Broome County
2026 Municipal Training Series

Planning for Solar (+ Storage): Fire Prevention & Safety

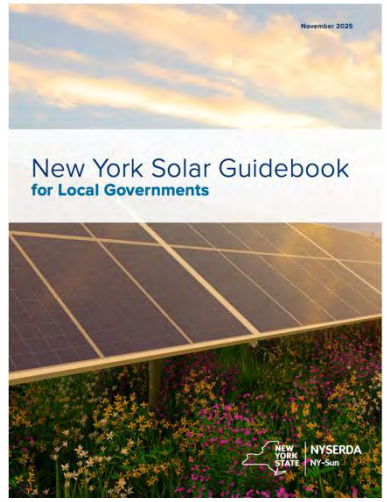
NEW YORK STATE OF OPPORTUNITY. | NYSERDA

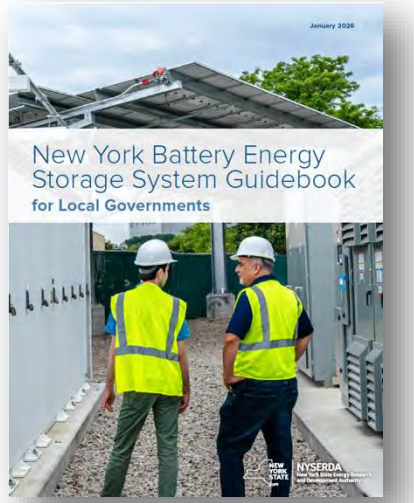
Stillwater, NY

NYSERDA

Clean Energy Siting Team

- **Clean Energy Guidebooks for Local Governments,**
- Hands-on **education & training opportunities**
- **Technical assistance and local laws** review/ drafting support
- **Pre-recorded trainings** (e.g. '*Deploying Safe Lithium-Ion Energy Storage in Your Community'* webinar)
- Support from regional **Clean Energy Advisors** and technical contractor resources





Solar &
Fire Safety

Johnstown, NY

Solar & Fire Safety

- **Context**
- NYS Uniform Code and Fire Safety Considerations

Why are we talking about solar and fire safety?

- Local role in project reviews, approvals, and oversight
- Understanding the code landscape in NYS
- Roles & responsibilities around land use planning/zoning vs. Uniform Code

Solar & Fire Safety:
Context

Local role in project reviews, approvals, and oversight

Technology Type		**State Permitting*** (ORES)	**Local Permitting** (SEQR/local regulations)
Renewable Generator (e.g. solar, wind)		**≥ 25 MW***	**< 25 MW**
Battery Energy Storage System (BESS)	Co-located with Renewable Generator	All sizes if co-located with **≥ 25 MW** renewable generator	All sizes if co-located with **< 25 MW** renewable generator
	Standalone System	*N/A*	**All sizes***

**Under Public Service Law (PSL) §68, electric corporations are required to seek a Certificate of Public Convenience and Necessity (CPCN) for alternate energy production facilities – including renewables and energy storage systems – exceeding 80 MW.*

Solar & Fire Safety:
Context

Local role in project reviews, approvals, and oversight

Technology Type		Local Permitting (SEQR/local regulations)
Renewable Generator (e.g. solar, wind)		**< 25 MW**
BESS	Co-located w/ Renewable Generator	All sizes if co-located w/ **< 25 MW** renewable generator
	Standalone System	All sizes

Solar & Fire Safety

- **Context**
- NYS Uniform Code and Fire Safety Considerations

Land Use & Planning Considerations for Solar:

- Electrical infrastructure (proximity, capacity)
- Appropriate locations (zoning)
- Bulk and area standards
- Environmental impacts
- Visual impacts
- Agricultural impacts
- Decommissioning
- Taxation

Solar & Fire Safety

- **Context**
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Land Use & Planning Considerations for Battery Energy Storage Systems:

- Electrical infrastructure (proximity, capacity)
- Appropriate locations (zoning)
- Bulk and area standards
- Environmental impacts
- Visual impacts
- Agricultural impacts
- Decommissioning
- Taxation
- **Fire safety**
- **Incident management training**

Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

The NYS Uniform Fire Prevention and Building Code (Uniform Code):

- First took effect in 1984
- Prescribes standards for building construction which are automatically applicable in every authority having jurisdiction (AHJ)*
- Updated through a thorough, expert-informed process on a periodic basis (incl. opportunities for public review and comment)
- Comprises multiple code books, incl.:
  - NYS Fire Code
  - NYS Residential Code
  - NYS Building Code
  - Many others!

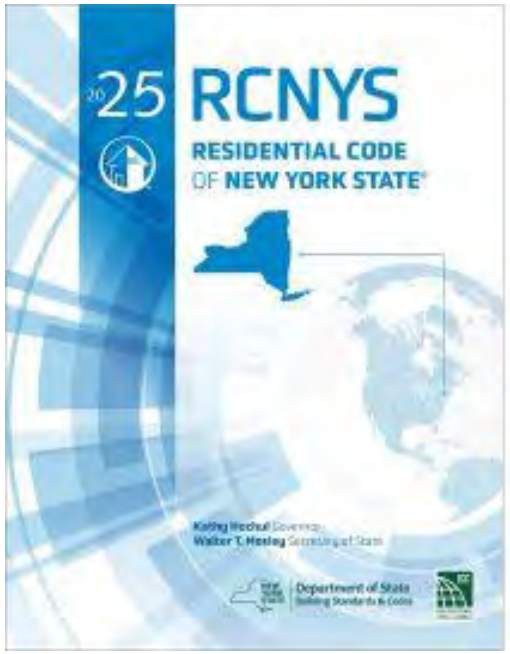
Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

The NYS Uniform Fire Prevention and Building Code (Uniform Code):

- AHJs are responsible for administration and enforcement of the Uniform Code
- Code enforcement is performed by NYS Department of State-certified Code Enforcement Officials
  - Annual training requirements
- Duties typically performed by municipal staff; inter-municipal staff, or county staff where needed and established via service agreement.

Solar & Fire Safety: NYS Uniform Code and Fire Safety Considerations



SECTION R329—SOLAR ENERGY SYSTEMS

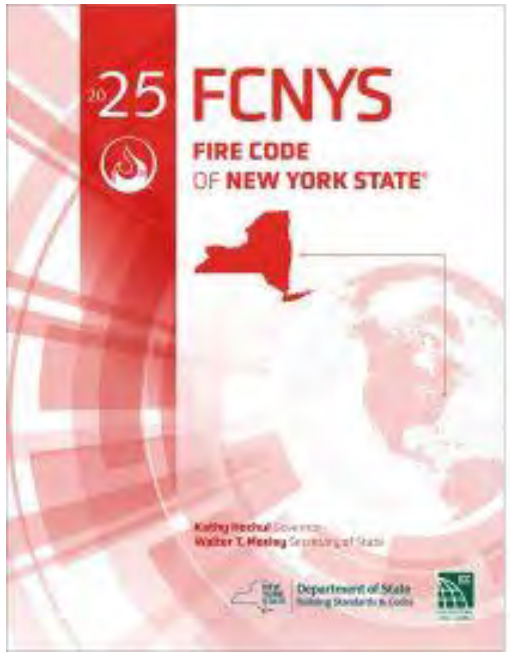
R329.1 General. *Solar energy systems* shall comply with the provisions of this section.

R329.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with Chapter 23.

R329.3 Photovoltaic systems. Photovoltaic (*PV*) systems shall be designed and installed in accordance with Sections R329.3.1 through R329.8.1 and the manufacturer's installation instructions. The electrical portion of solar *PV* systems shall be designed and installed in accordance with NFPA 70.

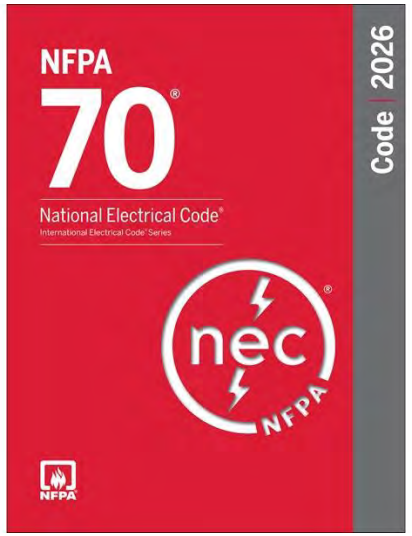
R329.3.1 Equipment listings. *Photovoltaic panels* and modules shall be *listed* and *labeled* in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be *listed* and *labeled* in accordance with UL 1741. Systems connected to the utility grid shall use inverters *listed* for utility interaction. Mounting systems *listed* and *labeled* in accordance with UL 2703 shall be installed in accordance with the manufacturer's installation instructions and their listings. Building-integrated photovoltaic (BIPV) *roof coverings* and BIPV roof assemblies shall be *listed* and *labeled* in accordance with UL 7103.

R329.4 Rooftop-mounted photovoltaic systems. Rooftop-mounted *photovoltaic panel systems* installed on or above the *roof covering* shall be designed and installed in accordance with this section.



SECTION 1205—SOLAR PHOTOVOLTAIC POWER SYSTEMS

1205.1 General. Solar photovoltaic (PV) systems shall be installed in accordance with the *Building Code of New York State* or *Residential Code of New York State*. The electrical portion of solar PV systems shall be installed in accordance with NFPA 70. Rooftop-mounted solar photovoltaic systems shall be installed in accordance with Sections 1205.2 through 1205.4.3. Ground-mounted solar photovoltaic systems shall comply with Section 1205.5.



Article 690: PV systems other than the PV generating plant (solar farms) covered in Article 691.

Article 691: Large-scale systems with an inverter generating capacity of 5000 kW and greater.

Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

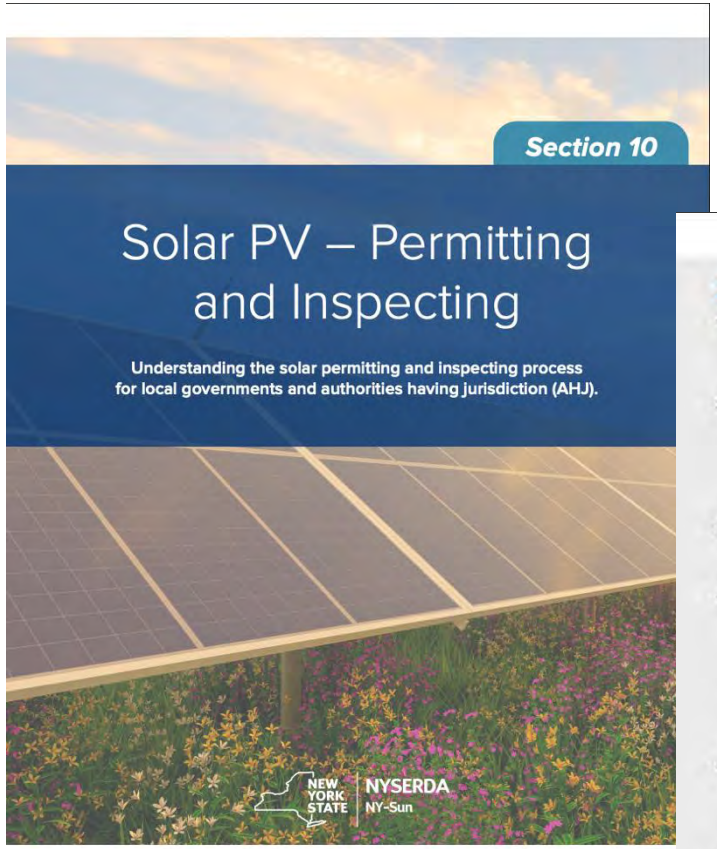
Permitting and Enforcement for Solar:

- Vast majority of solar installations are small, distributed energy resources (DER) projects
- For these systems, recommend use of the NYS Unified Solar Permit:
  - Comprehensive, standardized permit to streamline approval code review/enforcement processes
  - Proper implementation of a standardized process can save municipalities (and applicants) staff resource, time, and money.

Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

Resource for Code Enforcement Officials



Solar Guidebook for Local Governments | NYSERDA | 17 Columbia Circle Albany, NY 12203

S10.1

Section Contents

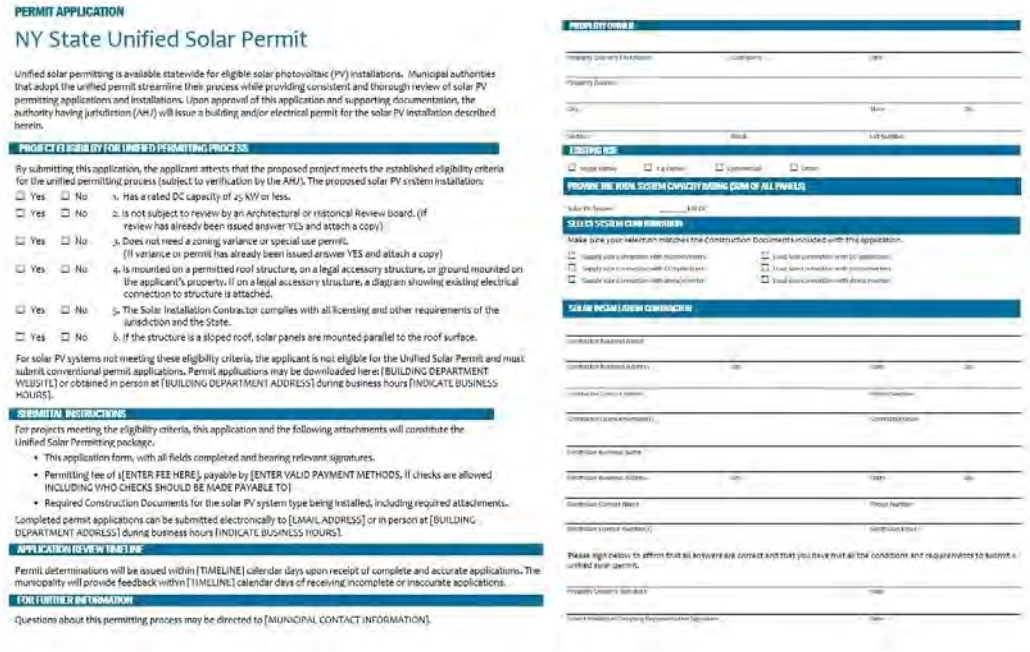
S10.2

Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

Solar Permitting:

- Application documents are to be stamped/signed by a licensed professional engineer or registered architect
- Application details must match underlying documents



PERMIT APPLICATION

NY State Unified Solar Permit

Unified solar permitting is available statewide for eligible solar photovoltaic (PV) installations. Municipal authorities that adopt the unified permit streamline their process while providing consistent and thorough review of solar PV permitting applications and installations. Upon approval of this application and supporting documentation, the authority having jurisdiction (AHJ) will issue a building and/or electrical permit for the solar PV installation described herein.

PROJECT ELIGIBILITY FOR UNIFIED PERMITTING PROCESS

By submitting this application, the applicant attests that the proposed project meets the established eligibility criteria for the unified permitting process (subject to verification by the AHJ). The proposed solar PV system installation:

- ☐ Yes ☐ No 1. Has a rated DC capacity of 25 kW or less.
- ☐ Yes ☐ No 2. Is not subject to review by an Architectural or Historical Review Board. (If review has already been issued answer YES and attach a copy)
- ☐ Yes ☐ No 3. Does not need a zoning variance or special use permit. (If variance or permit has already been issued answer YES and attach a copy)
- ☐ Yes ☐ No 4. Is mounted on a permitted roof structure, on a legal accessory structure, or ground mounted on the applicant's property. If on a legal accessory structure, a diagram showing existing electrical connection to structure is attached.
- ☐ Yes ☐ No 5. The Solar Installation Contractor complies with all licensing and other requirements of the jurisdiction and the State.
- ☐ Yes ☐ No 6. If the structure is a sloped roof, solar panels are mounted parallel to the roof surface.

For solar PV systems not meeting these eligibility criteria, the applicant is not eligible for the Unified Solar Permit and must submit conventional permit applications. Permit applications may be downloaded here: [BUILDING DEPARTMENT WEBSITE] or obtained in person at [BUILDING DEPARTMENT ADDRESS] during business hours [INDICATE BUSINESS HOURS].

SUBMITTAL INSTRUCTIONS

For projects meeting the eligibility criteria, this application and the following attachments will constitute the Unified Solar Permitting package.

- This application form, with all fields completed and bearing relevant signatures.
- Permitting fee of $[ENTER FEE HERE], payable by [ENTER VALID PAYMENT METHODS, IF checks are allowed INCLUDING WHO CHECKS SHOULD BE MADE PAYABLE TO]
- Required Construction Documents for the solar PV system type being installed, including required attachments.

Completed permit applications can be submitted electronically to [EMAIL ADDRESS] or in person at [BUILDING DEPARTMENT ADDRESS] during business hours [INDICATE BUSINESS HOURS].

APPLICATION REVIEW TIMELINE

Permit determinations will be issued within [TIMELINE] calendar days upon receipt of complete and accurate applications. The municipality will provide feedback within [TIMELINE] calendar days of receiving incomplete or inaccurate applications.

FOR FURTHER INFORMATION

Questions about this permitting process may be directed to [MUNICIPAL CONTACT INFORMATION].

Solar & Fire Safety: NYS Uniform Code and Fire Safety Considerations

Equipment Info→

submittal includes the following information:

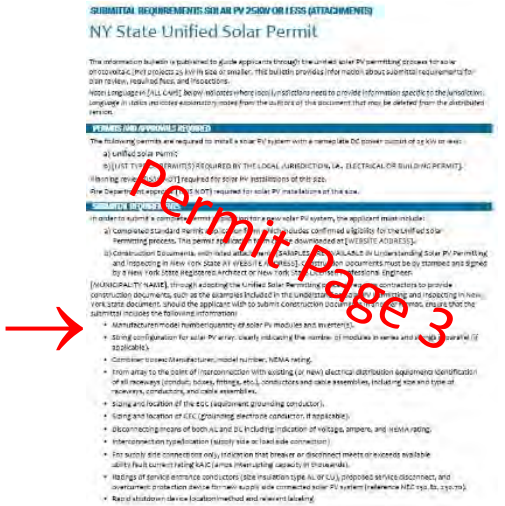
- Manufacturer/model number/quantity of solar PV modules and inverter(s).
- String configuration for solar PV array, clearly indicating the number of modules in series and strings in parallel (if applicable).
- Combiner boxes: Manufacturer, model number, NEMA rating.
- From array to the point of interconnection with existing (or new) electrical distribution equipment: identification of all raceways (conduit, boxes, fittings, etc.), conductors and cable assemblies, including size and type of raceways, conductors, and cable assemblies.
- Sizing and location of the EGC (equipment grounding conductor).
- Sizing and location of GEC (grounding electrode conductor, if applicable).
- Disconnecting means of both AC and DC including indication of voltage, ampere, and NEMA rating.
- Interconnection type/location (supply side or load side connection)
- For supply side connections only, indication that breaker or disconnect meets or exceeds available utility fault current rating kAIC (amps interrupting capacity in thousands).
- Ratings of service entrance conductors (size insulation type AL or CU), proposed service disconnect, and overcurrent protection device for new supply side connected solar PV system (reference NEC 230.82, 230.70).
- Rapid shutdown device location/method and relevant labeling.

c) (For Roof Mounted Systems) A roof plan showing roof layout, solar PV panels and the following fire safety items: approximate location of roof access point, location of code-compliant access pathways, code exemptions, solar PV system fire classification, and the locations of all required labels and markings.

d) Provide construction drawings with the following information:

- The type of roof covering and the number of roof coverings installed.
- Type of roof framing, size of members, and spacing.
- Weight of panels, support locations, and method of attachment.
- Framing plan and details for any work necessary to strengthen the existing roof structure.
- Site-specific structural calculations.

e) Where an approved racking system is used, provide documentation showing manufacturer of the racking system, maximum allowable weight the system can support, attachment method to roof or ground, and product evaluation information or structural design for the rack.



Solar & Fire Safety: NYS Uniform Code and Fire Safety Considerations

Equipment Info→

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Roof/Site Plan→

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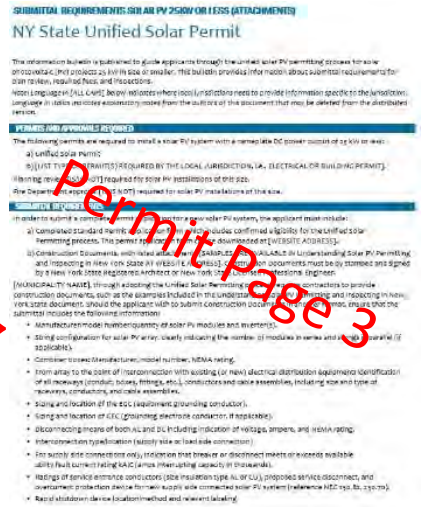

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Structural Info→

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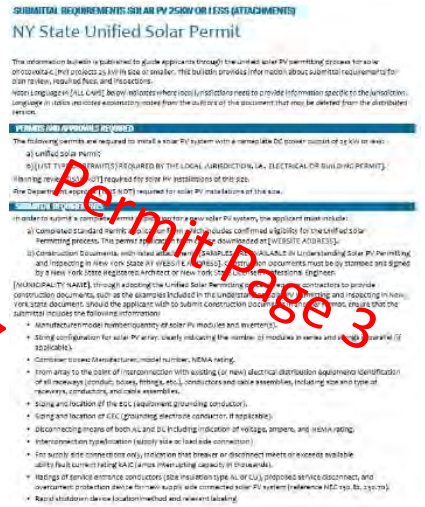
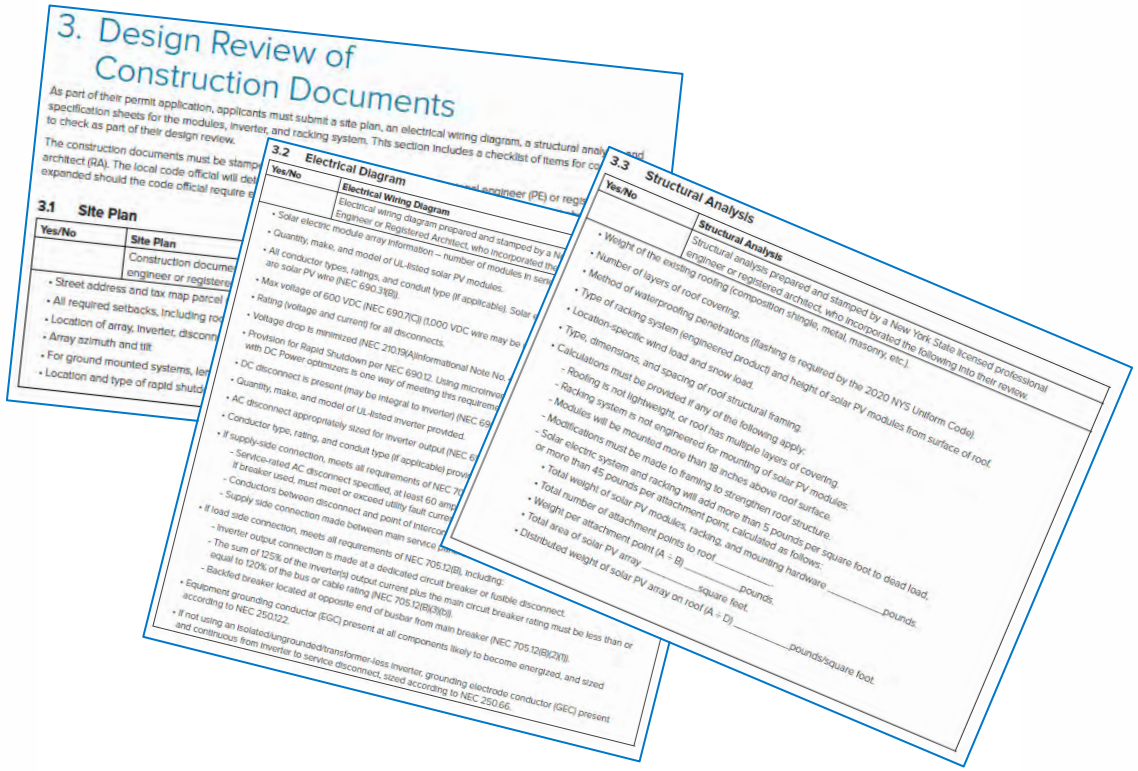


Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

Operationalizing the process:

- Design Review Checklist
  - Walk through of the submitted construction documents; Site Plan, Electrical Checklist, and Structural Analysis



Solar & Fire Safety

- Context
- **NYS Uniform Code and Fire Safety Considerations**

Operationalizing the process:

- Field Inspection Checklist
  - Multi-page guide of what to look for throughout the entire installation
  - Developed based on input from over 4,000 detailed inspections
  - Heavily reliant on code requirements
  - Supports a robust, thorough, and fair inspection process
  - Printable for easy use in the field

https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Resources-for-Contractors

BESS & Fire Safety

Blasdell, NY

BESS & Fire Safety

- **Context**
- Introduction to Battery Energy Storage Systems (BESS)
- NYS Uniform Code and Fire Safety Considerations

Why are we talking about energy storage?

Critical questions driving grid infrastructure planning and investments:

- Do we have enough (+ *when we need it*)?
  → '**Resource Adequacy**'

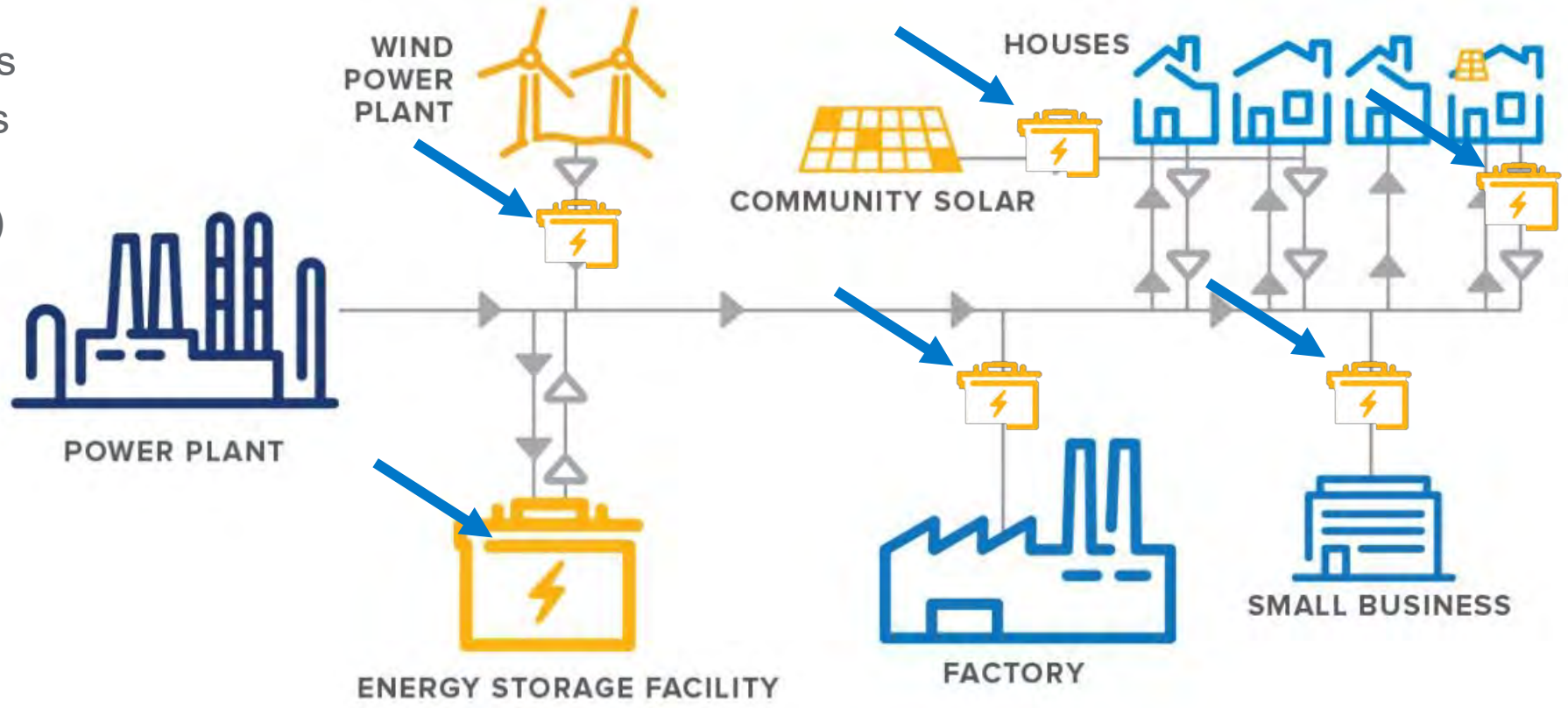
- Can the grid function reliably, incl. withstanding demand spikes / weather-related strain?
  → '**Reliability' / 'Resilience'**

- Can we avoid or manage costs of grid investments, operations, maintenance?
  → '**Affordability**'

BESS & Fire Safety:
Context

Energy storage is helping address these questions for different stakeholders:

- Residential customers
- Commercial customers
- Electric service utilities (e.g. NYSEG)
- Grid operator (NYISO)

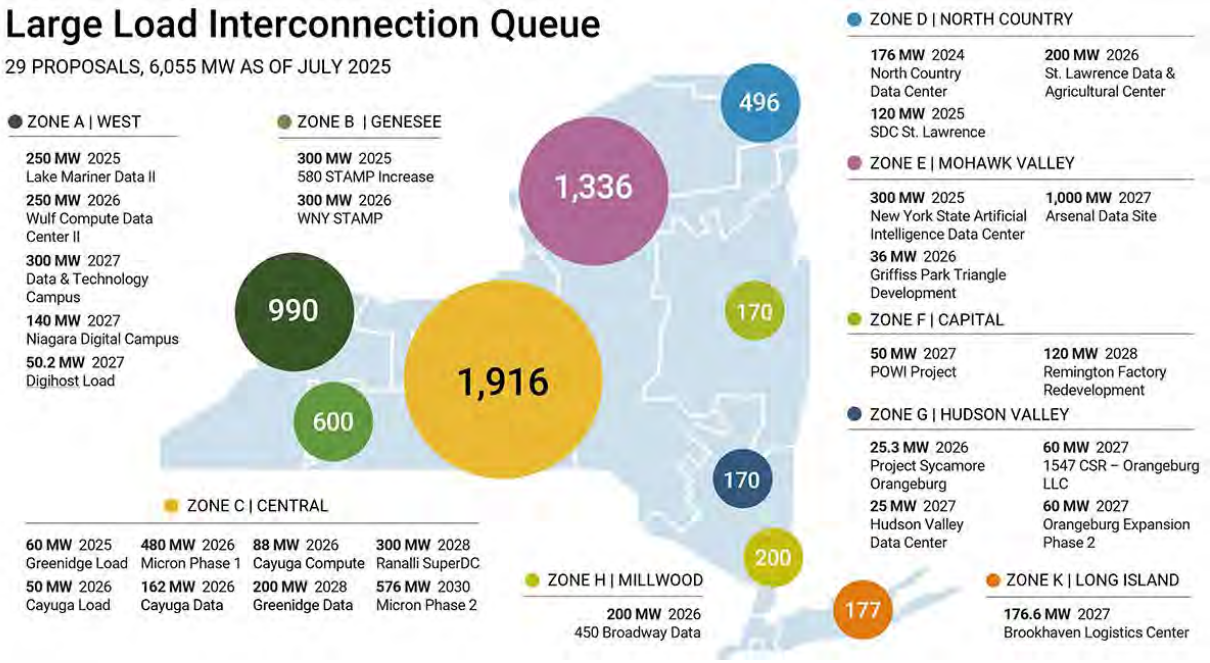


BESS & Fire Safety

- **Context**
- Introduction to Battery Energy Storage Systems (BESS)
- NYS Uniform Code and Fire Safety Considerations

Why else are we talking about energy storage?

Load growth! (Manufacturing, economic development projects, data centers, consumer and transportation electrification, etc.)



Source: NYISO, August 2025

BESS & Fire Safety

- **Context**
- Introduction to Battery Energy Storage Systems (BESS)
- NYS Uniform Code and Fire Safety Considerations

New York is an energy storage leader:

- Legacy energy storage technologies/ infrastructure
- Energy storage research and innovation

Blenheim-Gilboa Power Station
Pumped-Hydro Energy Storage
1,160 MW
Blenheim and Gilboa, NY

Lewiston Pumped Storage Project
Pumped-Hydro Energy Storage
240 MW
Lewiston, NY

New Energy New York
Energy Storage Research
& Innovation Engine
Binghamton, NY

BESS & Fire Safety

- Context
- **Introduction to Battery Energy Storage Systems (BESS)**
- NYS Uniform Code and Fire Safety Considerations

- We want **electrical energy**
- Technologies capable of storing + converting one form of energy to another, usable form

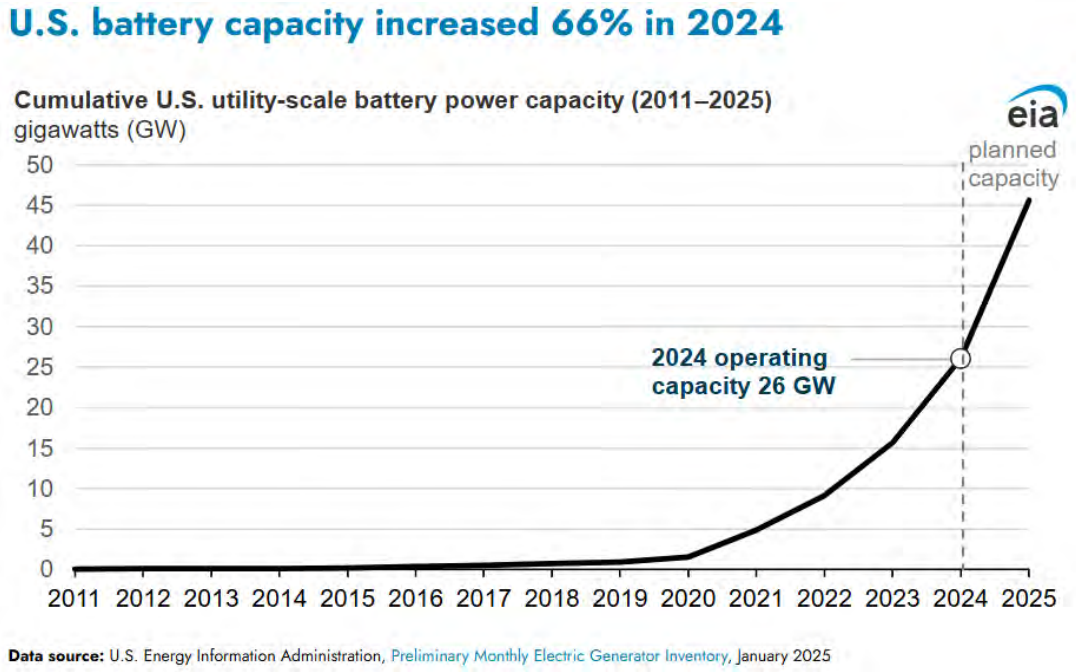
- Examples of energy storage technologies:
  - Chemical (BESS, fuel)
  - Mechanical (pumped storage, compressed gas)
  - Thermal (solar water heater)

BESS & Fire Safety

- Context
- **Introduction to Battery Energy Storage Systems (BESS)**
- NYS Uniform Code and Fire Safety Considerations

Majority of energy storage being deployed today is **battery energy storage**, due to:

- Technology maturity
- Falling costs
- Siting considerations
- System efficiency
- Energy density
- Scalability

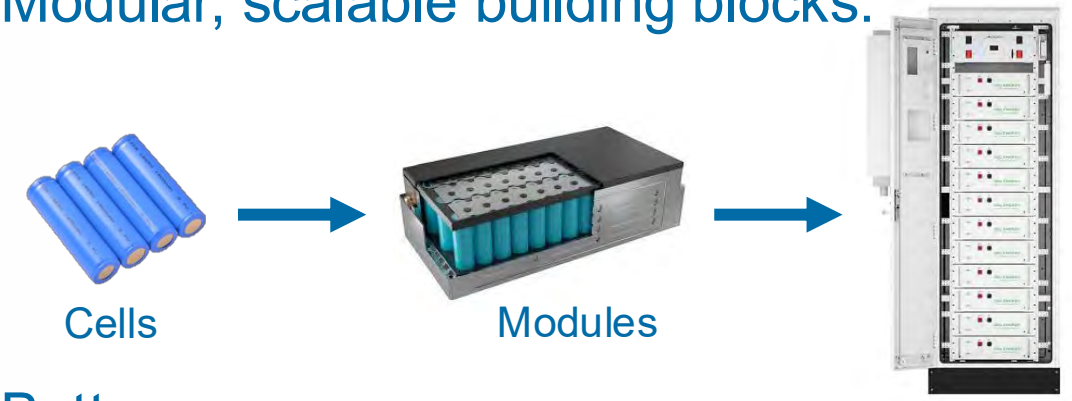


BESS & Fire Safety

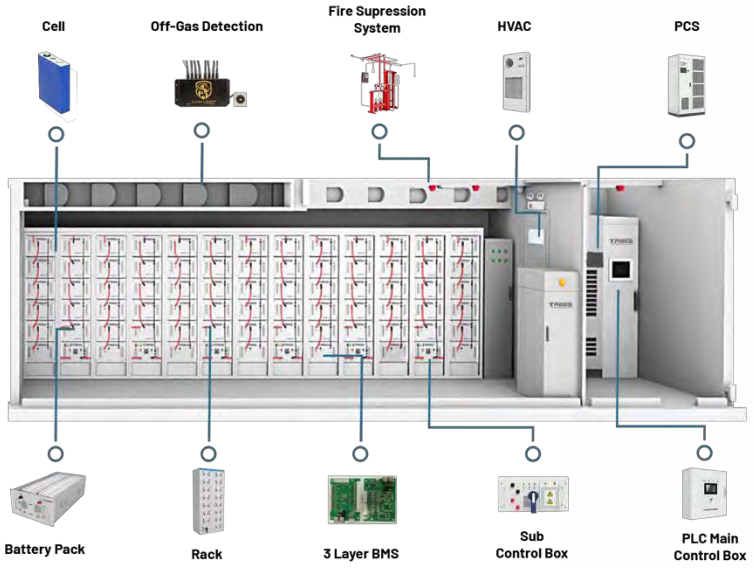
- Context
- **Introduction to Battery Energy Storage Systems (BESS)**
- NYS Uniform Code and Fire Safety Considerations

Battery Energy Storage Systems (BESS):

- Modular, scalable building blocks:

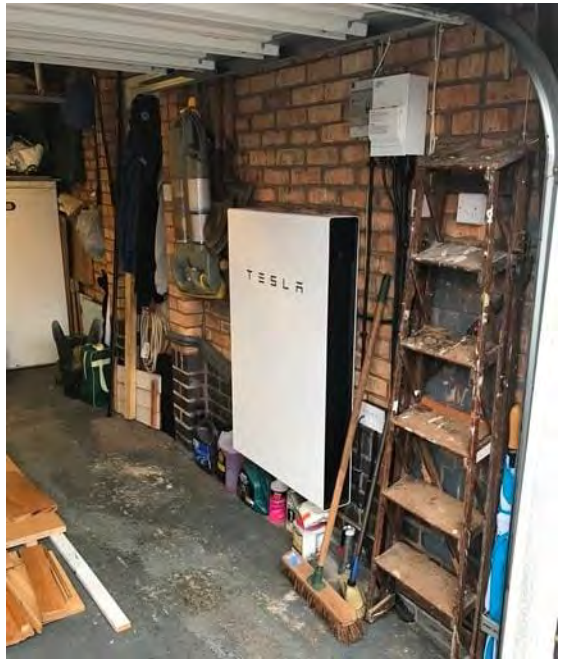


- Battery management system (BMS)
- Balance of system (BOS) equipment



Introduction to Battery Energy Storage Systems (BESS)

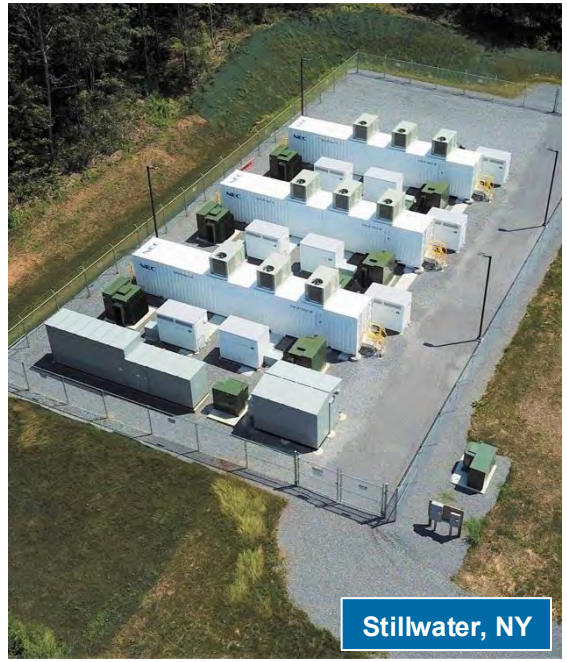
Residential
"Behind the Meter"
~5-10 kW



On-Site Retail
"Behind the Meter"
~50-750 kW

Off-Site Retail
"Front of the Meter"
~1-5 MW

Bulk
"Front of the Meter"
>5 MW



Residential & Retail Program

Bulk Program

BESS & Fire Safety

- Context
- **Introduction to Battery Energy Storage Systems (BESS)**
- NYS Uniform Code and Fire Safety Considerations

Storage Infrastructure Requires Scale:

BESS & Fire Safety

- Context
- Introduction to Battery Energy Storage Systems (BESS)
- **NYS Uniform Code and Fire Safety Considerations**

"The best way to fight a fire is to prevent it."

…what does that actually look like?

Prevention:

- Adoption of modern **codes and standards**
- Thorough **permitting and project reviews,** incl. utilization of **peer review**
- Robust **code enforcement**

Education:

- **Data-informed awareness** of technology and equipment risks and safety profiles
- **Well-educated, well-trained, and involved stakeholders**: permitting and regulatory officials, first responders, public

Education:

- **Emergency response planning**
- **Environmental monitoring**
- **Decommissioning and restoration**

BESS & Fire Safety

- Context
- Introduction to Battery Energy Storage Systems (BESS)
- **NYS Uniform Code and Fire Safety Considerations**

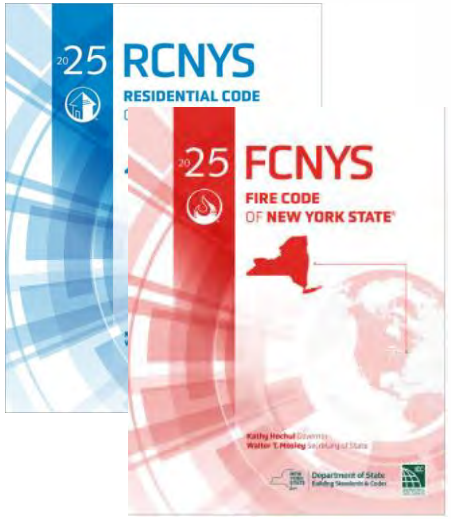
2019: NYS issues *Energy Storage System Supplement*

2020: Formal incorporation of BESS requirements into Uniform Code

2023: Inter-Agency Fire Safety Working Group (Working Group) convened

2024: Working Group issues recommendations for updates/additions, which are included in draft Uniform Code

2026: 2025 NYS Uniform Code goes into effect; automatically applicable in all AHJs*



National Standards for BESS

Applicable Codes & Standards:

- **UL 9540:** "Standard for Energy Storage Systems and Equipment" certifies that all components of the system work safely in harmony together
- **UL 1741:** Inverters for utility interactive systems listed for use with distributed energy resources
- **UL 9540A:** Test method to evaluate system safety pertaining to thermal runaway

- **International Fire Code** (IFC) Chapter 1207, Energy Storage Systems
  - This is the basis for 2020 FCNYS section 1206 and section 1207 of the 2025 FCNYS

- **NFPA 12** – Standard on CO_2 Extinguishing Systems
- **NFPA 13** – Standard for the Installation of Sprinkler Systems
- **NFPA 15** – Standard for Water Spray Fixed Systems for Fire Protection
- **NFPA 68** – Standard on Explosion Protection by Deflagration Venting
- **NFPA 69** – Standard on Explosion Prevention Systems
- **NFPA 70** – National Electric Code (NEC)
- **NFPA 72** – National Fire Alarm and Signaling Code
- **NFPA 750** – Standard on Water Mist Fire Protection Systems
- **NFPA 855** – Standard for the Installation of Stationary Energy Storage Systems*
- **NFPA 1142** – Standard on Water Supplies for Suburban and Rural Firefighting
- **NFPA 2001** – Standard on Clean Agent Fire Extinguishing Systems
- **NFPA 2010** – Standard for Fixed Aerosol Fire-Extinguishing Systems

BESS & Fire Safety

NYS Inter-Agency Fire Safety Working Group (Working Group)

In July 2023, in response to fires in Warwick, Chaumont, and East Hampton, Governor Hochul convened the Working Group.

Agency Participants:

- Division of Homeland Security and Emergency Services (**DHSES**)
- Office of Fire Prevention and Control (**OFPC**)
- NYS Energy Research and Development Authority (**NYSERDA**)
- Department of Environmental Conservation (**DEC**)
- Department of Public Service (**DPS**)
- Department of State (**DOS**)

Working Group Partners:

- Long Island Power Authority (**LIPA**)
- New York Power Authority (**NYPA**)
- DOE-Funded National Labs
- Other highly-specialized Subject Matter Experts

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Working Group tasks include:

- **Analysis**: Oversee collection, assessment of environmental testing data, emergency response actions, Root Cause Analyses
  - **Result**: Publication of findings: no identified injuries or harmful levels of toxins
- **Regulations**: Review existing codes, standards, and regulations; develop recommendations for revisions and enhancements
  - **Result**: Recommendations Report, updated 2025 NYS Fire Code
- **Inspections**: Conduct field inspections of in-service BESS fleet.
  - **Result**: Enhanced safety inspection protocols, checklists

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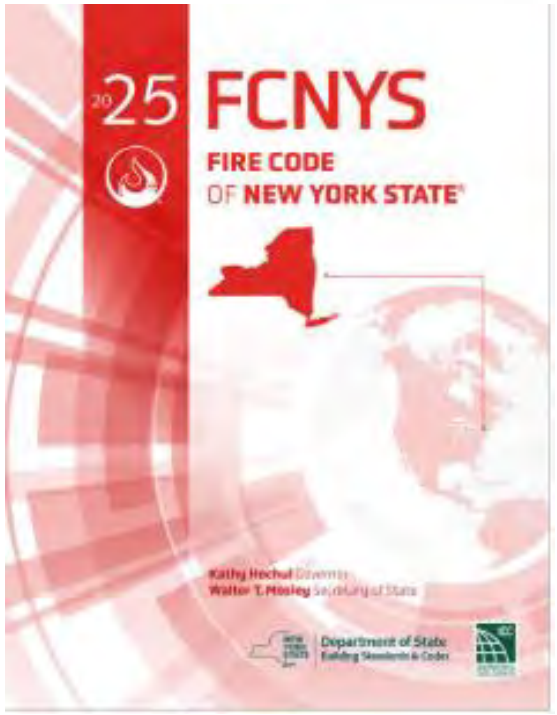
2025 NYS Fire Code Requirements:

- Building Permits and Operating Permits
- Permit application requirements to include, among other items:
  - Commissioning Plan
  - Decommissioning Plan
  - Fire Safety & Evacuation Plan
  - Peer Review
  - Robust equipment and technology specs



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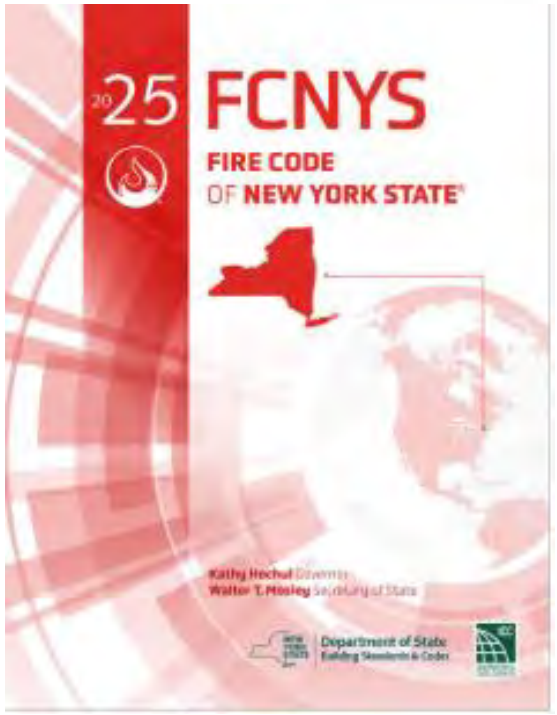
2025 NYS Fire Code Requirements:

- Hazard Mitigation Analysis (analyzes failure modes and effects)
- Large-Scale Fire Testing
- Fire Remediation:
  - Hazard support personnel
  - *"…at their own expense…"*
- Annual Site Visit and Trainings
- 3rd Party Safety Inspections



BESS & Fire Safety

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Key Takeaways from the 2026 Uniform Code:

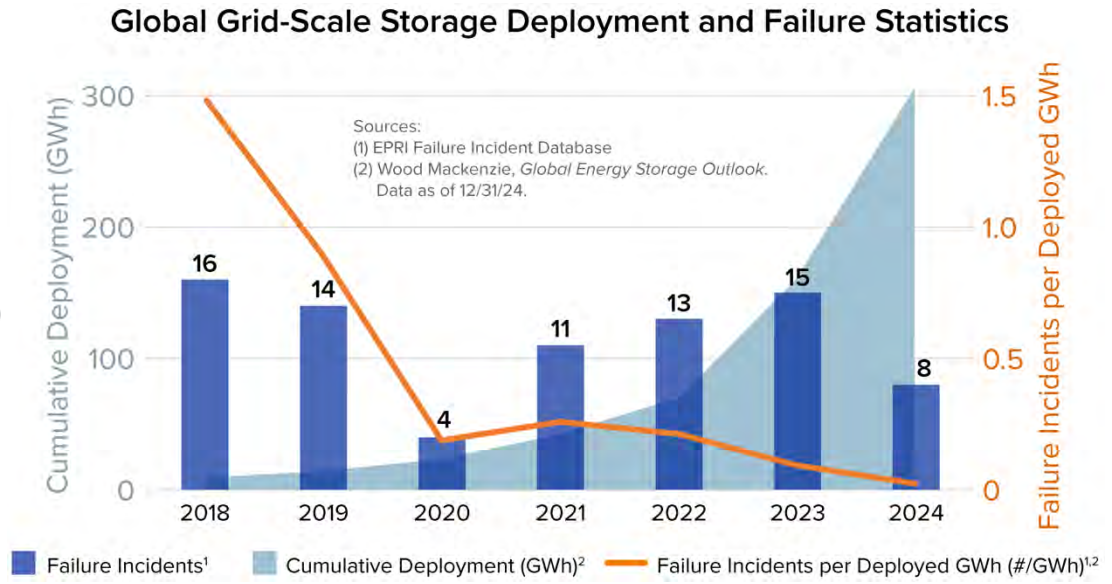
- Requires **applicant-funded peer reviews**, to ensure subject matter expert support for local officials
- Requires project-specific **Emergency Response Plans,** to be developed in conjunction with local fire department
- Requires project owners to **provide annual on-site trainings**, **Plan reviews**
- Requires project owner to furnish **Hazard Support Personnel** to support and collaborate with local first responders

BESS & Fire Safety

Data-Informed Discussion of BESS Failures

Electric Power Research Institute (EPRI)
[BESS Failure Incident Database] / [Whitepaper]:

- BESS failure incidents are rare, and getting significantly rarer: 98% decrease in failure rate (= # of incidents/volume of deployed BESS) from 2018-2024
- Root causes of BESS failures vary across different categories/ phases of the project lifecycle
- Equipment/components responsible for failures have varied + been addressed through:
  - Updated codes, standards, and testing methodologies
  - Increased manufacturer quality controls
  - Improved monitoring systems and analytics



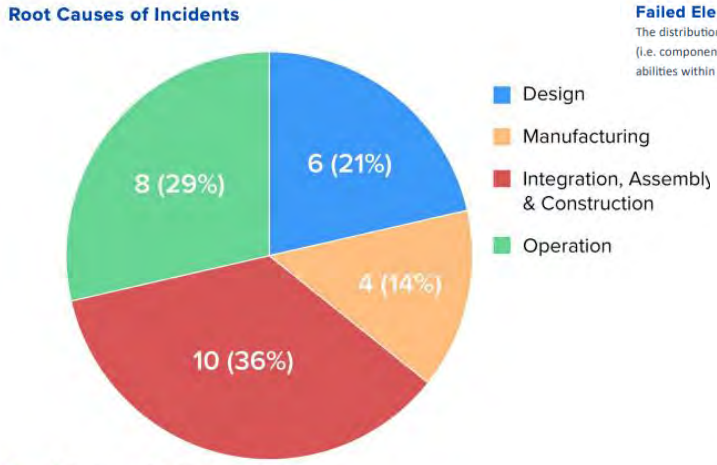


Figure 4. Breakdown of BESS Failures by Root Cause

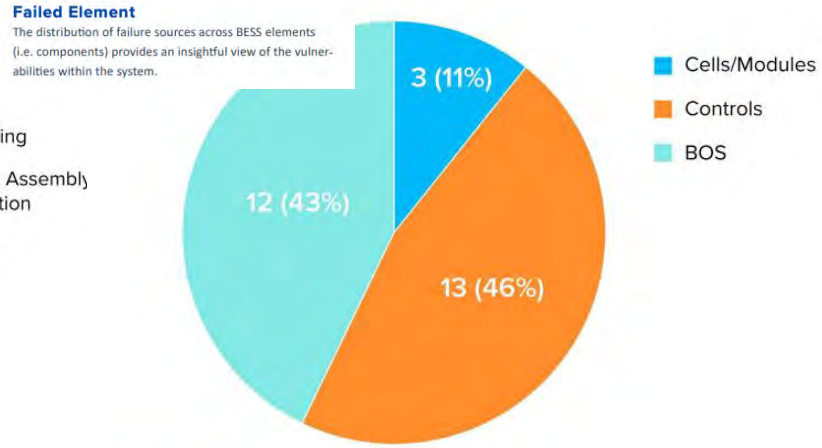


Figure 6. Breakdown of BESS Failures by Failed Element

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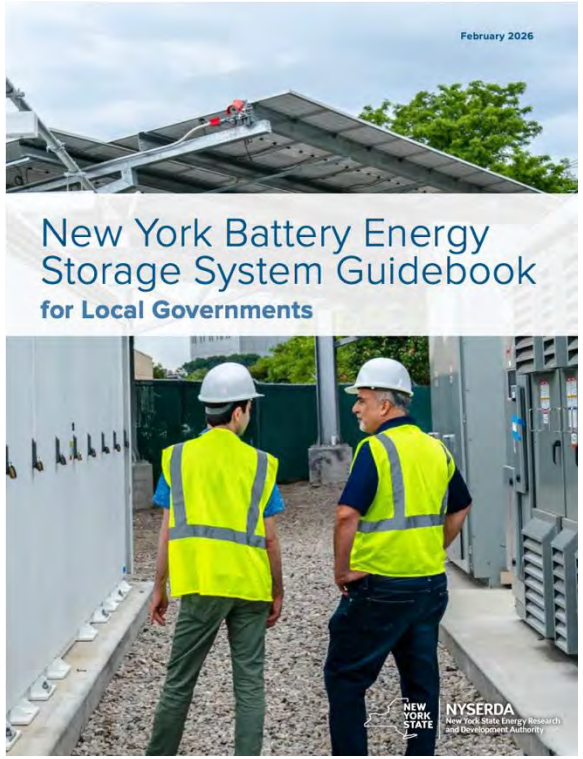
Resources available:

- **Clean Energy Guidebooks** incl. BESS Guidebook
- Hands-on **education & training opportunities**
- **Technical assistance, incl. local laws** review/drafting support
- **Pre-recorded trainings** (e.g. '*Deploying Safe Lithium-Ion Energy Storage in Your Community'* webinar)
- Support from regional **Clean Energy Advisors,** technical contractor resources



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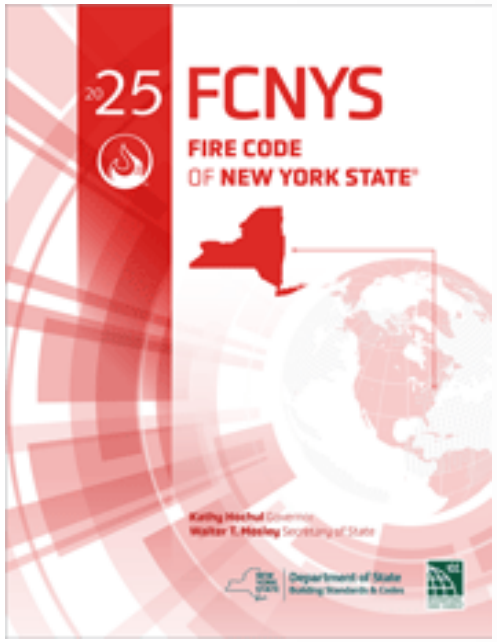
Resources available:

NYS Inter-Agency Fire Safety Working Group:

- Inter-Agency Fire Safety Working Group Site (created December 2023)
- Data Collection Press Release (December 2023)
- Code Recommendations Document (July 2024)

NYS State Fire Prevention and Building Code Council:

- New York 2025 Code Books



Office of Fire Prevention & Control (OFPC):

- BESS Fire Service Response Guide
- Lithium-ion Battery Awareness Course (DHSES Learning Management)