

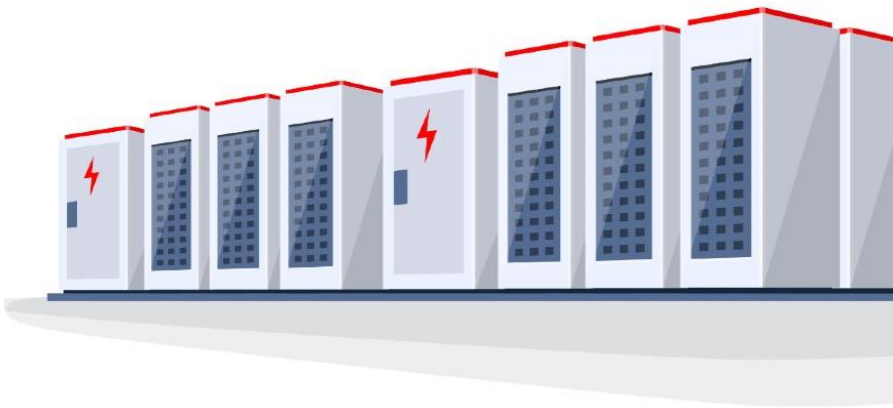


March 8, 2022

**Medway Planning & Economic Development Board
Meeting**

Battery Energy Storage Systems (BESS)

- Flyer for the upcoming 3-17-22 BESS presentation by Arup on technical language to include in zoning regulations
- Preliminary draft of an outline of recommended technical language to include in zoning regulations, dated 3-4-22, prepared by Arup.



Battery Energy Storage Systems (BESS) Zoning Regulations

The Town of Medway has contracted with Arup, a multi-disciplinary firm of engineers, designers, planners, consultants and technical specialists, to assist the Town and the community to learn about battery energy storage systems (BESS).

Arup will make a presentation about recommended technical language to include in possible zoning bylaw provisions regarding BESS facilities. Arup's report will be available in advance of the meeting and may be viewed or downloaded after March 11th at: <https://www.townofmedway.org/planning-economic-development-board>

There will be an opportunity for questions and answers.

NOTE – The purpose of this session is to present information pertaining to recommended technical provisions to include in possible BESS zoning regulations. The presentation will not address any particular site, project proposal, or rezoning.

Zoning Regulations for Battery Energy Storage Systems

Thursday,
March 17, 2022
@ 7 p.m. via ZOOM

Presentation by
Arup, the Town's
BESS consultant.

Zoom Access

<https://us02web.zoom.us/j/87401837922?pwd=aE1oa2hBeINOd2pVVGJHN1VjU0dXUT09>

Meeting ID:
845 3553 8141

Passcode: 213705

Medway Planning and Economic Development Board

155 Village Street
Medway, MA 02053

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Town of Medway

BESS Technical Zoning Outline

March 4, 2022

DRAFT PRELIMINARY

Overview

| Proposed BESS Zoning Section | Arup BESS Technical Input |
|------------------------------|---------------------------------|
| Authority | None |
| Purpose | None |
| Application | BESS Code Thresholds |
| Definitions | Definitions |
| General Requirements | Building Code |
| | Electrical Code |
| | Fire Code |
| | Required Documentation |
| Siting Standards | Permissible Location Thresholds |
| | Required Setbacks |
| | Emergency Access |
| | Code Required Commissioning |
| Design Standards | Signage |
| | Utility Connections |

| Proposed BESS Zoning Section | Arup BESS Technical Input |
|------------------------------------|------------------------------------|
| Design Standards, cont. | Disconnection Means |
| | UL Listing requirements |
| Safety and Environmental Standards | Perimeter Barrier |
| | Vegetation / Combustible Setback |
| | Emergency Response Plan |
| | Technology-Specific Safety Systems |
| Monitor and Maintenance | Code Required Maintenance |
| Abandonment or Decommissioning | Decommissioning |
| Procedures | None |
| Terms of Special Permit | None |
| Permit Time Frame and Abandonment | None |
| Enforcement | None |
| Severability | None |

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Approach

Each section of recommended zoning bylaw content is provided with two options.

- **Option A:** NFPA 855, Standard for the Installation of Stationary Energy Storage Systems

If implemented, Option A would require full compliance with the most recent available edition of NFPA 855 for all BESS projects within Medway. NFPA 855, though not currently formally adopted by the State of Massachusetts, is the latest available standard on BESS safety. It is our recommendation that the Town of Medway consider voluntary adoption of NFPA 855 to capture the latest industry research and knowledge in BESS safety.

- **Option B:** 527 CMR 1.00, Massachusetts Comprehensive Fire Safety Code

Option B represents the minimum requirements applicable to all jurisdictions within Massachusetts.

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Authority

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---------------------------|
| - | 1. | None |

Purpose

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---------------------------|
| A. | 2. | None |

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Application

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| B. | 4. | BESS Code Thresholds |

Technical Code/Regulation Reference Section

This section applies to energy storage systems exceeding the thresholds contained in NFPA 855

Code/Regulation Plain Language (reference only)

Applicable to energy storage systems exceeding the following capacities:

- *Lead-acid > 70 kWh*
- *Nickel > 70 kWh*
- *Li-ion > 20 kWh*
- *Sodium nickel chloride > 20 kWh*
- *Flow > 20 kWh*
- *Other battery technologies > 10 kWh*
- *BESS in one- and two-family dwellings > 1 kWh*

Code Reference

NFPA 855 Table 1.3

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Application

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| B. | 4. | BESS Code Thresholds |

| Technical Code/Regulation Reference Section |
|--|
| <p>This section applies to energy storage systems exceeding the thresholds contained in 527 CMR 1.00</p> |

| Code/Regulation Plain Language (reference only) |
|---|
| <p><i>Indoor stationary Lead-Acid and Nickel-Cadmium batteries with electrolyte capacities > 100gal in sprinklered buildings or > 50gal in unsprinklered buildings where used as facility standby power, emergency power, or UPS</i></p> <p>Indoor and outdoor Li-ion, sodium, flow, and other battery technologies exceeding the following capacities:</p> <ul style="list-style-type: none">- Li-ion > 20 kWh- Sodium > 20 kWh- Sodium ion > 70 kWh- Flow > 20 kWh- Other battery technologies > 10 kWh <p>Note that 527 CMR does not currently contain prescriptive requirements applicable to BESS below the thresholds identified above (i.e. < 20 kWh). The MA State Fire Marshall's Office has issued a Joint Memorandum providing guidance for AHJs seeking to regulate ESS within one- and two-family homes. This gap is addressed if Option A is pursued.</p> |

| Code Reference |
|---|
| <p>527 CMR 1.00 §52.2.1</p> <p>527 CMR 1.00 §52.3.1</p> |

Definitions

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|--|
| C. | 3. | Definitions |
| <p>Technical Code/Regulation Reference Section</p> <p>Terminology contained in this section is as defined by NFPA 855, in addition to the definitions in this section.</p> <p>Reference to NFPA 855 should be assumed as reference to the latest edition of the code.</p> <p>780 CMR, Massachusetts State Building Code. The state building code for Massachusetts.</p> <p>527 CMR 1.00, Massachusetts Comprehensive Fire Safety Code. The state fire code for Massachusetts.</p> <p>527 CMR 12.00, Massachusetts Electrical Code. The state electrical code for Massachusetts.</p> <p>Where a term is not defined, they shall be defined using their ordinary accepted meanings within the context in which they are used</p> | <p>Code/Regulation Plain Language (reference only)</p> <p><i>BESS-specific terminology is defined in Chapter 3 of NFPA 855</i></p> | <p>Code Reference</p> <p>NFPA 855 Chapter 3</p> |

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Definitions

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|--|
| C. | 3. | Definitions |
| <p>Technical Code/Regulation Reference Section</p> <p>Terminology contained in this section is as defined by 527 CMR 1.00, in addition to the definitions in this section.</p> <p>Reference to NFPA 855 should be assumed as reference to the latest edition of the code.</p> <p>780 CMR, Massachusetts State Building Code. The state building code for Massachusetts.</p> <p>527 CMR 1.00, Massachusetts Comprehensive Fire Safety Code. The state fire code for Massachusetts.</p> <p>527 CMR 12.00, Massachusetts Electrical Code. The state electrical code for Massachusetts.</p> | <p>Code/Regulation Plain Language (reference only)</p> <p><i>BESS-specific terminology is defined in Chapter 3 of 527 CMR 1.00</i></p> | <p>Code Reference</p> <p>527 CMR 1.00 Chapter 3</p> |

DRAFT PRELIMINARY

General Requirements – Building Code

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|--|
| D. | 5. | Building Code |
| Technical Code/Regulation Reference Section <p>All energy storage systems shall be designed, constructed, and operated in accordance with the applicable requirements of 780 CMR.</p> <p>Permits shall comply with 780 CMR</p> | Code/Regulation Plain Language (reference only) <p><i>Building permits will be applied for and obtained through the typical building permit process in Medway</i></p> | Code Reference <p>780 CMR §105</p> |

DRAFT PRELIMINARY

General Requirements – Building Code

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---|
| D. | 5. | Building Code |
| Technical Code/Regulation Reference Section Same as Option A | Code/Regulation Plain Language (reference only) Same as Option A | Code Reference Same as Option A |

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General Requirements – Electrical Code

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---|
| D. | 5. | Electrical Code |
| Technical Code/Regulation Reference Section <p>All energy storage systems shall be designed, constructed, and operated in accordance with the applicable requirements of 527 CMR 12.00</p> <p>Permits shall comply with 527 CMR 12.00 and M.G.L.c.</p> | Code/Regulation Plain Language (reference only) <p><i>ESS requirements pertaining to electrical design and installation are contained within Article 480 of 527 CMR 12.00 (NEC)</i></p> <p><i>Electrical permits will be applied for and obtained through the typical electrical permit process in Medway</i></p> | Code Reference <p>527 CMR 12.00 Rule 8 and M.G.L.c. 143 §3L</p> |

DRAFT PRELIMINARY

General Requirements – Electrical Code

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---|
| D. | 5. | Electrical Code |
| Technical Code/Regulation Reference Section Same as Option A | Code/Regulation Plain Language (reference only) Same as Option A | Code Reference Same as Option A |

DRAFT PRELIMINARY

General Requirements – Fire Code

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---|
| D. | 5. | Fire Code |
| Technical Code/Regulation Reference Section <p>All energy storage systems shall be designed, constructed, and operated in accordance with the applicable requirements of NFPA 855, Standard for the Installation of Stationary Energy Storage Systems and 527 CMR 1.00</p> <p>Permits shall comply with 527 CMR 1.00</p> | Code/Regulation Plain Language (reference only) <p><i>ESS requirements for safety, operation, and installation are contained within Chapter 52 of 527 CMR 1.00</i></p> <p><i>A permit through the local fire department is required for BESS exceeding the code thresholds for capacity identified above. Fire permits will be applied for and reviewed through the typical fire permit process in Medway</i></p> | Code Reference <p>527 CMR 1.00 §1.12 and §1.12.8.32</p> |

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General Requirements – Fire Code

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---|
| D. | 5. | Fire Code |
| Technical Code/Regulation Reference Section <p>All energy storage systems shall be designed, constructed, and operated in accordance with the applicable requirements of NFPA 855, Standard for the Installation of Stationary Energy Storage Systems and 527 CMR 1.00</p> <p>Permits shall comply with 527 CMR 1.00</p> | Code/Regulation Plain Language (reference only) <p><i>Option A would require full compliance with the newest edition of NFPA 855</i></p> <p><i>A permit through the local fire department is required for BESS exceeding the code thresholds for capacity identified above. Fire permits will be applied for and reviewed through the typical fire permit process in Medway</i></p> | Code Reference <p>527 CMR 1.00 §1.12 and §1.12.8.32</p> |

DRAFT PRELIMINARY

General Requirements – Required Documentation

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|--|
| D. | 5. | Required Documentation |
| Technical Code/Regulation Reference Section <p>Required documentation for the construction of new ESS systems per NFPA 855 will be provided to the AHJ for approval</p> | Code/Regulation Plain Language (reference only) <p><i>Required documentation to be provided to the AHJ during the design and permitting process and the building owner / owner's authorized agent includes:</i></p> <ol style="list-style-type: none"> <i>1. Construction plans and specifications to be provided to the AHJ</i> <i>2. Plans and specifications associated with energy storage systems owned and operated by utilities as a component of the electric grid that are considered critical infrastructure documents</i> <i>3. Test data, evaluation information, and calculations where required elsewhere by NFPA 855</i> <i>4. Where modeling data is provided, validation of modeling results is required</i> <i>5. Commissioning plan containing information complying with NFPA 855 Chapter 6</i> <i>6. Emergency operations plan</i> | Code Reference <p>NFPA 855 §4.1.2 and §4.1.3</p> |

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General Requirements – Required Documentation

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---|
| D. | 5. | Required Documentation |
| Technical Code/Regulation Reference Section Required documentation for the construction of new ESS systems per 527 CMR 1.00 will be provided to the AHJ for approval | Code/Regulation Plain Language (reference only) <i>Prior to installation, plans must be submitted and approved by the AHJ</i> | Code Reference 527 CMR 1.00 §52.1.2 |

DRAFT PRELIMINARY

Siting Requirements – Permissible Location Thresholds

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|--|
| E. | 7.H. | Permissible Location Thresholds |
| <p>Technical Code/Regulation Reference Section</p> <p>Energy storage system capacities, including array capacity and separation, are limited to the thresholds contained in NFPA 855</p> <p>Where energy storage systems exceed the thresholds identified above, the AHJ is permitted to approve installations on the basis of large-scale fire test data and/or hazard mitigation analysis as permitted by NFPA 855</p> | <p>Code/Regulation Plain Language (reference only)</p> <p><i>The BESS applicant can install systems up to the thresholds listed below. For BESS with larger capacities than the thresholds, large-scale fire test data and hazard analysis are required to support the installation.</i></p> <p><i>ESS threshold for overall capacity applies to ESS located:</i></p> <ul style="list-style-type: none"> - Indoor ESS located in non-dedicated-use buildings - Outdoor ESS located nearby (within 100ft) of the following exposures: buildings, lot lines that can be built upon, public ways (roads), stored combustible materials, hazardous materials, high-piled storage, and other exposure hazards not associated with electrical grid infrastructure - ESS in open parking garages and on rooftops of buildings <p><i>ESS overall capacity thresholds are:</i></p> <ul style="list-style-type: none"> - Lead-acid, Unlimited; - Nickel, Unlimited; - Li-ion ≤ 600 kWh; - Sodium nickel chloride ≤ 600 kWh; - Flow ≤ 600 kWh; - Other battery technologies ≤ 200 kWh | <p>Code Reference</p> <p>NFPA 855 §4.6 and §4.8</p> <p>NFPA 855 §4.1.4 and §4.1.5</p> |

DRAFT PRELIMINARY

Siting Requirements – Permissible Location Thresholds

Option A: NFPA 855, Continued

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------------|
| E. | 7.H. | Permissible Location Thresholds |
| Technical Code/Regulation Reference Section | Code/Regulation Plain Language (reference only) | Code Reference |
| | <p><i>ESS threshold for array capacity is 50 kWh separated by 3 feet applies to ESS located:</i></p> <ul style="list-style-type: none"> <i>- Indoor ESS located in non-dedicated-use buildings</i> <i>- Outdoor ESS located nearby (within 100ft) of the following exposures: buildings, lot lines that can be built upon, public ways (roads), stored combustible materials, hazardous materials, high-piled storage, and other exposure hazards not associated with electrical grid infrastructure</i> <p><i>For the ESS locations above exceeding the thresholds, large-scale fire testing and hazard mitigation analysis is required.</i></p> <p><i>Large-scale fire test data per UL 9540A is required for BESS > 50 kWh as a requirement of the UL 9540 BESS listing</i></p> | |

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Siting Requirements – Permissible Location Thresholds

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|---|
| E. | 7.H. | Permissible Location Thresholds |
| Technical Code/Regulation Reference Section Energy storage system capacities are limited to the thresholds contained in 527 CMR 1.00 Energy storage system arrays are limited to the capacity and spacing thresholds contained in 527 CMR 1.00 Where energy storage systems exceed the thresholds identified above, the AHJ is permitted to approve installations on the basis of large-scale fire test data and/or hazard mitigation analysis as permitted by 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>The BESS applicant can install systems up to the thresholds listed below. For BESS with larger capacities than the thresholds, large-scale fire test data and hazard analysis are required to support the installation.</i> <i>Energy storage systems are limited to the following maximum capacities:</i> - Li-ion ≤ 600 kWh; - Sodium ≤ 600 kWh; - Flow ≤ 600 kWh; - Other battery technologies ≤ 200 kWh; - Prepackaged and pre-engineered systems ≤ 250 kWh <i>Arrays within energy storage systems are limited to a maximum of 50 kWh spaced a minimum of 3ft apart and 3ft from combustible BESS container walls</i> <i>The AHJ may approve ESS with larger overall capacities where a hazard mitigation analysis (FMEA or other equivalent type) is provided.</i> <i>Large-scale fire test data per UL 9540A is required for BESS > 50 kWh as a requirement of the UL 9540 BESS listing</i> | Code Reference 527 CMR 1.00 §52.3.2.2 527 CMR 1.00 §52.3.2.3 527 CMR 1.00 §52.3.2.4 and §52.3.2.5 |

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Siting Requirements – Required Setbacks

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|--|
| E. | 7.H. | Required Setbacks |
| Technical Code/Regulation Reference Section Setbacks for outdoor ESS shall be in accordance with NFPA 855 | Code/Regulation Plain Language (reference only) <i>A minimum of 10ft must be maintained between ESS and the following:</i> <ul style="list-style-type: none"> - Lot lines - Public ways - Buildings - Stored combustible materials - Hazardous materials - High-piled storage - Personnel means of egress - Other exposure hazards not associated with electrical grid infrastructure <i>This setback distance may be reduced by implementing one of the alternative measures contained within NFPA 855 §4.4.3.3 for outdoor installations and NFPA 855 §4.4.4.2 for rooftop or open parking garage ESS</i> | Code Reference NFPA 855 §4.4.3.3, NFPA 855 §4.4.3.4 or NFPA 855 §4.4.4.2 as applicable |

DRAFT PRELIMINARY

Siting Requirements – Required Setbacks

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|--|---|
| E. | 7.H. | Required Setbacks |
| Technical Code/Regulation Reference Section Setbacks for outdoor ESS shall be in accordance with 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>A minimum of 5ft must be maintained between ESS and the following:</i> <ul style="list-style-type: none"> - Lot lines - Public ways - Buildings - Stored combustible materials - Hazardous materials - High-piled storage - Personnel means of egress - Other exposure hazards not associated with electrical grid infrastructure | Code Reference 527 CMR 1.00 §52.3.2.1.4.3; 527 CMR 1.00 §52.3.2.1.4.5 |

DRAFT PRELIMINARY

Siting Requirements – Emergency Access

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|---|
| E. | 7.H. | Emergency Access |
| Technical Code/Regulation Reference Section Fire department access must be provided in accordance with 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>Fire department access roads, knox boxes, and other access features must be provided as is required by the State fire code</i> | Code Reference 527 CMR 1.00 §18.2 |

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Siting Requirements – Emergency Access

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| E. | 7.H. | Emergency Access |

| Technical Code/Regulation Reference Section |
|---|
| Same as Option A |

| Code/Regulation Plain Language (reference only) |
|---|
| Same as Option A |

| Code Reference |
|------------------|
| Same as Option A |

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Siting Requirements – Code Required Commissioning

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|-----------------------------|
| E. | 7.H. | Code Required Commissioning |

Technical Code/Regulation Reference Section

Commissioning of ESS systems shall be in accordance with NFPA 855

Code/Regulation Plain Language (reference only)

The system installer or commissioning agent shall prepare a commissioning plan prior to the start of commissioning.

A report documenting the commissioning process and results shall be prepared and a copy provided to the AHJ prior to final inspection and approval and included in the ESS facility manual

Code Reference

NFPA 855 Chapter 6

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Siting Requirements – Code Required Commissioning

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|--|
| E. | 7.H. | Code Required Commissioning |
| Technical Code/Regulation Reference Section | Code/Regulation Plain Language (reference only) <p><i>527 CMR 1.00 does not contain commissioning requirements specific to ESS beyond standard commissioning practices for mechanical, electrical, plumbing and fire protection systems.</i></p> <p><i>527 CMR 1.00 requires pre-packages and pre-engineered BESS to be installed in accordance with their listing. This code section is referenced under UL Listing Requirements section of this recommended BESS zoning packet.</i></p> | Code Reference <p>527 CMR 1.00 §52.3.2.5.1</p> |

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Design Standards – Signage

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | Signage |

| Technical Code/Regulation Reference Section | Code/Regulation Plain Language (reference only) | Code Reference |
|---|--|-----------------|
| Provide signage in accordance with NFPA 855 | <p><i>Signage should be provided on doors to rooms, entrances to ESS facilities, and on ESS outdoor containers. Signage shall be in accordance with ANSI Z535. The following signage is required:</i></p> <ul style="list-style-type: none"> - <i>"Energy Storage Systems" with symbol of lightning bolt in a triangle</i> - <i>Identification of the type(s) of batteries present</i> - <i>Special hazards associated as identified in NFPA 855 Chapter 9-15</i> - <i>Type of suppression system installed in the ESS area</i> - <i>Emergency contact information</i> <p><i>A permanent plaque is required noting the location of electrical disconnects</i></p> | NFPA 855 §4.3.5 |

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Design Standards – Signage

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|---|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | Signage |
| Technical Code/Regulation Reference Section Provide signage in accordance with 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>Signage should be provided on doors or in approved locations near entrances to ESS rooms or facilities. The following signage is required:</i> <ul style="list-style-type: none"> - Hazard identification markings per NFPA 704 [NFPA hazard diamond] - "This room contains energized battery systems," or equivalent - Identification of the type(s) of batteries present - AUTHORIZED PERSONNEL ONLY - Technology-specific markings, if required by 527 CMR 1.00 §52.3.2.11 | Code Reference 527 CMR 1.00 §52.3.2.6.5 |

DRAFT PRELIMINARY

Design Standards – Utility Connections

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | Utility Connections |

Technical Code/Regulation Reference Section

System interconnections into utility grids shall be in accordance with NFPA 855

Code/Regulation Plain Language (reference only)

Depending on the location of the ESS in relation to and its interaction with the electrical grid, interconnection will be completed per 527 CMR 12.00 (NEC) or IEEE C2

Code Reference

NFPA 855 Chapter 5

DRAFT PRELIMINARY

Design Standards – Utility Connections

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | Utility Connections |

Technical Code/Regulation Reference Section

Utility connections shall be in accordance with 527 CMR 12.00 or per the applicable electrical for the electrical grid system

Code/Regulation Plain Language (reference only)

Depending on the location of the ESS in relation to and its interaction with the electrical grid, interconnection will be completed per 527 CMR 12.00 (NEC) or IEEE C2

Code Reference

527 CMR 12.00

DRAFT PRELIMINARY

Design Standards – Disconnection Means

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | Disconnection Means |
| Technical Code/Regulation Reference Section Provide means for disconnecting the ESS per NFPA 855 and 527 CMR 12.00 | Code/Regulation Plain Language (reference only) <i>The means for disconnecting should be readily accessible and within site of the ESS. The disconnect should be designed per 527 CMR 12.00 (NEC)</i> | Code Reference NFPA 855 §5.2 527 CMR 12.00 Article 480 |

DRAFT PRELIMINARY

Design Standards – Disconnection Means

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | Disconnection Means |

| Technical Code/Regulation Reference Section |
|---|
| Provide means for disconnecting the ESS per 527 CMR 12.00 |

| Code/Regulation Plain Language (reference only) |
|--|
| <i>The disconnect should be designed per 527 CMR 12.00 (NEC)</i> |

| Code Reference |
|---------------------------|
| 527 CMR 12.00 Article 480 |

DRAFT PRELIMINARY

Design Standards – UL Listing Requirements

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | UL Listing Requirements |
| Technical Code/Regulation Reference Section <p>ESS systems, including required equipment listings, must be in accordance with NFPA 855</p> <p>For any of the following, UL 9540A fire test data must be made available to the AHJ for review:</p> <ul style="list-style-type: none"> - BESS systems > 50kWh in capacity - BESS systems with spacing between arrays of < 3 ft | Code/Regulation Plain Language (reference only) <p><i>ESS systems are required to be listed per UL 9540, Energy Storage Systems and Equipment</i></p> <p><i>For BESS > 50kWh in capacity listed per the 2nd edition of UL 9540, UL 9540A testing is required and should be available for AHJ review</i></p> | Code Reference <p>NFPA 855 §4.2</p> |

DRAFT PRELIMINARY

Design Standards – UL Listing Requirements

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|--|--|
| F. | 7.B., 7.C., 7.D., 7.E., 7.F., 8 | UL Listing Requirements |
| Technical Code/Regulation Reference Section <p>ESS systems must be listed in accordance with 527 CMR 1.00</p> <p>For any of the following, UL 9540A fire test data must be made available to the AHJ for review:</p> <ul style="list-style-type: none"> - BESS systems > 50kWh in capacity - BESS systems with spacing between arrays of < 3 ft | Code/Regulation Plain Language (reference only) <p><i>Prepackaged or pre-engineered ESS systems are required to be listed per UL 9540, Energy Storage Systems and Equipment, and UL 1973, Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications.</i></p> <p><i>For BESS > 50kWh in capacity listed per the 2nd edition of UL 9540, UL 9540A testing is required and should be available for AHJ review</i></p> | Code Reference <p>527 CMR 1.00 §52.3.2.5</p> |

DRAFT PRELIMINARY

Safety and Environmental Standards – Perimeter Barriers

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|--|--|
| G. | 7.H. | Perimeter Barriers |
| Technical Code/Regulation Reference Section ESS sites should be protected from unauthorized access per NFPA 855 and 527 CMR 12.00 | Code/Regulation Plain Language (reference only) <i>Security barriers, fences, landscaping, and other enclosures must not inhibit required air flow to or exhaust from the ESS and components</i> <i>Electrical equipment greater than 1,000V require a means to restrict access</i> | Code Reference NFPA 855 §4.3.8 527 CMR 12.00 Article 110.30 |

DRAFT PRELIMINARY

Safety and Environmental Standards – Perimeter Barriers

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|---|
| G. | 7.H. | Perimeter Barriers |
| Technical Code/Regulation Reference Section ESS sites should be protected from unauthorized access per 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>Requires the BESS to be secured in a way subject to approval by the AHJ.</i> | Code Reference 527 CMR 1.00 §52.3.2.1.4.6 |

DRAFT PRELIMINARY

Safety and Environmental Standards – Vegetation Setback

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|--|
| G. | 7.H. | Vegetation / Combustibles Setback |
| Technical Code/Regulation Reference Section Vegetation around the ESS site must be maintained in accordance with NFPA 855 | Code/Regulation Plain Language (reference only) <i>Areas within 10ft of outdoor ESS containers must be cleared of combustible vegetation. Single specimens of trees or manicured ground cover such as green grass may be permitted if it does not constitute as a source to readily transmit fire</i> | Code Reference NFPA 855 §4.4.3.6 |

DRAFT PRELIMINARY

Safety and Environmental Standards – Vegetation Control

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|-----------------------------------|
| G. | 7.H. | Vegetation / Combustibles Setback |

| Technical Code/Regulation Reference Section |
|---|
| |

| Code/Regulation Plain Language (reference only) |
|--|
| <i>Vegetation control in 527 CMR 1.00 is covered under required setback distances for BESS, referenced under the Required Setbacks section of this BESS Zoning Considerations package.</i> |

| Code Reference |
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DRAFT PRELIMINARY

Safety and Environmental Standards – Emergency Response Plan

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|--|
| G. | 7.H. | Emergency Response Plan |
| Technical Code/Regulation Reference Section An emergency operations plan shall be created for the ESS system in accordance with NFPA 855 and be provided to the AHJ for review | Code/Regulation Plain Language (reference only) <i>Emergency operations plans are required to be provided to the AHJ and must include the following at a minimum:</i> <ul style="list-style-type: none"> - Procedures for safe shut-down, de-energizing, or isolation of equipment and for safe start-up following shut-down - Procedures for inspection and testing of alarms, interlocks, and controls - Procedures to be followed in response to battery management system conditions, including agreed-upon notification to fire department personnel and off-normal potentially hazardous conditions - Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other hazardous conditions - Response considerations to address response safety concerns and extinguishment when an SDS (material Safety Data Sheet) is not required - Procedures for dealing with ESS equipment damaged in a fire including safe removal - Other procedures as determined necessary by the AHJ to provide for safety of occupants and emergency responders - Procedures and schedules for conducting drills of these procedures | Code Reference NFPA 855 §4.1.3.2.1 |

DRAFT PRELIMINARY

Safety and Environmental Standards – Emergency Response Plan

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---|
| G. | 7.H. | Emergency Response Plan |
| Technical Code/Regulation Reference Section An emergency operations plan shall be created for the ESS system in accordance with 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>Emergency response plans may be provided as part of a hazard mitigation analysis completed for the ESS system but are not explicitly required by 527 CMR 1.00. They are not required by 527 CMR 1.00 to be provided to the AHJ.</i> <i>As additional guidance for emergency response plans, 527 CMR 1.00 requires emergency planning for generic facilities utilizing hazardous materials.</i> <i>It is recommended that local fire departments work together with the ESS site stakeholders to create a pre-incident plan, part of the facility's Emergency Operations Plan. It is recommended that the pre-incident plan include the following, as described in NFPA 855 Annex C.</i> | Code Reference 527 CMR 1.00 §52.3.2.4, Hazard Mitigation Analysis 527 CMR 1.00 §60.1.5 |

DRAFT PRELIMINARY

Safety and Environmental Standards – Technology-Specific Systems

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|--|
| G. | 7.H. | Technology-Specific Safety Systems |
| Technical Code/Regulation Reference Section Provide specialty safety systems in accordance with NFPA 855 as applicable for the battery chemistry and installed location | Code/Regulation Plain Language (reference only) <i>NFPA 855 requires specialty safety systems to be provided based on the ESS chemistry and installed location. Specialty safety systems include:</i> <ul style="list-style-type: none"> - Exhaust ventilation - Spill control - Neutralization [of spills] - Safety caps - Thermal runaway - Explosion control - Size and separation [of BESS systems and arrays] - Fire suppression and control - Smoke and fire detection | Code Reference NFPA 855 Table 9.2 and Chapters 4 and 9 |

DRAFT PRELIMINARY

Safety and Environmental Standards – Technology-Specific Systems

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|--|
| G. | 7.H. | Technology-Specific Safety Systems |
| Technical Code/Regulation Reference Section Provide technology-specific safety systems in accordance with 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>527 CMR 1.00 Chapter 52 requires specialty safety systems to be provided based on the ESS chemistry and installed location. Specialty safety systems include:</i> <ul style="list-style-type: none"> - Exhaust ventilation - Spill control - Neutralization [of spills] - Safety caps - Thermal runaway - Explosion control - Size and separation [of BESS systems and arrays] - Fire suppression and control - Smoke and fire detection | Code Reference 527 CMR 1.00 Table 52.2.1 and 527 CMR 1.00 Chapter 52 |

DRAFT PRELIMINARY

Monitor and Maintenance

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| H. | - | Code Required Maintenance |

Technical Code/Regulation Reference Section

Maintenance shall be in accordance with NFPA 855 and documented in Operations and Maintenance documentation per NFPA 855

Code/Regulation Plain Language (reference only)

Maintenance provisions will be driven by manufacturer requirements for the specific listed system. Maintenance plans will be documented in the Operations and Maintenance manual, required by NFPA 855

Code Reference

NFPA 855 §7.2

NFPA 855 §6.3

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Monitor and Maintenance

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| H. | - | Code Required Maintenance |

| Technical Code/Regulation Reference Section |
|--|
| Maintenance shall be in accordance with 527 CMR 1.00 and the manufacturer's listing and instructions |

| Code/Regulation Plain Language (reference only) |
|---|
| <i>Maintenance provisions will be driven by manufacturer requirements for the specific listed system.</i> |

| Code Reference |
|-------------------------|
| 527 CMR 1.00 §52.3.2.12 |

DRAFT PRELIMINARY

Abandonment or Decommissioning

Option A: NFPA 855

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|---|
| I. | 7.G. | Decommissioning |
| Technical Code/Regulation Reference Section Decommissioning of ESS systems shall be in accordance with NFPA 855 | Code/Regulation Plain Language (reference only) <i>Decommissioning shall be documented in a Decommissioning Plan. The AHJ shall be notified prior to decommissioning of an ESS system and shall be provided with a Decommissioning Report following decommissioning process and results</i> | Code Reference NFPA 855 Chapter 8 |

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Abandonment or Decommissioning

Option B: 527 CMR 1.00

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|---|---|---|
| I. | 7.G. | Decommissioning |
| Technical Code/Regulation Reference Section Decommissioning of ESS systems shall be in accordance with 527 CMR 1.00 | Code/Regulation Plain Language (reference only) <i>Decommissioning plans for BESS facilities may be provided as part of a hazard mitigation analysis completed for the ESS system but are not explicitly required by 527 CMR 1.00. They are not required by 527 CMR 1.00 to be provided to the AHJ.</i> <i>As additional guidance for decommissioning of facilities, 527 CMR 1.00 provides requirements related to facility closure for generic facilities utilizing hazardous materials.</i> <i>AHJs are required to be notified of facility closure a minimum of 30 days prior and have the ability to require owners to submit facility closure plans.</i> | Code Reference 527 CMR 1.00 §60.1.4 |

DRAFT PRELIMINARY

Procedures

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---------------------------|
| J. | - | None |

DRAFT PRELIMINARY

Terms of Special Permit

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---------------------------|
| K. | 7.I | None |

DRAFT PRELIMINARY

Permit Time Frame and Abandonment

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---------------------------|
| - | 9. | None |

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Enforcement

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|--|---------------------------|
| - | 10. | None |

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Severability

| Medway Zoning Bylaw (11/15/21) 8.8 Small Wind Generation | NYSDERDA BESS Guidebook (Dec 2020) 2. Model Law | Arup BESS Technical Input |
|--|---|---------------------------|
| - | 11. | None |

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