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# New York Battery Energy Storage System Guidebook for Local Governments



**NYSERDA**



# New York Battery Energy Storage System Guidebook

In December 2018, the New York Public Service Commission adopted Governor Cuomo's 1,500 MW energy storage target by 2025 and established a 3,000 MW target by 2030. Over \$350 million in New York State incentives have been authorized to accelerate the adoption of energy storage systems in effort of building a self-sustaining industry. Energy storage systems will serve many critical roles to enable New York's clean energy future. As intermittent renewable power sources, such as wind and solar, provide a larger portion of New York's electricity, energy storage systems will be used to smooth and time-shift renewable generation, and minimize curtailment. As New York's grid becomes smarter and more decentralized, these systems will dispatch stored energy when and where it is needed the most. Further, energy storage systems will allow New York to meet its peak power needs without relying on its oldest and dirtiest peak generating plants, many of which are approaching the end of their useful lives.

As an important first step in protecting public and firefighter safety while promoting safe energy storage, the New York State Energy Research and Development Authority (NYSERDA) developed the first comprehensive set of guidelines for reviewing and evaluating battery energy storage systems. The Battery Energy Storage System Guidebook (Guidebook) helps local government officials, and Authorities Having Jurisdiction (AHJs), understand and develop a battery energy storage system permitting and inspection processes to ensure efficiency, transparency, and safety in their local communities. The Guidebook provides in-depth details about the permitting and inspection processes of battery energy systems that have (1) experienced the sharpest price declines, (2) are offered by a large number of manufacturers, and (3) are likely to comprise the largest number of battery energy storage system permits an AHJ may see.

## The Guidebook contains the following chapters:

- **Battery Energy Storage System Model Law (Model Law):** The Model Law is intended to help local government officials and AHJs adopt legislation and regulations to responsibly accommodate battery energy storage systems in their communities. The Model Law lays out procedural frameworks and substantive requirements for residential, commercial, and utility-scale battery energy storage systems.
- **Battery Energy Storage System Model Permit (Model Permit):** 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.
- **Battery Energy Storage System Inspection Checklist (Checklist):** The Checklist is intended to be utilized as a guideline for field inspections of residential and small commercial battery energy storage systems. It can be used directly by local code enforcement officers or provided to a third-party inspection agency, where applicable.

When combined with all applicable provisions of the codes, regulations, and industry standards as referenced in the New York State Uniform Fire Prevention and Building Code, these resources create an all-encompassing process to safely permit all types of battery energy storage systems. The Guidebook is intended to create complementary review processes for battery energy storage systems separate from other technologies. For example, if a hybrid project contains both a battery energy storage system and solar photovoltaics, the proposed project would have to comply with both solar and battery energy storage system requirements.

This relatively new technology, and its subsequent variations, continues to face regulatory, policy and financial challenges. NYSERDA will continue to work with permitting authorities and the industry to test the processes outlined in the guide so they can be refined and updated as the codes and standards evolve.

The Guidebook is advisory only and not legally binding. These resources are not intended for adoption precisely as they are written, and each municipality should delete, modify, or add other provisions as appropriate to suit local conditions, comprehensive plans, and existing land use and zoning provisions. Neither NYSERDA, nor any of its employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information. AHJs and other entities are welcome to use and distribute the Guidebook.

**NYSERDA offers continuing free technical assistance to local governments** to help further understand the issues addressed in the Battery Energy Storage System Guidebook. Please contact the siting team at NYSERDA by emailing [cleanenergyhelp@nysERDA.ny.gov](mailto:cleanenergyhelp@nysERDA.ny.gov) for additional help or questions.

**You can download specific chapters of the New York Battery Energy Storage System Guidebook at [nysERDA.ny.gov/Energy-Storage-Guidebook](https://nysERDA.ny.gov/Energy-Storage-Guidebook).**

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*NYSERDA offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean energy jobs. A public benefit corporation, NYSERDA has been advancing innovative energy solutions since 1975.*

# Table of Contents

<b>Battery Energy Storage System Model Law . . . . .</b>	<b>3</b>
<b>Battery Energy Storage System Model Permit . .</b>	<b>27</b>
<b>Battery Energy Storage System Inspection Checklist . . . . .</b>	<b>35</b>

# Battery Energy Storage System Model Law

For local governments to utilize when drafting local laws and regulations for battery energy storage systems.

# Section Contents

- 1. Instructions.....5
- 2. Model Law .....7

# Overview

The Model Law is intended to help local government officials and AHJs adopt legislation and regulations to responsibly accommodate battery energy storage systems in their communities. The Model Law lays out procedural frameworks and substantive requirements for residential, commercial, and utility-scale battery energy storage systems.

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**The workable version of this document can be found at [nyscrda.ny.gov/Energy-Storage-Guidebook](https://nyscrda.ny.gov/Energy-Storage-Guidebook), under Battery Energy Storage System Model Law tab.**

## 1. Instructions

1. This Model Law can be adopted by the governing board of cities, towns, and villages (hereinafter “local governments” or “municipalities”) to regulate the installation, operation, maintenance, and decommissioning of battery energy storage systems. The Model Law is intended to be an “all-inclusive” local law, regulating the subject of battery energy storage systems under typical zoning and land use regulations and it includes the process for compliance with the State Environmental Quality Review Act. Municipalities should review this Model Law, examine their local laws and regulations and the types, size range and number of battery energy storage system projects proposed, and adopt a local law addressing the aspects of battery energy storage system development that make the most sense for each municipality, deleting, modifying, or adding other provisions as appropriate.
2. This Model Law references a “Battery Energy Storage System Model Permit” that is available as part of NYSERDA’s Battery Energy Storage Guidebook. 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.
3. In some cases, there may be multiple approaches to regulate a certain aspect of battery energy storage systems. The word “OR” has been placed in the text of the model law to indicate these options. Municipalities should choose the option that works best for their communities. The content provided in brackets and highlighted is optional. Depending on local circumstances, a municipality may want to include this content or choose to adopt a different standard.
4. The Model Law is not intended for adoption precisely as it is written. It is intended to be advisory only, and users should not rely upon it as legal advice. A municipality is not required to adopt this Model Law. Municipal officials are urged to seek legal advice from their attorneys before enacting a battery energy storage system law. Municipalities must carefully consider how the language in this Model Law may be modified to suit local conditions, comprehensive plan, and existing land use and zoning provisions.

5. Before enacting this Model Law, a comprehensive plan outlining the goals and policies for the installation, operation, maintenance, and decommissioning of battery energy storage systems must be adopted by the local governing board (city or common council, town board, village board of trustees). Some local governing boards can satisfy this requirement by updating an existing comprehensive plan while others must adopt a new comprehensive plan. Suggestions on how local governing boards can develop and adopt in their existing or new comprehensive plans battery energy storage system friendly policies and plans that provide local protection are listed below:
- A. Adopt a resolution or policy statement that outlines a strategy for municipal-wide battery energy storage system development. The chief executive officer of a local government (like a town supervisor or city or village mayor) may choose to issue in accordance with its local charter or other valid local law or regulations an executive order, proclamation or other declaration to advance battery energy storage system development.
  - B. Appoint a Battery Energy Storage Task Force (“Task Force”) that represents all interested stakeholders, including residents, businesses, interested non-profit organizations, the battery energy storage industry, utilities, and relevant municipal officials and staff to prepare an action plan, adopt a new or amend the comprehensive plan to include battery energy storage system planning goals and actions, and develop local laws and/or other regulations to ensure the orderly development of battery energy storage system projects.
  - C. Charge the Task Force with conducting meetings on a communitywide basis to involve all key stakeholders, gather all available ideas, identify divergent groups and views, and secure support from the entire community. The Task Force also should conduct studies and should determine whether existing policies, plans, and land use regulations require amendments to remove barriers to and facilitate battery energy storage system development goals.
  - D. Establish a training program for local staff and land use boards. Municipalities are encouraged to utilize State and Federal technical assistance and grants for training programs when available.
  - E. Partner with adjacent communities to adopt compatible policies, plan components, and zoning provisions for battery energy storage system projects. County or regional planning agencies may also advise participating local governments on locally addressing these issues.



# 2. Model Law

## 1. Authority

This Battery Energy Storage System Law is adopted pursuant to Article IX of the New York State Constitution, §2(c)(6) and (10), New York Statute of Local Governments, § 10 (1) and (7); [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 10 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.

## 2. Statement of Purpose

This Battery Energy Storage System Law is adopted to advance and protect the public health, safety, and welfare of [Village/Town/City] by creating regulations for the installation and use of battery energy storage systems, with the following objectives:

- A. To provide a regulatory scheme for the designation of properties suitable for the location, construction and operation of battery energy storage systems;
- B. To protect the health, welfare, safety, and quality of life for the general public;
- C. To ensure compatible land uses in the vicinity of the areas affected by battery energy storage systems;
- D. To mitigate the impacts of battery energy storage systems on environmental resources such as important agricultural lands, forests, wildlife and other protected resources; and
- E. To create synergy between battery energy storage system development and [other stated goals of the community pursuant to its Comprehensive Plan].

## 3. Definitions

**ANSI:** American National Standards Institute

**BATTERY:** A single Cell or a group of Cells connected together electrically in series, in parallel, or a combination of both, which can charge, discharge, and store energy electrochemically. For the purposes of this law, batteries utilized in consumer products are excluded from these requirements.

**BATTERY ENERGY STORAGE MANAGEMENT SYSTEM:** An electronic system that protects storage batteries from operating outside their safe operating parameters and generates an alarm and trouble signal for off normal conditions.

**BATTERY ENERGY STORAGE SYSTEM:** A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, , power conditioning systems, and associated electrical equipment designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing, or similar capabilities. A battery energy storage system is classified as a Tier 1, Tier 2, or Tier 3 Battery Energy Storage System as follows:

- A. Tier 1 Battery Energy Storage Systems include either:
  - 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 Table 1

B. Tier 2 Battery Energy Storage Systems include battery energy storage systems that are not included in Tier 1, have an aggregate energy capacity greater than the threshold capacity listed in Table 1, and have an aggregate energy capacity less than 600 kWh

**TABLE 1 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
Nickel metal hydride (Ni-MH)	70 kWh
Other battery technologies	10 kWh

- C. Tier 3 Battery Energy Storage Systems include all the following:
- 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

**COMMISSIONING:** A systematic process that provides documented confirmation that a battery energy storage system functions according to the intended design criteria and complies with applicable code requirements.

**DEDICATED-USE BUILDING:** A building that is built for the primary intention of housing battery energy storage system equipment and is classified as Group F-1 occupancy as defined in the International Building Code. It is constructed in accordance with the Uniform Code, and it complies with the following:

- 1) The building’s only permitted primary use is for battery energy storage, energy generation, and other electrical grid-related operations.
- 2) Occupants in the rooms and areas containing battery energy storage systems are limited to personnel that operate, maintain, service, test, and repair the battery energy storage system and other energy systems.
- 3) No other occupancy types are permitted in the building.
- 4) Administrative and support personnel are permitted in incidental-use areas within the buildings that do not contain battery energy storage system, provided the following:
  - a. The areas do not occupy more than 10 percent of the building area of the story in which they are located.
  - b. A means of egress is provided from the incidental-use areas to a public way that does not require occupants to traverse through areas containing battery energy storage systems or other energy systems.

**DWELLING UNIT:** One or more rooms arranged for complete, independent housekeeping purposes with space for eating, living, and sleeping; facilities for cooking; and provisions for sanitation.

**ENERGY CODE:** The New York State Energy Conservation Construction Code adopted pursuant to Article 11 of the Energy Law, as currently in effect and as hereafter amended from time to time.

**FIRE CODE:** The fire code section of the New York State Uniform Fire Prevention and Building Code adopted pursuant to Article 18 of the Executive Law, as currently in effect and as hereafter amended from time to time.

**FLOW BATTERY:** A type of rechargeable Battery that uses typically large, separated liquid reservoirs of electrolytes that flow through a reaction zone to store, charge, and discharge energy. These electrolytes are typically non-flammable.

**LEAD-ACID BATTERY:** A rechargeable Battery that is comprised of lead electrodes immersed in sulphuric acid electrolyte. These batteries may be flooded, vented, sealed, or may come in other form factors. They may produce hazardous gases during normal operations.

**LITHIUM-ION BATTERY:** A storage Battery with lithium ions serving as the charge carriers of the Battery. The electrolyte is typically a mixture of organic solvents with an inorganic salt and can be in a liquid or a gelled polymer form.

**NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL):** A U.S. Department of Labor designation recognizing a private sector organization to perform certification for certain products to ensure that they meet the requirements of both the construction and general industry OSHA electrical standards.

**NEC:** National Electric Code.

**NFPA:** National Fire Protection Association.

**NICKEL-BASED BATTERY:** A rechargeable Battery in which the positive active material is nickel oxide, the negative contains either cadmium (Nickel-cadmium, Ni-Cd), hydrogen ions stored in a metal-hydride structure (Nickel-metal hydride, Ni-MH), or zinc (Nickel-zinc, Ni-Zn) as the electrode and the electrolyte is potassium hydroxide.

**NON-DEDICATED-USE BUILDING:** All buildings that contain a battery energy storage system and do not comply with the dedicated-use building requirements, including all other occupancy types such as, but not limited to, commercial, industrial, offices, and multifamily housing.

**NON-PARTICIPATING PROPERTY:** Any property that is not a Participating property.

**OCCUPIED COMMUNITY BUILDING:** Any building in Occupancy Group A, B, E, I, R, as defined in the International Building Code, including but not limited to schools, colleges, daycare facilities, hospitals, correctional facilities, public libraries, theaters, stadiums, apartments, hotels, and houses of worship.

**ONE-TO-TWO-FAMILY DWELLING:** A building that contains not more than two dwelling units with independent cooking and bathroom facilities.

**PARTICIPATING PROPERTY:** A battery energy storage system host property or any real property that is the subject of an agreement that provides for the payment of monetary compensation to the landowner from the battery energy storage system owner (or affiliate) regardless of whether any part of a battery energy storage system is constructed on the property.

**SPECIAL FLOOD HAZARD AREA:** The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

**UNIFORM CODE:** the New York State Uniform Fire Prevention and Building Code adopted pursuant to Article 18 of the Executive Law, as currently in effect and as hereafter amended from time to time.

## 4. Applicability

- A. The requirements of this Local Law shall apply to all battery energy storage systems permitted, installed, or modified in [Village/Town/City] after the effective date of this Local Law, excluding general maintenance and repair.
- B. Battery energy storage systems constructed or installed prior to the effective date of this Local Law shall not be required to meet the requirements of this Local Law.
- C. Modifications to, retrofits or replacements of an existing battery energy storage system that increase the total battery energy storage system designed discharge duration or power rating shall be subject to this Local Law.

## 5. General Requirements

- A. A Building permit, and an electrical permit shall be required for installation of all battery energy storage systems.
- B. Issuance of permits and approvals by the [Reviewing Board] shall include review pursuant to the State Environmental Quality Review Act [ECL Article 8 and its implementing regulations at 6 NYCRR Part 617 ("SEQRA")].
- C. 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 Uniform Code and/or the 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.

## 6. Permitting Requirements for Tier 1 Battery Energy Storage Systems

- A. Tier 1 Battery Energy Storage Systems shall be permitted in all zoning districts and shall be subject to the “Battery Energy Storage System Permit” and exempt from site plan review.

## 7. Permitting Requirements for Tier 2 Battery Energy Storage Systems

- A. Tier 2 Battery Energy Storage Systems shall be permitted in all zoning districts, shall be subject to the Uniform Code (referenced in Appendix 2) and the “Battery Energy Storage System Permit,” and are exempt from site plan review.

## 8. Permitting Requirements for Tier 3 Battery Energy Storage Systems

Tier 3 Battery Energy Storage Systems are permitted through the issuance of a [special use permit] within the [XXXXXXXXXXXXXXXX, XXXXXXXXXXXX, XXXXXXXXXXXX] zoning districts, and subject to the Uniform Code and site plan application requirements set forth in this Section.

- A. Applications for the installation of Tier 3 Battery Energy Storage System shall be:
- 1) reviewed by the [Code Enforcement/Zoning Enforcement Officer or Reviewing Board] for completeness. An application shall be complete when it addresses all matters listed in this Local Law including, but not necessarily limited to, (i) compliance with all applicable provisions of the Uniform Code and all applicable provisions of the Energy Code and (ii) matters relating to the proposed battery energy storage system and Floodplain, Utility Lines and Electrical Circuitry, Signage, Lighting, Vegetation and Tree-cutting, Noise, Decommissioning, Site Plan and Development, Special Use and Development, Ownership Changes, Safety, Permit Time Frame and Abandonment. Applicants shall be advised within [10] business days of the completeness of their application or any deficiencies that must be addressed prior to substantive review.
  - 2) subject to a public hearing to hear all comments for and against the application. The [Reviewing Board] of the [Village/Town/City] shall have a notice printed in a newspaper of general circulation in the [Village/Town/City] at least [5] days in advance of such hearing. Applicants shall have delivered the notice by first class mail to adjoining landowners or landowners within [200] feet of the property at least [10] days prior to such a hearing. Proof of mailing shall be provided to the [Reviewing Board] at the public hearing.
  - 3) referred to the [County Planning Department] pursuant to General Municipal Law § 239-m if required.
  - 4) upon closing of the public hearing, the [Reviewing Board] shall take action on the application within 62 days of the public hearing, which can include approval, approval with conditions, or denial. The 62-day period may be extended upon consent by both the [Reviewing Board] and Applicant.
- B. Floodplain. The Applicant of battery energy storage systems shall obtain necessary local floodplain development permits if proposed within Special Flood Hazard Areas.
- C. Utility Lines and Electrical Circuitry. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.
- D. Signage.
- 1) The signage shall be in compliance with ANSI Z535 and shall include the type of technology associated with the battery energy storage systems, any special hazards associated, the type of suppression system installed in the area of battery energy storage systems, and 24-hour emergency contact information, including reach-back phone number.
  - 2) As required by the NEC, disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.
- E. Lighting. Lighting of the battery energy storage systems shall be limited to that minimally required for safety and operational purposes and shall be reasonably shielded and downcast from abutting properties.
- F. Vegetation and tree-cutting. Areas within [10] feet on each side of Tier 3 Battery Energy Storage Systems shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do

not form a means of readily transmitting fire. Removal of trees should be minimized to the extent possible.

G. Noise. The [1-hour] average noise generated from the battery energy storage systems, components, and associated ancillary equipment shall not exceed a noise level of [60] dBA as measured at the outside wall of any Non-participating Residence and Occupied Community Building. Applicants may submit equipment and component manufacturers noise ratings to demonstrate compliance. The applicant may be required to provide Operating Sound Pressure Level measurements from a reasonable number of sampled locations at the perimeter of the battery energy storage system to demonstrate compliance with this standard.

H. Decommissioning.

- 1) Decommissioning Plan. The applicant shall submit a decommissioning plan, developed in accordance with the Uniform Code, containing a narrative description of the activities to be accomplished for removing the energy storage system from service, and from the facility in which it is located. The decommissioning plan shall also include: (i) the anticipated life of the battery energy storage system; (ii) the estimated decommissioning costs; (iii) how said estimate was determined; (iv) the method of ensuring that funds will be available for decommissioning and restoration; (v) the method that the decommissioning cost will be kept current; (vi) the manner in which the battery energy storage system will be decommissioned, and the Site restored; and (vii) a listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.
- 2) Decommissioning Fund. The applicant, or successors, shall continuously maintain a fund or bond payable to the [Village/Town/City], in a form approved by the [Village/Town/City] for the removal of the battery energy storage system, in an amount to be determined by the [Village/Town/City], for the period of the life of the facility. This fund may consist of a letter of credit from a State of New York licensed-financial institution. All costs of the financial security shall be borne by the applicant.

I. Site plan application. For a Tier 3 Battery Energy Storage System requiring a Special Use Permit, site plan approval shall be required. Any site plan application shall include the following information:

- 1) Property lines and physical features, including roads, for the project site.
- 2) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, and screening vegetation or structures.
- 3) A [one- or three-line] electrical diagram detailing the battery energy storage system layout, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and over current devices.
- 4) A preliminary equipment specification sheet that documents the proposed battery energy storage system components, inverters and associated electrical equipment that are to be installed. A final equipment specification sheet shall be submitted prior to the issuance of building permit.
- 5) Name, address, and contact information of proposed or potential system installer and the owner and/or operator of the battery energy storage system. Such information of the final system installer shall be submitted prior to the issuance of building permit.
- 6) Name, address, phone number, and signature of the project Applicant, as well as all the property owners, demonstrating their consent to the application and the use of the property for the battery energy storage system.
- 7) Zoning district designation for the parcel(s) of land comprising the project site.
- 8) Commissioning Plan. Such plan shall document and verify that the system and its associated controls and safety systems are in proper working condition per requirements set forth in the Uniform Code (referenced in Appendix 1). Battery energy storage system commissioning shall be conducted by a New York State (NYS) Licensed Professional Engineer or NYS Registered Architect after the installation is complete but prior to final inspection and approval. A corrective action plan shall be developed for any open or continuing issues that are allowed to be continued after commissioning. A report describing the results of the system commissioning and including the results of the initial acceptance testing required in the Uniform Code (referenced in Appendix 1) shall be provided to [Reviewing Board] prior to final inspection and approval and maintained at an approved on-site location.

Energy storage system commissioning shall not be required for lead-acid and nickel-cadmium battery systems at

facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.

- 9) Fire Safety Compliance Plan. Such plan shall document and verify that the system and its associated controls and safety systems are in compliance with the Uniform Code (referenced in Appendix 2).
- 10) System and Property Operation and Maintenance Manual. Such plan shall describe continuing battery energy storage system maintenance and property upkeep, as well as design, construction, installation, testing and commissioning information and shall meet all requirements set forth in the Uniform Code (referenced in Appendix 3).
- 11) Erosion and sediment control and storm water management plans prepared to New York State Department of Environmental Conservation standards, if applicable, and to such standards as may be established by the Planning Board.
- 12) Prior to the issuance of the building permit or final approval by the [Reviewing Board], but not required as part of the application, engineering documents must be signed and sealed by a NYS Licensed Professional Engineer or NYS Registered Architect.
- 13) An Emergency Operation Plan per requirements set forth in Appendix 4.

#### J. Special Use Permit Standards.

- 1) Setbacks. Tier 3 Battery Energy Storage Systems shall comply with the setback requirements of the underlying zoning district for principal structures.
- 2) Height. Tier 3 Battery Energy Storage Systems shall comply with the building height limitations for principal structures of the underlying zoning district.
- 3) Fencing Requirements. Tier 3 Battery Energy Storage Systems, including all mechanical equipment, shall be enclosed by a [7-foot-high] fence with a self-locking gate to prevent unauthorized access unless housed in a dedicated-use building and not interfering with ventilation or exhaust ports.
- 4) Screening and Visibility. Tier 3 Battery Energy Storage Systems shall have views minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping, or other screening methods that will harmonize with the character of the property and surrounding area and not interfering with ventilation or exhaust ports.

K. Ownership Changes. If the owner of the battery energy storage system changes or the owner of the property changes, the special use permit shall remain in effect, provided that the successor owner or operator assumes in writing all of the obligations of the special use permit, site plan approval, and decommissioning plan. A new owner or operator of the battery energy storage system shall notify the zoning enforcement officer (ZEO) of such change in ownership or operator within [30] days of the ownership change. A new owner or operator must provide such notification to the ZEO in writing. The special use permit and all other local approvals for the battery energy storage system would be void if a new owner or operator fails to provide written notification to the ZEO in the required timeframe. Reinstatement of a void special use permit will be subject to the same review and approval processes for new applications under this Local Law.

## 9. Safety

A. System Certification. Battery energy storage systems and Equipment shall be listed by a Nationally Recognized Testing Laboratory to UL 9540 or CAN 9540 (Standard for battery energy storage systems and Equipment) with subcomponents meeting each of the following standards that are applicable based on the storage type (electrochemical, thermal, mechanical):

- 1) UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications),
- 2) UL 1642 (Standard for Lithium Batteries),
- 3) UL 1741 or UL 62109 (inverters and power converters),
- 4) Certified under the applicable electrical, building, and fire prevention codes as required.
- 5) Alternatively, field evaluation by an approved testing laboratory for compliance with UL 9540 and applicable codes, regulations and safety standards may be used to meet system certification requirements.

Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76 are not required to be listed.

B. Site Access. Battery energy storage systems shall be maintained in good working order and in accordance with industry standards. Site access shall be maintained, including snow removal at a level acceptable to the local fire department and, if the Tier 3 Battery Energy Storage System is located in an ambulance district, the local ambulance corps.

C. Battery energy storage systems, components, and associated ancillary equipment shall have required working space clearances, and electrical circuitry shall be within weatherproof enclosures marked with the environmental rating suitable for the type of exposure in compliance with NFPA 70.

## **10. Permit Time Frame and Abandonment**

- A. The Special Use Permit and site plan approval for a battery energy storage system shall be valid for a period of [24] months, provided that a building permit is issued for construction [and/or] construction is commenced. In the event construction is not completed in accordance with the final site plan, as may have been amended and approved, as required by the [Reviewing Board], within [24] months after approval, the Applicant or the [Village/Town/City] may extend the time to complete construction for [180] days. If the owner and/or operator fails to perform substantial construction after [36] months, the approvals shall expire.
- B. If the owner and/or operator fails to comply with decommissioning upon any abandonment, the [Village/Town/City] may, at its discretion, utilize the available bond and/or security for the removal of a Tier 3 Battery Energy Storage System and restoration of the site in accordance with the decommissioning plan.

## **11. Enforcement**

Any violation of this Battery Energy Storage System Law shall be subject to the same enforcement requirements, including the civil and criminal penalties, provided for in the zoning or land use regulations of [Village/Town/City].

## **12. Severability**

The invalidity or unenforceability of any section, subsection, paragraph, sentence, clause, provision, or phrase of the aforementioned sections, as declared by the valid judgment of any court of competent jurisdiction to be unconstitutional, shall not affect the validity or enforceability of any other section, subsection, paragraph, sentence, clause, provision, or phrase, which shall remain in full force and effect.

## **APPENDIX 1: Commissioning Plan**

The battery energy storage system commissioning plan shall comply with the Uniform Code and include, at a minimum, 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 understand 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.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the BESS, and respond to incidents involving the BESS, including documentation that such service has been contracted for.



## APPENDIX 2: Supplemental Guidance for Developing the Fire Safety Compliance Plan

**Disclaimer:** Appendix 2 is primarily based on the 2019 Energy Storage System Supplement containing amendments to the New York State Uniform Fire Prevention and Building Code, published by the New York State Department of State. The 2019 Energy Storage System Supplement can be found on the July 17, 2019 edition of the State Register, available at <https://www.dos.ny.gov/info/register/2019.html>. NYSERDA will continue to update this Guidebook as these codes and standards evolve.

Appendix 2 is not exhaustive and is intended for general reference only. Prior to the design or installation of any system, please refer to the Uniform Code and always consult with the Authority Having Jurisdiction. NYSERDA makes no representation or warranty as to whether following this guide will satisfy any rule or requirement. Should any conflicts exist between Appendix 2 and the Uniform Code, the Uniform Code requirements shall prevail.

1. **Hazard mitigation analysis.** A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided under any of the following conditions:
  - Where BESS technologies not specifically identified in Table 1: Battery Energy Storage System Tier 2 Threshold Quantities are provided.
  - More than one BESS technology is provided in a room or enclosed area where there is a potential for adverse interaction between technologies.
  - Where allowed as a basis for increasing maximum allowable quantities outlined in Table 2: Maximum Allowable Quantities
- 1.1. **Fault condition.** The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.
  - A thermal runaway condition in a single BESS rack, module or unit.
  - Failure of any battery (energy) management system.
  - Failure of any required ventilation or exhaust system.
  - Voltage surges on the primary electric supply.
  - Short circuits on the load side of the BESS.
  - Failure of the smoke detection, fire detection, fire suppression, or gas detection system.
  - Required spill neutralization not being provided or failure of a required secondary containment system.
- 1.2. **Analysis approval.** The fire code official is authorized to approve the hazardous mitigation analysis provided the consequences of the hazard mitigation analysis demonstrate:
  - Fires will be contained within unoccupied BESS rooms or areas for the minimum duration of the fire-resistance rated separations identified in Section 7.4.
  - Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.
  - Toxic and highly toxic gases released during fires will not reach concentrations in access of Immediately Dangerous to Life or Health (IDLH) level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.
  - Flammable gases released from BESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL).
  - Flammable gases released from BESS during fire, overcharging and other abnormal conditions will be controlled through the use of ventilation of the gases preventing accumulation or by deflagration venting.
- 1.3. **Additional protection measures.** Construction, equipment and systems that are required for the BESS to comply with the hazardous mitigation analysis, including but not limited to those specifically described in this Appendix shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

2. **Fire Safety.** BESS installations shall comply with the requirements of this section.

2.1. **Large Scale Fire Test.** Where required elsewhere in Appendix 2, large scale fire testing shall be conducted on a representative energy storage system in accordance with UL 9540A or approved equivalent. The testing shall be conducted or witnessed and reported by an approved testing laboratory and show that a fire involving one energy storage system will not propagate to an adjacent energy storage system. In addition, the testing shall demonstrate that, where the energy storage system is installed within a room, enclosed area or walk-in energy storage system unit, a fire will be contained within the room, enclosed area or walk-in energy storage system unit for a duration equal to the fire-resistance rating of the room assemblies as specified in Section 8.4. The test report shall be provided to the fire code official for review and approval.

2.2 **Fire remediation.** Where a fire or other event has damaged the BESS and ignition or re-ignition of the BESS is possible, the system owner, agent, or lessee shall take the following actions, at their expense, to mitigate the hazard or remove damaged equipment from the premises to a safe location.

2.2.1 **Fire mitigation personnel.** Where, in the opinion of the fire code official, it is essential for public safety that trained personnel be on site to respond to possible ignition or re-ignition of a damaged BESS, the system owner, agent or lessee shall immediately dispatch one or more fire mitigation personnel to the premise, as required and approved, at their expense. These personnel shall remain on duty continuously after the fire department leaves the premise until the damaged energy storage equipment is removed from the premises, or earlier if the fire code official indicates the public safety hazard has been abated. On-duty fire mitigation personnel shall have the following responsibilities:

- Keep diligent watch for fires, obstructions to means of egress and other hazards.
- Immediately contact the fire department if their assistance is needed to mitigate any hazards or extinguish fires.
- Take prompt measures for remediation of hazards in accordance with the decommissioning plan
- Take prompt measures to assist in the evacuation of the public from the structures.

2.2.2 **Peer Review.** Where required by the Authority Having Jurisdiction, the owner or the owner's authorized agent shall be responsible for retaining and furnishing the services of a registered design professional or special expert, who will perform as a peer reviewer, subject to the approval of the fire code official. The costs of special services shall be borne by the owner or the owner's authorized agent.

2.2.2.1. **Special expert.** Where the scope of work is limited or focused in an area that does not require the services of a registered design professional or the special knowledge and skills associated with the practice of architecture or engineering, an approved special expert may be employed by the owner or the owner's authorized agent as the person in responsible charge of the limited or focused activity. The scope of work of a special expert shall be limited to the area of expertise as demonstrated in the documentation submitted to the fire code official for review and approval. Special experts are those individuals who possess the following qualifications:

1. Has credentials of education and experience in an area of practice that is needed to evaluate risks and safe operations associated with the design, operation and special hazards of energy storage systems.
2. Licensing or registration, when required by any other applicable statute, regulation, or local law or ordinance.

3. **Battery energy storage management system.** Where required by the BESS listing an approved energy storage management system shall be provided that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications. The system shall disconnect electrical connections to the BESS or otherwise place it in a safe condition if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

4. **Enclosures.** Enclosures of BESS shall be of noncombustible construction.

5. **General installations requirements.** BESS shall comply with the requirements of Sections 5.1 through 5.12.

5.1. **Electrical disconnects.** Where the BESS disconnecting means is not within sight of the main electrical service disconnecting means, placards or directories shall be installed at the location of the main electrical service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.

**Exception:** Electrical disconnects for lead acid and nickel cadmium battery systems at facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC shall be permitted to have electrical disconnects signage in accordance with NFPA 76.

5.2. **Working clearances.** Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment in accordance with NFPA 70 and the manufacturer's instructions.

5.3. **Fire-resistance rated separations.** Rooms and other indoor areas containing BESS shall be separated from other areas of the building in accordance with Section 8.4. BESS shall be permitted to be in the same room with the equipment they support.

5.4. **Seismic and structural design.** Stationary BESS shall comply with the seismic design requirements in Chapter 16 of the International Building Code, and shall not exceed the floor loading limitation of the building.

5.5. **Vehicle impact protection.** Where BESS are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Fire Code Section 312.

5.6. **Combustible storage.** Combustible materials shall not be stored in BESS rooms, areas, or walk-in units. Combustible materials in occupied work centers covered by Section 5.10 shall be stored at least 3 feet (914 mm) from BESS cabinets.

5.7. **Toxic and highly toxic gases.** BESS that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall be provided with a hazardous exhaust system in accordance with Section 502.8 of the International Mechanical Code.

5.8. **Signage.** Approved signs shall be provided on or adjacent to all entry doors for BESS rooms or areas and on enclosures of BESS cabinets and walk-in units located outdoors, on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. The signage shall include the following or equivalent.

- "Energy Storage System", "Battery Storage System", "Capacitor Energy Storage System", or the equivalent.
- The identification of the electrochemical BESS technology present.
- "Energized electrical circuits"
- If water reactive electrochemical BESS are present the signage shall include "APPLY NO WATER"
- Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section 2.2.

**Exception:** Existing electrochemical BESS shall be permitted to include the signage required at the time they were installed.

5.9. **Security of installations.** Rooms, areas and walk-in units in which electrochemical BESS are located shall be secured against unauthorized entry and safe-guarded in an approved manner. Security barriers, fences, landscaping, and other enclosures shall not inhibit the required air flow to or exhaust from the electrochemical BESS and its components.

5.10. **Occupied work centers.** Electrochemical BESS located in rooms or areas occupied by personnel not directly involved with maintenance, service and testing of the systems shall comply with the following.

- Electrochemical BESS located in occupied work centers shall be housed in locked noncombustible cabinets or other enclosures to prevent access by unauthorized personnel.
- Where electrochemical BESS are contained in cabinets in occupied work centers, the cabinets shall be located within 10 feet (3048 mm) of the equipment that they support.
- Cabinets shall include signage complying with Section 5.8.

- 5.11. **Open rack installations.** Where electrochemical BESS are installed in a separate equipment room and only authorized personnel have access to the room, they shall be permitted to be installed on an open rack for ease of maintenance.
- 5.12. **Walk-in units.** Walk-in units shall only be entered for inspection, maintenance and repair of BESS units and ancillary equipment, and shall not be occupied for other purposes.
6. **Electrochemical BESS Protection.** The protection of electrochemical BESS shall be in accordance with 6.1 through 6.8 where required by Sections 8 through 10.
- 6.1. **Size and separation.** Electrochemical BESS shall be segregated into groups not exceeding 50 kWh (180 Mega joules). Each group shall be separated a minimum three feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Fire Code Chapter 10.

**Exceptions:**

- Lead acid and nickel cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
- The fire code official is authorized to approve larger capacities or smaller separation distances based on large scale fire testing.

6.2. **Mixed electrochemical energy systems.** Where rooms, areas and walk-in units contain different types of electrochemical energy technologies, the total aggregate quantities of the systems shall be determined based on the sum of percentages of each technology type quantity divided by the maximum allowable quantity of each technology type. The sum of the percentages shall not exceed 100 percent of the maximum allowable quantity.

6.3. **Elevation.** Electrochemical BESS shall not be located in the following areas:

- Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or
- Where the floor is located below the lowest level of exit discharge.

**Exceptions:**

- Lead acid and Nickel cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
- Where approved, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
- Where approved by the fire code official, installations shall be permitted on higher and lower floors.

**TABLE 2 MAXIMUM ALLOWABLE QUANTITIES**

Technology	Maximum Allowable Quantities <sup>a</sup>
Lead-acid, all types	Unlimited
Nickel-cadmium (Ni-Cd)	Unlimited
Nickel metal hydride (Ni-MH)	Unlimited
Lithium-ion	600 kWh
Flow batteries <sup>b</sup>	600 kWh
Other battery technologies	200 kWh

a. For electrochemical energy storage system units rated in Amp-Hours, kWh shall equal rated voltage times the Amp-hour rating divided by 1000  
 b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte type technologies

6.4. **Fire detection.** An approved automatic smoke detection system or radiant energy–sensing fire detection system complying with Fire Code Section 907 shall be installed in rooms, indoor areas, and walk-in units containing electrochemical BESS. An approved radiant energy–sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where approved to a constantly attended location.

6.4.1. **System status.** Where required by the fire code official, visible annunciation shall be provided on cabinet exteriors or in other approved locations to indicate that potentially hazardous conditions associated with the BESS exist.

6.5. **Fire suppression systems.** Rooms and areas within buildings and walk-in units containing electrochemical BESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

- An automatic sprinkler system designed and installed in accordance with Fire Code Section 903.3.1.1 with a minimum density of 0.3 gpm/ft.<sup>2</sup> based on the fire area or 2,500 ft.<sup>2</sup> design area, whichever is smaller.
- Where approved, an automatic sprinkler system designed and installed in accordance with Fire Code Section 903.3.1.1 with a sprinkler hazard classification based on large scale fire testing.
- The following alternate automatic fire extinguishing systems designed and installed in accordance with Fire Code Section 904, provided the installation is approved by the fire code official based on large scale fire testing
  - NFPA 12, Standard on Carbon Dioxide Extinguishing Systems
  - NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection
  - NFPA 750, Standard on Water Mist Fire Protection Systems
  - NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems
  - NFPA 2010, Standard for Fixed Aerosol Fire-Extinguishing Systems

**Exception:** Fire suppression systems for lead acid and nickel cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.

6.5.1. **Water reactive systems.** Electrochemical BESS that utilize water reactive materials shall be protected by an approved alternative automatic fire-extinguishing system in accordance with Fire Code Section 904, where the installation is approved by the fire code official based on large scale fire testing.

6.6. **Maximum enclosure size.** Outdoor walk-in units housing BESS shall not exceed 53 feet by 8 feet by 9.5 feet high, not including bolt-on HVAC and related equipment, as approved. Outdoor walk-in units exceeding these limitations shall be considered indoor installations and comply with the requirements in Section 8.

6.7. **Vegetation control.** Areas within 10 feet (3 m) on each side of outdoor BESS shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do not form a means of readily transmitting fire.

6.8. **Means of egress separation.** BESS located outdoors and in open parking garages shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).

**Exception:** The fire code official is authorized to approve a reduced separation distance if large scale fire testing is provided that shows that a fire involving the BESS will not adversely impact occupant egress.

7. **Electrochemical BESS technology specific protection.** Electrochemical BESS installations shall comply with the requirements of this section in accordance with the applicable requirements of Table 3.

TABLE 3 ELECTROCHEMICAL BESS TECHNOLOGY SPECIFIC

Compliance Required <sup>b</sup>	Battery Technology				Other BESS and Battery Technologies <sup>b</sup>
	Lead-acid	Ni-Cad & Ni-MH	Lithium-ion	Flow	
7.1 Exhaust ventilation	Yes	Yes	No	Yes	Yes
7.2 Spill control and neutralization	Yes <sup>c</sup>	Yes <sup>c</sup>	No	Yes	Yes
7.3 Explosion control	Yes <sup>a</sup>	Yes <sup>a</sup>	Yes	Yes	Yes
7.4 Safety Caps	Yes	Yes	No	Yes	Yes
7.5 Thermal runaway	Yes <sup>d</sup>	Yes	Yes <sup>e</sup>	Yes	Yes <sup>e</sup>

a. Not required for lead-acid and nickel cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.

b. Protection shall be provided unless documentation acceptable to the fire code official is provided that provides justification why the protection is not necessary based on the technology used.

c. Applicable to vented (i.e. flooded) type nickel cadmium and lead acid batteries.

d. Not required for vented (i.e. flooded) type lead acid batteries.

e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.

7.1. **Exhaust ventilation.** Where required by Table 3 or elsewhere in this code, exhaust ventilation of rooms, areas, and walk-in units containing electrochemical BESS shall be provided in accordance with the International Mechanical Code and Section 7.1.1 or 7.1.2.

7.1.1. **Ventilation based upon LFL.** The exhaust ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, area, or walk-in unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

7.1.2. **Ventilation based upon exhaust rate.** Mechanical exhaust ventilation shall be provided at a rate of not less than 1 ft<sup>3</sup>/min/ft<sup>2</sup> (5.1 L/sec/m<sup>2</sup>) of floor area of the room, area, or walk-in unit. The ventilation shall be either continuous or shall be activated by a gas detection system in accordance with Section 7.1.2.4.

7.1.2.1. **Standby power.** Mechanical exhaust ventilation shall be provided with a minimum of two hours of standby power in accordance with Fire Code Section 604.2.17.

7.1.2.2. **Installation instructions.** Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer's installation instructions and the International Mechanical Code.

7.1.2.3. **Supervision.** Required mechanical exhaust ventilation systems shall be supervised by an approved supervising station in accordance with NFPA 72.

7.1.2.4. **Gas detection system.** Where required by Section 7.1.2, rooms, areas, and walk-in units containing BESS shall be protected by an approved continuous gas detection system that complies with Fire Code Section 916 and with the following:

- The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area, or walk-in unit exceeds 25 percent of the LFL.
- The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
- The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with Fire Code Section 916.
- Failure of the gas detection system shall annunciate a trouble signal at an approved supervising station in accordance with NFPA 72.

7.2. **Spill control and neutralization.** Where required by Table 3 or elsewhere in this code, areas containing free-flowing liquid electrolyte or hazardous materials shall be provided with spill control and neutralization in accordance with this section.

7.2.1. **Spill control.** Spill control shall be provided to prevent the flow of liquid electrolyte or hazardous materials to adjoining rooms or areas. The method shall be capable of containing a spill from the single largest battery or vessel.

7.2.2. **Neutralization.** An approved method to neutralize spilled liquid electrolyte shall be provided that is capable of neutralizing a spill from the largest battery or vessel to a pH between 5.0 and 9.0.

**Exceptions:** The requirements of Section 7.2 only apply where the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L) for lead-acid and nickel-cadmium battery systems operating at less than 50 VAC and 60 VDC that are located at facilities under the exclusive control of communications utilities and those facilities comply with NFPA 76 in addition to applicable requirements of this code.

7.3. **Explosion control.** Where required by Table 3 or elsewhere in this code, explosion control complying with Fire Code Section 911 shall be provided for rooms, areas or walk-in units containing electrochemical BESS technologies.

**Exceptions:**

- Where approved, explosion control is permitted to be waived by the fire code official based on large scale fire testing which demonstrates that flammable gases are not liberated from electrochemical BESS cells or modules.
- Where approved, explosion control is permitted to be waived by the fire code official based on documentation provided that demonstrates that the electrochemical BESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.

7.4. **Safety caps.** Where required by Table 3 or elsewhere in this code, vented batteries and other BESS shall be provided with flame-arresting safety caps.

7.5. **Thermal runaway.** Where required by Table 3 or elsewhere in this code, batteries and other BESS shall be provided with a listed device or other approved method to prevent, detect and minimize the impact of thermal runaway.

8. **Indoor installations.** Indoor BESS installations shall be in accordance with Sections 8.1 through 8.4.

8.1. **Dedicated use buildings.** For the purpose of Table 4 dedicated use BESS buildings shall be classified as Group F-1 occupancies and comply with all the following:

- The building shall only be used for BESS, electrical energy generation, and other electrical grid related operations.
- Occupants in the rooms and areas containing BESS are limited to personnel that operate, maintain, service, test and repair the BESS and other energy systems.
- No other occupancy types shall be permitted in the building.
- Administrative and support personnel shall be permitted in areas within the buildings that do not contain BESS, provided:
  - o The areas do not occupy more than 10 percent of the building area of the story in which they are located.
  - o A means of egress is provided from the incidental use areas to the public way that does not require occupants to traverse through areas containing BESS or other energy system equipment.

8.2. **Non-dedicated use buildings.** For the purpose of Table 4 non-dedicated use buildings include all buildings that contain BESS and do not comply with 8.1 dedicated use building requirements.

TABLE 4 INDOOR BESS INSTALLATIONS

Compliance Required	Dedicated Use Buildings <sup>a</sup>	Non-Dedicated Use Buildings <sup>b</sup>
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 <sup>c</sup>	Yes
6.5. Fire suppression systems	Yes <sup>d</sup>	Yes
8.3. Dwelling units and sleeping units	NA	Yes
8.4. Fire-resistance rated separations	Yes	Yes
7. Technology specific protection	Yes	Yes

a. See Section 8.1.

b. See Section 8.2.

c. Where approved by the fire code official, alarm signals are not required to be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or a constantly attended location where local fire alarm annunciation is provided and trained personnel are always present.

d. Where approved by the fire code official, fire suppression systems are permitted to be omitted in dedicated use buildings located more than 100 feet (30.5 M) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high piled stock and other exposure hazards.

8.3. **Dwelling units and sleeping units.** BESS shall not be installed in sleeping units or in habitable spaces of dwelling units.

8.4. **Fire-resistance rated separations.** Rooms and areas containing BESS shall include fire-resistance rated separations as follows:

- In dedicated use buildings, rooms and areas containing BESS shall be separated from areas in which administrative and support personnel are located.
- In non-dedicated use buildings, rooms and areas containing BESS shall be separated from other areas in the building.

Separation shall be provided by 2 hour rated fire barriers constructed in accordance with Section 707 of the International Building Code and 2 hour rated horizontal assemblies constructed in accordance with Section 711 of the International Building Code, as appropriate.

9. **Outdoor installations.** Outdoor installations shall be in accordance with Sections 9.1 through 9.3. Exterior wall installations for individual BESS units not exceeding 20 kWh shall be in accordance with 9.4.

9.1. **Remote outdoor installations.** For the purpose of Table 5, remote outdoor installations include BESS located more than 100 feet (30.5 M) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high piled stock and other exposure hazards.

9.2. **Installations near exposures.** For the purpose of Table 5, installations near exposures include all outdoor BESS installations that do not comply with 9.1 remote outdoor location requirements.



TABLE 5 OUTDOOR BESS INSTALLATIONS

Compliance Required	Remote Installations <sup>a</sup>	Installations Near Exposures <sup>b</sup>
5. General Installation Requirements	Yes	Yes
6.1 Size and separation	No	Yes <sup>c</sup>
6.4. Smoke and automatic fire detection	Yes	Yes
6.5. Fire suppression systems	Yes <sup>d</sup>	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

a. See Section 9.1.

b. See Section 9.2.

c. In outdoor walk-in units, spacing is not required between BESS units and the walls of the enclosure.

d. Where approved by the fire code official, fire suppression systems are permitted to be omitted.

9.3. **Clearance to exposures.** BESS located outdoors shall be separated by a minimum ten feet (3048 mm) from the following exposures:

- Lot lines
- Public ways
- Buildings
- Stored combustible materials
- Hazardous materials
- High-piled stock
- Other exposure hazards

**Exceptions:**

- Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free standing fire barrier, suitable for exterior use, and extending 5 feet (1.5 m) above and extending 5 feet (1.5 m) beyond the physical boundary of the BESS installation is provided to protect the exposure.
- Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where noncombustible exterior walls with no openings or combustible overhangs are provided on the wall adjacent to the BESS and the fire-resistance rating of the exterior wall is a minimum 2 hours.
- Clearances to buildings are permitted to be reduced to 3 feet (914.4 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the BESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large scale fire testing.

9.4. **Exterior wall installations.** BESS shall be permitted to be installed outdoors on exterior walls of buildings when all of the following conditions are met:

- The maximum energy capacity of individual BESS units shall not exceed 20 kWh.
- The BESS shall comply with applicable requirements in this Appendix.
- The BESS shall be installed in accordance with the manufacturer’s instructions and their listing.
- Individual BESS units shall be separated from each other by at least three feet (914 mm).
- The BESS shall be separated from doors, windows, operable openings into buildings, or HVAC inlets by at least five feet (1524 mm)

**Exception:** Where approved smaller separation distances in items 4 and 5 shall be permitted based on large scale fire testing.

10. **Special installations.** Rooftop and open parking garage BESS installations shall comply with Sections 10.1 through 10.6.

10.1. **Rooftop installations.** For the purpose of Table 6, rooftop BESS installations are those located on the roofs of buildings.

10.2. **Open parking garage installations.** For the purpose of Table 6, open parking garage BESS installations are those located in a structure or portion of a structure that complies with Section 406.5 of the International Building Code.

TABLE 6 SPECIAL BESS INSTALLATIONS

Compliance Required	Rooftops <sup>a</sup>	Open Parking Garages <sup>b</sup>
5. General Installation Requirements	Yes	Yes
6.1. Size and separation	Yes	Yes
6.4. Smoke and automatic fire detection	Yes	Yes
6.6. Maximum enclosure size	Yes	Yes
6.8. Means of egress separation	Yes	Yes
10.3. Clearance to exposures	Yes	Yes
10.4. Fire suppression systems	Yes	Yes
10.5. Rooftop installations	Yes	No
10.6. Open parking garage installations	No	Yes
7. Technology specific protection	Yes	Yes

a. See Section 10.1.

b. See Section 10.2.

10.3. **Clearance to exposures.** BESS located on rooftops and in open parking garages shall be separated by a minimum ten feet (3048 mm) from the following exposures:

- Buildings, except the building on which rooftop BESS is mounted
- Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed
- Lot lines
- Public ways
- Stored combustible materials
- Locations where motor vehicles can be parked
- Hazardous materials
- Other exposure hazards

**Exceptions:**

- Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free standing fire barrier, suitable for exterior use, and extending 5 feet (1.5 m) above and extending 5 feet (1.5 m) beyond the physical boundary of the BESS installation is provided to protect the exposure.
- Clearances are permitted to be reduced to 3 feet (914.4 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the BESS and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large scale fire testing.

10.4. **Fire suppression systems.** BESS located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the BESS enclosure in accordance with Section 6.5. Areas containing BESS other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 6.5.

**Exception:** A fire suppression system is not required in open parking garages if large scale fire testing is provided that shows that a fire will not impact the exposures in Section 10.3.

10.5. **Rooftop installations.** BESS and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

- Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
- Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
- BESS and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment, or component but not less than 5 feet (1.5 m).
- The roofing materials under and within 5 feet (1524 mm) horizontally from a BESS or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
- A Class I standpipe outlet shall be installed at an approved location on the roof level of the building or in the stairway bulkhead at the top level.
- The BESS shall be the minimum of 10 feet from the fire service access point on the roof top.
- The BESS shall not be located within 50 feet (15,240 mm) of air inlets for building HVAC systems.

**Exception:** This distance shall be permitted to be reduced to 25 feet (7,620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors deenergizes the ventilation system connected to the air intakes upon detection of fire.

10.6. **Open parking garages.** BESS and associated equipment that are located in open parking garages shall comply with all of the following:

- BESS shall not be located within 50 feet (15,240 mm) of air inlets for building HVAC systems.

**Exception:** This distance shall be permitted to be reduced to 25 feet (7,620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.

- BESS shall not be located within 25 feet (7,620 mm) of exits leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.
- An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least five feet (1,024 mm) from the outer enclosure of the BESS.

## APPENDIX 3: Operation and Maintenance Manual

The Operation and Maintenance Manual shall be provided to both the BESS owner and their operator before the battery energy storage system is put into operation. The energy storage system shall be operated and maintained in accordance with the manual and a copy of the documentation shall be retained at an approved onsite location to be accessible to facility personnel, fire code officials, and emergency responders.

In addition to complying with the Uniform Code, the battery energy storage system Operation and Maintenance Manual shall, at a minimum, 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.
7. Inspection and testing records

## 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.

## Questions?

If you have any questions about the Battery Energy Storage System Model Law, please email questions to [cleanenergyhelp@nyscrda.ny.gov](mailto:cleanenergyhelp@nyscrda.ny.gov) or request free technical assistance at [nyscrda.ny.gov/Energy-Storage-Guidebook](http://nyscrda.ny.gov/Energy-Storage-Guidebook). The NYSERDA team looks forward to partnering with communities across the State.

# Battery Energy Storage System Model Permit

Understanding the permitting requirements of residential and small commercial battery energy storage systems.

# Section Contents

1. Battery Energy Storage System Model Permit . . . . .29

# 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 [nyserdera.ny.gov/Energy-Storage-Guidebook](https://nyserdera.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.

## SUBMITTAL INSTRUCTIONS

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].

## 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].

## 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



---

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. [REDACTED].

## 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 [REDACTED] Code.

### **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.
  - Show method and location of required ventilation equipment (if required) for indoor installations.
- Identify the total number of batteries.
- The floor plan shall include:
  - New equipment for the battery energy storage system.
  - Existing equipment for interconnection.
  - Show required working clearances for all existing/new electrical equipment.
  - Show whether the equipment is to be installed indoors or outdoors.
  - Show method and location of requirement ventilation equipment (if required) for indoor installations.
  - Show method of protection from physical damage for the battery energy storage system.
  - Show means of access to battery energy storage system.
  - Denote whether conductors are routed indoors or outdoors.
- Provide an elevation drawing of the system equipment and specify elevation in relation to flood plains.
  - If the building is in a flood zone, it shall be above base flood elevation.
- Provide supporting documents from manufacturer if equipment is subject to physical damage.

### **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 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 installed at the main service panel and at locations of all electric power production sources capable of being interconnected (2017 NEC 706.11).
- One or Three-Line Diagram
  - Show grounding and bonding for the battery energy storage system, including the ground return path.
  - Show method of interconnection.
  - Show overcurrent protection method and rating when required.
  - Include detailed wiring information for all new circuits, including:
    - > Conductor size/type
    - > Number of conductors
    - > Conduit size
    - > Conduit type
  - Show all disconnection means.
  - Show ratings (voltage, ampacity, environmental, etc) for new and existing service equipment.
- Specifications and installation instructions

- 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. Energy storage systems listed and labeled solely for utility or commercial use shall not be used for residential applications.
    - > Exceptions:
      - Where approved, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.
      - Energy storage systems less than 1 kWh (3.6 megajoules).
  - 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:
    - > BESS shall be listed in accordance with UL 9540.
    - > Chargers, inverters, and energy storage management systems shall be covered as part of the UL 9540 listing or shall be listed separately.
  - An approved energy storage 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 and based on large scale fire testing complying with requirements set forth in the applicable fire code.
  - > 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.
  - > Rooms and areas containing energy storage systems shall be protected on the system side by fire-resistant construction.
  - > Energy storage systems installed in a location subject to vehicle damage shall be protected by approved barriers.

## 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).

## PLAN REVIEW

Permit applications can be submitted to [REDACTED] in person at [REDACTED] and [REDACTED] electronically through: [REDACTED].

## FEES

[REDACTED]

## DEPARTMENTAL CONTACT INFORMATION

Once all permits to construct the battery energy storage system installation have been issued and the system has been installed, it must be inspected before final approval is granted for the battery energy storage system. On-site inspections can be scheduled by contacting [REDACTED] by telephone at [REDACTED] or electronically at [REDACTED].

Inspection requests received within business hours are typically scheduled for the next business day. If next business day is not available, inspection should happen within a five-day window. [REDACTED].

In order to receive final approval, the following inspection is required:

[REDACTED] The applicant must contact [REDACTED] when ready for a final inspection. During this inspection, the inspector will review the complete installation to ensure compliance with codes and standards, as well as confirming that the installation matches the records included with the permit application. The applicant must have ready, at the time of inspection, the following materials and make them available to the inspector:

- Copies of as-built drawings and equipment specifications, if different than the materials provided with the application.
- Photographs of key hard to access equipment.

[REDACTED] has adopted a standardized “Battery Energy Storage System Inspection Checklist”, which can be found here: [REDACTED].

## DEPARTMENTAL CONTACT INFORMATION

For additional information regarding this permit process, please consult our departmental website at [REDACTED] or contact [REDACTED] at [REDACTED].

## Questions?

If you have any questions about the Battery Energy Storage System Model Permit, please email questions to [cleanenergyhelp@nyserderda.ny.gov](mailto:cleanenergyhelp@nyserderda.ny.gov) or request free technical assistance at [nyserderda.ny.gov/Energy-Storage-Guidebook](http://nyserderda.ny.gov/Energy-Storage-Guidebook). The NYSERDA team looks forward to partnering with communities across the State.

# Battery Energy Storage System Inspection Checklist

Checklist to assist with field inspections of residential and small commercial battery energy storage systems.



**NYSERDA**

Battery Energy Storage System Guidebook for Local Governments  
NYSERDA 17 Columbia Circle Albany, NY 12203

# Section Contents

1. Inspection Checklist .....37

# Overview

The Checklist is intended to be utilized as a guideline for field inspections of residential and small commercial battery energy storage systems. It can be used directly by local code enforcement officers or provided to a third-party inspection agency, where applicable.

The Battery Energy Storage System Inspection Checklist 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 [nyserdera.ny.gov/Energy-Storage-Guidebook](https://nyserdera.ny.gov/Energy-Storage-Guidebook), Battery Energy Storage System Inspection Checklist tab.

## 1. Inspection Checklist

Applicable Codes: NEC 2017, [add any additional local codes required]

The information provided in this document is general and intended as a guide only. Each project is unique and additional requirements may be enforced as deemed appropriate.

### Project Information

Permit Number	
Primary Contractor	
Project Address	
Date	

### Pre-Inspection

	De-energize electrical panels prior to removing the dead-front. All equipment shall be open and ready for inspection
	The approved plans, permit, and installation instructions shall be on site at time of inspection
	Major changes, including revisions, to the installation shall be submitted to the AHJ for review and approval prior to inspection

## Inspection

### General

	Exact match of component product number and rating with plan
	All equipment shall bear the appropriate listing mark of a Nationally Recognized Testing Laboratory where such marking is required as part of the listing, and installed in accordance with its listing (NEC Article 110.3(B))
	Battery energy storage system includes a manual (system description, operating and safety instructions, maintenance requirements, safe battery handling requirements/recommendations)
	A personnel door(s) intended for entrance to and egress from rooms designed as BESS rooms shall open in the direction of egress and shall be equipped with listed panic hardware, (NEC 706.10(D))
	Provide sufficient working spaces and clearances for batteries. Working space shall be measured from the edge of the battery cabinet, racks, or trays, (NEC 480.9, 110.26)
	<p>Spaces about the ESS shall comply with NEC 110.26. Working space shall be measured from the edge of the ESS modules, battery cabinets, racks, or trays, (NEC 706.10(C))</p> <ul style="list-style-type: none"> <li>• For battery racks, there shall be a minimum clearance of 1 inch between a cell container and any wall or structure on the side not requiring access for maintenance.</li> <li>• ESS modules, battery cabinets, racks, or trays shall be permitted to contact adjacent walls or structures, provided that the battery shelf has a free air space for not less than 90% of its length.</li> <li>• Pre-engineered and self-contained ESSs shall be permitted to have working space between components within the system in accordance with the manufacturer's recommendations and listing of the system.</li> </ul>

### Equipment

	Flexible Battery DC conductors are listed as hard service use and/or moisture resistant, (NEC 690.74, 706.32)
	Fine stranded flexible cables (if used) terminated in accordance with NEC 110.14, (NEC 110.14, 690.74, 706.32)
	Ungrounded conductor is not marked using white, grey, or white striped conductors to avoid confusion with grounded conductor markings, (NEC 200.7)
	Electrochemically dissimilar metals are not in direct physical contact, (NEC 110.14)
	All connections shall be secure, (NEC 110.14, 706.31)
	All metallic raceways and equipment shall be bonded and electrically continuous, (NEC 110.3(B), 250.8)
	Unused opening shall be close with protection equivalent to the wall of enclosure, (NEC 110.3(B), 408.7)
	The selected wiring methods are appropriate for the location and installed in accordance with their intended use, (NEC 310, 706)
	All live parts of batteries must be guarded regardless of voltage or battery type, (NEC 706.10(B))
	Batteries' live parts shall be guarded in accordance with (NEC 110.27, 480.10(B))
	Verify that the attachment of the battery storage unit to the wall or floor is per the approved plans. If the wall or floor construction differs from the approved plans, a revision is required prior to inspection

### Grounding

	Any conductive battery racks, cases or trays must be connected to an equipment grounding conductor. (NEC 250.110)
	Equipment grounding conductor is properly identified as either bare, green, or green with continuous yellow stripe(s), (NEC 250.119)
	If there is no existing AC grounding electrode, the ESS contractor shall install (2) ground rods at the main electrical service. If there is only (1) ground rod, a second one shall be installed. Ground rods shall be a minimum of 6' apart, (NEC Exhibit 250.25, Article 250.53, 706)



## Main Electric Service

	Circuit breakers shall be of the same manufacturer as the main service panel, (NEC 110.3)
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## Ventilation

	Provide adequate ventilation for batteries per manufacturer's requirements. (NEC 706.10(A))
	Batteries/enclosures contain ventilation equipment to prevent excessive accumulation of gas pressure and/or gas ignition, (NEC 706.10)

## Connections and Terminations

	Cell terminations have measures taken to prevent corrosion
	Electrical connections do not put mechanical strain on battery terminals, (NEC 706.31, 110.14(A))
	Overcurrent protection of ungrounded conductors shall have overcurrent protection device(s) located as close as practicable to the battery terminals in an unclassified location, (NEC 480.5, 706.7)
	Battery circuit and equipment shall be protected by overcurrent protective devices as close as practicable to the storage battery terminals in accordance with the requirements of NEC Article 240, (NEC 240.21(H), 705.65(A))
	Unless the short-circuit currents from all sources do not exceed the ampacity of the conductors, storage battery inverters shall be protected by overcurrent protective devices from all other sources, (NEC 705.65(A))
	A listed current-limiting overcurrent protective device shall be installed adjacent to the ESS for each dc output circuit, (NEC 706.21(C))
	In an ac-coupled system, the plug-in type circuit breaker connected to the output of the storage battery or multimode inverter is required to be secured, (NEC 408.36(D), 710.15(E))
	Storage battery, multimode, and utility-interactive inverter output circuit breakers that are marked "Line" and "Load" are not permitted to be back-fed, (NEC 710.15(E), 110.3(B), 705.12(B)(4))
	Single 120-volt inverter in ac coupled systems should not supply back-up loads containing multiwire branch circuit or any 240 volt outlets. Such action can overload the common neutral in such a wiring method, (NEC 710.15(C))

## Monitoring and Charge Control

	Charge controllers shall be compatible with the battery or ESS manufacturer's electrical ratings and charging specifications, (NEC110.3(B))
	Charge controller is properly installed to prevent overcharging or damaging batteries, (NEC 690.72, 706.23)
	Diversionary charge controllers with utility-interactive and multimode inverters shall have a second independent controller to prevent battery overcharge in the event the diversion loads are unavailable or the diversion charge controller fails, (NEC 706.23(B)(3)(b))

## Disconnecting Means

	A disconnecting means is provided for all ungrounded conductors derived from a dc stationary battery system with a voltage of over 60 volts dc, (NEC 480.7)
	A disconnecting means shall be provided for all ungrounded conductors derived from an ESS. A disconnecting means shall be readily accessible and located within sight of the ESS, (NEC 706.7(A))
	Battery circuits subject to field servicing where exceeding 240 volts nominal between conductors or to ground, shall have provisions to disconnect the series-connected strings into segments not exceeding 240 volts nominal for maintenance by qualified persons. Non-load-break bolted, or plug-in disconnects shall be permitted, (NEC 706.30(B))
	ESS exceeding 100 volts between conductors or to ground shall have a disconnecting means, accessible only to qualified persons, that disconnects ungrounded and grounded circuit conductor(s) in the electrical storage system for maintenance. This disconnecting means shall not disconnect the grounded circuit conductor(s) for the remainder of any other electrical system. A non-load-break-rated switch shall be permitted to be used as a disconnecting means, (NEC 706.30(C))
	Where battery energy storage system input and output terminals are more than 5ft from the connected equipment, or where these terminals pass through a wall or partition must comply with all of NEC 706.7(E) (1) A disconnecting means shall be provided at the energy storage system end of the circuit. Fused disconnecting means or circuit breakers shall be permitted to be used. (2) A second disconnecting means located at the connected equipment shall be installed where the disconnecting means required by 706.7(E)(1) is not within sight of the connected equipment. (3) Where fused disconnecting means are used, the line terminals of the disconnecting means shall be connected toward the energy storage system terminals. (4) Disconnecting means shall be permitted to be installed in energy storage system enclosures where explosive atmospheres can exist if listed for hazardous locations. (5) Where the disconnecting means in (1) is not within sight of the disconnecting means in (2), placards or directories shall be installed at the locations of all disconnecting means indicating the location of all other disconnecting means. (NEC 706.7(E))
	Where a disconnecting means, located in accordance with NEC 480.7(A) (out of sight of the battery storage system), is provided with remote controls to activate the disconnecting means and the controls for the disconnecting means are not located within sight of the stationary battery system, the disconnecting means shall be capable of being locked in the open position, (NEC 480.7(B))
	The equipment grounding lug shall be as specified by the manufacturer, (NEC 110.3(B))
	Remove any insulating finish, such as paint, under the equipment grounding lug prior to installation (NEC 250.8, 250.12)
	Maximum height requirements for disconnects applies to integrated disconnect (e.g., Tesla PowerWalls or similar applications)

## Interconnection

	The interconnection methods comply with NEC Article 705.12 (if connected to other energy sources)
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## Signage

	<p>The signage shall be in compliance with ANSI Z535 and shall include the following information</p> <ol style="list-style-type: none"> <li>1. Labeled “Energy Storage Systems” with symbol of lightning bolt in a triangle</li> <li>2. Type of technology associated with the ESS</li> <li>3. Special hazards associated</li> <li>4. Type of suppression system installed in the area of the ESS</li> <li>5. Emergency contact information</li> </ol>
	<p>A permanent plaque or directory denoting the location of all electric power source disconnecting means on or in the premises shall be installed at each service equipment location and at the location(s) of the system disconnect(s) for all electric power production sources capable of being interconnected. The marking shall comply with NEC 110.21(B) (NEC 706.11)</p>
	<p>Equipment containing overcurrent devices in circuits supplying power to a busbar or conductors supplied from multiple sources shall be marked to indicate the presence of all sources. (NEC 705.12(B)(3))</p>
	<p>PV system output circuit conductors shall be marked to indicate the polarity where connected to battery energy storage systems. (NEC 690.55)</p>
	<p>DC system conductors of 4 AWG or larger shall be identified using colored marking tape, (NEC 210.5(C)(2))</p>
	<p>Where controls to activate the disconnecting means of a battery are not located within sight of a stationary battery system, the location of the controls shall be field marked on the disconnecting means. (NEC 480.7(B))</p>
	<p>Where controls to activate the disconnecting means of an ESS are not located within sight of the system, the disconnecting means shall be capable of being locked in the open position, in accordance with 110.25, and the location of the controls shall be field marked on the disconnecting means. (NEC 706.7(B))</p>
	<p>Where the sum of the ampere ratings of all overcurrent devices on panelboards, both load and supply devices, excluding the rating of the overcurrent device protecting the busbar, shall not exceed the ampacity of the busbar. The rating of the overcurrent device protecting the busbar shall not exceed the rating of the busbar. Permanent warning labels shall be applied to distribution equipment displaying the following or equivalent wording: (NEC 705.12(B)(2)(3)(c)):</p> <p style="text-align: center;"><b>WARNING: THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR</b></p>
	<p>Where two sources, one a primary power source and the other another power source, are located at opposite ends of a busbar that contains loads, the sum of 125 percent of the power source(s) output circuit current and the rating of the overcurrent device protecting the busbar shall not exceed 120 percent of the ampacity of the busbar. The busbar shall be sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment adjacent to the back-fed breaker from the power source that displays the following or equivalent wording: (NEC 705.12(B)(2)(3)(b)):</p> <p style="text-align: center;"><b>WARNING: INVERTER OUTPUT CONNECTION; DO NOT RELOCATE THIS OVERCURRENT DEVICE.</b></p>
	<p>All battery and battery management equipment and associated switchgear are marked and labeled according to all applicable codes including arc flash incident calculations for the safety of operation and maintenance personnel required by the National Electrical Code and OSHA: (NEC 110.16)</p>
	<p>If a battery dc disconnecting means is not provided at the batteries, the disconnecting means shall be legibly marked in the field. The marking shall be of sufficient durability to withstand the environment involved and shall include the following (NEC 480.7(D)):</p> <ul style="list-style-type: none"> <li>• Nominal battery voltage</li> <li>• Maximum available short-circuit current derived from the stationary battery system</li> <li>• Date the calculation was performed for the value above</li> <li>• The battery disconnecting means shall be marked in accordance with 110.16</li> </ul>

# Questions?

If you have any questions about the Battery Energy Storage System Inspection Checklist, please email questions to [cleanenergyhelp@nyserda.ny.gov](mailto:cleanenergyhelp@nyserda.ny.gov) or request free technical assistance at [nyserda.ny.gov/Energy-Storage-Guidebook](https://nyserda.ny.gov/Energy-Storage-Guidebook). The NYSERDA team looks forward to partnering with communities across the State.

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**State of New York**

Andrew M. Cuomo, Governor

**New York State Energy Research and Development Authority**

Richard L. Kauffman, Chair | Alicia Barton, President and CEO