

ESS GUIDELINES



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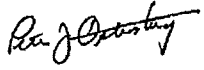
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Joint Memorandum

To: Building Inspectors and Fire Prevention Officers

From: Layla D'Emilia, Commissioner, Division of Professional Licensure 
Peter Ostroskey, State Fire Marshal, Department of Fire Services 

Date: June 7, 2021

Re: **Superseding Guidance for Energy Storage System (ESS) Installations in One- and Two-Family Dwellings**

This guidance document is updated and includes additional clarifying information. It supersedes the guidance dated May 21, 2021 that was emailed to recipients on May 24, 2021.

ESS installations under 20 KWh are not currently regulated and shall be installed in accordance with the manufacturer's instructions and listing requirements.

The advancement in stationary battery storage of electrical power generated by photovoltaic systems has outpaced prescriptive requirements in the current 780 CMR, *Massachusetts State Building Code*, and 527 CMR 1.00, *Massachusetts Comprehensive Fire Safety Code*. As a result of receiving many inquiries from municipal building and fire officials about how 780 CMR and 527 CMR 1.00 regulate Energy Storage Systems (ESS), this document has been created to provide guidance to authorities having jurisdiction (AHJs) to permitting ESS for one- and two-family dwellings. This guidance document aims to create consistency with issuing building, fire and electrical permits for ESS across the Commonwealth and provide minimum safeguards for the occupants of one- and two-family dwelling structures.

527 CMR 1.00: Chapter 52 currently regulates lithium ESS installations over 20 KWh. However, when adopted in October 2019, it was not anticipated that ESS installed in one- and two-family dwellings would exceed 20 KWh and the provisions of Chapter 52 are more aligned with commercial-type ESS installations. Therefore, this guidance may aid the AHJ in evaluating alternative means of design to a nationally accepted standard prior to the issuance of a permit.

527 CMR 1.00: 1.4 *equivalencies, alternatives, and modifications* is traditionally applied in cases where technology outpaces code adoption.

Plans for such installations must be submitted to building, fire and wiring inspector/officials for review and approval in accordance with 780 CMR, 527 CMR 1.00:1.4 and 52, and 527 CMR 12.00 prior to the issuance of a permit.

The provisions below are an industry standard that are currently under review for potential adoption in the future version of the codes, and may aid the AHJ in evaluating alternative means of design to a nationally accepted standard:

- The *ESS* must be *listed* and *labeled* in accordance with UL 9540 and be installed in accordance with the manufacturer's instructions and NFPA 70. [2020 NFPA 855: 15.2]
- Individual battery storage units are to be separated from each other by not less than 3 feet (914 mm) except where smaller separation distances are allowed by the manufacturer's specifications. [2020 NFPA 855: 15.5]
- *ESS* shall not be installed in the living area of dwelling units, in sleeping rooms, or closets or spaces opening directly into sleeping rooms. [2020 NFPA 855: 15.6.2]
- *ESS* shall be installed in the following locations:
 1. *ESS* shall only be installed in **attached garages** separated from the dwelling unit living and sleeping areas in accordance with the building code (780 CMR R302). [2020 NFPA 855: 15.6.1]
 - If the room or space where the *ESS* is to be installed is not finished, the walls and ceiling of the room or space shall be protected with not less than 5/8" Type X gypsum board. [2020 NFPA 855:15.6.1.1]
 - If the room or space where the *ESS* is to be installed is finished, but the walls and ceiling of the room or space are protected with less than 5/8" Type X gypsum board, an equivalent level of construction is needed to achieve the same fire resistance rating of 5/8" Type X gypsum.
 2. *ESS* shall only be installed **in basements not used for living or sleeping purposes, and shall only be installed in utility closets, storage closets, or storage spaces within basements.**
 - If the basement space or utility closet where the *ESS* is to be installed is not finished, the walls and ceiling of the basement space, or utility closet shall be protected with not less than 5/8" Type X gypsum board. [2020 NFPA 855:15.6.1.1]
 - Typically, utility closets or open spaces containing appliances within basements are separated from the remainder of the dwelling by noncombustible construction with clearance to combustibles in accordance with the manufacturer's specifications (reference 780 CMR M1306.1). If the *ESS* is installed outside a utility closet, a similar noncombustible or minimal fire resistance rated construction provision could be applied as an alternative design.
 - Combustible construction shall be protected by 5/8" Type X gypsum per manufacturer's instructions but not less than 24" extending to the sides and above the unit (including the ceiling).

- If the room or space where the ESS is to be installed is finished, but the walls and ceiling of the room or space are protected with less than 5/8" Type X gypsum board, an equivalent level of construction is needed to achieve the same fire resistance rating of 5/8" Type X gypsum in the location(s) indicated above.
- 3. **In detached garage or accessory structure.** If a detached garage or structure is closer than 10' to the dwelling unit, then the walls within 10' of the dwelling unit should be treated with the same level of protection as an attached garage (see item #1).
- 4. **Outdoors on exterior walls, or on the ground located a minimum of 3' from doors and windows.**
 - If the ESS is installed outdoors on exterior walls, the ESS must be mounted on non-combustible construction (similar to electrical panels).
 - If the ESS is installed within an enclosure that shares a wall with the dwelling unit, heat detection should be provided and be interconnected with the dwelling unit smoke alarms.
- A hardwired-powered smoke alarm shall be installed in the immediate vicinity of the ESS and interconnected with the smoke alarms installed throughout the dwelling in compliance with 780 CMR R314. Where ESS are installed in an attached garage or an area in which smoke alarms cannot be installed in accordance with their listing, a hardwired-powered, interconnected listed heat alarm shall be installed and be connected to the smoke alarm system required by 780 CMR R314. [2020 NFPA 855: 15.9.1 and 15.9.2]
- Individual ESS units shall not exceed a maximum rating of 20 kWh. The aggregate rating of the ESS shall not exceed:
 - 40 kWh within enclosed utility closets or storage spaces.¹
 - 80 kWh in attached or detached garages, or detached accessory structures.
 - 80 kWh in outdoor/exterior wall installations. [2020 NFPA 855:15.7.1]
- An ESS installation exceeding the permitted individual or aggregate ratings shall be installed in accordance with 527 CMR 1.00: Chapter 52 and 780 CMR.
- 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. [2020 NFPA 855: 15.8.1]
- An ESS installed in a location subject to vehicle damage shall be protected by *approved* barriers. [2020 NFPA 855: 15.10]
- Indoor installations of ESS that produce hydrogen or other flammable gases during charging are to be provided with mechanical *ventilation* in accordance with 780 CMR M1307.4.

¹ This aggregate rating is the standard for basements. To reiterate, ESS shall only be installed in basements not used for living or sleeping purposes, and shall only be installed in utility closets, storage closets, or storage spaces within basements.

- A label shall be required on the installed system containing the contact information for the qualified maintenance and service providers. [2020 NFPA 855:15.4.1]

The following information shall be provided with the application of an ESS installation: A copy of the manufacturer's specifications, installation manual, operation, maintenance, and decommissioning instructions. Upon the completion of the project this information shall be provided to the owner or placed in a conspicuous location near the ESS equipment.

In order to install an ESS, a building owner must obtain a permit from the building official per 780 CMR, fire official per 527 CMR 1.00, and wiring inspector per 527 CMR 12.00.

If a property *owner* (or their designee) within your jurisdiction is seeking a permit to install an ESS, and you have questions or concerns, please do not hesitate to contact the state representatives noted below. While there is no route to state-wide approval of alternative designs, we anticipate similar alternatives being proposed across multiple jurisdictions and can assist with the review of these proposed installations to create consistency.

- District State Building Inspector (<https://www.mass.gov/doc/state-building-inspector-district-assignments/download>)
- Division of Fire Safety, Department of Fire Services (<https://www.mass.gov/info-details/dfs-staff-list-and-directory#division-of-fire-safety->). For communities North of I-90, contact Kristen McDonough at Kristen.mcdonough@mass.gov. For communities along South of I-90, contact Jake Nunnemacher at Jacob.nunnemacher@mass.gov.