Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

August 20, 2025

RE: Guidance on Public Health, Safety and Environmental Impacts of Electric Battery Storage and Electric Vehicle Chargers

The Honorable Christine Barber
House Chair, Joint Committee on
Environment and Natural Resources
State House, Room 136
Boston, MA 02133

The Honorable Becca Rausch
Senate Chair, Joint Committee on
Environment and Natural Resources
State House, Room 215
Boston, MA 02133

The Honorable Mark Cusack
House Chair, Joint Committee on
Telecommunications, Utilities, and Energy
State House, Room 43
Boston, MA 02133

The Honorable Michael Barrett
Senate Chair, Joint Committee on
Telecommunications, Utilities, and Energy
State House, Room 312B
Boston, MA 02133

Chair Barber, Chair Rausch, Chair Cusack, and Chair Barrett,

As directed by Section 122 of Chapter 239 of the Acts of 2024, please find attached guidance on the public health, safety and environmental impacts of electric battery storage and electric vehicle chargers prepared by the Massachusetts Department of Environmental Protection in consultation with the Board of Fire Prevention and Regulations and the Department of Energy Resources.

Sincerely,

Bonnie Heiple
Commissioner
Massachusetts Department of Environmental Protection

Guidance on Public Health, Safety and Environmental Impacts of Electric Battery Storage and Electric Vehicle Chargers

Section 122 of Chapter 239 of the Acts of 2024, *An Act promoting a clean energy grid, advancing equity, and protecting ratepayers* ("2024 Climate Act"), directed the Massachusetts Department of Environmental Protection ("MassDEP"), in consultation with the Board of Fire Prevention Regulations ("BFPR") and the Department of Energy Resources ("DOER"), to issue guidance on the public health, safety, and environmental impacts of electric battery storage and electric vehicle chargers.

This Guidance provides an overview of stationary battery energy storage systems, including their role in increasing reliability of the electric grid and storing energy from renewable sources such as wind and solar, their different sizes and uses, and the most common types of battery energy storage technology. The Guidance identifies the applicable regulations, codes, and guidelines that govern the safe installation, operation, and decommissioning of battery energy storage systems and protection of public health and the environment.

This Guidance also provides an overview of electric vehicle ("EV") charger equipment, including the role of EV chargers in electrifying and decarbonizing the transportation sector, and the different types of chargers. The Guidance identifies the applicable requirements that govern the safe installation and use of EV chargers.

BATTERY ENERGY STORAGE

I. Introduction to Battery Energy Storage

The term "energy storage" applies to many different technologies, including electrochemical storage (batteries), flywheels, thermal storage, and pumped hydroelectric storage. All of these technologies can store energy and then make the energy available later.

This Guidance focuses on stationary battery energy storage systems ("BESS") used to provide electricity to a home, building, or the electric grid. BESS may be co-located with an energy generation source, such as a solar array, or be a standalone facility. BESS are distinct from the batteries that power consumer electronics, electric vehicles, or other electric mobility devices. BESS are important for the Commonwealth to meet its decarbonization goals. The Global Warming Solutions Act, as amended by the 2021 Climate Roadmap Act ("GWSA"), requires Massachusetts to reach economy wide, Net Zero greenhouse gas emissions ("GHG") by 2050.[1] To meet this requirement, the Massachusetts Clean Energy and Climate Plan for 2050 ("2050 CECP") identifies the role of clean, emissions-free energy generation, particularly onshore and offshore wind and solar photovoltaics resources, which together are expected to comprise about 75% of New England's electric capacity by 2050.[2]

In order to integrate this buildout of solar and wind generation capacity, energy storage will be essential. Solar and wind are key to meeting our decarbonization goals in a cost-effective manner. However, they are intermittent resources that only generate power when the sun is

[1] St. 2008 c. 298 (GWSA); St. 2021 c. 8 (Climate Roadmap Act).

[2] The 2050 CECP Phased scenario allows for the clean energy transition to be gradually "phased-in" over the next three decades. See: https://www.mass.gov/doc/2050-clean-energy-and-climate-plan/download

shining or the wind is blowing. While expected generation from solar and wind resources can be easily and accurately forecasted, BESS of varying sizes deployed throughout the electric grid will be necessary to integrate solar and wind generation resources and fill in gaps when these and other resources are incapable of meeting systemwide demand on their own.

During times when the supply of renewable electricity from resources like solar and wind exceeds customer demand, energy storage can absorb and store that excess supply, augmenting the supply and demand balance required by the electric grid. Then, when demand for electricity exceeds renewable electricity supply, for example after the sun sets and solar panels are no longer generating electricity, energy storage can discharge the excess electricity to meet customer demand.

Without energy storage in place during periods of high electricity demand where there are limited resources generating electricity, fossil fuel plants known as "peaker" plants must come online. Peaker plants, when used, are typically large emitters of both GHG and other emissions that negatively impact local air quality. The ability for energy storage to displace peaker plants is critical for Massachusetts to meet Net Zero by 2050 and to improve public health outcomes. The deployment of BESS also yields significant economic benefits as they help to optimize electric grid operations, reducing the cost of meeting peak demand, avoiding the need for additional transmission and distribution investments, balancing the electric grid during times when supply and demand are not aligned, and improving the resilience of the electric grid, all of which benefit ratepayers and the economy at large by reducing electricity costs. Energy storage also creates opportunities for new job growth and can be a significant source of increased local property tax revenues in communities where it is deployed.

To achieve these economic benefits as well as the GWSA's 2050 power sector decarbonization requirements, Massachusetts will likely need to deploy 5.6 gigawatts (GW) or more of energy storage capacity.[3]

- ***Energy storage has different uses and different scales***

BESS technologies can be categorized based on scale and technology type. The scale of BESS generally includes two categories: utility scale and non-utility scale. Utility scale BESS refers to larger systems that serve and benefit the electric grid as a whole. Non-utility scale BESS are smaller, and while they too can serve and benefit the electric grid, they primarily serve individual or small groups of end use customers such as a home, apartment building, or commercial building.

The energy in a BESS is measured in power capacity and energy capacity. A BESS's power capacity refers to the system's maximum ability to deliver instantaneous power to the grid to meet customers' real-time demand. Power capacity for BESS is typically expressed in terms of kilowatts ("kW") or megawatts ("MW"). Energy capacity refers to the cumulative amount of power over time that a BESS can deliver and is typically expressed in terms of kilowatt-hours ("kWh") or megawatt-hours ("MWh"). For example, a BESS that is rated as 1 MW/4 MWh has a

[3] 2050 CECP Workbook of Energy Modeling Results. See spreadsheet tab "8. Electric Capacity," cell W21 which shows energy storage capacity for Massachusetts under the Phased scenario.

power capacity of 1 MW and can meet 1 MW of instantaneous customer demand, and can do so for a total of 4 hours before it is fully discharged, giving the BESS an energy capacity of 4 MWh.

- ***Utility Scale Energy Storage***

Utility scale BESS are typically sized from several hundred kW to several hundred MW, with smaller systems typically serving the electric distribution system and larger systems typically serving the electric transmission system.

The primary purpose of the electric transmission system is to transmit large amounts of electricity over long distances to meet demand. The electric transmission system that serves Massachusetts also serves the other New England states and is managed by ISO New England ("ISO-NE"). Utility scale BESS is key to reducing costs and emissions associated with transmission system services because a BESS at that scale can be charged from low-cost renewable resources like solar and wind and can be deployed to reduce the overall peak demand of the system and the large associated costs.[4] In other words, it can charge when costs are low and discharge when costs are high, helping to reduce electricity costs for all customers during periods of high demand.

The electric distribution system in the Commonwealth, which connects to the transmission system and distributes electricity to customers, is owned and operated by either an Electric Distribution Company ("EDC") or a Municipal Electric Department ("MED"), depending on the municipality.[5] Utility scale energy storage at this level can both serve the transmission system and help the EDCs and MEDs provide safe and reliable electric distribution system service to customers while lowering customer bills and integrating renewable energy into the electrical grid. One example of unique distribution level services that a utility scale BESS can provide is deferring or avoiding the need for distribution system upgrades by reducing local peaks and providing local power capacity and reliability. They can also provide local energy resilience by being strategically located to help avoid power outages.[6]

Utility scale BESS at the transmission and distribution levels can help reduce the need for fossil fuel peaker plants and therefore improve local air quality.

- ***Commercial and Residential (Non-Utility Scale)***

Non-utility scale storage is commonly owned and operated by building- and home-owners looking for a way to reduce electricity bills and have backup power. These battery systems are smaller than utility scale, and are typically located on a customer's premises and sized based on the electric demand of the building. Non-utility scale BESS can provide all of the same services

[4] For example, Massachusetts *State of Charge* Report found that the top 10% of peak demand hours represented about 40% of annual electricity spend. See: ESI: State of Charge Report, pg. i-ii.
[5] Massachusetts municipally-owned electric companies. https://www.mass.gov/info-details/massachusetts-municipally-owned-electric-companies
[6] For example, Eversource Energy's Outer Cape Battery Energy Storage System is designed to provide backup power to 11,000 customers that live on Outer Cape Cod, avoiding both frequent outages and the need for a second distribution line along the same route through the Cape Cod National Seashore as the existing distribution line.

as utility scale resources, though typically to a smaller degree; however, they can also uniquely provide end use customer services such as bill savings through building peak demand management and site-specific resilience to power outages. In addition, non-utility scale energy storage can provide local air quality benefits if it is replacing a fossil fuel-based backup generator.

- ***Battery Storage Technologies and Makeup***

There are many technological approaches to BESS. Nearly all recent and current battery energy storage deployments are lithium-ion-based electrochemical energy storage technologies ("lithium-ion batteries").[7,8] In Massachusetts, about 97% of installed BESS in EDC municipalities are lithium-ion batteries.[9]

Lithium-ion batteries dominate the current energy storage market for several reasons. Lithium-ion batteries are generally less expensive than other energy storage technologies. Because lithium-ion batteries are also the predominant energy storage technology in consumer electronics and electric vehicles, the technology benefits from large scale manufacturing and a robust supply chain, leading to dramatic cost declines over the past decade.[10] Second, lithium-ion batteries have favorable energy storage properties, such as high energy density, long lifetime, fast response time, fast recharging time, and low losses in energy storage capacity when sitting idle (also known as low self-discharge).

Lithium-ion batteries comprise a family of batteries which differ in their specific chemistries. More recently, energy storage project developers have transitioned from a high nickel content lithium-ion battery chemistry (known as nickel manganese cobalt or "NMC") to a chemistry high in iron (known as lithium iron phosphate or "LFP").[11] Even though LFP is less energy dense than NMC, LFP has advantages over NMC of lower cost, lower flammability, and longer lifetime. In 2023, LFP comprised 80% of new energy storage installations worldwide.[12]

Batteries such as lithium-ion batteries start with a building block, called a cell, where energy is stored for future use. Multiple cells are electrically connected into modules, and multiple modules are then electrically connected to form the BESS. Through this scaling process, a BESS can be designed to meet the customer's particular power and energy needs. BESS are typically

---

[7] Denholm, Paul, Wesley Cole, and Nate Blair. 2023. Moving Beyond 4-Hour Li-Ion Batteries: Challenges and Opportunities for Long(er)-Duration Energy Storage. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-85878. https://www.nrel.gov/docs/fy23osti/85878.pdf.

[8] Taylor, S., & Ribeiro, H. (2024, June 28). The risks of leaving long-duration energy storage short of money. S&P Global Commodity Insights. https://www.spglobal.com/commodity-insights/en/news-research/blog/electric-power/062824-the-risks-of-leaving-long-duration-energy-storage-short-of-money

[9] 2024 ES Target Reports

[10] BloombergNEF. (2024, December 10). *Lithium-ion battery pack prices see largest drop since 2017, falling to $115 per kilowatt-hour*. BloombergNEF. https://about.bnef.com/blog/lithium-ion-battery-pack-prices-see-largest-drop-since-2017-falling-to-115-per-kilowatt-hour-bloombergnef/?utm_source=semafor

[11] (2023, *n.d.*). *Utility-scale battery storage*. In *2023 Annual Technology Baseline*. NREL. Retrieved June 11, 2025, from https://atb.nrel.gov/electricity/2023/utility-scale_battery_storage

[12] International Energy Agency. (2024). Batteries and secure energy transitions. https://iea.blob.core.windows.net/assets/cb39c1bf-d2b3-446d-8c35-aae6b1f3a4a0/BatteriesandSecureEnergyTransitions.pdf

integrated into enclosures, which can include HVAC to keep the BESS at the appropriate operating temperature, and various safety systems and designs discussed in more detail in this guidance. A battery management system acts like the brain of the BESS and continuously monitors the BESS to ensure it is operating according to design standards and can adjust the BESS's operation or trigger safety systems as necessary.[13]

Lithium-ion batteries, like all technologies, will continue to see innovations to improve their performance, safety, longevity, cost, and reliability. The energy storage market as a whole will also continue to see innovations and evolve, with non-lithium-ion approaches likely to take more significant market share sometime in the future.

- ***Siting and Permitting Reform for Clean Energy, Including Energy Storage Systems***

The 2024 Climate Act required changes to the way clean energy projects, including BESS, are sited and permitted in the Commonwealth. Beginning on July 1, 2026, the Energy Facilities Siting Board ("EFSB") will have exclusive authority to review and permit all proposed BESS projects with a rated capacity of 100 MWh or greater, referred to as a "large clean energy storage facility."[14] The EFSB will issue a single consolidated permit that comprises all state, regional, and local permits that a large clean energy storage facility would otherwise need to commence construction and operation.[15]

A BESS with a rated capacity of less than 100 MWh, referred to in the Act as a "small clean energy storage facility," will be subject to all local permits, but the local permitting authorities will be required to issue a single, consolidated permit in 12 months or less.[16]

The 2024 Climate Act requires the EFSB and DOER to promulgate a uniform set of health, safety, environmental and other standards, including zoning criteria in DOER's case, governing the siting and permitting of eligible clean energy projects within their respective jurisdictions. The EFSB and DOER each must promulgate such standards by March 1, 2026. These new standards may incorporate by reference, supersede, or be in addition to any or all of the requirements addressed in this Guidance.

II. Fire Safety

The safety of BESS has improved significantly in recent years. One comprehensive analysis found that the failure rate of utility-scale BESS decreased by 97% between 2018 and 2023 as the deployment of BESS greatly increased.[17] Lessons learned from earlier incidents when this technology was nascent have led to new and robust requirements and improved industry practices. BESS that are designed with sufficient safety protections and are installed, operated, and maintained in a manner that maintains the system safety can be operated without incident as demonstrated by the many systems currently operating safely in the field.

[13] Preger, Y. (2021). Chapter 3: Lithium-Ion Batteries. In Energy Storage Handbook (pp. 3-1–3-30). Sandia National Laboratories. https://www.sandia.gov/app/uploads/sites/163/2021/09/ESHB-Ch3_Lithium-Batteries_Preger.pdf
[14] St. 2024, c. 239, §§ 57, 132.
[15] St. 2024, c. 239, § 74.
[16] St. 2024, c. 239, § 23
[17] Electric Power Research Institute, Insights from EPRI's Battery Energy Storage Systems (BESS) Failure Incident Database, Analysis of Failure Root Cause (2024), https://www.epri.com/research/products/000000003002030360.

In Massachusetts, several layers of coordinated standards apply to BESS. Stationary BESS must comply with the requirements of 527 CMR 1.00: *The Massachusetts Comprehensive Fire Safety Code* ("the Massachusetts Fire Code"). The Board of Fire Prevention Regulations ("BFPR") promulgates the Massachusetts Fire Code, which adopts NFPA 1: *Fire Code*, with some state-specific modifications. NFPA 1 is the national model fire code developed by the National Fire Protection Association ("NFPA").[18] The Massachusetts Fire Code, Chapter 52, references the 2020 NFPA 855: *Standard for the Installation of Stationary Energy Storage Systems*.
A table of relevant fire safety regulations, codes, standards and certifications is appended to this Guidance.

NFPA 1 outlines requirements that provide a reasonable level of fire and life safety, as well as property protection from the hazards created by fire, explosion, and dangerous conditions. NFPA 1 addresses fire protection systems such as sprinklers and alarms, emergency planning and evacuation, providing fire departments with site access, water supplies and flow requirements, and minimizing risks of handling, using or storing hazardous materials.

NFPA 855 was first issued in 2019 in response to the increasing use of energy storage systems, including BESS. It sets comprehensive criteria for the fire protection of BESS and other energy storage installations based on the technology used, the setting where the system is being installed, the size and separation of the installations, and the fire suppression and control systems in place. NFPA 855 also reflects the current best practice for preventing explosions and safely containing fires.

The requirements of NFPA 855 address design, installation, operation and decommissioning. While the applicability of the requirements will vary based on the specifics of a project such as size, location, and system, the following are examples of criteria in NFPA 855:

- *Location of the project*: NFPA 855 Chapter 4.4 provides detailed requirements addressing both indoor and outdoor installations. Location requirements for outdoor BESS include providing minimum distances from exposures like buildings or public ways; vegetation control; ensuring electrical circuitry is housed within weatherproof enclosures; and requiring that fire department access roads be provided in accordance with local fire codes. Indoor BESS requirements address different criteria for buildings dedicated to BESS versus non-dedicated-use buildings.

- *Equipment*: NFPA 855 Chapter 4.2 requires BESS equipment to be listed in accordance with UL 9540 - *Standard for Energy Storage Systems and Equipment*, unless specifically exempted. UL 9540 is a certification that evaluates the entire battery system, verifying that it meets fire, electrical, and functional safety requirements. UL 9540 also requires that the major battery components be qualified to their own standards, such as UL 1741,

[18] The NFPA is a U.S.-based non-profit organization dedicated to reducing fire and related hazards. The NFPA develops model safety standards through a public, consensus-driven process drawing on the expertise of thousands of volunteers from relevant industries. States may adopt all or parts of NFPA codes as requirements, as Massachusetts has done by adopting NFPA 1 with certain state amendments. NFPA model codes are revised regularly to reflect the most current practices. In Massachusetts, the BFPR regularly reviews and adopts updated code editions.

which certifies a battery's power conversion system, and UL 1973, which certifies the safety and performance of battery cells, modules, and packs, evaluating their ability to withstand thermal runaway, mechanical stress, and electrical faults.[19]

- *Installation*: NFPA 855 Chapter 4.3 requires BESS to be installed in accordance with the manufacturer's requirements. Installation requirements also address signage, seismic protection, impact protection, site security, and adequate egress, as appropriate.

- *Emergency Planning and Training*: NFPA 855 Chapter 4.1.3 requires BESS owners to establish and maintain an emergency operations plan with procedures for the safe shutdown, de-energizing or isolation of equipment and systems, inspection and testing, responding to emergency notifications, and procedures to be followed in the case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Emergency training for facility staff is also required.

NFPA 855 also requires smoke detection systems on all BESS systems located within buildings or structures, fire control and suppression systems, explosion control and spill control measures.

- ***Fire Safety Information and Documentation Expected for Permitting Energy Storage Systems***

A permit from the local fire department is required to install and operate lithium-ion BESS greater than 20 kWh, or one (1) kWh for installations in one- or two-family dwellings or townhouse units.[20] At these thresholds, the vast majority of BESS installations, both residential, commercial, and utility scale, in indoor or outdoor locations, are required to obtain such a permit.

BESS Scale	Threshold For Fire Department Permitting (kWH)
One- or two-family dwellings or townhouse units	1 kWh
Commercial and utility-scale	20 kWh

For BESS installations exceeding 1 kWh in one- or two-family dwellings or townhouse units, the plans and specifications associated with the installation shall be submitted to the local fire department for approval and include the following:

- the location and layout diagram of the room or area in which the BESS is to be installed;
- details on wall construction for rooms or areas where BESS are installed;
- the quantities and types of BESS units;
- manufacturer's specifications, ratings, and listings of BESS;

[19] Underwriters Laboratory, or "UL", is an independent testing and certification organization. Manufacturers submit their products to UL for evaluation. UL assesses the product's safety, performance, and compliance with applicable standards. This may include electrical, mechanical, environmental, and other specific tests depending on the nature of the product.

[20] Beginning July 1, 2026, proposed BESS facilities with a rated capacity of 100 MWh will be within the sole jurisdiction of the EFSB for purposes of all state, local and regional permits, including permits typically issued by local fire departments.

- description of energy storage management systems and their operation;
- location and content of required signage;
- details on fire suppression, smoke or fire detection, gas detection, thermal management, ventilation, exhaust, and deflagration venting systems, if provided;
- support arrangement associated with the installation, including any required seismic support; and
- description of scope of work for retrofit or repairs of BESS.

Applicants proposing a BESS project exceeding 20 kWh are required to submit detailed information for review by local fire officials. The information includes, but is not limited to, the following:

- the quantities and types of BESS units;
- manufacturer's specifications, ratings, and listings of BESS;
- emergency operations plan;
- hazard mitigation analysis;
- details of all safety systems, including fire suppression, smoke or fire detection, gas detection, thermal management, ventilation, exhaust, and deflagration venting systems, as applicable;
- results of fire and explosion testing to UL 9540A or equivalent;
- location and layout diagram of the room or area in which the BESS is to be installed;
- details on hourly fire-resistant-rated assemblies provided or relied upon in relation to the BESS;
- location and content of required signage;
- support arrangement associated with the installation, including any seismic support.

This information allows for fire departments, and local and state regulators, to assess the individual safety characteristics of a particular project and ensure that the proposed project complies with all of the applicable code requirements prior to issuing a permit.

- ***In the Event of a Fire***

Lithium-ion batteries can experience thermal runaway. Thermal runaway is defined in NFPA 855 as "The condition when an electrochemical cell increases its temperature through self-heating in an uncontrollable fashion and progresses when the cell's heat generation is at a higher rate than it can dissipate, potentially leading to off-gassing, fire, or explosion." Lithium-ion BESS are required to include a listed device or other approved method to preclude, detect, and minimize the impact of thermal runaway. NFPA 855, Chapter 9.3.

Water is considered the preferred agent for suppressing lithium-ion battery fires. Water has superior cooling capacity and is easy to transport to the seat of the fire. Fire-fighting foams, such as those containing per- and polyfluoroalkyl substances ("PFAS"), are not considered to be effective for these chemistries because they lack the ability to cool sufficiently and can conduct electricity. Fire-fighting dry chemical powders can eliminate visible flame, but they also lack the ability to cool burning battery components as water can do.[21]

---

[21] NFPA 855 – 2020 Edition, Annex C.

III. Protecting Public Health and the Environment

BESS must comply with all applicable laws and regulations, including federal, state and local requirements protective of public health and the environment. These legal frameworks govern all aspects of a BESS project, including, but not limited to, siting, zoning, wetlands impacts, stormwater management and impacts, drinking water protection, release(s) or threat(s) of release of oil or hazardous materials to the environment, and noise levels. Any local zoning by-law or ordinance must comply with M.G.L. c. 40A § 3, which prohibits the unreasonable regulation of BESS.[22]

The permits and approvals required for a given BESS project will depend on the specific circumstances of the proposal. Key environmental permitting and approval considerations include, but are not limited to, the following, particularly for utility-scale BESS which have a larger footprint:

Wetlands: BESS projects involving activities in jurisdictional wetlands resource areas and corresponding buffer zones must comply with the Wetlands Protection Act ("WPA"), M.G.L. c. 131, § 40, and the WPA regulations at 310 CMR 10.00. Projects that result in a discharge of dredged or fill material to waters of the United States and require a Section 401 Water Quality Certification are subject to the regulations at 314 CMR 9.00. Local jurisdictions may also have wetlands protection bylaws.[23]

Stormwater: BESS developments may be required to comply with MassDEP's Stormwater Management Standards provided in 310 CMR 10.05(6)(k)-(q), if the development is subject to the jurisdiction of the Wetlands Protection Act, and 314 CMR 9.06(6)(a), if the development requires a Section 401 water quality certification for discharges of dredged or fill material. The Stormwater Management Standards encourage stormwater recharge to groundwater, require measures to control surface water runoff that may contribute to downstream flooding, and prevent stormwater discharges from causing or contributing to the pollution of the surface waters and groundwaters of the Commonwealth. The standards require the implementation of a wide variety of stormwater management strategies, depending on specific site characteristics, including environmentally sensitive site design and low impact development (LID) techniques to minimize impervious surface and land disturbance, source control and pollution prevention, structural and non-structural best management practices, construction period erosion and sedimentation control, and the long-term operation and maintenance of stormwater management systems.

Compliance with the Stormwater Management Standards may require remote shut-off valves, lined conveyances and basins, or other measures designed to intercept and contain surface water runoff during a failure event such as a fire. More information about the Stormwater

---

[22] M.G.L 40A § 3 provides "No zoning ordinance or by-law shall prohibit or unreasonably regulate the installation of solar energy systems or the building of structures that facilitate the collection of solar energy, except where necessary to protect the public health, safety or welfare." Battery energy storage systems qualify as "structures that facilitate the collection of solar energy." Massachusetts Office of the Attorney General, Decision re: Carver Annual Town Meeting of April 12, 2022, p.6 note 8, issued November 14, 2022.

[23] Beginning July 1, 2026, proposed BESS facilities with a rated capacity of 100 MWh will be within the sole jurisdiction of the EFSB for purposes of all state, local and regional permits.

Management Standards is available at https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards.

Drinking Water: MassDEP regulates public water systems pursuant to M.G.L. c. 111, § 160 and 310 CMR 22.00, the Drinking Water Regulations. The Drinking Water Regulations impose requirements on public water systems to prevent the pollution of drinking water by protecting both surface water (310 CMR 22.20B, et seq.) and groundwater (310 CMR 22.21) sources.

Public water suppliers and BESS project applicants should consult the MassDEP Drinking Water Program's guidance on the siting of BESS around sources of public drinking water, titled *Information to be Submitted to MassDEP for Proposed Solar and Wind Energy Projects on Lands Owned or Controlled by Public Water Systems for Drinking Water Purposes* (available at https://www.mass.gov/doc/pwss-and-windsolar-energy-projects-guidance). BESS is prohibited within the area immediately surrounding a public water supply well or wellfield, known as Zone I (defined at 310 CMR 22.02). Outside of Zone I, (e.g., Zone II for groundwater sources or Zone A for surface water sources) on land owned or controlled by the public water system for drinking water purposes, BESS require MassDEP approval and should meet the conditions specified in the guideline. Example conditions include locating BESS above the 100-year floodplain and within a self-containment area so that in the event of a fire, fire extinguishing chemicals will be completely contained.

Public water sources designed to withdraw more than 100,000 gallons per day must protect the MassDEP approved Zone II or Zone A recharge areas. Protection must be in the form of municipal bylaws/ordinances, general bylaws/ordinances or Board of Health Regulations. Protection controls must prohibit the activities cited in 310 CMR 22.20B(2) for Zone A and 310 CMR 22.21(2) for Zone II. Other municipal controls may also apply.[24]

Waterways / Chapter 91: If a BESS project requires construction, filling, or dredging in filled or flowed tidelands, great ponds, and the navigable portions of non-tidal rivers and streams on which public funds have been expended, then the project proponent would need to obtain a license from MassDEP pursuant to M.G.L. c. 91 and 310 CMR 9.00.

Air Quality / Emissions: BESS do not emit air pollutants at levels requiring an air permit from MassDEP.

Noise: BESS can generate significant levels of sound from cooling systems, inverters, system electronics, and transformers, and can become a nuisance when located near residences that can be as much as 40 decibels about background sound levels if not appropriately designed to attenuate sound.

BESS must comply with any local noise bylaws, regulations or ordinances.[25] They also must

[24] Beginning July 1, 2026, proposed BESS facilities with a rated capacity of 100 MWh will be within the sole jurisdiction of the EFSB for purposes of all state, local and regional permits.
[25] Beginning July 1, 2026, proposed BESS facilities with a rated capacity of 100 MWh will be within the sole jurisdiction of the EFSB for purposes of all state, local and regional permits.

comply with MassDEP's noise regulations at 310 CMR 7.10.

MassDEP issued a Noise Policy (90-001) that states that a source of sound is considered to be violating 310 CMR 7.10 if the source either increases the broadband sound level by more than 10 decibels above ambient or produces a "pure tone" condition – when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more. These criteria are measured both at the property line and at the nearest inhabited residences or other sensitive receptors.

Sound suppression or mitigation measures may be implemented to achieve desired sound levels. Examples of such measures include the use of lower noise equipment, sound attenuation barriers, and operational restrictions such as limiting fan speeds and the number of active units during quieter hours. Sound suppression measures should be designed to achieve the lowest sound level increase above background that is technologically feasible.

- ***Environmental Considerations in the Event of a Fire or Other Release***

Any fire occurring in the built environment is likely to contribute to environmental contamination, including air contamination from the fire plume and possible subsequent deposition to land and water, contamination from suppression water runoff, and other potential environmental discharges from burned materials. Like all energy technologies, batteries can present chemistry-specific hazards under faulty conditions. Lithium-ion batteries could leak or spill chemicals, so these systems are typically required to provide spill containment.

In the event of a fire or spill at a BESS facility, the local fire department should be called immediately. After the local fire department has been notified, MassDEP's Emergency Response (ER) must be notified via the ER Hot Line (888-304-1133) within 2 hours of a release or spill of oil or hazardous materials that meet MassDEP's 2-hour reporting thresholds requirements. MassDEP Emergency Response personnel are available 24/7 to respond and help contain and assess spills/releases of oil or hazardous chemicals.

Once the battery components and site have been rendered safe, the owner of the BESS facility should hire a hazardous materials response contractor for proper assessment, transport and disposal. Pursuant to regulations known as the Massachusetts Contingency Plan ("MCP", 310 CMR 40.0000), following a battery fire or other release to the environment, the owner of the BESS is required to hire a Licensed Site Professional/response contractor to implement immediate response actions. This could include, for example, immediate containment or spill cleanup and sampling of nearby soils, surface waters and groundwater for residual contamination. If contamination is found above regulatory limits, then further cleanup is required according to MCP requirements. If the owner/potentially responsible party is unwilling or unable to hire a contractor, MassDEP has the ability to activate one, and pursue cost recovery from the potentially responsible party (i.e. owner).[26] MassDEP also maintains on its website a list of

[26] Source: DFS Memorandum, Dangers of Lithium Batteries, Feb. 6, 2023, https://www.mass.gov/doc/advisory-dangers-of-lithium-batteries-2023/download.

licensed hazardous waste transporters who can provide transport and disposal services.[27]

- ***End-of-Life and Decommissioning***

Pursuant to the Massachusetts Fire Code and NFPA 855, BESS facility owners must provide a decommissioning plan to the fire department for approval prior to decommissioning the system. In accordance with Chapter 8 of NFPA 855, the decommissioning plan must include steps for the safe shut down, disassembly and removal of the battery components.

Most lithium-ion batteries meet the definition of hazardous waste pursuant to the Massachusetts Hazardous Waste Regulations, 310 CMR 30.000. However, lithium-ion batteries may be managed in compliance with the streamlined standards for universal waste management (e.g., a manifest is not required) at 310 CMR 30.1000, provided that the batteries are managed at the site of generation in a way that prevents releases to the environment and the batteries are sent to another universal waste "handler" or a "destination facility" that is authorized to recycle lithium-ion batteries.

In addition to existing requirements, a special commission known as the Extended Producer Responsibility Commission has been established pursuant to the 2024 Climate Act.[28] The Commission is charged with making policy recommendations for handling lithium-ion batteries and other products when they reach the end of their useful life. The Commission is chaired by the MassDEP Commissioner and comprises a diverse set of stakeholders. The Commission's recommendations are due to the Legislature by January 15, 2026.

[27] https://www.mass.gov/doc/massdep-licensed-hazardous-waste-transporter-list-0/download.
[28] St. 2024 c. 239, § 108; https://www.mass.gov/info-details/extended-producer-responsibility-commission.

ELECTRIC VEHICLE CHARGERS

I. Introduction to Electric Vehicle Chargers

The electrification of the transportation sector in Massachusetts is critical to achieving the Commonwealth's greenhouse gas ("GHG") reduction goals. The transportation sector is responsible for 38% of GHG emissions in Massachusetts, making it the largest source of emissions by sector from the combustion of gasoline, diesel, and aviation fuel in cars, buses, trucks, ships, and airplanes.[29]

As the use of electric vehicles (EVs) has grown, so has the need for EV charging infrastructure. EV charging infrastructure needs to be installed throughout the state for drivers and business owners to feel comfortable switching to EVs. Massachusetts has a number of programs that provide incentives and grant funding for EV chargers, one of which is MassDEP's Electric Vehicle Incentive Program ("MassEVIP") which supports charging stations for the general public, employees and fleets, and multi-unit dwellings and educational campuses.

There are three main drivers of MassDEP's MassEVIP programs:

1. Transportation emissions contribute to the formation of ground-level ozone, a key component of smog. This pollution can exacerbate respiratory conditions such as asthma and bronchitis, particularly affecting children, older adults, and people with pre-existing health issues. Additionally, exposure to nitrogen dioxide (NO_2), a byproduct of vehicle emissions, can irritate the respiratory system and increase susceptibility to infections.

2. The transportation sector is a significant source of GHG emissions in Massachusetts, accounting for approximately 38% of the state's total emissions.[30] These emissions contribute to global warming and climate change, posing long-term risks to the environment and public health.

3. Communities located near high-traffic areas, such as highways and industrial zones, often experience cumulative pollution from multiple sources. This compounded exposure can lead to higher rates of respiratory and cardiovascular diseases among residents, disproportionately impacting low-income and minority populations.[31]

EV chargers come in three types based on the power output of the charger: Level 1, Level 2, and direct current (DC) fast chargers, also known as Level 3.

1. Level 1 chargers use standard 120-volt (V) alternating current (AC). There are hardwired units that are most commonly used in commercial settings as well as cords that can be plugged into a standard 3-prong outlet. Hardwired units should be installed by a licensed

---

[29] https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-metrics.
[30] https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-metrics.
[31] https://www.mass.gov/news/massachusetts-becomes-first-state-to-require-analysis-of-cumulative-impacts-for-air-quality-permits-near-environmental-justice-populations.

electrician. A Level 1 charging cord may be provided by the manufacturer[32] with the purchase of a new EV, or can be purchased separately, and can be used to charge the vehicle at home using a standard outlet without the need for special installation or wiring.

2. Level 2 chargers use 240-volts AC, the level commonly used for clothes dryers and other large household appliances. Level 2 chargers may be installed at single family homes (in a garage or near the driveway), as well as in public areas like parking lots, parking garages and rest stops. Level 2 chargers should be installed by a licensed electrician.

3. DC fast chargers can charge a vehicle significantly faster than other charger types, but are also significantly more expensive. They also often require significant upgrades to the existing electrical infrastructure, depending on the amount of power already available and how many charging stations are installed and how many kW of power they can supply. Fast chargers can range in power from 50 kW to 350 kW, with even faster charging speeds coming in the near future. Fast chargers are often located along highways or major thoroughfares similar to traditional gas stations. Fast chargers should be installed by a licensed electrician.

II. Safety Considerations for EV Chargers

EV chargers in Massachusetts must comply with the requirements of 527 CMR 12.00, the Massachusetts Electrical Code. The Massachusetts Electrical Code adopts the 2023 edition of NFPA 70: *National Electrical Code*.[33] All EV charging equipment should be installed by licensed electricians.

NFPA 70 includes requirements regarding the type of equipment associated with an EV charger, such as the type and length of both the cord connecting the EV charging equipment to the power supply and the cord connecting the EV charger to the vehicle. Weatherproof enclosures are required if the EV charger is installed in an exposed location. NFPA 70 also outlines requirements regarding the appropriate wiring, voltage, and overcurrent protection for EV charger installation.

Only EV charger equipment listed to a UL certification or other qualified testing laboratory should be used. Additionally, since 2023, certain EV chargers installed in Massachusetts must meet federal Energy Star standards and be listed in the State Appliance Standards Database.[34]

---

[32] Beginning in model year 2026, each electric vehicle sold in Massachusetts must be supplied with a charging cord of at least 20 feet in length, compatible with Level 1 and Level 2 charging. 13 CCR 1962.3(c)(3) as required by 310 CMR 7.40 *Low Emission Vehicle Program*.
[33] NFPA 70 refers to EV chargers of all types as electric vehicle supply equipment, or "EVSE".
[34] See https://www.mass.gov/how-to/certify-products-for-appliance-efficiency-standards.

APPENDIX

Reference Table of Fire Safety Regulations, Codes, Standards and Certifications

Code or Standard	Description	Applicability
527 CMR 1.00: The Massachusetts Comprehensive Fire Safety Code	Massachusetts regulation incorporating by reference NFPA 1, the Fire Code, with some modifications. NFPA 1, *Fire Code*, details requirements that provide a reasonable level of fire and life safety, as well as property protection from the hazards created by fire, explosion, and dangerous conditions. It includes a comprehensive approach to fire and life safety, from fire alarms and sprinkler systems to protection from specific processes and hazards, to help protect people from the ever-changing hazards in a building. 527 CMR 1.00 was most recently revised in December 2022. It adopts the 2021 edition of NFPA 1, with Massachusetts amendments.	• Utility scale BESS • Commercial/residential scale BESS
NFPA 1: Fire Code	NFPA 1 outlines requirements that provide a reasonable level of fire and life safety, as well as property protection from the hazards created by fire, explosion, and dangerous conditions. The code includes a comprehensive approach to fire and life safety, from fire alarms and sprinkler systems to protection from specific processes and hazards, to help protect people from the ever-changing hazards in a building. NFPA 1 – 2021 is the current edition adopted in Massachusetts by 527 CMR 1.00.	• Utility scale BESS • Commercial/residential scale BESS
NFPA 855: Standard for the Installation of Stationary Energy Storage Systems	The current edition adopted by 527 CMR 1.00 is NFPA 855 – 2020 edition. The standard offers comprehensive criteria for the fire protection of energy storage system installations, including BESS, based on the technology used, the setting where the technology is being installed, the size and separation of installations,	• Utility scale BESS • Commercial/residential scale BESS

Code or Standard	Description	Applicability
	and the fire suppression and control systems in place. NFPA 855 provides mandatory requirements for the design, installation, commissioning, operation, maintenance, and decommissioning of BESS, distinguished by battery energy storage technology.	
527 CMR 12.00 The Massachusetts Electrical Code	Massachusetts Electrical Code adopting by reference NFPA 70, *National Electric Code*. The current version of the Massachusetts Electrical Code was adopted in February 2023. It adopts the 2023 edition of NFPA 70, with Massachusetts amendments.	• Utility scale BESS • Commercial/residential scale BESS • EV charger installations
NFPA 70: National Electric Code	A set of standards for the safe installation of electrical wiring and equipment in the United States. Its primary purpose is to ensure the safety of electrical installations by setting forth requirements to protect people and property from electrical hazards. The NEC covers the installation of electrical conductors, equipment, and raceways; signaling and communications conductors and equipment; and fiber optics. It is updated regularly to incorporate new technologies and improve safety measures. NFPA 70 – 2023 is the current edition adopted in Massachusetts by 527 CMR 12.00.	• Utility scale BESS • Commercial/residential scale BESS • EV charger installations
UL 9540 Standard for Energy Storage Systems and Equipment	The UL 9540 certification evaluates the entire battery energy storage system, verifying that it meets rigorous fire, electrical, and functional safety requirements. 527 CMR 1.00 and NFPA 855 requires all battery energy storage systems be listed to UL 9540.	• Utility scale BESS • Commercial/residential scale BESS
UL 9540A	UL 9540A is a large-scale fire test that evaluates thermal runaway propagation risks on a representative battery energy	• Utility scale BESS • Commercial/residential scale BESS

Code or Standard	Description	Applicability
Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems	storage system by assessing how battery cells, modules, and packs react to overheating, mechanical damage, or electrical abuse. Conducted at the cell, module, unit, and system levels, this test helps determine fire safety and supports implementation of effective mitigation strategies.	
UL 1973 Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications	Referenced in NFPA 855, UL 1973 certifies the safety and performance of battery cells, modules, and packs, evaluating their ability to withstand thermal runaway, mechanical stress, and electrical faults.	• Utility scale BESS • Commercial/residential scale BESS
UL 1741 Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources	UL 1741 is a product safety standard that outlines requirements for inverters, converters, controllers, and interconnection system equipment used in distributed energy resources systems. It ensures these devices are safe and reliable, particularly when connecting to the electrical grid.	• Utility scale BESS • Commercial/residential scale BESS
UL 1642 Standard for Safety for Lithium Batteries	UL 1642 is a standard for the safety of lithium batteries. This standard aims to reduce the risk of fire or explosion during battery use and also when user-replaceable batteries are removed and disposed of	• Utility scale BESS • Commercial/residential scale BESS
UL 2594 Electric Vehicle Supply Equipment	UL 2594 is the UL standard for EV chargers, or Electric Vehicle Supply Equipment (EVSE). It broadly covers different components of EVSE, including cord sets, charging stations, and fixed power outlets, specifying safety requirements for both indoor and outdoor use. The standard focuses on safety, including electrical and mechanical aspects, and covers voltage and current ratings, as well as different types of EVSE like wall-mounted and portable chargers.	• EV charger installations