Recommendations for New Massachusetts Appliance Standards

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About Energy Solutions

Energy Solutions is a mission-driven clean energy implementation firm that specializes in programs that align with the market to deliver significant resource impacts. For 25 years we've been pioneering end-to-end, market-driven solutions that deliver reliable, large-scale and cost-effective savings to our utility, government, and private sector clients across North America. Our passionate, smart employee-owners are committed to excellence and to building long-lasting, trusted relationships with our clients.

This report was prepared for the Massachusetts Department of Energy Resources.

Background and Summary

Appliance standards establish minimum energy and water efficiency or load flexibility requirements for products. Appliance standards help to reduce customer utility bills, greenhouse gas emissions, peak load, grid impacts, and water consumption. When properly administered, they increase equitable access to higher quality products by removing the least-efficient, worst-performing products from the market. The U.S. Department of Energy (DOE) adopts national standards for dozens of residential, commercial, and industrial products.[1] With the exception of plumbing fixtures, states can only establish efficiency standards for products not covered by DOE.[2]

For states, consumers, utilities, and other stakeholders, appliance standards provide significant savings opportunities. As of 2023, 13 states and Washington D.C. have adopted state appliance standards. Massachusetts adopted a suite of appliance standards in 2021 as part of Chapter 8 of the Acts of 2021: An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, regulating 18 product categories. These standards have taken effect in the Commonwealth, and this report provides recommendations for legislative updates to the Massachusetts appliance standards to adopt new standards, make adjustments to the current appliance standards, and amend the enforcement authority of DOER to make the standards set forth in M.G.L. c. 25B(3) more practicable, for unforeseeable or unique circumstances, as required by M.G.L. c. 25B(10).

Table 1. Recommendations for New Appliance Efficiency Standards

Product	Reasoning	Savings
Automatic landscape irrigation controllers	This new standard was recently added to the ASAP Model Bill and largely aligns with recent standards in CO and proposed in CA.	This product has water savings for non-agricultural irrigation systems.
Gas fireplaces	This new standard would align with the gas saving requirements of New York, Nevada, Rhode Island, and Canadian standards.	This standard would result in gas consumption savings.
Flexible demand appliance standards (FDAS)	This new language would provide DOER the authority to establish regulations that enable grid interactivity of appliances. This authority is similar to that of the California Energy Commission, and states including CO, WA, and OR have established FDAS.	FDAS would result in shifting of electricity usage to avoid peak electricity constraints and reduce electric system greenhouse gas emissions.
Electric Vehicle Supply Equipment (EVSE)	This update to the EVSE standard language allows for necessary flexibility to ensure EVSEs can be installed to support broader decarbonization policy objectives.	This is expected to have negligible impact on energy efficiency compared to the current standard.
Waivers	This new language would provide DOER the authority to grant limited waivers.	This update is expected have negligible impact on the impact of any existing standards.

[1] https://www.energy.gov/eere/buildings/standards-and-test-procedures
[2] DOE has nationally waived state preemption for plumbing products thus allowing states to set more stringent plumbing standards; however, all other products cannot have more stringent efficiency standards set at the state level without a waiver granted by DOE. https://www.energy.gov/eere/buildings/articles/appliance-and-equipment-standards-fact-sheet

New Standard Recommendations and Legislative Changes

The following product categories and legislative adjustments are being recommended.

Automatic Landscape Irrigation Controllers

Automatic landscape irrigation controllers, which are connected to permanently plumbed irrigation (or sprinkler) systems, control the frequency, start time, and duration of irrigation based on external information. These controls support saving water that would otherwise be unnecessarily used. The proposed standards save water (and, ultimately energy due to the energy use required to operate water systems) through requirements regulating the control of these systems to ensure they are operating when necessary (i.e., ensuring sprinkler systems do not run during rainy weather). These standards are already established in Colorado and similar standards have been proposed in California.[3] We recommend adopting the following definition and granting DOER authority to ultimately establish performance requirements, as follows:

Said section 5 of said chapter 25B is hereby further amended by inserting:

> "Automatic landscape irrigation controller" means a device used to remotely control valves that operate a landscape irrigation system. Such devices include, but are not limited to, weather-based irrigation controllers, soil moisture-based irrigation controllers, and timer-based irrigation controllers, whether configured as a standalone controller, a base controller, an add-on device, or a plug-in device. "Automatic landscape irrigation controller" does not include irrigation control devices designed for attachment to a hose bib or a hose end or those designed and marketed for agricultural purposes.

Said section 5 of said chapter 25B is hereby further amended by inserting:

> The commissioner may adopt and update regulations for Automatic Landscape Irrigation Controls in order to facilitate the achievement of the people and the commonwealth's goals and objectives for climate mitigation.

Anticipated impact:

According to analysis conducted by the Appliance Standards Awareness Project (ASAP),[4] a compliant product may cost up to $99 more than a non-compliant product, however given significant water bill savings, that cost would be paid back in savings in just over 9 months. The potential annual savings from an irrigation controller standard in Massachusetts in 2030 would

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[3] CO established through HB23-1161 passed in 2023, and CA docket: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=17-AAER-10

[4] https://appliance-standards.org/sites/default/files/2024_Massachusetts_Appliance_Standards_Savings_Report.pdf

be 384 million gallons of water, which grows to 1,212 million gallons in 2040 and the associated aggregate annual utility bill savings are expected to be up to $22.7 million in 2040.

Statewide metric	2030 Annual Savings	2040 Annual Savings
Water	384 million gallons	1,212 million gallons
Utility bill	$6.2 million	$22.7 million
Incremental cost	Up to $99	
Payback Period	.7 years	

Gas Fireplaces

Gas fireplaces are products that burn natural gas to provide either supplemental space heating or a decorative aesthetic in a fireplace or stove. There are multiple configurations for these products, but ultimately, they all provide the same function. State standards can provide energy savings by reducing the usage of pilot lights and other ignition designs which result in constant natural gas and energy use even when the product is not otherwise in use. These standards are already established in Nevada, New York, Rhode Island, as well as in Canada. We recommend the following requirements:

Said section 2 of said chapter 25B is hereby further amended by inserting the following definitions:

- “Gas fireplace” means a decorative gas fireplace or a heating gas fireplace.
- "Decorative gas fireplace" means a vented fireplace, including appliances that are freestanding, recessed, zero clearance, log set, or a gas fireplace insert, that is fueled by natural gas or propane, is marked for decorative use only, and is not equipped with a thermostat or intended for use as a heater.
- "Heating gas fireplace" means a vented fireplace, including appliances that are freestanding, recessed, zero clearance, or a gas fireplace insert, that is fueled by natural gas or propane and is not a decorative fireplace.

Said section 5 of said chapter 25B is hereby further amended by inserting the following requirements:

- Gas fireplaces shall be capable of automatically extinguishing any pilot flame when the main gas burner flame is extinguished.
- Gas fireplaces must prevent any ignition source for the main gas burner flame from operating continuously for more than seven days from last use of the main burner.

Anticipated impact:

According to analysis conducted by ASAP,[5] a compliant product may cost up to $38 more than a non-compliant product, however given gas utility bill savings, that cost would be paid back in savings in just over 9 months. The potential annual savings from a gas fireplace standard in Massachusetts in 2030 would be 46 billion Btus of gas, which grows to 149 billion Btus in 2040.[6] As a gas saving technology, ASAP anticipated 7,900 metric tons of CO2 and 6.7 tons of NOx to be reduced by 2040. The annual utility bill savings are expected to be up to $2.7 million in 2040.

Statewide metric	2030 Annual Savings	2040 Annual Savings
Gas	46 billion Btus	149 billion Btus
CO2	2,500 metric tons	7,900 metric tons
NOx	2.1 tons	6.7 tons
Utility bill	$700,000	$2.4 million
Incremental cost	Heating Fireplace: $38	Decorative Fireplace: $37
Payback Period	.7 years	

Flexible Demand Appliance Standards (FDAS) Authority

Grid enabled products have the capability to shift timing of when they consume electricity to better match energy demand and supply, as well as enable excess renewable electricity production to be used rather than curtailed. Appliance standards that establish requirements for grid interactivity functionality are known as Flexible Demand Appliance Standards (FDAS). FDAS have significant benefits when deployed, including improving grid reliability, minimizing electrical grid greenhouse gas emissions, and cost benefits to consumers as the share of intermittent renewable wind and solar power grows. When grid-enabled products are enrolled in utility demand response programs, consumers have the opportunity to get paid for participation in programs. The California Energy Commission has a program to establish new FDAS,[7] and several other states including Colorado, Washington, and Oregon have established individual flexible demand appliance standards.[8]

FDAS will eventually provide savings to household and business energy bills, which are increasingly important to low-income households and small businesses. FDAS do not require

[5] https://appliance-standards.org/sites/default/files/2024_Massachusetts_Appliance_Standards_Savings_Report.pdf
[6] Ibid.
[7] https://www.energy.ca.gov/proceedings/active-proceedings/flexible-demand-appliances
[8] Colorado established smart thermostat and flexible demand water heater standards through HB23-1161 passed in 2023. Washington and Oregon established flexible demand water heater standards through the passage of HB 1444 in 2019 and HB 2062 in 2021, respectively.

enrollment in demand flexibility programs, and therefore the standard itself does not impact the performance of equipment. Instead, authorizing DOER to establish FDAS through regulations would ensure that products installed in Massachusetts have the built-in capabilities to become a flexible load resource such that residents have the opportunity to participate in programs that provide an incentive for moving load to different times of day. This standard would not result in direct energy or emissions savings, but would instead be an enabling requirement to help ensure that there would be a sufficient installed base for effective load shifting as a grid resource. Load flexibility is anticipated to be one of the least-cost strategies to support decarbonization in Massachusetts.[9] Authorizing flexible demand standards would ensure communication pathways that enable effective load shifting and align with industry developed definitions for these capabilities, as follows:

Said section 2 of said chapter 25B is hereby further amended by inserting:

> "Flexible demand" means the capability to schedule, shift, or curtail the electrical demand of a load-serving entity's customer through direct action by the customer or through action by a third party, the load-serving entity, or a grid balancing authority, with the customers consent.
>
> "Flexible demand appliance standard" means a requirement for flexible demand capabilities for a covered product.

Said section 5 of said chapter 25B, as so appearing, is hereby further amended by inserting:

> The commissioner may adopt and update regulations for the standards for any appliances to facilitate the deployment of flexible demand technologies. The regulations may include labeling provisions to promote the use of appliances with flexible demand capabilities. The flexible demand appliance standards shall be based on feasible and attainable efficiencies or feasible improvements that will enable appliance operations to be scheduled, shifted, or curtailed to reduce emissions of greenhouse gases associated with electricity generation. The standards shall become effective not earlier than 1 year after the date of their adoption or updating.

Revisions for Electric Vehicle Supply Equipment (EVSE) Standard

When the initial EVSE standards were adopted in 2021, Massachusetts aligned standards for Level 1 and Level 2 chargers with what was the current version of ENERGY STAR, V1.0. Level 1 and Level 2 chargers are installed in homes, workplaces, and for public access charging. Massachusetts did not establish standards for direct current fast chargers (DCFC), which are

[9] Per the Energy Pathways report from the Massachusetts Decarbonization Roadmap https://www.mass.gov/2050Roadmap, the DER Breakthrough scenario, which included flexible loads such as water heaters, was the least cost pathway.

typically installed in formal stations in heavy traffic corridors and were not included in the scope of the original V1.0 ENERGY STAR specification.[10] Since 2021, the EPA ENERGY STAR program has updated the EVSE specification to incorporate DCFC in V1.1, and most recently in 2023 to V1.2, which slightly updates the requirements for Level 1 and Level 2 chargers to account for more quickly evolving technical functionality. The current law limits the standard to achievement of V1.0. As EVSE have been deployed across the Commonwealth to support the growth of electric vehicles as opposed to internal combustion vehicles and support decarbonization of the transportation sector, the standard aligning with the older V1.0 version of ENERGY STAR has posed challenges. Since EPA updated its specification to V1.2, the EVSE industry has largely embraced the updated specification, which more appropriately accounts for the functionality of today's EVSE and allows for a slight increase in energy usage to accommodate features that hasten adoption. We recommend the following legislative changes to both revise the current standard and clarify its applicability to Level 1 and Level 2 chargers.

Said section 2 of said chapter 25B is hereby further amended by inserting:

> "Connector", a device that attaches an electric vehicle to a charging port to transfer electricity; provided, however, that "connector" may also be referred to as a plug.
>
> "Electric vehicle supply equipment" or "EVSE", a device, including at least 1 charging port and connector, for charging electric vehicles; provided, however, that "electric vehicle supply equipment" may also be referred to as a charger.
>
> "Level 1", galvanically-connected electric vehicle supply equipment with a single-phase input voltage nominally 120 volts AC and maximum output current of not more than 16 amperes AC.
>
> "Level 2", a galvanically-connected electric vehicle supply equipment with a single-phase input voltage range from 208 to 240 volts AC and maximum output current of not more than 80 amperes AC.
>
> "Port", a system or connecting outlet on a charger that provides power to charge an electric vehicle; provided, however, that a port may be equipped with multiple connectors but use only 1 connector at a time to provide such power.

Said section 5 of said chapter 25B, as so appearing, is hereby further amended by inserting:

> Level 1 and Level 2 Electric vehicle supply equipment included in the scope of the ENERGY STAR Program Requirements Product Specification for Electric Vehicle Supply Equipment, Version 1.2 (Rev. June 2023), shall meet the qualification criteria of that specification.
>
> The commissioner may adopt and update regulations for electric vehicle supply equipment in order to facilitate the achievement of the people and the commonwealth's goals and objectives for climate mitigation and required greenhouse

[10] Details on Level 1, Level 2, and DCFC at https://www.transportation.gov/urban-e-mobility-toolkit/e-mobility-basics/charging-speeds

gas emissions limits, which may allow the use of equipment that consumes additional kilowatts per hour in a revision of efficiency standards for electric vehicle supply equipment.

Waivers and Regulatory Flexibility

The recommended standards will help ensure equitable impacts of standards for both Massachusetts residents and businesses; however, the authority to establish and revise specific standards via regulation is critical for dynamic product categories where further revision and refinement may be necessary to ensure the objectives of the standards are achieved. In the case of EVSE, where the 2021 standard was set via statute and could not be modified to address the evolving technological and market needs absent legislative action. Massachusetts has already experienced compliance challenges. We recommend that the details of standards be established through regulation wherever feasible as setting detailed standards via statute runs a risk of unintended consequences or implementation challenges, particularly for technologies expected to rapidly evolve. Authorizing DOER to establish standards for these types of appliances through regulation will allow Massachusetts to more quickly adapt its standards to accommodate changing technologies.

Additionally, regulatory waivers provide enforcement discretion for the Commonwealth to address any unintended consequences from existing standards, or the development of new products that may not fall squarely within the intended scope of those standards. Waivers allow for carefully considered exceptions for individual products or installations without requiring a new rulemaking or statutory process. The proposed waiver authority is narrow in scope but intended to support the intent of the regulations while allowing for innovation or responsiveness to dynamic markets. This authority is beneficial for consumers, installers, and manufacturers as it reduces regulatory burden and allows increased flexibility, ultimately helping ensure equitable impacts of standards both for Massachusetts residents and businesses. We recommend the following language to provide greater flexibility to DOER in its implementation of appliance standards:

Said section 4 of said chapter 25B, as so appearing, is hereby further amended by inserting:

> The Department may adopt rules to establish a waiver process to grant full or partial waivers to minimum efficiency standards, flexible demand appliance standards, or test procedures established under this section. Manufacturers, retailers, distributors, or installers of covered products and potentially covered products may petition the Department for a waiver. The Department must make publicly available details of any such petition and final ruling. The Department may grant a waiver only if doing so will support the objectives of this act and will not result in a significant erosion of the product types' consumer or environmental benefits as a class.
>
> The commissioner may, by regulation, update energy efficiency standards for the types of new products set forth in clauses (e) to (y), inclusive, of section 3. Any revision of such efficiency standards shall be based upon the determination of the commissioner; provided, however, that a revision of said efficiency standards for electric vehicle

supply equipment may allow the use of equipment that consumes additional kilowatts per hour. Any standard revised pursuant to this section which conflicts with a corresponding standard in the state plumbing code shall take precedence over the standard in said state plumbing code. Any standard revised pursuant to this section shall not take effect for at least 1 year after its adoption.

Conclusion

Massachusetts has taken important steps towards achieving its greenhouse gas reduction objectives through the establishment of state standards. However, there are opportunities to enhance these standards and have a broader impact through both process changes, adjustments, and the adoption of additional standards. Enactment of these standards and legislative updates will help save consumers money, water, energy, and support a functional implementation of appliance standards for the Commonwealth into the future.

Appendix 1: Proposed Legislative Language

Language in **bold** is already included in S.2838.

Said section 2 of said chapter 25B is hereby further amended by inserting:

“Automatic landscape irrigation controller” means a device used to remotely control valves that operate a landscape irrigation system. Such devices include, but are not limited to, weather-based irrigation controllers, soil moisture-based irrigation controllers, and timer-based irrigation controllers, whether configured as a standalone controller, a base controller, an add-on device, or a plug-in device. “Automatic landscape irrigation controller” does not include irrigation control devices designed for attachment to a hose bib or a hose end or those designed and marketed for agricultural purposes.

“Gas fireplace” means a decorative gas fireplace or a heating gas fireplace.

"Decorative gas fireplace" means a vented fireplace, including appliances that are freestanding, recessed, zero clearance, log set, or a gas fireplace insert, that is fueled by natural gas or propane, is marked for decorative use only, and is not equipped with a thermostat or intended for use as a heater.

"Heating gas fireplace" means a vented fireplace, including appliances that are freestanding, recessed, zero clearance, or a gas fireplace insert, that is fueled by natural gas or propane and is not a decorative fireplace.

“Connector”, a device that attaches an electric vehicle to a charging port to transfer electricity; provided, however, that “connector” may also be referred to as a plug.

“Electric vehicle supply equipment” or “EVSE”, a device, including at least 1 charging port and connector, for charging electric vehicles; provided, however, that “electric vehicle supply equipment” may also be referred to as a charger.

“Flexible demand”, the capability to schedule, shift or curtail the electrical demand of a load-serving entity’s customer through direct action by the customer or through action by a third party, the load-serving entity or a grid balancing authority, with the customer’s consent.

“Level 1”, galvanically-connected electric vehicle supply equipment with a single-phase input voltage nominally 120 volts AC and maximum output current of not more than 16 amperes AC.

“Level 2”, a galvanically-connected electric vehicle supply equipment with a single-phase input voltage range from 208 to 240 volts AC and maximum output current of not more than 80 amperes AC.

“Port”, a system or connecting outlet on a charger that provides power to charge an electric vehicle; provided, however, that a port may be equipped with multiple connectors but use only 1 connector at a time to provide such power.

"Flexible demand" means the capability to schedule, shift, or curtail the electrical demand of a load-serving entity's customer through direct action by the customer or through action by a third party, the load-serving entity, or a grid balancing authority, with the customers consent.

"Flexible demand appliance standard" means a requirement for flexible demand capabilities for a covered product.

Said section 4 of said chapter 25B, as so appearing, is hereby further amended by inserting:

The Department may adopt rules to establish a waiver process to grant full or partial waivers to minimum efficiency standards, flexible demand appliance standards, or test procedures established under this section. Manufacturers, retailers, distributors, or installers of covered products and potentially covered products may petition the Department for a waiver. The Department must make publicly available details of any such petition and final ruling. The Department may grant a waiver only if doing so will support the objectives of this act and will not result in a significant erosion of the product types' consumer or environmental benefits as a class.

The commissioner may, by regulation, update energy efficiency standards for the types of new products set forth in clauses (e) to (y), inclusive, of section 3. Any revision of such efficiency standards shall be based upon the determination of the commissioner; provided, however, that a revision of said efficiency standards for electric vehicle supply equipment may allow the use of equipment that consumes additional kilowatts per hour. Any standard revised pursuant to this section which conflicts with a corresponding standard in the state plumbing code shall take precedence over the standard in said state plumbing code. Any standard revised pursuant to this section shall not take effect for at least 1 year after its adoption.

Said section 5 of said chapter 25B, as so appearing, is hereby further amended by inserting:

The commissioner may adopt and update regulations for Automatic Landscape Irrigation Controls in order to facilitate the achievement of the people and the commonwealth's goals and objectives for climate mitigation.

Gas fireplaces shall comply with the following requirements:

> Gas fireplaces shall be capable of automatically extinguishing any pilot flame when the main gas burner flame is extinguished.
>
> Gas fireplaces must prevent any ignition source for the main gas burner flame from operating continuously for more than seven days from last use of the main burner.

Level 1 and Level 2 **Electric vehicle supply equipment included in the scope of the ENERGY STAR Program Requirements Product Specification for Electric Vehicle Supply Equipment, Version 1.2 (Rev. June 2023), shall meet the qualification criteria of that specification.**

The commissioner may adopt and update regulations for electric vehicle supply equipment in order to facilitate the achievement of the people and the commonwealth's goals and objectives

for climate mitigation and required greenhouse gas emissions limits, which may allow the use of equipment that consumes additional kilowatts per hour in a revision of efficiency standards for electric vehicle supply equipment.

The commissioner may adopt and update regulations for the standards for any appliances to facilitate the deployment of flexible demand technologies. The regulations may include labeling provisions to promote the use of appliances with flexible demand capabilities. The flexible demand appliance standards shall be based on feasible and attainable efficiencies or feasible improvements that will enable appliance operations to be scheduled, shifted or curtailed to reduce emissions of greenhouse gases associated with electricity generation. The standards shall become effective not earlier than 1 year after the date of their adoption or updating.