Kingston Zoning Group

BESS
March 13, 2026

Units - Area

1 acre = 43,560 SF
1/2 acre = 21,780 SF
1/4 acre = 10,890 SF

Kingston Zoning Code
405.21.O Small-Scale Renewable Energy Systems

- Ground-mounted solar energy systems (a photovoltaic system of electricity generating solar panels mounted on the ground) with a footprint not greater than **600sf.**
- Other types of renewable energy systems including Hydropower, Geothermal Heat Pumps, and Solar Water Heaters, as long as the combined footprint of above ground components are not greater than **200sf.**

**Small-scale <1,000sf
** BESS are predominantly installed on the ground due to their weight, size, and fire safety requirements, appearing as containers or pads. Rooftop/Wall Mount are limited to smaller residential/commercial units, requiring strict adherence to fire safety, weight, and ventilation codes.

NYSERDA - Battery Energy Storage System FAQ
(P.11) “Many suitable project locations can be smaller than an acre while the total project footprint of some BESS installations may occupy several acres.

For example, **5MW commercial BESS systems can typically fit in a quarter acre lot**, including 10-foot clearance to exposures required by Fire Code.“

Units - Power vs. Energy

kilowatt kW (Power)
How fast electricity is being used or delivered

1,000 kW = 1 megawatt MW

kilowatt-hour kWh (Energy)
How much electricity is used or stored over time

** units are related but not interchangeable

NYSERDA - Battery Energy Storage System FAQ
(P.3) What are the different types of BESS?

- **Residential storage:** Primarily used for home resiliency to deliver back-up power, these systems can also shift energy consumption to off-peak hours and integrate home solar for a low-cost clean energy supply. These types of systems usually are up to 20kWh per unit.
- **Commercial storage:** Businesses can install storage systems onsite or separate from building loads, like a community solar project. These systems can be paired with solar, provide back-up power, and earn compensation from utilities for delivering grid benefits. These systems sizes vary and usually are up to 5 MW.
- **Bulk storage (utility scale):** These grid-connected storage projects enable increased integration of renewable energy sources while ensuring a resilient and reliable power supply when and where it's needed most. They provide multiple grid services which will be explained in detail in this document.

**Comercial storage up to 5 MW which would require about 10,890 SF

BESS Model Law - NYSERDA

P. 19 - 20

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 plans, 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:

BESS Model Law - NYSERDA

P. 26

6. Permitting Requirements for Tier 1 Battery Energy Storage Systems

Tier 1 Battery Energy Storage Systems shall be permitted in all zoning districts, subject to the Uniform Code and the "Battery Energy Storage System Permit," and exempt from site plan review.

7. Permitting Requirements for Tier 2 Battery Energy Storage Systems

Tier 2 Battery Energy Storage Systems are permitted through the issuance of a [special use permit] within the [XXXXXXXXXXXX, XXXXXXXXXX, XXXXXXXXXX] zoning districts, and shall be subject to the Uniform Code and the site plan application requirements set forth in this Section.

A. Applications for the installation of Tier 2 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, and 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.

** Tier 1 is subject to the Uniform Code (Uniform Fire Prevention & Building Code) and the "Battery Energy Storage System Permit".
** Tier 2 more complex and needs further/careful review

2020 Uniform Fire Prevention and Building Codes
P. 34 - 57

Overview

The New York State Uniform Fire Prevention and Building Code (Uniform Code) prescribes mandatory statewide minimum standards for building construction and fire prevention. In 2020, the Uniform Code was amended to include the latest safety considerations for energy storage systems.

All energy storage systems must be designed and installed in accordance with all applicable provisions of the Uniform Code. Select excerpts from the 2020 Uniform Code that apply to Energy Storage Systems are included herein for ease of reference only.

For the latest code updates, please refer to the New York State Department of State (NYS DOS) website (www.dos.ny.gov). Should any conflicts exist between this section and the Uniform Code, the Uniform Code requirements shall prevail. This section of the Guidebook is adapted from select publications included in the 2020 Uniform Code, published by NYS DOS, available here.

The Uniform Code is formulated by the State Fire Prevention and Building Code Council (the "Code Council") pursuant to Article 18 of the New York State Executive Law.

New York Battery Energy Storage System Guidebook - NYSERDA

2020 Uniform Fire Prevention and Building Codes
P. 34 - 57

2020 Residential Code of NYS

1. The 2020 Residential Code of New York State

1.1 2020 Residential Code of New York State Section R202 (Definitions) This is not an exhaustive list of definitions that may apply to energy storage systems

ENERGY STORAGE SYSTEM. One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time, not to include a stand-alone 12- volt car battery or an electric motor vehicle.

(RB) BATTERY SYSTEM, STATIONARY STORAGE. A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls 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.

1.2 2020 Residential Code of New York State Section R327 (Energy Storage Systems)

SECTION R327 ENERGY STORAGE SYSTEMS

R327.1 General. Energy storage systems installed in buildings or structures that are subject to the provisions of this code shall be installed and maintained in accordance with Sections R327.2 through R327.11. The temporary use of an owner's or occupant's electric powered vehicle as an energy storage system shall be in accordance with Section R327.12.

Energy storage system installations exceeding the permitted aggregate ratings in Section R327.5 shall be installed in accordance with Section 1206.2 through 1206.17.7.7 of the Fire Code of New York State.

R327.2 Equipment listings. Energy storage systems listed and labeled solely for utility or commercial use shall not be used for residential applications.

Exceptions:

1. 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.
2. Energy storage systems less than 1 kWh (3.6 megajoules). R327.3 Installation. Energy storage systems shall be installed in accordance with the manufacturer's instructions and their listing.

R327.3.1 Spacing. Individual units shall be separated from each other by at least 3 feet of spacing unless smaller separation distances are documented to be adequate based on large scale fire testing complying with Section 1206.6 of the Fire Code of New York State.

R327.4 Location. Energy storage systems shall only be installed in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space and sleeping units in accordance with Section R302 of this code.
3. Outdoors on exterior walls located a minimum 3 ft. from doors and windows.
4. Utility closets and storage or utility spaces within dwelling units and sleeping units

New York Battery Energy Storage System Guidebook - NYSERDA

2020 Uniform Fire Prevention and Building Codes
P. 34 - 57

2020 Residential Code of NYS

R327.5 Energy ratings. Individual energy storage system units shall have a maximum rating of 20 kWh. The aggregate rating 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

R327.6 Electrical installation. Energy storage systems shall be installed in accordance with NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction.

R327.7 Fire detection. Rooms and areas in which energy storage systems are installed shall be protected by smoke alarms in accordance with Section R314. A heat detector or heat alarm listed and interconnected to the smoke alarms shall be installed in locations where smoke alarms cannot be installed based on their listing.

R327.8 Fire-resistance rating. Rooms and areas containing energy storage systems shall be protected on the system side by no less than 5/8-inch Type X gypsum board or equivalent, installed on the walls and ceiling of the room or area.

Attached garages containing energy storage systems shall be protected on the system side by fire-resistant construction in accordance with Section R302.

R327.9 Protection from impact. Energy storage systems installed in a location subject to vehicle damage shall be protected by approved barriers.

R327.10 Ventilation. Indoor installations of energy storage systems that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 1206.13.1 of the Fire Code of New York State.

R327.11 Toxic and highly toxic gas. Energy storage systems that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within one- and two-family dwellings and townhouses.

R327.12 Electric vehicle use. The temporary use of an owner or occupant's electric powered vehicle to power a dwelling unit or sleeping unit while parked in an attached or detached garage or outside shall comply with the vehicle manufacturer's instructions and NFPA 70. The batteries on electric vehicles shall not contribute to the aggregate energy limitations in Section R327.

**Tier 1 <600kW needs further review. NY Fire Code applies per R327.1

New York Battery Energy Storage System Guidebook - NYSERDA

2020 Uniform Fire Prevention and Building Codes
P. 34 - 57

2020 Fire Code of NYS

3.3 2020 Fire Code of New York State Section 1206 Electrical Energy Storage Systems

SECTION 1206 Electrical ENERGY STORAGE SYSTEMS

[NY] 1206.1 Scope. Energy storage systems having capacities exceeding the values shown in Table 1206.1 shall comply with Section 1206.2 through 1206.17.7.7. Energy storage systems in Group R-3 and R-4 occupancies shall comply with Section 1206.18.

TABLE 1206.1 — ENERGY STORAGE SYSTEM THRESHOLD QUANTITIES

TECHNOLOGY	ENERGY CAPACITY[a]
Lead-acid batteries, all types	70 kWh (252 Megajoules)[c]
Nickel-cadmium batteries (Ni-Cd)	70 kWh (252 Megajoules)
Nickel metal hydride (Ni-MH)	70 kWh (252 Megajoules)
Lithium-ion batteries	20 kWh (72 Megajoules)
Flow batteries[b]	20 kWh (72 Megajoules)
Other battery technologies	10 kWh (36 Megajoules)
Capacitor energy storage systems	3 kWh (10.8 Megajoules)
Other electrochemical energy storage systems technologies	3 kWh (10.8 Megajoules)

a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in Amp-Hours, kWh shall equal rated voltage times amp-hour rating divided by 1000.
b. Shall include vanadium, zinc-bromine, polysulfde-bromide, and other flowing electrolyte type technologies.
c. An installation that exceeds 50 gallons of lead-acid battery electrolyte shall be considered to have exceeded the threshold quantities of this Table.

1206.3 Permits
1206.4 Construction documents
1206.5 Hazard mitigation analysis
1206.7 Fire remediation
1206.8 Peer review
1206.9 Commissioning, decommissioning, operation and maintenance
1206.10 Equipment

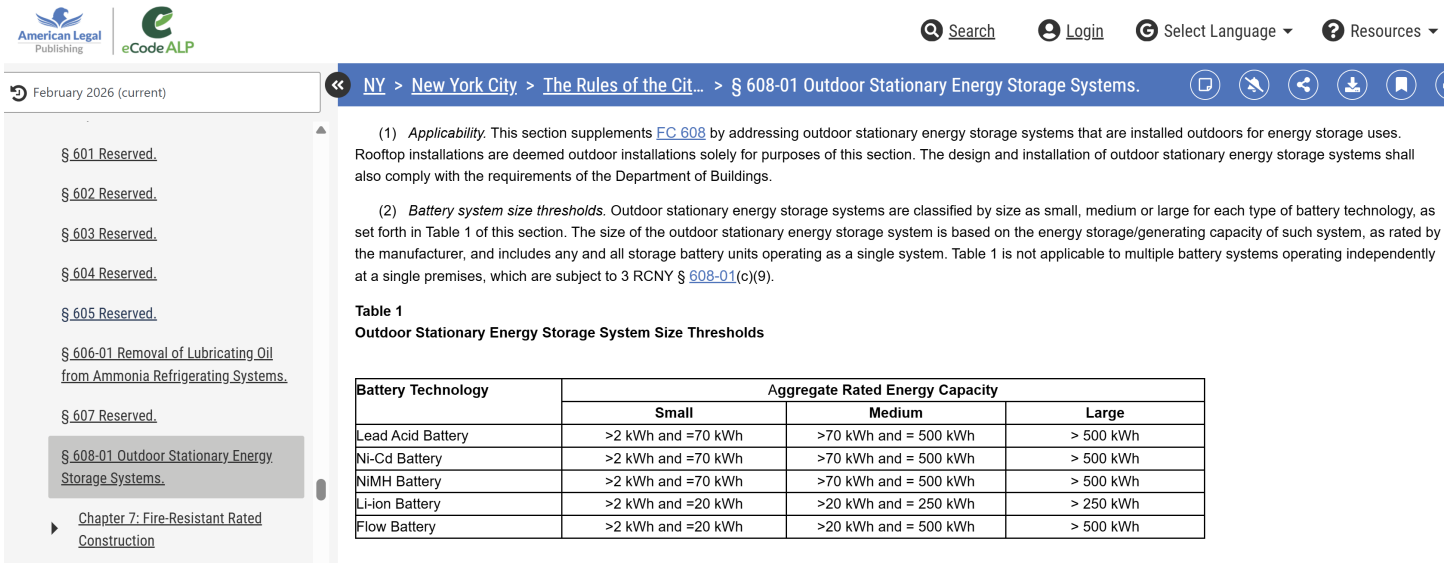
Tier Classifications

New York City

The Rules of the City of NY

608-01 Outdoor Stationary Energy Storage Systems

https://codelibrary.amlegal.com/codes/newyorkcity/latest/NYCrules/0-0-0-140278



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February 2026 (current)

NY > New York City > The Rules of the Cit… > § 608-01 Outdoor Stationary Energy Storage Systems.

§ 601 Reserved.
§ 602 Reserved.
§ 603 Reserved.
§ 604 Reserved.
§ 605 Reserved.
§ 606-01 Removal of Lubricating Oil from Ammonia Refrigerating Systems.
§ 607 Reserved.
§ 608-01 Outdoor Stationary Energy Storage Systems.
Chapter 7: Fire-Resistant Rated Construction

(1) *Applicability.* This section supplements FC 608 by addressing outdoor stationary energy storage systems that are installed outdoors for energy storage uses. Rooftop installations are deemed outdoor installations solely for purposes of this section. The design and installation of outdoor stationary energy storage systems shall also comply with the requirements of the Department of Buildings.

(2) *Battery system size thresholds.* Outdoor stationary energy storage systems are classified by size as small, medium or large for each type of battery technology, as set forth in Table 1 of this section. The size of the outdoor stationary energy storage system is based on the energy storage/generating capacity of such system, as rated by the manufacturer, and includes any and all storage battery units operating as a single system. Table 1 is not applicable to multiple battery systems operating independently at a single premises, which are subject to 3 RCNY § 608-01(c)(9).

Table 1
Outdoor Stationary Energy Storage System Size Thresholds

Battery Technology	Aggregate Rated Energy Capacity		
	Small	Medium	Large
Lead Acid Battery	>2 kWh and =70 kWh	>70 kWh and = 500 kWh	> 500 kWh
Ni-Cd Battery	>2 kWh and =70 kWh	>70 kWh and = 500 kWh	> 500 kWh
NiMH Battery	>2 kWh and =70 kWh	>70 kWh and = 500 kWh	> 500 kWh
Li-ion Battery	>2 kWh and =20 kWh	>20 kWh and = 250 kWh	> 250 kWh
Flow Battery	>2 kWh and =20 kWh	>20 kWh and = 500 kWh	> 500 kWh

There are stationary BESS and mobile BESS.
Stationary is the typical.
Mobile (typ. 150 kWh or less) designed for mobility and used for temp power in construction, events, etc.

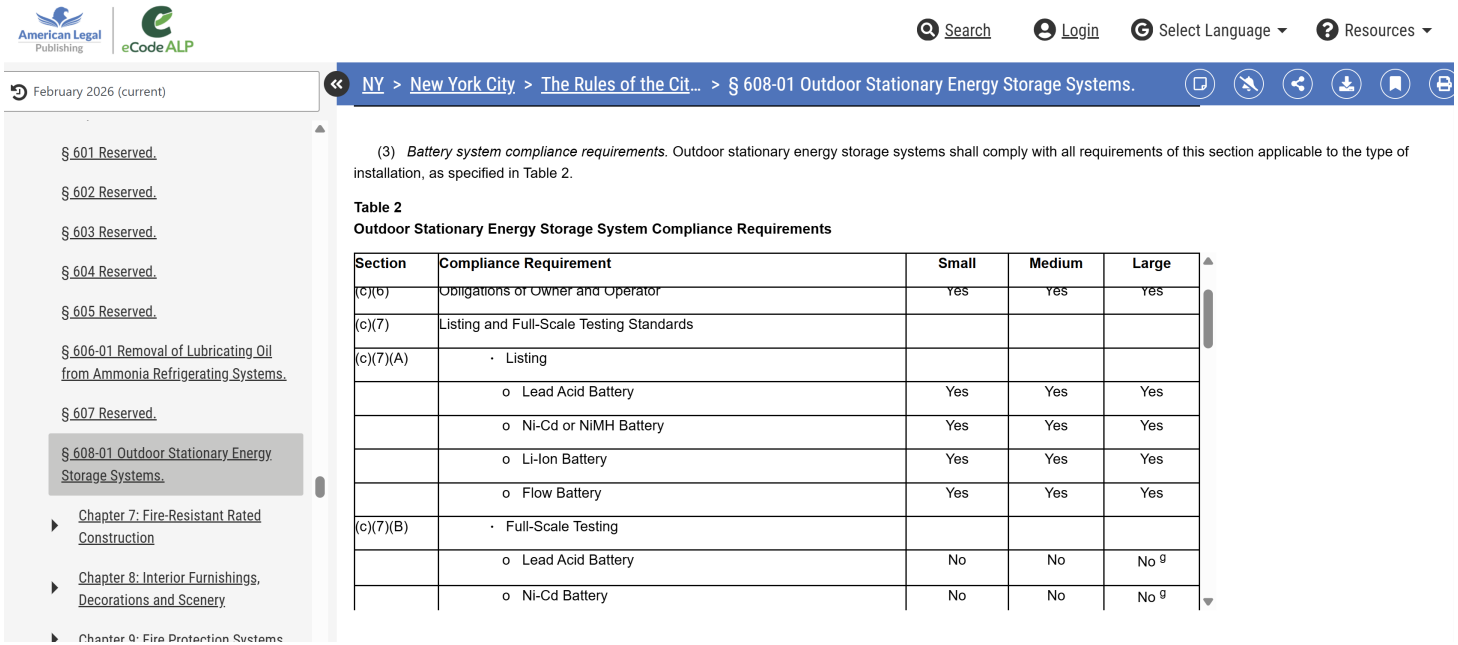
Small scale: 2 kWh to 20 kWh (Li-ion & flow battery) and 2 kWh to 70 kWh (others)

New York City

The Rules of the City of NY

608-01 Outdoor Stationary Energy Storage Systems

https://codelibrary.amlegal.com/codes/newyorkcity/latest/NYCrules/0-0-0-140278



Medium and Large scale require permit.
Small does not.

Listing for all battery types is required for all scales.
Testing for Li-Ion battery is required for all scales.

Arlington, WA (Population 22,916)

Zoning Code and Development Design Standards & Guidelines

Chapter 20.114 Alternative Energy Systems and Technologies

https://www.arlingtonwa.gov/295/Land-Use-Code-Devt-Design-Standards-Guid

Battery Energy Storage System: A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls 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* (Residential-Scale) battery energy storage systems have a maximum stored energy capacity less than or equal to 20 kWh and, if in a room or enclosed area, consist of only a single energy storage system technology. The aggregate rating of the ESS shall not exceed the following for each location listed:
    a. 40 kWh within utility closets, basements, and storage or utility spaces
    b. 80 kWh in attached or detached garages and detached accessory structures.
    c. 80 kWh where outdoor wall mounted.
    d. 80 kWh where outdoor ground mounted.
b. *Tier 2* (Medium -Scale/Commercial) battery energy storage systems have an aggregate energy capacity greater than 40 kWh up to 600 (kWh).
c. *Tier 3* (Industrial-Scale/Public Utility) battery energy storage systems having an aggregate energy capacity greater than 600 kWh, up to, but not exceeding 200 mega-watt hours (MWh), or battery energy storage systems with more than one storage battery energy technology is provided in a room or enclosed area. An HMA shall be required for lithium-ion ESS that exceed 600 kWh (2,160 MJ) for outdoor ESS installations, ESS installations in open parking garages and on rooftops of buildings, and mobile ESS equipment.

Aggregate rating: The combined total of all battery units in one installation.

Arlington, WA (Population 22,916)

Zoning Code and Development Design Standards & Guidelines

Chapter 20.114 Alternative Energy Systems and Technologies (2024)

https://www.arlingtonwa.gov/295/Land-Use-Code-Devt-Design-Standards-Guid

20.114.140 – Permitting Requirements for Tier 1 Battery Energy Storage Systems

Tier 1 Battery Energy Storage Systems are allowed in all zoning districts, subject to the applicable requirements of the most current editions of the IRC, IBC, NEC, NFPA 70, NFPA 855, and all equipment shall be UL 9540 listed. Tier 1 systems are subject to minor floor plan/site plan review as required in the BESS Permit. Tier 1 systems, if installed outside a structure, shall meet all established setbacks for the zone they are within, be protected by fencing and screened from view by adjacent property and the public Right of Way.

20.114.145 – Permitting Requirements for Tier 2 Battery Energy Storage Systems

Tier 2 Battery Energy Storage Systems are allowed, in conjunction with a Special Use Permit, within the Highway Commercial (HC), Business Park (BP) Light Industrial (LI) and General Industrial (GI) zones, subject to the applicable requirements of the most current edition of the IEC, IBC, NEC, and NFPA 855., and are subject to administrative site plan review. Tier 2 systems shall be set back a minimum of fifty (50) feet from adjacent properties, provide security fencing and be screened from view from adjacent property and public Right of Way.

20.114.150 – Permitting Requirements for Tier 3 Battery Energy Storage Systems

a. Tier 3 Battery Energy Storage Systems are allowed only in General Industrial (GI) zones, in conjunction with a Conditional Use Permit. Tier 3 systems shall be set back five hundred (500) feet from any residentially zoned property, provide security fencing, and be screened from view from adjacent property and the public Right of Way. All Tier 3 Battery Energy Storage Systems shall adhere to the most current edition of the following Codes, Standards and Test Methods:
    1. 2021 International Fire Code® (IFC)
    2. 2021 NFPA 1, Fire Code (NFPA 1)
    3. 2023 NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems* (NFPA

NFPA 70 - National Electric Code
NFPA 855 - Standard for the Installation of Staionary Energy Storage Systems
UL 9540 - Standard for Safety of Energy Storage Systems and Equipment,

Battery Energy Storage Systems FAQ - NYSERDA

P.8

2. What safety standards do BESS projects follow in New York?

New York State is a national leader in BESS safety. The 2025 NYS Fire Code has some of the most rigorous safety standards in the nation which are based on NFPA 855 and the International Fire Code (IFC), in addition to recommendations from Governor Hochul's Inter Agency Fire Safety Working Group.

BESS safety regulations are based on multiple Codes and Standards*:

- Underwriters Laboratories (UL) 1741 – Inverters for utility interactive systems
- UL 1973 – Standard for batteries
- UL 1974 – Second use batteries.
- UL 9540 – "Standard for Energy Storage Systems and Equipment" certifies that all components of the system work safely in harmony together
- UL 9540A – Test method to evaluate system safety and inform installations
- The National Fire Protection Association (NFPA) 12 – Standard on CO2 Extinguishing Systems
- NFPA 13 – Standard for the Installation of Sprinkler Systems
- NFPA 15 – Standard for Water Spray Fixed Systems for Fire Protection
- NFPA 68 – Standard on Explosion Protection by Deflagration Venting
- NFPA 69 – Standard on Explosion Prevention Systems
- NFPA 70 – National Electric Code
- NFPA 72 – National Fire Alarm and Signaling Code
- NFPA 750 – Standard on Water Mist Fire Protection Systems
- NFPA 855 – Standard for the Installation of Stationary Energy Storage Systems
- NFPA 1142 – Standard on Water Supplies for Suburban and Rural Firefighting
- NFPA 2001 – Standard on Clean Agent Fire Extinguishing Systems
- NFPA 2010 – Standard for Fixed Aerosol Fire-Extinguishing Systems

**this is not an exhaustive list of all of applicable standards.*

American Planning Association

Battery Energy Storage Systems (3/2024)

https://planning.org/zoningpractice/2024/march/battery-energy-storage-systems/

BATTERY ENERGY STORAGE USE CASES

As the cost of batteries declines and the efficacy improves, batteries are being used in many new applications where costs were previously prohibitive. People are quite familiar with how this has changed consumer devices and function. Mobility devices using batteries, from electric bicycles and scooters to passenger vehicles and even buses, are also increasingly common in the market.

Stationary battery use cases are less well understood by the general public and are perceived as having land-use impacts that may require planning or zoning consideration. A review of the literature and existing standards applied by state and local jurisdictions shows that stationary battery applications fall into four general use cases, each of which has potential subcategories: residential, commercial, standalone utility asset, and integrated with wholesale energy generation.

Residential battery systems are generally coupled with rooftop or backyard solar arrays designed to supply household energy. These battery applications serve primarily a backup power or resilience function but are increasingly being deployed as an alternative to selling excess production to the utility as "net metering" buy back rates are reduced by state regulators or legislators. These systems all fall well below the 600 kWh NFPA 855 threshold for mandatory fire and thermal protections. Most residential backup systems would also fall below the 20 kWh International Fire Code (IFC) limitation for residential battery units.

Commercial battery systems are increasingly used in conjunction with on-site solar generation, particularly as a means to reduce the demand charge portion of commercial electric bills. Some applications are also designed to provide backup power or resilience benefits. Most systems will fall below the NPFA 855 threshold, but larger commercial or industrial applications will exceed the 600-kWh standard and need to meet structure containment, fire suppression, personnel training, and a variety of other standards.

Standalone utility asset battery systems are high-capacity systems deployed at substations or occasionally as a standalone land use, which serve to enhance performance and resilience of the local electric system. These systems will always be over the 600-kWh

Location

Location

Zoning Code and Development Design Standards & Guidelines

Chapter 20.114 Alternative Energy Systems and Technologies (2024)

https://www.arlingtonwa.gov/295/Land-Use-Code-Devt-Design-Standards-Guid

Part II – Battery Energy Storage Systems

20.114.125 - Introduction

a. Batteries are a unique class of energy storage system infrastructure. Because the basic unit is a small cell or pouch, a BESS is modular in nature and can be configured in virtually any size. Additionally, a BESS has relatively limited infrastructure requirements, needing a concrete pad to sit on and a connection to the electric grid. These two factors-modularity and limited infrastructure needs-means that a BESS can be built virtually anywhere, including in close proximity to existing commercial and residential uses.

b. Battery Energy Storage Systems can consist of numerous battery types, listed within the definitions section, but lithium-ion batteries are currently the most prevalent technology and can be configured as a large-scale system consisting of several acres, or a small system installed in the garage of a home or anything in between. The energy density of lithium-ion batteries is its key benefit, it is also its greatest risk. Lithium-ion batteries store large amounts of energy in a small space coupled with having a flammable electrolyte, having the potential to become unstable and enter thermal runaway- a state in which the chemical reactions within the battery release excess energy and gasses that cause battery failure and fires.

Can be located anywhere and not necessarily close to substations (small & medium scale)

Developers prefer to install BESS near substations due to cost. Applies to large-scale when it's a public utility. Small/medium scale don't have that restriction.

Climate Smart Kingston Comission Letter

Climate Smart Kingston Comission Letter

1. Mainly talks about Li-Ion battery systems

2. Recommendations?

4.1 Incorporate lithium-ion battery energy storage systems and other energy storage technologies **into the City of Kingston's Comprehensive Plan**

The City of Kingston is reviewing and updating its comprehensive plan. This is an opportunity to incorporate BESS and other energy storage technologies into the comprehensive plan. The City can outline its goals and procedures for the installation, operation, maintenance, and decommissioning of BESS and other energy storage technologies.

4.2 Update The Kingston Form Based Development Code to Incorporate BESS

The City of Kingston is reviewing its Form Based Development Code. This is an opportunity to incorporate BESS into the code including:

- Add battery energy storage system to Article 1: Overview and Definitions, *Section 405.2 Definitions.*
  - Provide a definition for small-scale systems and large-scale systems and include examples of the types of energy storage technologies (e.g. lithium ion) that are permitted.
- Identify the transect zones where small-scale and large-scale BESS is permitted and update Article 3: Transect Standards.
- Outline the standards and permitting requirements that apply for small-scale and large-scale BESS and update Article 4: General Standards.

4.3 Adopt Permit for Small-Scale BESS Systems

Adopting a standard permit can help local government officials establish the minimum submittal requirements for electrical and structural plan review for permitting small-scale BESS. This can streamline and speed up the permitting process for small-scale BESS. NYSERDA has a model permit that the Kingston can review, modify, share with stakeholders for feedback, and adopt. Kingston has taken similar steps for other clean energy technologies including for small-scale solar PV systems by adopting the Unified Solar Permit for solar PV systems 25 kW and below.

4.4 Offer and Organize Trainings for First Responders on BESS in City of Kingston and Broader Ulster County

NYSERDA offers free trainings for first responders on BESS safety and incident preparedness. The City of Kingston could organize a training for the Kington's firefighters and other first responders and invite surrounding communities to attend. Kingston could also consider hosting other trainings for code enforcement officers and/or planning and zoning board members.

Size

Size

Massachusetts

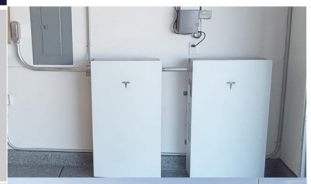
Solar PV & BESS Model Bylaws

Tiers by size

- Tier 1: < 250 kWh
- Tier 2: 250 kWh - 10 MWh
- Tier 3: 10 MWh - 100 MWh
- BESS facilities with a capacity of 100 MWh or more are subject to EFSB jurisdiction

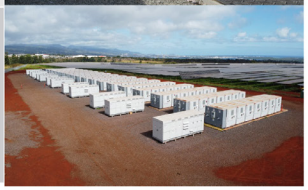
Typical BESS Project Types and Size Thresholds

Project Type	Typical Size
Tier 1 – Residential & Small Commercial	14 kWh - 250 kWh
Tier 2 – Larger Commercial & Small Standalone	250 kWh - 10 MWh
Tier 3 – Industrial and Larger Standalone	10 MWh - 100 MWh



Source: Solartek

Source: TRC



Source: Wärtsilä Energy Storage

Sustainable Energy Advantage, LLC

Battery Energy Storage Systems FAQ - NYSERDA

P.4 & 11

4. What are the components of a BESS?

BESS are carefully designed and thoroughly tested to ensure all its components work together and in harmony. These components include but are not limited to:

- **Battery cells** – which are grouped into modules and racks.
- **Battery Management System (BMS)** – which monitors every single cell and their performance. One of the most important components of the BESS, BMS can locate and control faults as well prevent any issues with the whole system.
- **Power Conversion System (PCS)** – converts electricity from Direct Current (DC) to Alternate Current (AC) which makes stored energy usable.
- **Energy Management System (EMS)** – allows to decide when to charge or discharge.
- **Cooling Systems** – HVAC systems are there to cool BESS as needed.
- **Communication Interfaces** – BESS integrate communication systems that allow grid operators to remotely control these systems and monitor them 24/7.

1/4 acre = 10,890 SF

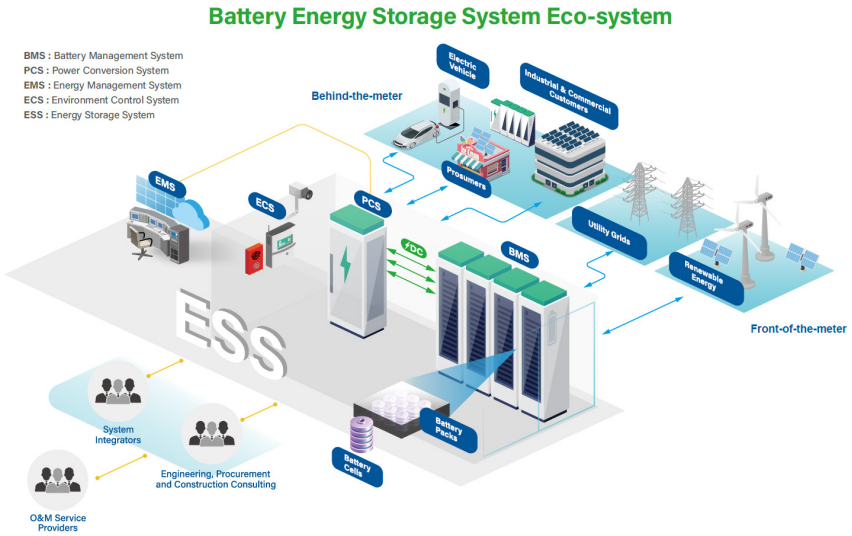
Commercial or medium-scale
**5MW Not kWh/mWh

4. What lot size is typical and appropriate for commercial BESS projects?

Lot sizes vary depending on the total capacity of a BESS project and container sizes. Many suitable project locations can be smaller than an acre while the total project footprint of some BESS installations may occupy several acres.

For example, 5MW commercial BESS systems can typically fit in a quarter acre lot, including 10-foot clearance to exposures required by Fire Code.

Other sources



https://www.advantech.com/en-us/resources/industry-focus/good-things-in-store-for-those-who-will-connect

A 1 MWh battery system typically occupies around 160–320 sf for the batteries themselves (10 × 32 ft container footprint), not counting space for inverters, transformers, access, and safety setbacks.

With support equipment and spacing, the overall site area grows beyond this simple container footprint.