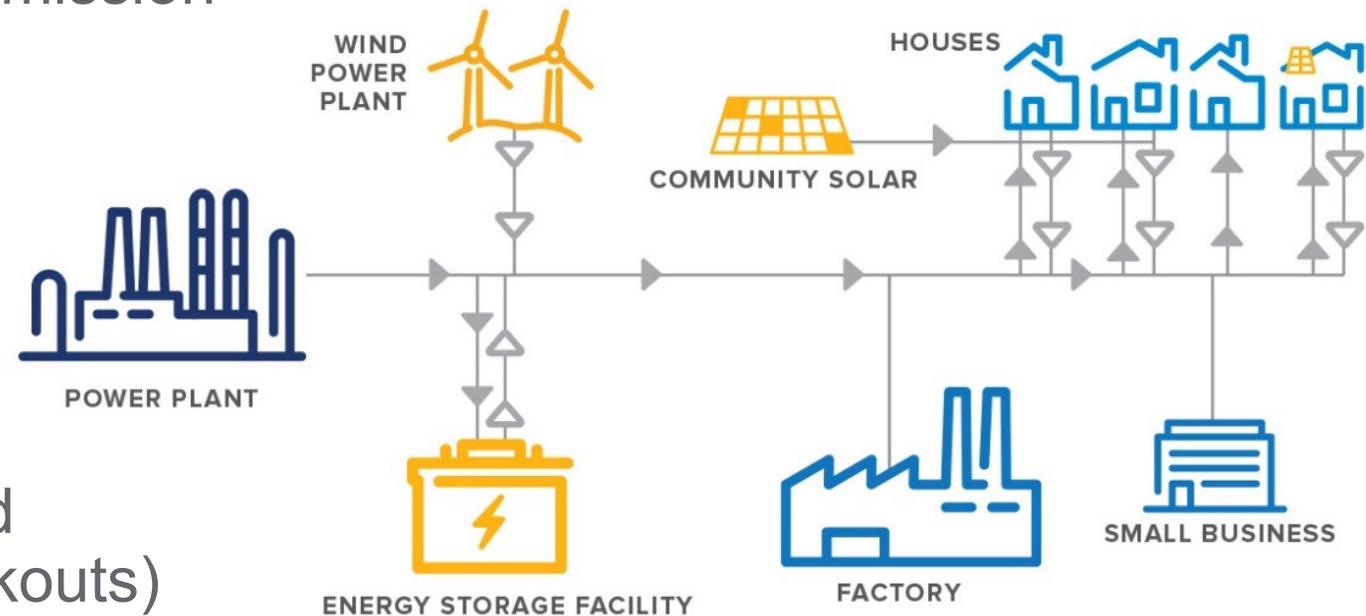
- 1,027 MW contracted, under development
- Over 100 commercial and bulk projects

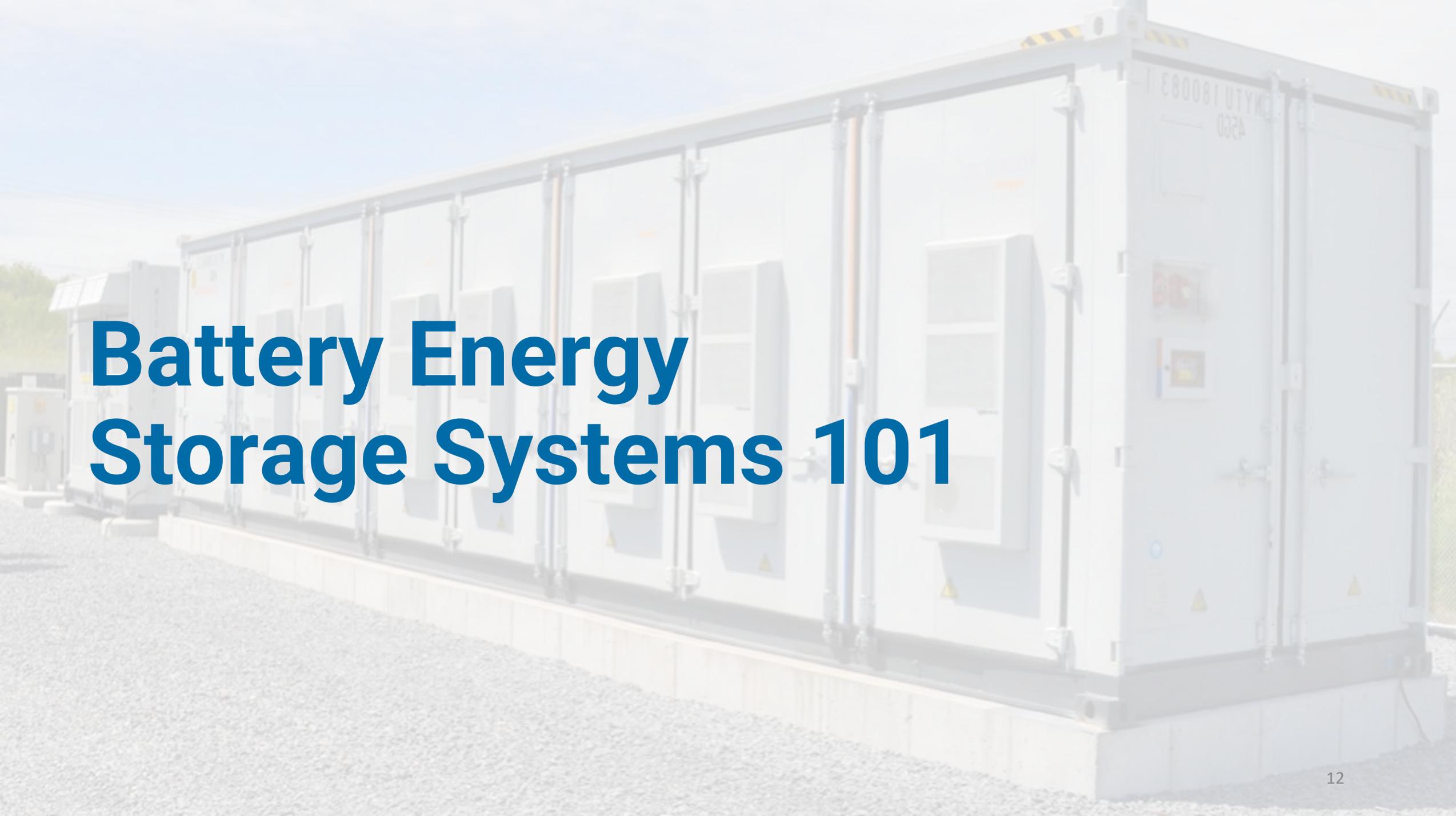


Use Cases for Energy Storage

Battery Energy Storage Systems can serve a variety of important roles, including these more common:

- Defer costly upgrades to transmission and distribution infrastructure
- Provide key ancillary grid services
- Support integration of renewable energy generators, including solar and wind
- Alleviate congestion in the grid (reducing brownouts and blackouts)
- Electric bill management, backup power for homes and businesses

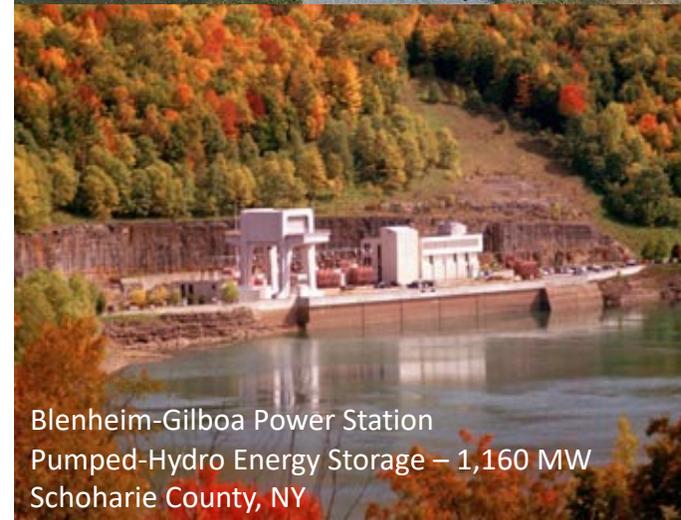
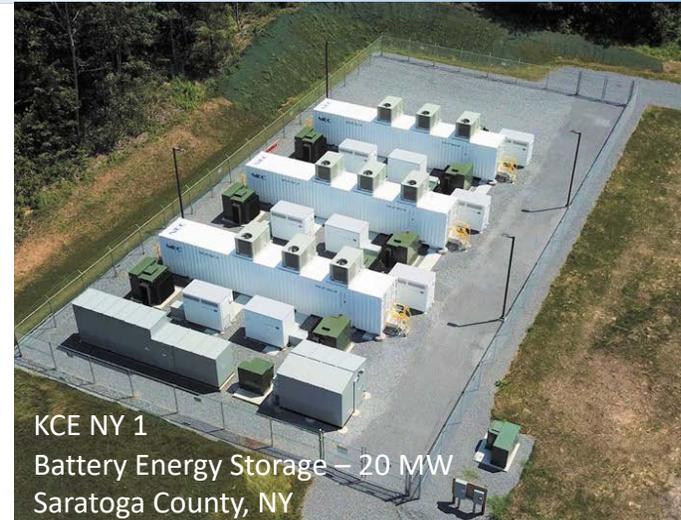


A row of white battery energy storage systems (BESS) units in an outdoor facility. The units are arranged in a long line on a gravel surface. Each unit has a door with a handle and a lock. The units are connected by a metal frame. The background shows a clear blue sky and some greenery.

Battery Energy Storage Systems 101

Battery Energy Storage Systems (BESS)

- We want electrical energy
- Energy Storage = System that holds kinetic, potential, or other forms of energy that can be converted to another form (electrical energy).
- Examples of stored energy types: (naturally occurring examples in red/green)
 - Chemical (batteries, fuel cells; *fossil fuels*)
 - Potential (pumped hydro; *water*)
 - Kinetic (fly wheels; *wind, tides*)
 - Thermal (water, rocks; *geothermal, sun*)



Battery **Energy Storage** Systems (BESS)

Two energy storage technologies dominate today in NYS and US:

- **Pumped Hydro** (potential to electrical energy)
 - By far the largest in terms of storage capacity, gigawatt-hours
 - Highly efficient, 73%
 - Limited future development on new sites
- **Batteries** (chemical to electrical energy)
 - By far the most flexible and common
 - Portable or stationary
 - Milliwatts to Gigawatts
 - Very quick to switch on and off

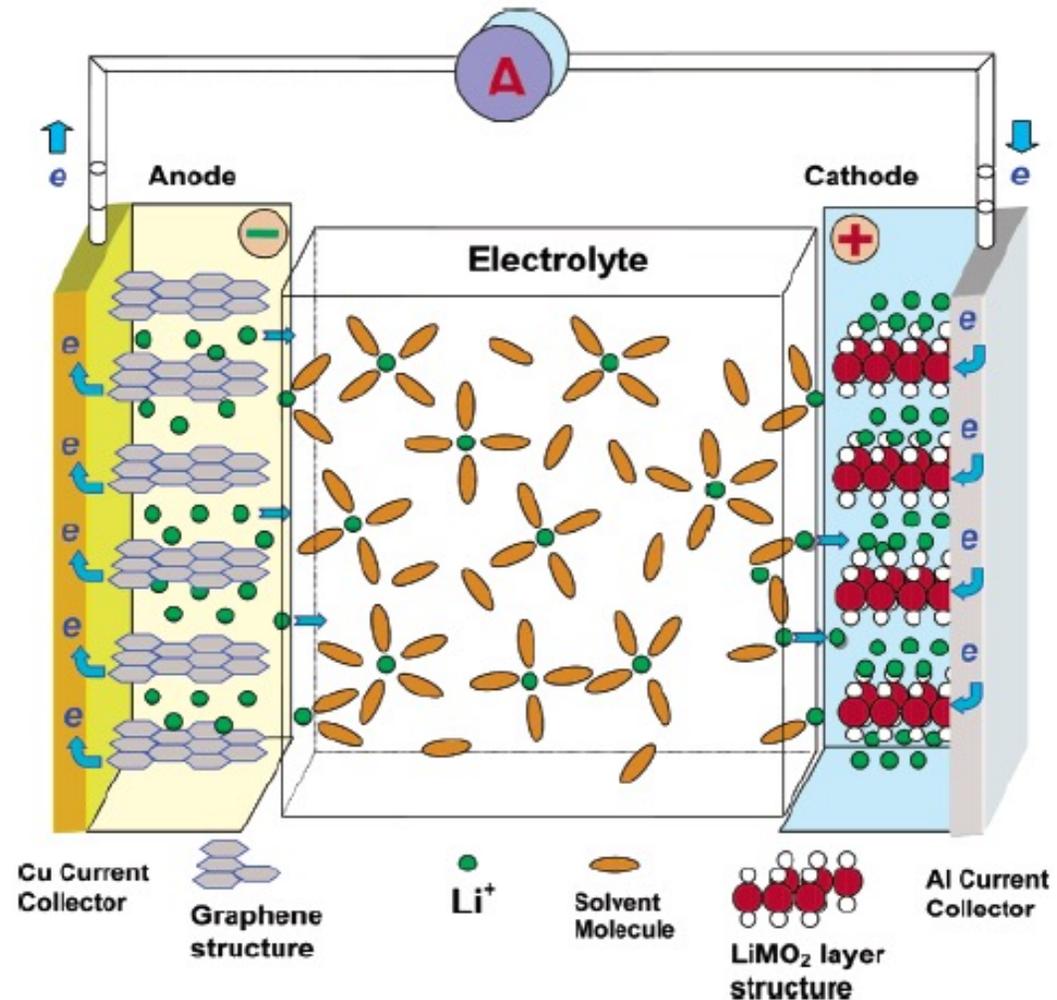


1.2 GWh in Moss Landing, CA

Battery Energy Storage Systems (BESS)

Anatomy of a Battery:

- Anode
- Cathode
- Electrolyte
 - Liquid - organic



Battery Energy Storage Systems (BESS)

A Brief History of Batteries:

- Volta discovered the first battery in **1799**
- The lead acid battery first reported in **1859**
- The alkaline cell was first marketed in the **1960s**
 - Not rechargeable (primary cell)
- The rechargeable lithium-ion battery was invented in **1972**
 - Commercial success came in 1991 with SONY
 - Now dominates energy storage market, except for SLI in cars and UPS.



45 years old - still working

Battery Energy Storage Systems (BESS)

Why lithium-ion?

- + Stores the **most energy per unit weight or volume** of any battery
- + Essentially **minimal maintenance cost** (computer monitored)
- + **Readily available**; billions made per year
- + **Cost is dropping all the time** – lifetime cost probably lowest
- + **“Portable”** – Utilities can move them as desired (typically in containers)

- Need electronic protection from overcharge/discharge
 - If not, then thermal runaway can occur resulting in fires
- Need temperature control, just like humans
 - Large systems are in air-conditioned containers

Battery Energy Storage Systems (BESS)

Which lithium-ion?

There are two dominant lithium-ion battery types:

Phosphates (LFP)

- Lower cost, safer but store less energy
- Dominant in China
- Expect to dominate in US for BESS in future
- Will be made in NYS (IM3NY in Endicott)

Oxides (NMC)

- Dominant for portable devices as has highest energy per unit volume (EVs, phones, etc.)
- Today, dominant for BESS in US

Battery Energy Storage Systems (BESS)

System Components:

- Cells -> Modules -> Racks
- Battery Management System (BMS)
- Monitoring and safety components
- Balance of System (BOS) equipment



BESS Installation Types

Residential



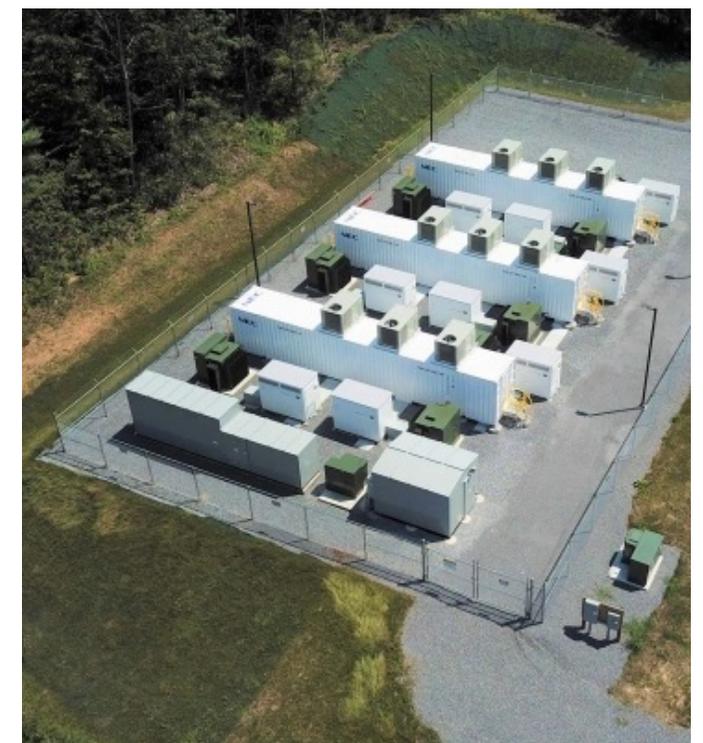
kWh

Commercial



kWh - MWh

Utility-Scale



MWh - GWh

BESS Fact vs. Fiction

Technology concerns:

- Lithium-ion batteries don't last long
 - FACT: Their lifetime can be up to 10-20 years
- Lithium-ion batteries won't work well in NY's climate
 - FACT: They will! But they need some of the same conditions we do (shelter, temperature regulation, etc.)
- These batteries can't be disposed of safely.
 - FACT: Recycling will be the normal and is already happening in NYS! BESS should not end in municipal waste streams.
- These systems are only needed or appropriate in dense population centers.
 - FACT: They are needed everywhere for resilience, grid stability, elimination of peaker plants, integration of renewable energy, etc.



BESS Fact vs. Fiction

Fire safety concerns:

- **These batteries are cheaply made and are likely to catch fire.**
 - FACT: Energy storage system fires do happen, but are rare. Advances in technology, safety standards, and fire/building codes have and will continue to mitigate fire safety risks.
 - Important to buy from reliable sources, not just lowest cost.
 - Code compliance and listing to safety standards are primary concerns, not just Country of Origin.
- **There are not adequate safety standards in place for these systems.**
 - FACT: Safety standards have evolved to address BESS, and are already in place under the 2020 NYS Uniform Fire Prevention and Building Code.
- **You can't use water to extinguish a lithium-ion BESS fire.**
 - FACT: Lithium-ion batteries *do not contain* metallic lithium, but rather lithium salts; as such, fire testing has demonstrated water to be an effective agent for cooling and extinguishing BESS fires and incidents.

BESS Fact vs. Fiction

Fire safety concerns (cont.):

- These systems are unmonitored; no one is paying attention if something were to happen.
 - FACT: The 2020 NYS Uniform Code ensures that BESS are equipped with sophisticated Battery Management Systems (BMS).
 - A BMS constantly monitors the system (down to the cell level) to ensure normal operating parameters. In the event of an incident, a BMS will notify key personnel and can even trigger HVAC or hazard mitigation systems.
- Local first responders/firefighters are unprepared to respond to an incident involving BESS.
 - FACT: Firefighters and responders are trained on a regular basis as to how to manage overheating, fires, and electrical hazards.
 - System-specific training and incident response plans should also be provided by project developers.



BESS Fact vs. Fiction

Environmental concerns:

- BESS will pollute the environment; even if firefighters use water on a system, that will produce toxic runoff.
 - FACT: Water is a suitable substance for cooling/extinguishing lithium-ion battery incidents, minimizing the need for spray foams and gels (some of which contain harmful “forever” chemicals).
 - Like many other fires, if water is used on a lithium-ion BESS fire, first responders *may* need to implement firewater collection strategies.
- These batteries produce toxic gases and will negatively affect air quality in communities.
 - FACT: Lithium-ion BESS do not offgas or produce emissions during operations.
- These batteries produce excess noise.
 - FACT: For larger installations, the only noise is from HVAC systems or inverters. Appropriate siting measures can ensure that noise will not be an issue for project neighbors.

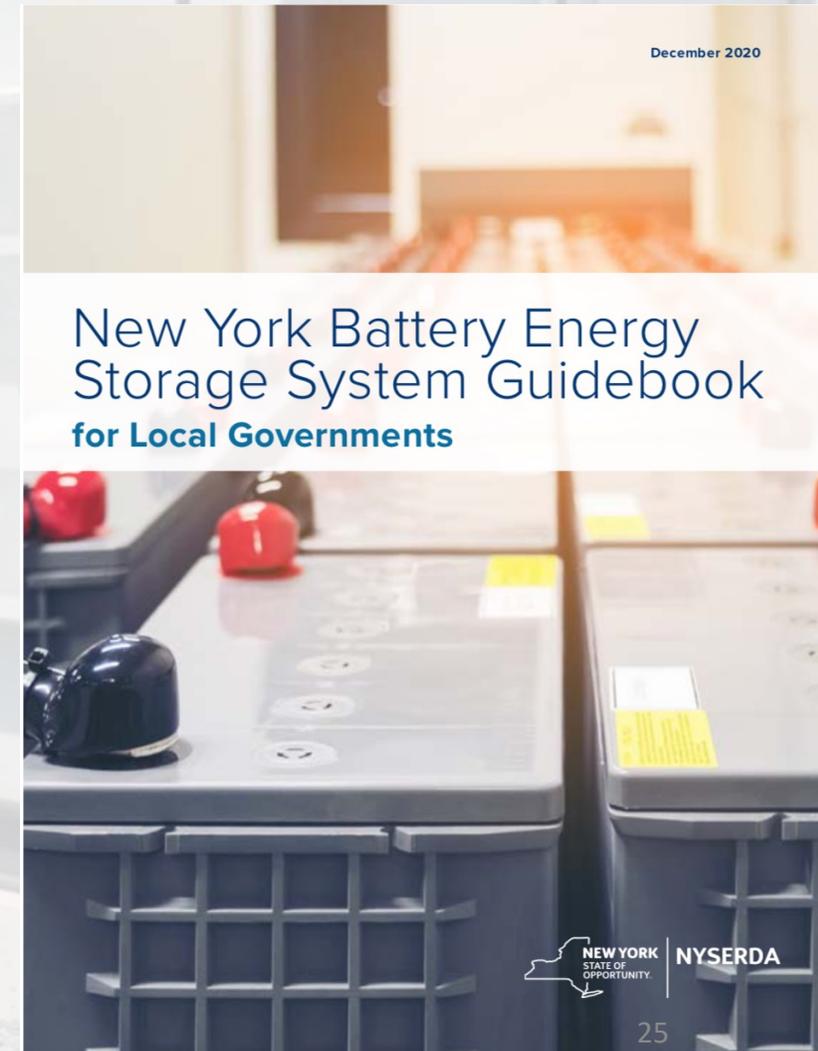
NYSERDA Resources for Local Governments

NY Battery Energy Storage System Guidebook:

- Model Zoning Law
- Model Permit + Inspection Checklist
- 2020 NYS Uniform Code References

NYSERDA Clean Energy Siting Team

- Work one-on-one with municipal boards & local officials to provide free technical assistance
- Offer free accredited trainings for code enforcement officials or planning/zoning board members



Q&A

Helpful links:

- [Energy Storage Guidebook for Local Governments](#)
- [NYSERDA Energy Storage Program](#)

For additional assistance, reach out to cleanenergyhelp@nyserda.ny.gov



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Next Webinar in Series:

Fire Safety (Wednesday, May 19th)

NYSERDA is pleased to host a series of webinars intended to equip local governments across New York State – including municipal board members, first responders, code enforcement officers, and other community stakeholders – with the knowledge and resources required to ensure responsible battery energy storage system development.

This webinar series, featuring presentations from NYSERDA staff as well as external subject matter experts, will cover a range of key topics related to battery energy storage systems which are particularly important for communities and local governments.

Events in this series will be held biweekly on Wednesdays from 5:30 p.m. to 6:45 p.m. ET.

Register for each session of interest using the registration links.

Questions? Email NYSERDA's Clean Energy Siting Team: cleanenergyhelp@nyserda.ny.gov

Battery Energy Storage Systems 101

Date: Wednesday, May 5, 2021

Featured Speakers: Dr. Stanley Whittingham, 2019 Nobel Laureate for Chemistry; Distinguished Professor of Chemistry, SUNY Binghamton

Gain an introduction to key concepts and technologies associated with battery energy storage systems, as well as an overview of relevant New York State (NYS) goals, policies and programs.

[REGISTER HERE](#)

Fire Safety

Date: Wednesday, May 19, 2021

Featured Speakers: NYS Office of Fire Prevention and Control (OFPC), Energy Safety Response Group (ESRG)

Learn about key fire safety considerations for battery energy storage systems, including a discussion of best practices for first responders, as well as a review of important regulations found in the 2020 NYS Uniform Fire Prevention and Building Code.

[REGISTER HERE](#)

Zoning and Permitting

Date: Wednesday, June 2, 2021

Featured Speakers: NYSERDA Clean Energy Siting Team

Dive into the valuable resources available to local governments in NYSERDA's Battery Energy Storage System Guidebook. These tools are designed to assist municipalities in implementing zoning, permitting, and inspection processes for battery energy storage installations.

[REGISTER HERE](#)

Decommissioning and End-of-Life Considerations

Date: Wednesday, June 16, 2021

Featured Speakers: DNV and Li-Cycle

Explore best practices for the treatment of battery energy storage systems at the end of their useful life – including system recycling and disposal – as well as an introduction to decommissioning plans for energy storage installations.

[REGISTER HERE](#)

Taxation and Assessments

Date: Wednesday, June 30, 2021

Featured Speaker: Hodgson Russ, LLP

Learn about New York State and local tax treatment of battery energy storage systems, including information regarding assessments and payments-in-lieu-of-taxes (PILOT) agreements.

[REGISTER HERE](#)