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Managing Clean Energy in Your Community

Solar and Battery Energy Storage Systems Overview

Houtan Moaveni
Senior Advisor to the President
NYS DG Interconnection Ombudsman

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New York Energy Policy

- Reforming the Energy Vision (REV) is Governor Andrew Cuomo's strategy to build a clean, resilient and affordable energy system for all New Yorkers
- Clean Energy Standard: 100% carbon-free by 2040
- Clean Energy Fund (CEF)
  - 10-year, $5 billion funding commitment
  - Reshapes NY's energy efficiency, renewable energy and energy innovation programs
  - Reduces the cost of clean energy
  - Accelerates the adoption of energy efficiency to reduce load
  - Increases renewable energy to meet demand
  - Mobilizes private investment in clean energy

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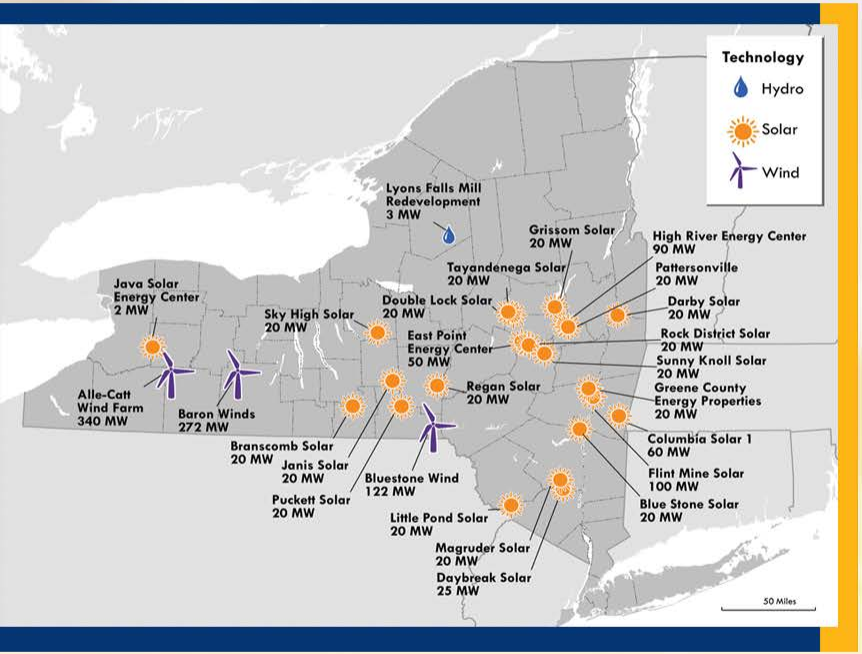
NYSERDA 2017 Large-Scale Renewable Awards



$1.4 billion

single largest commitment to renewable energy by a state in the U.S.

26 large-scale renewable energy projects across New York

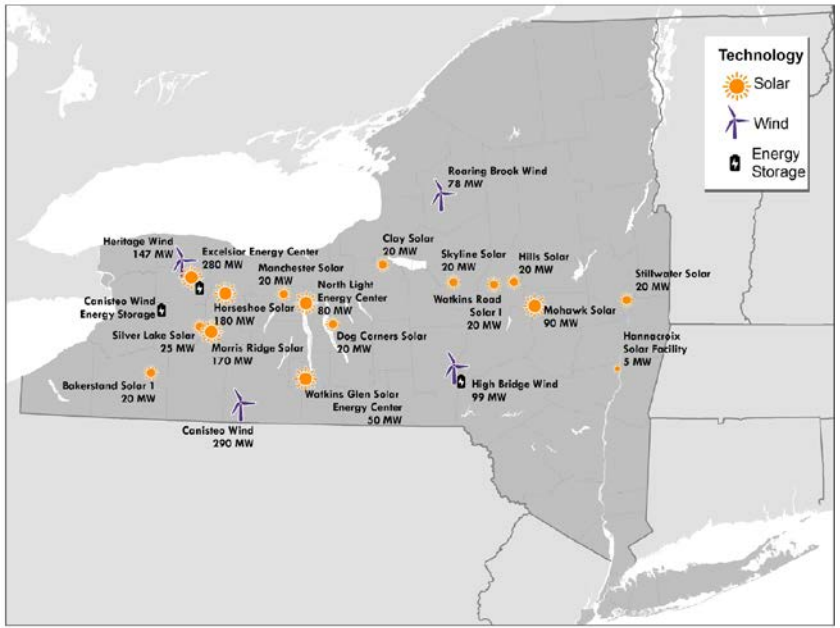
- **22** solar farms
- **3** wind farms; one features energy storage
- **1** hydroelectric facilities

Generate enough energy to power **more than 430,000 homes**

Reduce carbon emissions by **1.6 million metric tons**, equivalent to taking nearly **340,000 cars off the road**

Create **over 3,000** short- and long-term **well-paying jobs**

NYSERDA 2018 Large-Scale Renewable Awards



$1.5 billion commitment

20 large-scale renewable energy project across New York

- 16 solar farms; one features energy storage
- 4 wind farms; two with energy storage

Generate enough energy to power **more than 550,000 homes**

Reduce carbon emissions by more than **2 million metric tons**, equivalent to taking nearly **437,000 cars off the road**

Create **over 2,600** short- and long-term **well-paying jobs**

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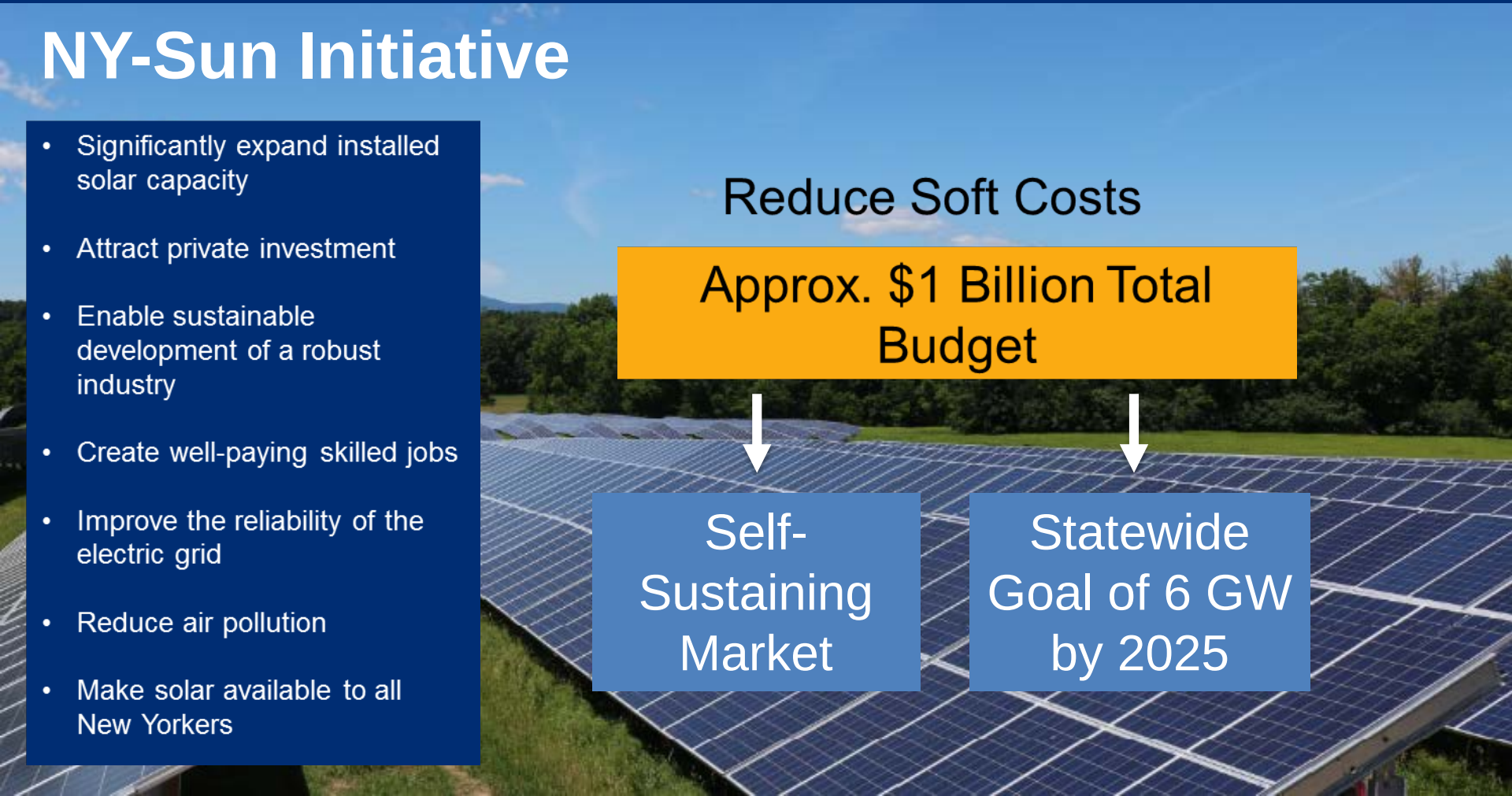
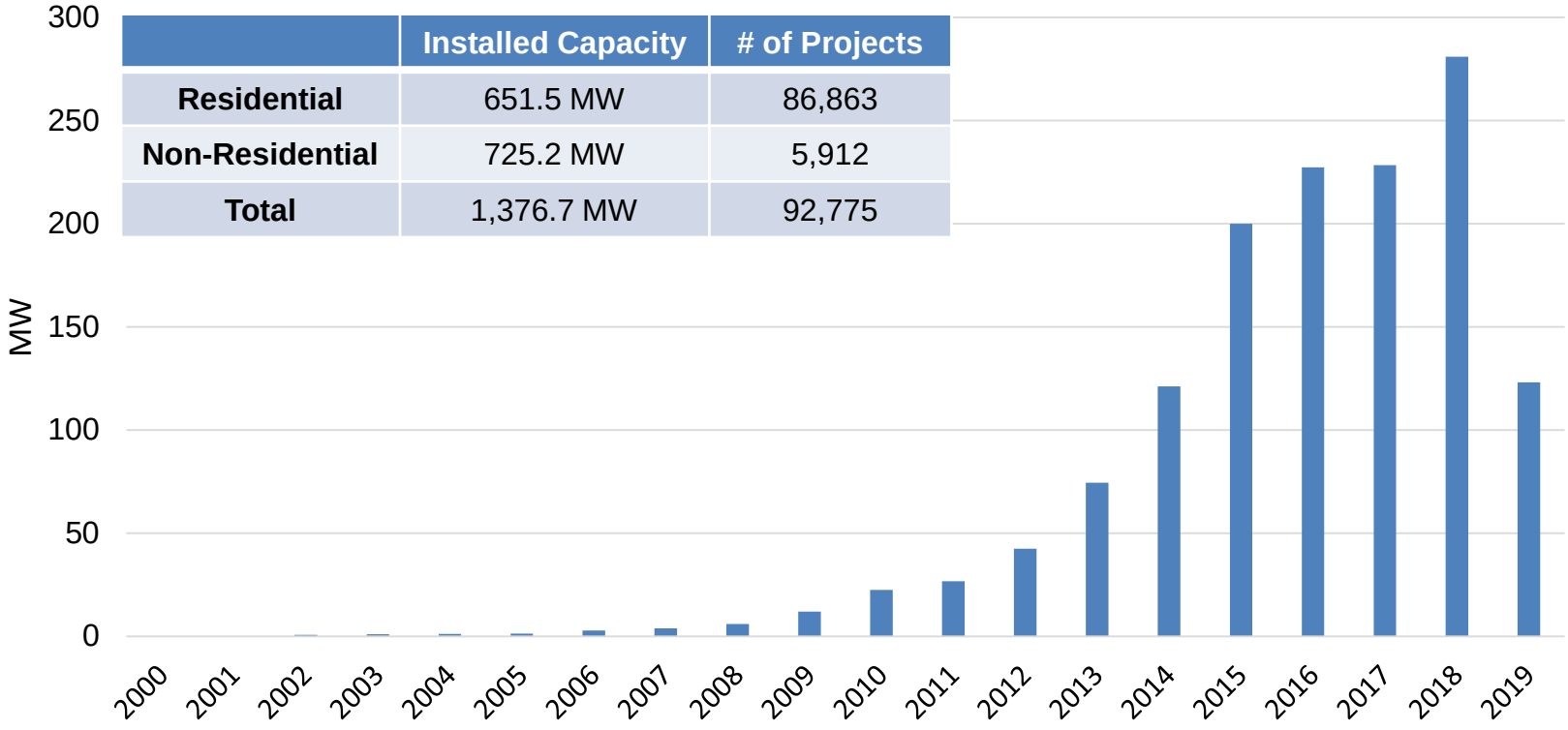
NY-Sun Initiative

- Significantly expand installed solar capacity
- Attract private investment
- Enable sustainable development of a robust industry
- Create well-paying skilled jobs
- Improve the reliability of the electric grid
- Reduce air pollution
- Make solar available to all New Yorkers



MW Installed Statewide by Year

	Installed Capacity	# of Projects
Residential	651.5 MW	86,863
Non-Residential	725.2 MW	5,912
Total	1,376.7 MW	92,775



OpenNY Data as of 4/30/19

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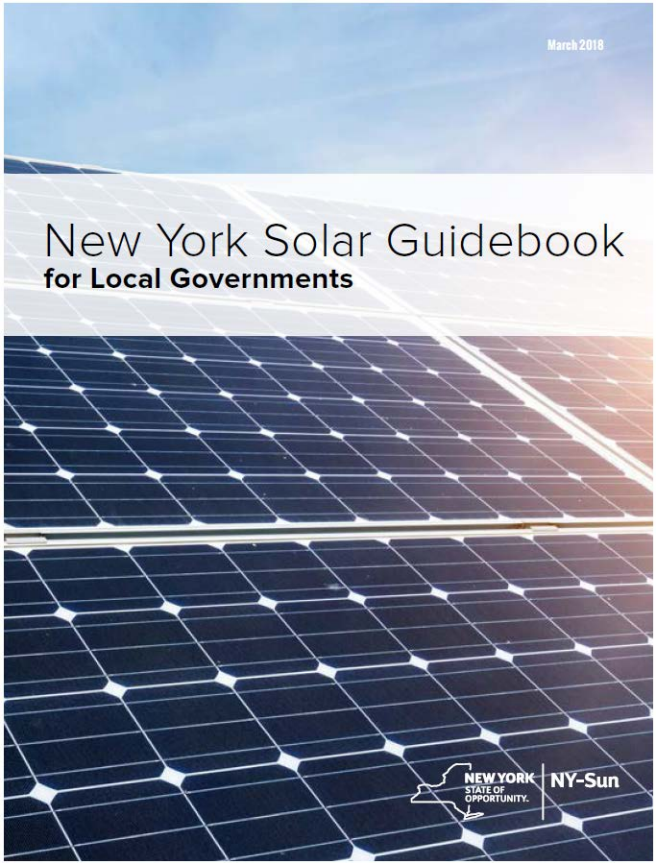
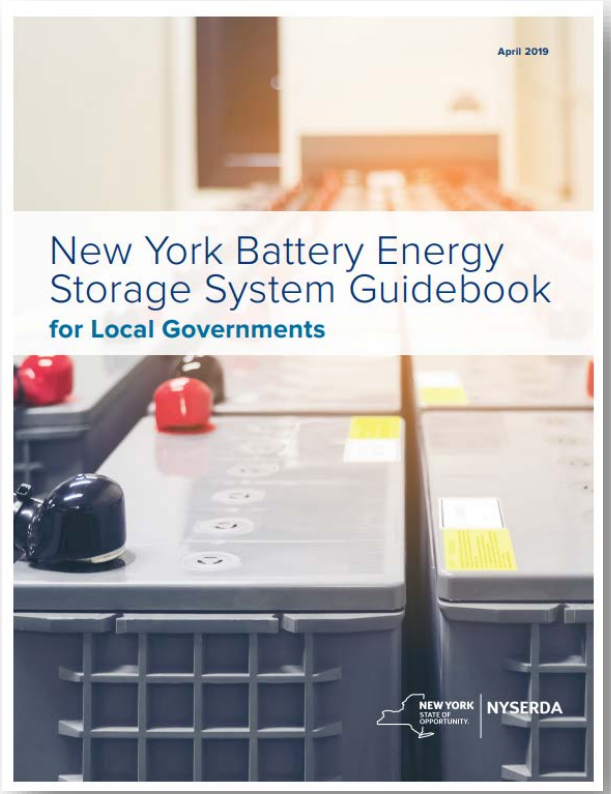
NY Solar Guidebook for Local Government



- **Chapter 1** - Solar PV Permitting and Inspecting in NYS
- **Chapter 2** - Roof Top Access and Ventilation Requirements
- **Chapter 3** - State Environmental Quality Review (SEQR)
- **Chapter 4** - NYS's Real Property Tax Law § 487
- **Chapter 5** - Solar Payment-In-Lieu-of-Taxes Toolkit
- **Chapter 6** - Using Special Use Permits and Site Plan Regulations
- **Chapter 7** - Solar Installations in Agricultural Districts
- **Chapter 8** - Landowner Considerations for Solar Land Leases
- **Chapter 9** - Decommissioning Solar Panel Systems
- **Chapter 10 -** Model Solar Energy Local Law
- **Chapter 11** – Municipal Solar Procurement Toolkit

NY Battery Energy Storage Guidebook for Local Governments



Chapter 1 – Battery Energy Storage Model Law

Chapter 2 – Battery Energy Storage Model Permit

Chapter 3 – Battery Energy Storage Inspection Checklist

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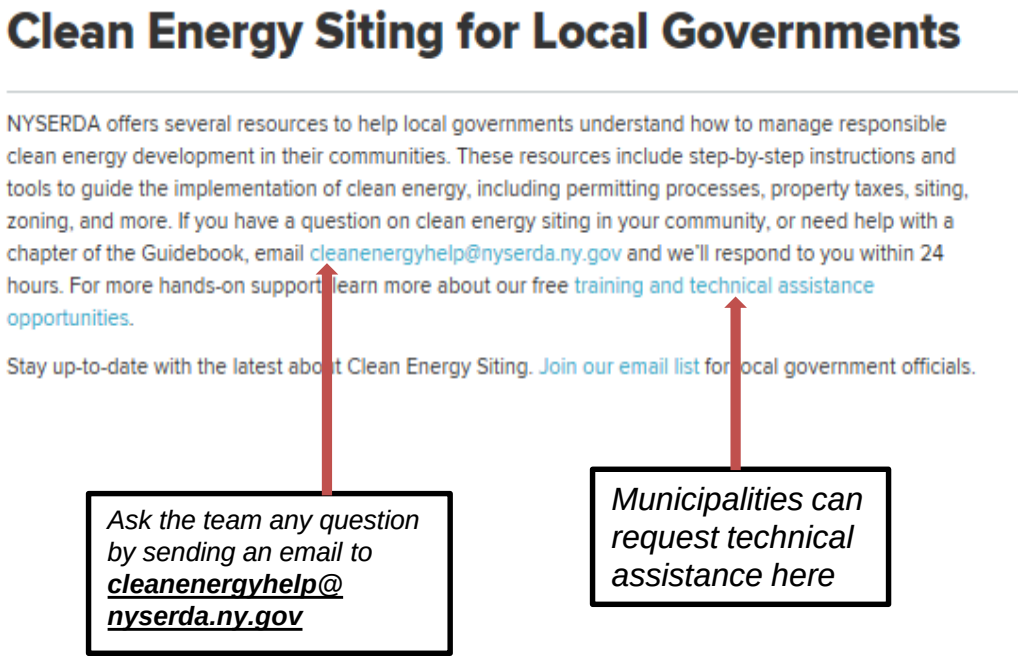
Technical Assistance for Local Governments

NYSERDA offers local governments free one-on-one assistance on:

1. Adopting a Payment-In-Lieu-Of-Taxes (PILOT) law and agreement
2. Completing the SEQR process
3. Planning and Zoning for Solar, Wind, Storage
   - Adopting a Model Solar Energy Law, Model Battery Energy Storage Law, Model Wind Energy Law
   - Siting PV in Agricultural Districts and agricultural areas
   - Updating master plans and zoning regulations
4. Municipal Solar Procurement
5. Permitting and Inspections
   - Adopting and implementing the Unified Solar Permit
   - Adopting and implementing the Battery Energy Storage Model Permit and Inspection Checklist
   - Technical consulting to relieve administrative burdens

Clean Energy Siting Homepage

The Battery Energy Storage Guidebook is available for download here



Ask the team any question by sending an email to ***cleanenergyhelp@nyserda.ny.gov***

Municipalities can request technical assistance here

nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Siting

Model Solar Energy Law

What Is the Model Solar Energy Law?

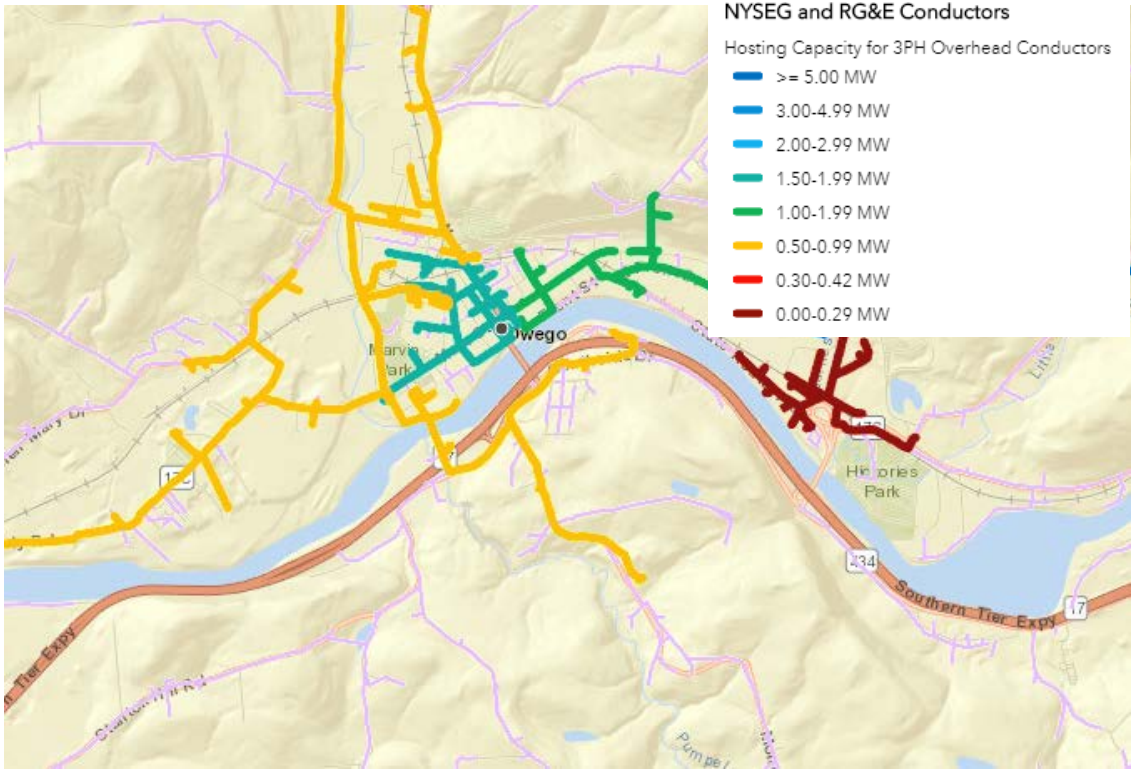
- This Model Law is an “all-inclusive” ordinance and is intended to provide a thorough review of all aspects of solar energy systems that could be regulated.

- The Model Law gives municipalities flexibilities to choose the options that work best in some cases.

- Municipalities should review this model law, examine their local situation, and adopt the regulations that make the most sense for their municipality, deleting, modifying, or adding other provisions as appropriate.

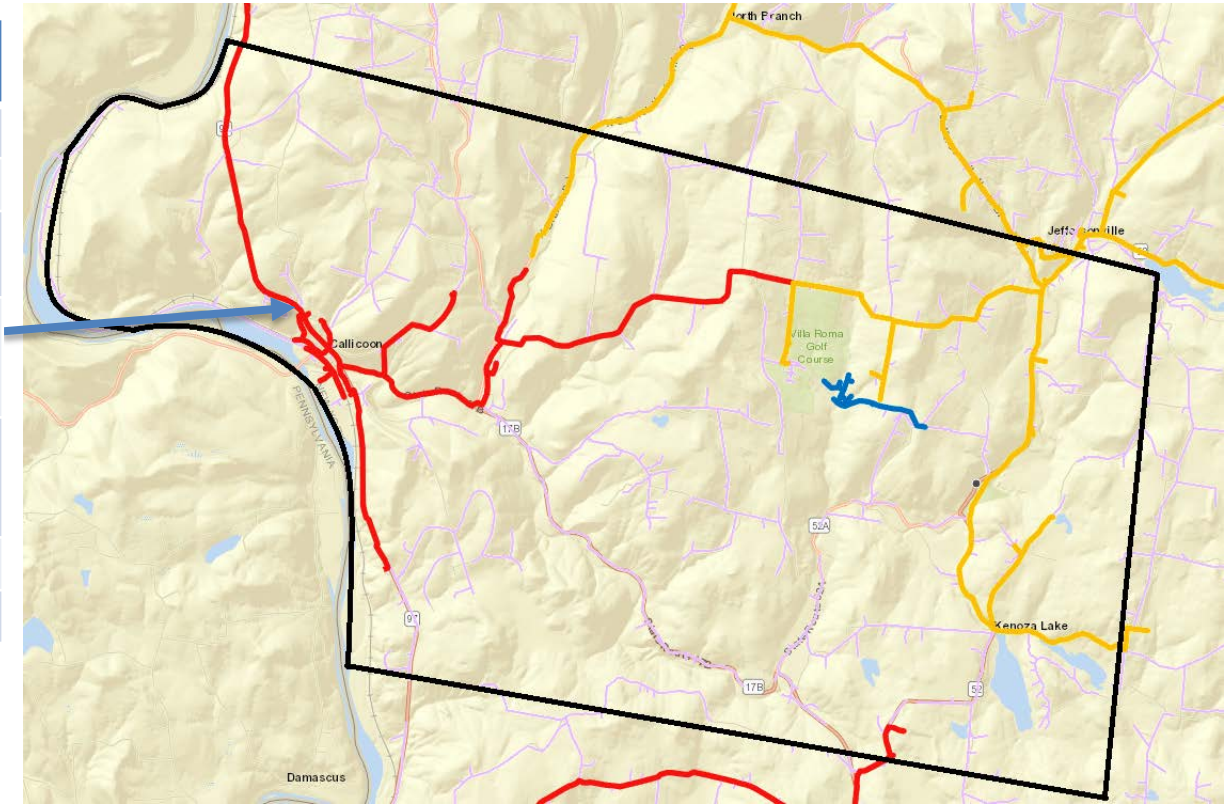
What Should Municipalities Do Before Drafting a Local Solar Energy Law?

1. Municipalities should first review the available Hosting Capacity maps to learn if the development of solar energy systems is economic and possible.



Example Substation

Hosting Capacity for 3PH Overhead Conductors:285	
Circuit Name	285
Number of Phases	3
Nominal Voltage (kV)	12.47
Minimum total Feeder Hosting Capacity (MW)	0.14
Maximum Total Feeder Hosting Capacity (MW)	0.49
Installed D.G. (MW)	0.15
Queued D.G. (MW)	3.84



What Should Municipalities do Before Drafting a Local Solar Energy Law?

2. Amend the comprehensive plan concurrently as developing a solar law to include a strategy for municipal-wide solar development.

3. Conduct outreach with the community to gather all available ideas, identify divergent groups and views, and secure support from the entire community.

4. Create a working group that will conduct meetings on a community wide basis and studies to determine whether existing policies, plans, and land use regulations require amendments to remove barriers to and facilitate solar energy development goals.

Contents

Section 1: Authority

- This Solar Energy Local Law is adopted pursuant to [Select one: sections 261-263 of the Town Law / sections 7-700 through 7-704 of the Village Law / sections 19 and 20 of the City Law and section 20 of the Municipal Home Rule Law] of the State of New York

- Which authorize the [Village/Town/City] to adopt zoning provisions that advance and protect the health, safety and welfare of the community, and, in accordance with the [Village/Town/City] law of New York State, **“to make provision for, so far as conditions may permit, the accommodation of solar energy systems and equipment and access to sunlight necessary therefor.”**

Section 2: Statement of Purpose

1. To take advantage of a safe, abundant, renewable and non-polluting energy resource;
2. To decrease the cost of electricity to the owners of residential and commercial properties, including single-family houses;
3. To increase employment and business development in the [Village/Town/City], to the extent reasonably practical, by furthering the installation of Solar Energy Systems;
4. To mitigate the impacts of Solar Energy Systems on environmental resources such as important agricultural lands, forests, wildlife and other protected resources, and;
5. To create synergy between solar and other stated goals of the community pursuant to the municipality's comprehensive plan.

Section 3: Definitions

System Energy System Classifications

- Tier 1 Solar Energy System:
  - Roof-Mounted
  - Building-Integrated

- Tier 2 Solar Energy System: Ground-Mounted systems that generate up to 110% of the electricity consumed on the site over the previous 12 months.
  - Either capacity-based (up to 25 kW AC) or physical size-based (up to 4,000 sq. ft.).

- Tier 3 Solar Energy System: Not included in the list for Tier 1 and Tier 2 Solar Energy System.

Tier 1 Roof-Mounted Solar Energy System

Tier 1 Roof-Mounted Solar Energy System

Tier 1 Building-Integrated Solar Energy System

Tier 2 Ground-Mounted Solar Energy System

Tier 3 Ground-Mounted Solar Energy System

Tier 3 Ground-Mounted Solar Energy System

Brownfields / Landfills / Repurposed Lands

Section 4: Applicability

- Requirements apply to solar systems permitted, installed, or modified.
  - Except for systems installed prior to effective date.
  - Including modifications of an existing system by more than 5% of area.
- State Fire, Building, Energy Codes, and the [Village/Town/City] Codes still apply.

Section 5: General Requirements

- Building permit
- Accommodation of solar energy systems and protection of access to sunlight are encouraged, in accordance with the municipality zoning law
- SEQR required under the rules by the NYS DEC

Section 6: Tier 1 Systems Permitting Requirements

Roof-Mounted

- Incorporate designs that address placement and tilt of solar panels on pitched roof:
  - On **pitched roofs,** the solar panels shall be mounted with a max 8” between roof surface and highest point of solar system, solar panels shall be parallel to roof surface they are mounted on/ attached to, and solar panels shall not extend beyond highest point of roof surface.
  - Solar panels on **flat roofs** shall not extend beyond surrounding parapet, or more than 24” above flat roof surface, whichever is higher.

- **Glare** – All solar panels shall have anti-reflective coating(s)

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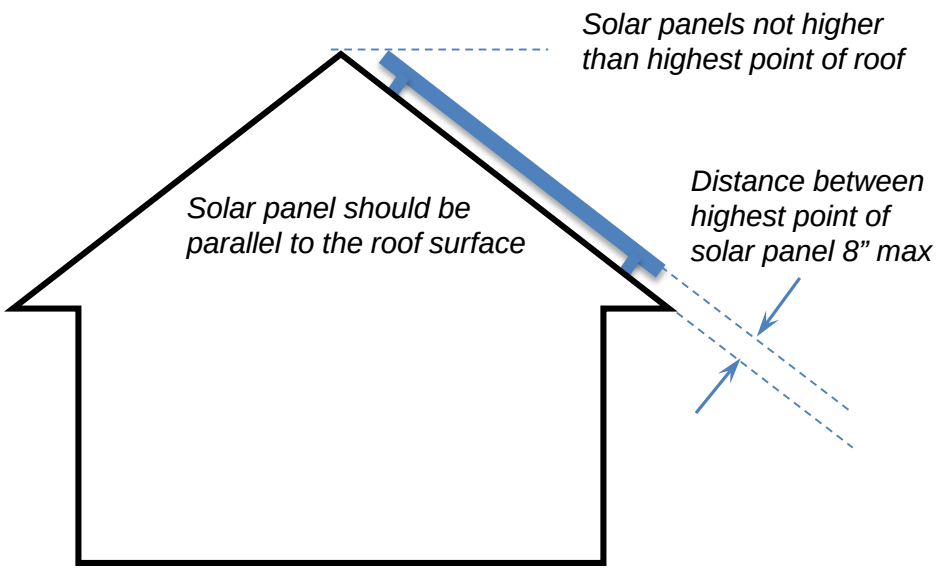
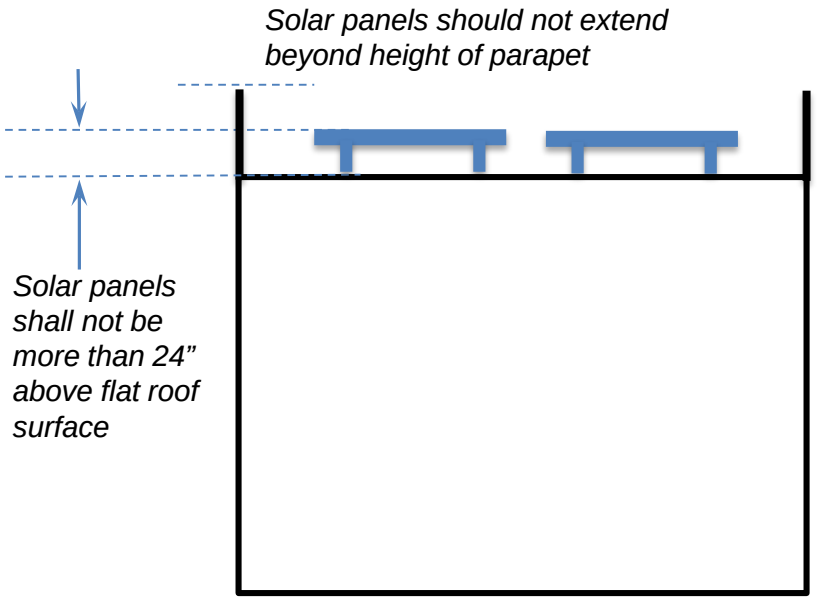
Section 6: Tier 1 Design Requirements

Pitched Roof



Flat Roof



Section 7: Tier 2 Systems Permitting Requirements

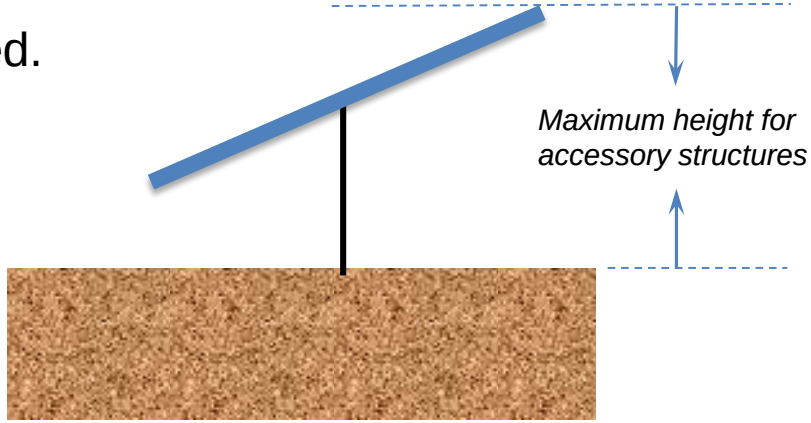
- **Glare** - All solar panels shall have anti-reflective coating(s).
- **Screening & Visibility -** Views shall be minimized from adjacent properties to the extent reasonably practicable.
- **Lot size -** Comply with the existing lot size requirement specified for accessory structures within the underlying zoning district.

Section 7: Tier 2 Height Requirements

Height (select from the following options):

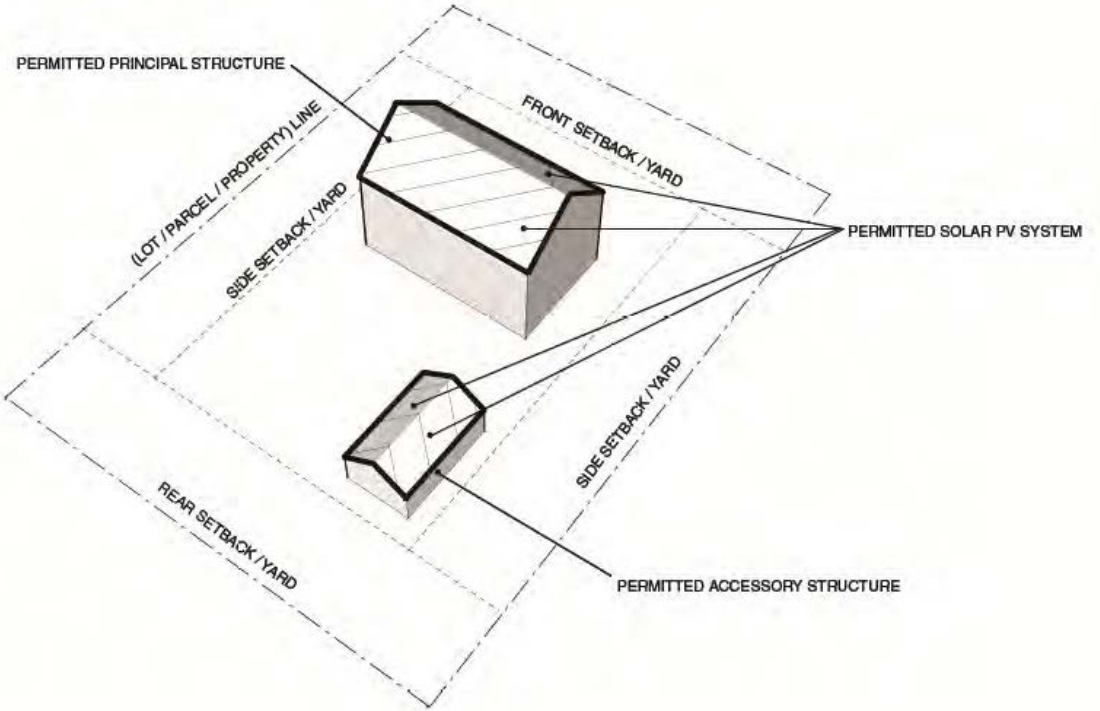
- Subject to the maximum height for accessory structures.
- Follow the height limitations suggested.

Zoning District (reference only)	Height
Residential Low Density	10’
Residential High Density	10’
Commercial / Business	15’
Light Industrial	15’
Heavy Industrial	15’
Agricultural / Residential	15’



Section 7: Tier 2 Setbacks

Subject to the setback requirement of accessory structures within the underlying zoning district



Section 8: Tier 3 Systems Permitting Requirements

Process for Approval

- Choose which zoning district(s) to permit systems.
- Applications shall be reviewed for completeness within 10 business days.
- Applications shall be subject to a public hearing and a notice shall be published in the official newspapers 5 days in advance.
- Referred to the [County Planning Department] pursuant to General Municipal Law § 239-m as required.
- Upon closing the public hearing, the reviewing board shall have 62 days to take action on the application. The 62-day period may be extended.

Requirements for Approval

1. Underground Requirements
2. Vehicular Paths
3. Signage
4. Glare
5. Lighting
6. Tree-cutting
7. Decommissioning
8. Site Plan Application
9. Special Use Permit Standards
10. Ownership Changes

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Section 8.B-C: Tier 3 Permitting Requirements

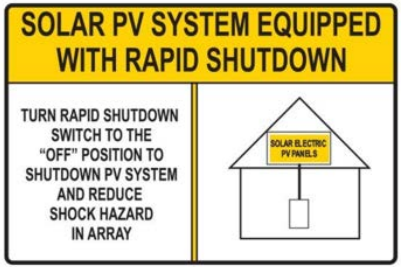
1. **Underground Requirements -** On-site utility lines shall be placed underground as permitted by the serving utility.

2. **Vehicular paths -** minimize the extent of impervious materials and soil compaction.

Section 8.C-G: Tier 3 Permitting Requirements

3. **Signage**
   - Displaying the manufacturer's name, safety information, emergence contact, and equipment specification information, within an area no more than 8 square feet.
   - Comply with the NEC for warning signs.

4. **Glare -** All solar panels shall have anti-reflective coating(s).
5. **Lighting -** Limited to that minimally required for safety and shall be reasonably shielded or downcast from abutting properties.
6. **Tree-cutting -** Minimize removal of existing trees larger than 6 inches in diameter.



Section 8.H: Tier 3 Decommissioning

- Decommissioning is required when a system is abandoned, and/or not producing electricity for a period of 1 year.

- Applicant shall provide a decommissioning **plan** that includes the **cost** and **time** of removing the Solar Energy System, and the plan to repair damage caused to the property.

- Financial security
  - In cash, bond, or security formats reasonably acceptable to the [Village/Town/City].
  - In amount be 125% of the cost of removal and restoration, with an escalator of 2% annually for the life of the solar energy system.
  - The decommissioning amount shall be reduced by the estimated salvage value of the system.

- The security is forfeited in the event of default, and shall remain in full force and effect until restoration of the property is completed.

Section 8.I: Tier 3 Site Plan Requirements

- Property lines and physical features of site.
- Proposed changes to landscape, grading, vegetation, lighting etc.
- A one, or three-line electrical diagram showing layout, equipment components and associated National Electric Code compliant mechanisms.
- Equipment specification sheet for proposed panels, significant components, mounting system and inverter.
- General information including name, address, and contact info of system installer and owner/operator.
- Name, address, phone number and signature of the project applicant and owners, demonstrating their consent to the use of the property for the Solar Energy System.
- Zoning district designation.
- Property Operation and Maintenance Plan.
- Erosion and sediment control and storm water management plans.
- Signed and sealed engineering documents by a NYS Licensed Professional Engineer, or Registered Architect.

Section 8.J: Tier 3 Special Use Permit Standards

Lot size (select from the following options):

- Subject to the lot size requirement of the underlying zoning district.
- Follow the suggested lot size requirement for each zoning district.

Height (select from the following options):

- Subject to the height limitations of the underlying zoning district.
- Follow the suggested height limits for each zoning district.

Zoning District	Lot size	Height
Residential Low Density	≥ 2 acres	15 feet
Residential High Density	--	--
Commercial / Business	≥ 5 acres	20 feet
Light Industrial	N/A	20 feet
Heavy Industrial	N/A	20 feet
Agricultural/ Residential	≥ 5 acres	20 feet

Key:
--: Not Allowed
N/A: Not Applicable

Section 8.J: Tier 3 Special Use Permit Standards

Setbacks (select from the following options):

- Subject to the setback requirement of the underlying zoning district.
- Follow the suggested setback requirement for each zoning district.

Zoning District	Front	Side	Rear
Residential Low Density	100’	100’	100’
Residential High Density	--	--	--
Commercial / Business	30’	15’	25’
Light Industrial	30’	15’	25’
Heavy Industrial	30’	15’	25’
Agricultural / Residential	30’	15’	25’

Section 8.J: Tier 3 Special Use Permit Standards

Lot coverage

- Calculation Methodology: the following surface areas shall be included in the calculations for lot coverage includes:
    1) Foundation systems
    2) All mechanical equipment of Solar Energy System
    3) Paved access roads
- Lot coverage, defined as above, shall not exceed the maximum lot coverage requirement of the underlying zoning district.

Section 8.J: Tier 3 Special Use Permit Standards

Fencing - a minimum 7-foot-high fence as required by National Electrical Code (NEC) with a self-locking gate.

Section 8.J: Tier 3 Special Use Permit Standards

Screening & Visibility

1. Systems **<10 acres** in size
   - Have views minimized from adjacent properties *to the extent reasonably practicable.*
   - Using architectural features, earth berms, landscaping or other screening methods.
2. Systems **≥10 acres** in size (designated as Type I actions in SEQR)
   - Could use the same assessment as the visual impact assessment required for SEQR to analyze visual impacts on public roadways and adjacent properties.
   - A line-of-sight analysis shall be provided, a digital viewshed report is optional.

What should be included in the screening & landscaping plan?

- Locations, elevations, height, plant species, and/or materials that will be used to mitigate any adverse aesthetic effects.

Section 8.J: Tier 3 Agricultural Resource Protection

1) Protect Prime Farmland and Farmland of Statewide Importance. Municipalities can choose options to address their specific concerns.

2) Follow the construction requirements of the New York State Department of Agriculture and Markets.

3) Provide native perennial vegetation and foraging habitat beneficial to game birds, songbirds, and pollinators.

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Model Battery Energy Storage System Law

Contents

Section 3: Definitions

System Sizes

Tier 1

a) Battery energy storage systems for **one to two family residential dwellings** within or outside the structure with an aggregate energy capacity **that shall not exceed:**
   1. 40 kWh within utility closets and storage or utility spaces
   2. 80 kWh in attached or detached garages and detached accessory structures
   3. 80 kWh on exterior walls
   4. 80 kWh outdoors on the ground

b) Other battery energy storage systems with an aggregate energy **capacity less than or equal to** the threshold capacity listed in the Table

Battery Energy Storage System Tier 2 Threshold Quantities

Battery Technology	Capacity
Flow batteries	20 kWh
Lead acid, all types	70 kWh
Lithium, all types	20 kWh
Nickel cadmium (Ni-Cd)	70 kWh
Sodium, all types	20 kWh
Other battery technologies	10 kWh

Tier 2

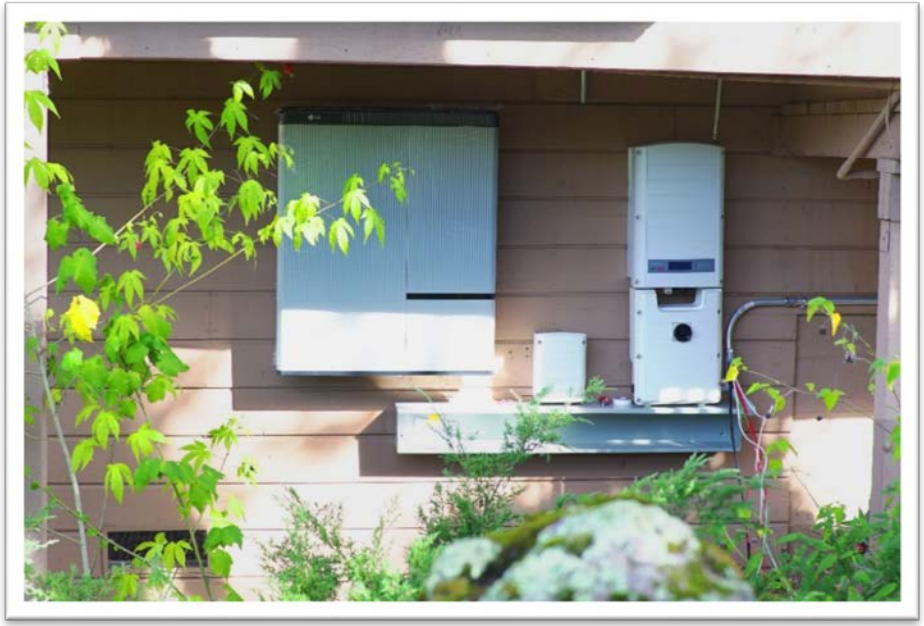
Systems with an aggregate system **capacity greater than** the values in the Table and **less than 600 kWh**

Tier 3

a) Battery energy storage systems with an aggregate energy capacity **greater than or equal to 600kWh**

b) Battery energy storage systems with **more than one storage battery technology** is provided in a room or indoor area

Tier 1 BESS Installation Photos



Tier 2 BESS Installation Photos

http://www.optimuminnolithiumbattery.com/ess-energy-storage-battery/optimuminno-100kwh-energy-storage-cabinet.html

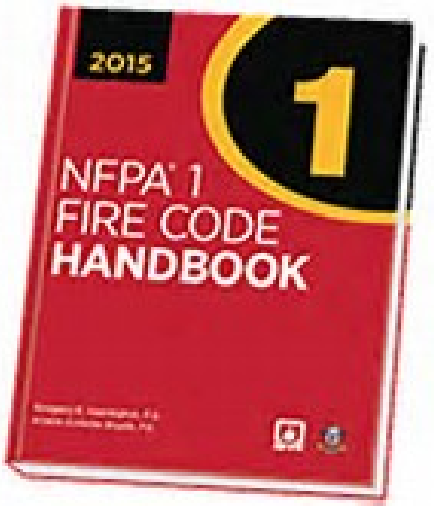
Tier 3 BESS Installation Photos

Section 6-8: Permitting Requirements

Section 6: Tier 1 Battery Energy Storage Systems	• Battery Energy Storage System Permit • Inspection Checklist
Section 7: Tier 2 Battery Energy Storage Systems	• Battery Energy Storage System Permit • Inspection Checklist • Applicable fire code and Appendix 2
Section 8: Tier 3 Battery Energy Storage Systems	• Special Use Permit • Site Plan Review • Applicable fire code and Appendix 2

Applicable Codes and Safety Measures

Applicable Codes



International Fire Code

2015 IFC	2018 IFC	2021 IFC
Based on older technologies, such as lead acid and VRLAs • Hazmat requirements exempted • Spill control, ventilation, smoke detection • Battery quantities unlimited • Location in building not regulated	New requirements added for.. • Hazard mitigation analysis • Size and spacing • UL 9540 listed • Maximum allowable quantities • Fire-extinguishing systems • Battery management systems • Technology specific protection • Outdoor installation requirements	Builds off of the 2018 IFC • Specific requirements based on location • Indoor locations, dedicated use v non dedicated use • Outdoor locations, remote v near exposures • Rooftops and open parking garages

Battery Energy Storage System Model Permit

Tier 1 and Tier 2 Requirement

Overview

The Model Permit is intended to help local government officials and AHJs establish the minimum submittal requirements for electrical and structural plan review that are necessary when permitting residential and small commercial battery energy storage systems.

Additionally, battery energy storage systems shall comply with all applicable provisions of the codes, regulations, and industry standards as referenced in the New York State Uniform Fire Prevention and Building Code.

The Battery Energy Storage System Model Permit is based on the 14th Edition of the National Electric Code (NEC), which is anticipated to be adopted by New York State in 2020. NYSERDA will continue to update the Guidebook as these codes and standards evolve.

The workable version of this document can be found at nyserda.ny.gov/Energy-Storage-Guidebook, under Battery Energy Storage System Model Permit tab.

PERMIT APPLICATION

Battery Energy Storage System Model Permit

Note: Language in [ALL CAPS] below indicates where local jurisdictions need to provide information specific to the jurisdiction. Language in italics indicates explanatory notes from the authors of this document that may be deleted from the distributed version.

This application and the following attachments will constitute the Battery Energy Storage System 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 battery energy storage system 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].

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.

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

This application and the following attachments will constitute the Battery Energy Storage System Permitting Package.

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- Permitting fee of $[ENTER FEE HERE], payable by [ENTER VALID PAYMENT METHODS, If checks are allowed INCLUDING WHO CHECKS SHOULD BE MADE PAYABLE TO]
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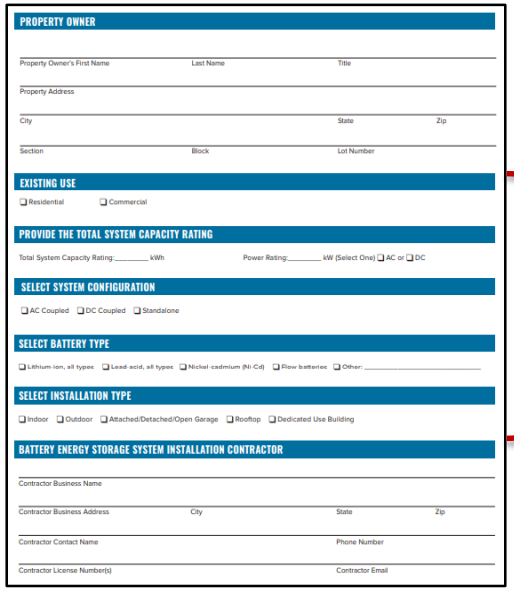
Battery Energy Storage System Model Permit

Tier 1 and Tier 2 Requirement



PROPERTY OWNER

Property Owner's First Name | Last Name | Title

Property Address

City | State | Zip

Section | Block | Lot Number

EXISTING USE

❑ Residential ❑ Commercial

PROVIDE THE TOTAL SYSTEM CAPACITY RATING

Total System Capacity Rating:_____ kWh Power Rating:_____ kW (Select One) ❑ AC or ❑ DC

SELECT SYSTEM CONFIGURATION

❑ AC Coupled ❑ DC Coupled ❑ Standalone

SELECT BATTERY TYPE

❑ Lithium-ion, all types ❑ Lead-acid, all types ❑ Nickel-cadmium (Ni-Cd) ❑ Flow batteries ❑ Other: _____

SELECT INSTALLATION TYPE

❑ Indoor ❑ Outdoor ❑ Attached/Detached/Open Garage ❑ Rooftop ❑ Dedicated Use Building

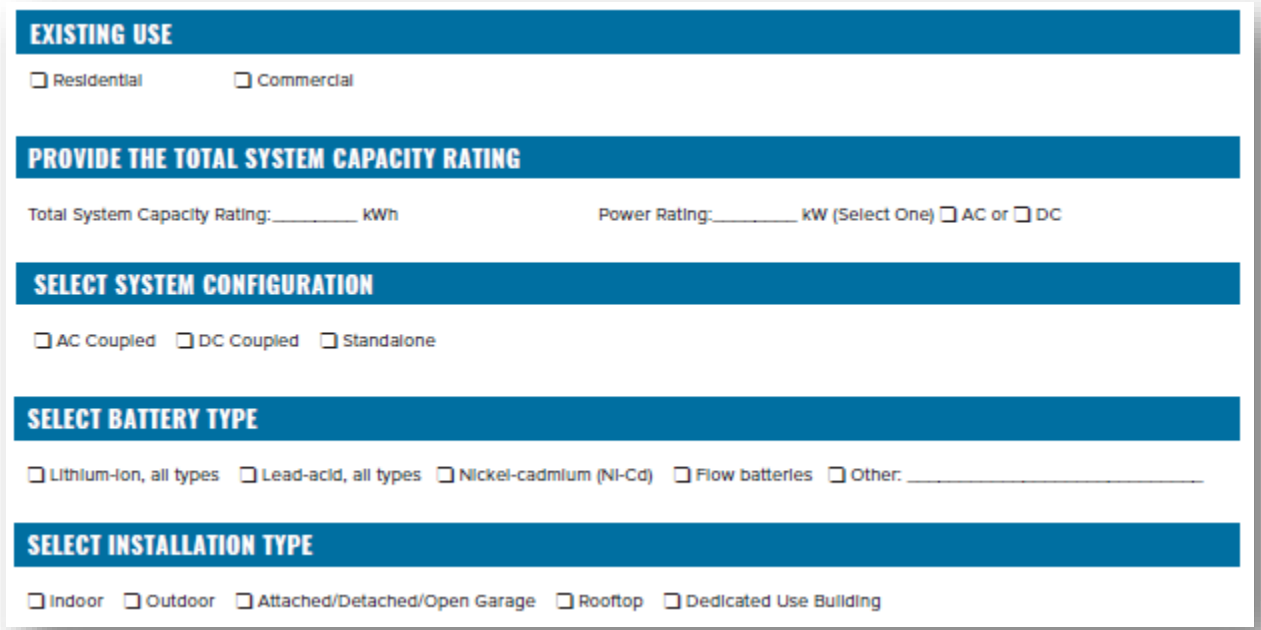
BATTERY ENERGY STORAGE SYSTEM INSTALLATION CONTRACTOR

Contractor Business Name

Contractor Business Address | City | State | Zip

Contractor Contact Name | Phone Number

Contractor License Number(s) | Contractor Email



EXISTING USE

❑ Residential ❑ Commercial

PROVIDE THE TOTAL SYSTEM CAPACITY RATING

Total System Capacity Rating:_____ kWh Power Rating:_____ kW (Select One) ❑ AC or ❑ DC

SELECT SYSTEM CONFIGURATION

❑ AC Coupled ❑ DC Coupled ❑ Standalone

SELECT BATTERY TYPE

❑ Lithium-ion, all types ❑ Lead-acid, all types ❑ Nickel-cadmium (Ni-Cd) ❑ Flow batteries ❑ Other: _____

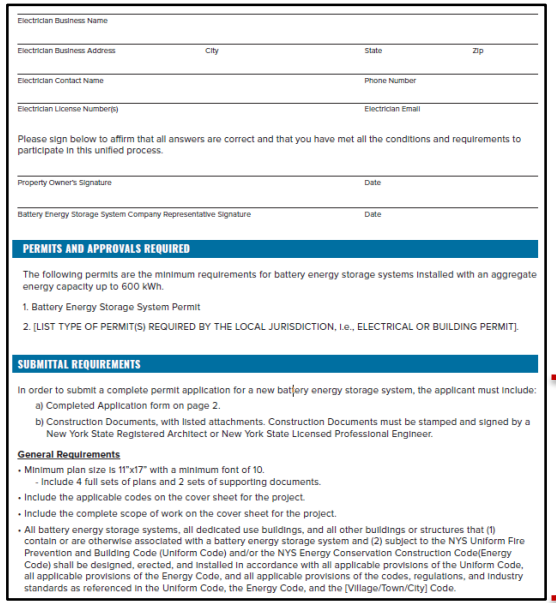
SELECT INSTALLATION TYPE

❑ Indoor ❑ Outdoor ❑ Attached/Detached/Open Garage ❑ Rooftop ❑ Dedicated Use Building

NEW YORK STATE OF OPPORTUNITY. NYSERDA

Battery Energy Storage System Model Permit

Tier 1 and Tier 2 Requirement



Electrician Business Name

Electrician Business Address | City | State | Zip

Electrician Contact Name | Phone Number

Electrician License Number(s) | Electrician Email

Please sign below to affirm that all answers are correct and that you have met all the conditions and requirements to participate in this unified process.

Property Owner's Signature | Date

Battery Energy Storage System Company Representative Signature | Date

PERMITS AND APPROVALS REQUIRED

The following permits are the minimum requirements for battery energy storage systems installed with an aggregate energy capacity up to 600 kWh.

1. Battery Energy Storage System Permit
2. [LIST TYPE OF PERMIT(S) REQUIRED BY THE LOCAL JURISDICTION, i.e., ELECTRICAL OR BUILDING PERMIT].

SUBMITTAL REQUIREMENTS

In order to submit a complete permit application for a new battery energy storage system, the applicant must include:

a) Completed Application form on page 2.

b) Construction Documents, with listed attachments. Construction Documents must be stamped and signed by a New York State Registered Architect or New York State Licensed Professional Engineer.

General Requirements

- Minimum plan size is 11"x17" with a minimum font of 10.
  - Include 4 full sets of plans and 2 sets of supporting documents.
- Include the applicable codes on the cover sheet for the project.
- Include the complete scope of work on the cover sheet for the project.
- All battery energy storage systems, all dedicated use buildings, and all other buildings or structures that (1) contain or are otherwise associated with a battery energy storage system and (2) subject to the NYS Uniform Fire Prevention and Building Code (Uniform Code) and/or the NYS Energy Conservation Construction Code(Energy Code) shall be designed, erected, and installed in accordance with all applicable provisions of the Uniform Code, all applicable provisions of the Energy Code, and all applicable provisions of the codes, regulations, and industry standards as referenced in the Uniform Code, the Energy Code, and the [Village/Town/City] Code.

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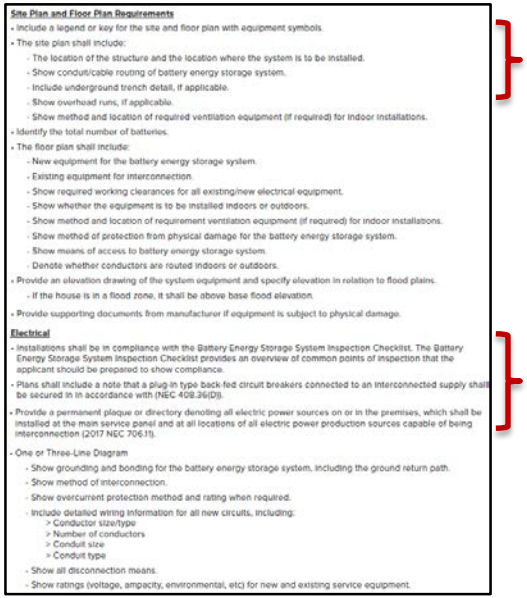
NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Battery Energy Storage System Model Permit

Tier 1 and Tier 2 Requirement



Site Plan and Floor Plan Requirements

- Include a legend or key for the site and floor plan with equipment symbols.
- The site plan shall include:
  - The location of the structure and the location where the system is to be installed.
  - Show conduit/cable routing of battery energy storage system.
  - Include underground trench detail, if applicable.
  - Show overhead runs, if applicable.

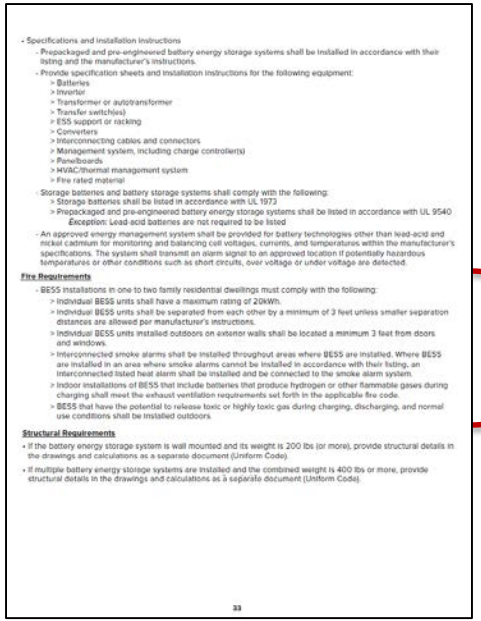
Electrical

- Installations shall be in compliance with the Battery Energy Storage System Inspection Checklist. The Battery Energy Storage System Inspection Checklist provides an overview of common points of inspection that the applicant should be prepared to show compliance.
- Plans shall include a note that a plug-in type back-fed circuit breakers connected to an interconnected supply shall be secured in in accordance with (NEC 408.36(D)).
- Provide a permanent plaque or directory denoting all electric power sources on or in the premises, which shall be

NEW YORK STATE OF OPPORTUNITY. NYSERDA

Battery Energy Storage System Model Permit

Tier 1 and Tier 2 Requirement



- Specifications and installation instructions
  - Prepackaged and pre-engineered battery energy storage systems shall be installed in accordance with their listing and the manufacturer's instructions.
  - Provide specification sheets and installation instructions for the following equipment:
    - > Batteries
    - > Inverter
    - > Transformer or autotransformer
    - > Transfer switch(es)
    - > ESS support or racking
    - > Converters
    - > Interconnecting cables and connectors
    - > Management system, including charge controller(s)
    - > Panelboards
    - > HVAC/thermal management system
    - > Fire rated material
  - Storage batteries and battery storage systems shall comply with the following:
    - > Storage batteries shall be listed in accordance with UL 1973
    - > Prepackaged and pre-engineered battery energy storage systems shall be listed in accordance with UL 9540
      Exception: Lead-acid batteries are not required to be listed
  - An approved energy management system shall be provided for battery technologies other than lead-acid and nickel cadmium for monitoring and balancing cell voltages, currents, and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

Fire Requirements

- BESS installations in one to two family residential dwellings must comply with the following:
  - > Individual BESS units shall have a maximum rating of 20kWh.
  - > Individual BESS units shall be separated from each other by a minimum of 3 feet unless smaller separation distances are allowed per manufacturer's instructions.
  - > Individual BESS units installed outdoors on exterior walls shall be located a minimum 3 feet from doors and windows.
  - > Interconnected smoke alarms shall be installed throughout areas where BESS are installed. Where BESS are installed in an area where smoke alarms cannot be installed in accordance with their listing, an interconnected listed heat alarm shall be installed and be connected to the smoke alarm system.
  - > Indoor installations of BESS that include batteries that produce hydrogen or other flammable gases during charging shall meet the exhaust ventilation requirements set forth in the applicable fire code.
  - > BESS that have the potential to release toxic or highly toxic gas during charging, discharging, and normal use conditions shall be installed outdoors.

Structural Requirements

- If the battery energy storage system is wall mounted and its weight is 200 lbs (or more), provide structural details in the drawings and calculations as a separate document (Uniform Code).
- If multiple battery energy storage systems are installed and the combined weight is 400 lbs or more, provide structural details in the drawings and calculations as a separate document (Uniform Code).

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NEW YORK STATE OF OPPORTUNITY. NYSERDA

Section 8: Tier 3 Systems Permitting Requirements

Process for Approval

- Choose which zoning district(s) to permit systems.
- Applications shall be reviewed for completeness within 10 business days.
- Applications shall be subject to a public hearing and a notice shall be published in the official newspapers 5 days in advance.
- Referred to the [County Planning Department] pursuant to General Municipal Law § 239-m as required.
- Upon closing the public hearing, the reviewing board shall have 62 days to take action on the application. The 62-day period may be extended.

Requirements for Approval

1. Floodplain
2. Utility Lines and Electrical Circuitry
3. Signage
4. Lighting
5. Vegetation and Tree-cutting
6. Noise
7. Decommissioning
8. Site Plan Application
9. Special Use Permit Standards
10. Ownership Changes

Section 8: Tier 3 Permitting Requirements

B-D: Floodplain, Utility Lines and Electrical Circuitry, Signage

B. Floodplain – Obtain necessary local floodplain development permits if proposed within Special Flood Hazard Areas

C. Utility Line and Electrical Circuitry – On-site lines placed underground if possible, except main service connection and new interconnection equipment

D. Signage – In compliance with ANSI Z535, indicate technology type, special hazards, suppression systems, and emergency contact. As required by NEC, emergency shutoff information and voltage warning

Section 8: Tier 3 Permitting Requirements

E-G: Lighting, Vegetation and Tree-cutting, and Noise

E. Lighting – Minimum necessary for safety and operation, shielded from abutting properties

F. Vegetation – 10 ft buffer from combustible vegetation, some types of single specimens allowed if they don't readily transmit fire, tree removal minimized to extent possible

G. Noise – [1hour] maximum allowable noise level of [60] dBA as measured at the outside wall of any Non-participating Residence and Occupied Community Building

Section 8: Tier 3 Permitting Requirements

H: Decommissioning

Decommissioning Plan

i. Anticipated life of system;

ii. Estimated decommissioning costs;

iii. How estimate was determined;

iv. Method of ensuring available funds for decommissioning and restoration;

v. Method to keep decommissioning cost current; and

vi. Manner in which system will be decommissioned and Site restored.

Decommissioning Fund

Applicant to continuously maintain a fund or bond payable to the city/town/village for removal of the system for the life of the facility

- Form and amount approved/determined by the city/town/village
- May consist of a letter of credit from a State of New York licensed-financial institution
- All costs of financial security borne by the applicant

Section 8: Tier 3 Permitting Requirements

I: Site Plan Application

1. Property lines and physical features of site
2. Proposed changes to landscape, grading, vegetation, lighting etc
3. A one or three-line electrical diagram showing layout, equipment components and associated National Electric Code compliant mechanisms
4. Equipment specification sheet for the proposed battery energy storage system components
5. General information including name, address, and contact info of system installer and owner/operator
6. Name, address, phone number and signature of the project applicant and owners, demonstrating their consent to the use of the property for the system
7. Zoning district designation
8. **Commissioning plan**
9. **Fire safety compliance plan**
10. **Operations and maintenance plan**
11. Erosion and sediment control and storm water management plans
12. Signed and sealed engineering documents by a NYS Licensed Professional Engineer, or Registered Architect
13. **Emergency operations plan**

Section 8: Tier 3 Permitting Requirements

Appendix 1: Commissioning Plan

APPENDIX 1: Commissioning Plan

The battery energy storage system commissioning plan shall include the following information:

1. A narrative description of the activities that will be accomplished during each phase of commissioning including the personnel intended to accomplish each of the activities.
2. A listing of the specific BESS and associated components, controls and safety related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to under-stand the installation and operation of the BESS.
5. Verification that required equipment and systems are installed in accordance with the approved plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the BESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.

http://www.abb.com/cawp/seitp202/25bd70f96d93c5bfc12580d400543938.aspx

Section 8: Tier 3 Permitting Requirements

Appendix 3: Operations and Maintenance Plan

APPENDIX 3: Operations and Maintenance Plan

The operations and maintenance documentation shall be provided to both the BESS owner and their operator before the battery energy storage system is put into operation. A copy of the documentation shall be placed in an approved location to be accessible to facility personnel, fire code officials, and emergency responders.

The battery energy storage system Operations plan shall include design, construction, installation, testing and commissioning information associated with the battery energy storage system as initially approved after being commissioned, as well as the following information:

1. Manufacturer's operation manuals and maintenance manuals for the entire BESS or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the BESS and its associated safety systems.
3. Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage control systems.
4. Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems in system programming instructions.
5. A schedule for inspecting and recalibrating all BESS controls.
6. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on site.

https://www.nrel.gov/esif/partnerships-raytheon.html

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Section 8: Tier 3 Permitting Requirements

Appendix 2: Supplemental Guidance for Developing the Fire Safety Compliance

- Outlines safety recommendations pertaining to hazard mitigation analysis
- Location and construction
- Fire-extinguishing systems
- Fire control and suppression
- Ventilation
- Spill control and neutralization
- Thermal runaway
- Safety caps
- Explosion control
- Special considerations for outdoor installations

http://fire-suppression-systems.com/fire-suppression-systems/applications/battery-energy-storage/

Appendix 2: Fire Safety Compliance

7. Electrochemical BESS technology specific protection

Compliance Required	Battery Technology				Other BESS and Battery Technologies
	Lead-acid	Ni-Cad & Ni-MH	Lithium-ion	Flow	
7.1 Exhaust ventilation	Yes	Yes	Yes	Yes	Yes
7.2 Spill control and neutralization	Yes	Yes	No	Yes	Yes
7.3 Explosion control	Yes	Yes	Yes	Yes	Yes
7.4 Safety Caps	Yes	Yes	No	Yes	Yes
7.5 Thermal runaway	Yes	Yes	Yes	Yes	Yes

Appendix 2: Fire Safety Compliance

8. Indoor Installations

1. **Dedicated use buildings**
   - Only used for BESS, electrical energy generation, or grid related operations
   - No unauthorized access, only maintenance
   - If separate areas for admin, no more than 10% of building area and direct means of egress
2. **Non-dedicated use buildings** – contains BESS, but not dedicated use as described above

Compliance Required	Dedicated Use Buildings	Non-Dedicated Use Buildings
5. General Installation Requirements	Yes	Yes
6.1. Size and separation	Yes	Yes
6.3. Elevation	Yes	Yes
6.4. Smoke and automatic fire detection	Yes	Yes
6.5. Fire suppression systems	Yes	Yes
8.3. Dwelling units and sleeping units	NA	Yes
8.4. Fire-resistance rated separations	Yes	Yes
7. Technology specific protection	Yes	Yes

Appendix 2: Fire Safety Compliance

9. Outdoor Installations

1. **Remote outdoor installations** – 100ft clearance from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high piled stock and other exposure hazards
2. **Installations near exposures** - not remote as described above

Compliance Required	Remote Installations	Installations Near Exposures
5. General Installation Requirements	Yes	Yes
6.1 Size and separation	No	Yes
6.4. Smoke and automatic fire detection	Yes	Yes
6.5. Fire suppression systems	Yes	Yes
6.6. Maximum enclosure size	Yes	Yes
6.7. Vegetation control	Yes	Yes
6.8. Means of egress separation	Yes	Yes
9.3. Clearance to exposures	Yes	Yes
7. Technology specific protection	Yes	Yes

Section 8: Tier 3 Permitting Requirements

Appendix 4: Emergency Operations Plan

APPENDIX 4: Emergency Operations Plan

An emergency operations plan shall include the following information:

a. Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.

b. Procedures for inspection and testing of associated alarms, interlocks, and controls.

c. Procedures to be followed in response to notifications from the Battery Energy Storage Management System, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.

d. Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.

e. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.

f. Procedures for dealing with battery energy storage system equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged battery energy storage system equipment from the facility.

g. Other procedures as determined necessary by the [Village/Town/City] to provide for the safety of occupants and emergency responders.

h. Procedures and schedules for conducting drills of these procedures.

Thank you

For additional questions, please contact me at:

cleanenergyhelp@nyserda.ny.gov

or

Houtan.Moaveni@nyserda.ny.gov

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