PRODUCT STEWARDSHIP INSTITUTE

# Battery EPR Background Document

## Massachusetts EPR Commission Meeting

## July 9, 2025

***Prepared by the Product Stewardship Institute, Inc.***

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## The Product Stewardship Institute

The Product Stewardship Institute is a policy expert and consulting nonprofit that powers the emerging circular economy to ensure products are responsibly managed from design to end of life. In 2000, PSI pioneered product stewardship in the United States by convening diverse stakeholders to build extended producer responsibility (EPR) policies and programs. Drawing on global best practices and expansive multinational relationships, our facilitated dialogues, policy models, and expert testimony have helped enact 147 EPR laws in 34 states across 20 product categories, including packaging, paint, batteries, mattresses, and electronics. Our members include state, local, and tribal governments in 48 states, and we partner with more than 120 businesses, academic institutions, environmental nonprofits, and international governments. Together, we advance scalable solutions that protect people and the planet. Join us at www.productstewardship.us.


## Acknowledgements

PSI prepared this report for the Massachusetts Department of Environmental Protection as an information resource for the Extended Producer Responsibility Commission.


## Project Contact


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# 1. Why Battery EPR?

Consumer batteries have been an environmental, health, and financial concern for at least the past four decades due to the following:

- **Volume/Wasted Resources and Jobs:** Large quantities of batteries are generated and disposed of annually, wasting material resources and energy, as well as losing recycling jobs.
- **Toxicity/Hazards/Cost:** Certain rechargeable batteries contain toxic materials or flammable materials. Lithium-ion batteries often catch fire or explode, releasing hazardous materials, causing facility destruction, and sometimes death. Recycling and waste facility insurance has increased due to increased operational risks.


- **Low Recycling Rate:** Only an estimated 12-15 percent of rechargeable batteries, and a much smaller percentage of single-use batteries, are being recycled in the U.S.
- **Municipal Government Cost:** Governments must pay to collect and manage consumer batteries that Call2Recycle® either does not accept or collects only for a fee. However, most batteries are disposed, with the cost borne by governments and taxpayers.
- **Low Consumer Awareness:** There is a lack of consumer awareness about the need to recycle certain batteries and/or where to recycle. Most consumers do not know the difference between battery types and want to recycle all batteries together.
- **Accessibility (convenience):** Although consumers may want to recycle, they need a convenient location for drop off and/or other convenient collection opportunities to follow through on that desire with action.
- **Embedded Batteries:** Many batteries are embedded in products, making them difficult to remove by the consumer, requiring the entire product to be collected, with the battery dismantled and recycled.
- **Difficulty in Measuring Program Performance:** It is difficult to quantify the number of batteries collected and recycled. Some batteries collected in electronics recycling programs are recycled with the host product and are not reported, and some battery collection programs do not publicly report their collection results.
- **Processing and Lifecycle Impacts:** There is a need for greater certainty regarding processing practices, and some believe that environmentally sound recycling standards should be developed. Even if battery recovery and recycling are high, impacts may occur during other stages in the battery lifecycle.

# 2. Common Battery Types

## Typical Battery Materials Covered by EPR

### Primary Battery

**Type:** Non-rechargeable; Typically removeable
**Weight:** 4.4 lbs or less


### Portable Battery

**Type:** Rechargeable
**Weight:** 11 lbs or less
**Wattage:** 300 watt-hours

### Medium-Format Battery

**Type:** Rechargeable
**Weight & Wattage:** More than 11 lbs or more than 300 watts ***and*** less than 25 lbs or less than 2,000 watts

### Battery-Containing Product

**Type:** Rechargeable or non-rechargeable

### Large Format Batteries

**Type:** Rechargeable
**Weight:** 25 lbs or more

**Products that may use or contain a primary battery.**

*Smoke Detectors*

*Clocks & Watches*

*Flashlights*

**Products that may use or contain a portable battery.**

*Power Tools*

*Digital Cameras*

*Emergency Devices*

**Products that may use or contain a medium-format battery.**

*E-Bikes*

*E-Scooters*

*Hover Boards*

**Battery-containing product examples.**

*Electric Toothbrushes*

*Vapes*

*Toys and Wearables*

**Products that may use or contain large format batteries**

*Electric Vehicles*

*Battery Energy Storage Systems*

*Golf Carts*

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# 3. Battery EPR Laws in the U.S.

## *History of Battery EPR in the U.S.*

The first EPR laws in the United States were established for batteries, starting with Vermont in 1991 for certain rechargeable batteries purchased by government. Florida and Maryland also passed rechargeable battery EPR laws in 1993 and 1994, targeting nickel cadmium (Ni-Cd), small sealed lead-acid (SSLA), and other rechargeable batteries under 25 pounds. Maine (1995) and Iowa (1996) followed next with laws for mercuric oxide batteries and rechargeable batteries.

In 1994, the first producer responsibility organization (PRO) formed in the United States – Call2Recycle – to manage these and future battery EPR laws.

In 1996, the United States Congress enacted The Mercury-Containing and Rechargeable Battery Management Act, federal public law 104-142,[1] which phased out mercury from primary (single-use) batteries and promoted the collection and recycling or safe disposal of Ni-Cd, SSLA, and other batteries. Although the federal law did not require producers to fund and operate a recycling program, as the state EPR laws did, the federal law did require that producers label rechargeable batteries with recycling symbols to educate consumers and encourage participation in voluntary stewardship programs. This paved the way for Call2Recycle to roll out its voluntary national program in states without EPR laws.

### An Inflection Point

In 2014, after nearly two decades of industry's full-service Call2Recycle program, the national recycling rate for rechargeable batteries stood at just 12-15%. As a result, numerous states increased their interest in establishing an EPR solution. One state, the Connecticut Department of Energy and Environmental Protection, hired PSI to convene a national dialogue focused on developing best practice policy elements for battery EPR. More than 130 participants from state and local government, industry, and environmental groups joined a hybrid meeting in Hartford, Connecticut. This meeting was the first time that the four industry battery associations aligned on battery EPR. (Today, the battery industry is represented solely by PRBA, the Rechargeable Battery Association.) As a result of the PSI dialogue, Vermont passed the nation's first battery EPR law for primary batteries in 2014, which boosted overall battery collection in the state 180% in its first year of implementation.

### Covered Material Scopes Expand Under Battery EPR Laws

Since 2020, numerous battery EPR laws have been enacted encompassing ever-larger scopes of covered materials. In 2020, the District of Columbia established the first U.S. EPR law that covers all portable primary and rechargeable batteries, as well as embedded batteries.

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[1] The Mercury-Containing and Rechargeable Battery Management Act. Accessed July 8, 2025 at https://www.epa.gov/rcra/mercury-containing-and-rechargeable-battery-management-act-public-law-104-142

California followed in 2022 with a law that covers not only portable primary and rechargeable batteries but also medium-format batteries, which are commonly used in e-bikes. In 2023, Washington's law covered the same battery products as California but added a study of embedded batteries – those contained in products that are not intended to be removed by the consumer.

In 2024, New Jersey established the first EPR law for EV batteries in the country but did not include portable or medium-format batteries. That same year, Vermont added rechargeable batteries to its decade-old primary battery law, and Illinois enacted a battery EPR law covering portable and medium format batteries. Like Washington, both of these laws required a study on how to include embedded batteries in the program. Nebraska, Colorado, and Connecticut all established battery EPR laws in 2025 with similar scopes.

At the federal level, the federal Bipartisan Infrastructure Law,[2] enacted in 2021, includes provisions to establish a task force to develop a federal framework for battery EPR. That task force is now called a workgroup and is ongoing with recommendations due later this year.

## Battery EPR Laws in the U.S. Today

Table 1 below summarizes the existing laws on portable and electronic vehicle batteries in the United States, while Figure 1, also below, depicts battery EPR laws and 2025 bills.

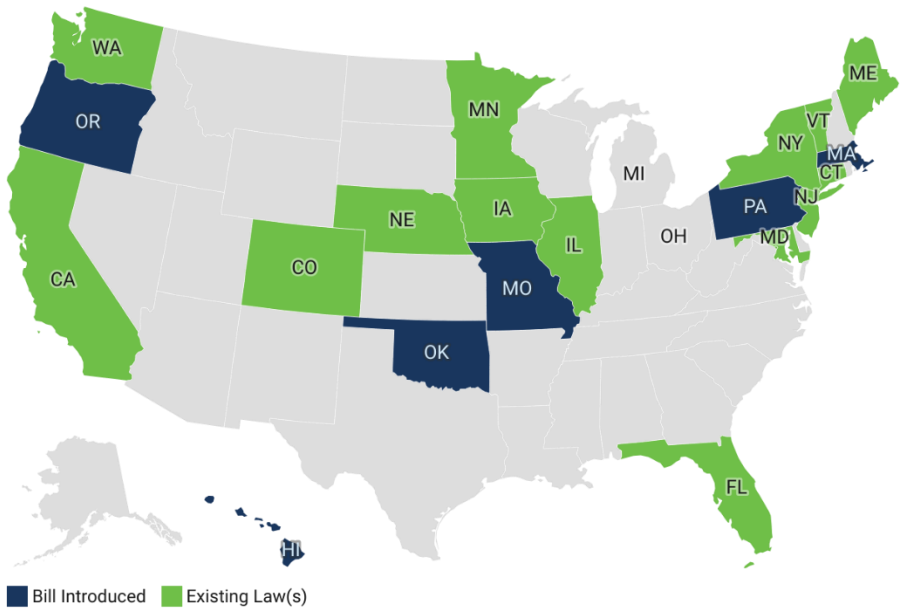
***Table 1: Battery EPR Laws in the United States (as of July 8, 2025)***

| State | Enacted | Amended | Batteries Covered |
|---|---|---|---|
| **California** | 2006 | | rechargeable |
| **California** | 2022 | | primary and rechargeable |
| **Colorado** | 2025 | | primary, rechargeable, medium-format |
| **Connecticut** | 2025 | | primary, rechargeable, medium-format, battery-containing devices |
| **District of Columbia** | 2020 | 2023 | primary and rechargeable |
| **Florida** | 1993 | | rechargeable |
| **Illinois** | 2024 | | |
| **Iowa** | 1996 | | rechargeable Ni-Cd and SSLA, mercuric oxide |
| **Maine** | 1995 | | mercuric oxide batteries |
| **Maryland** | 1993 | | rechargeable |

[2] Federal Bipartisan Infrastructure Law, page 135 STAT. 971. https://www.congress.gov/bill/117th-congress/house-bill/3684/text. Accessed July 8, 2025

| State | Enacted | Amended | Batteries Covered |
|---|---|---|---|
| **Maryland** | 1994 | | mercuric oxide batteries |
| **Minnesota** | 1991 | | rechargeable batteries |
| **Nebraska** | 2005 | | primary, rechargeable, medium-format, battery-containing devices |
| **New Jersey** | 1991 | | Rechargeable Ni-Cd and SSLA, mercuric oxide batteries |
| **New Jersey** | 2023 | | electric and hybrid vehicle batteries |
| **New York** | 2010 | 2025 | rechargeable, medium format |
| **Vermont** | 1991 | | rechargeable Ni-Cd purchased by a government entity; mercuric oxide |
| **Vermont** | 2010 | 2024 | primary, rechargeable, battery containing products |
| **Washington** | 2023 | | primary, rechargeable, medium-format |

***Figure 1: Battery EPR Laws and Bills in the United States – 2025 (as of July 9, 2025)***






*This map shows EPR laws and bills that create a new program. Bills amending existing EPR programs are not represented.*

# How Battery EPR Laws Work

## Call2Recycle

In states with EPR laws, Call2Recycle develops and submits a detailed program plan to the state oversight agency (typically the environmental agency) for approval. That plan includes information about how the program will be run to meet the statutory requirements. Once the oversight agency approves the plan, Call2Recycle operates the program as follows:

- Secures and contracts with collection sites (e.g., retailers, household hazardous waste (HHW) facilities) and ensures convenient access in urban, suburban, and rural areas.
- Provides retailer and collection sites with supplies, training, educational materials, and logistical support for registration and reporting.
- Secures and contracts with transporters and processors.
- Conducts public education and outreach, including a statewide promotion campaign.
- Assesses fees on producers based on market share to fund the program.
- Gathers data on collection, processing, awareness, and other metrics for reporting.
- Reports annually to the oversight agency on program activities and results.
- Ensures transparency and accountability through audits and evaluations.

## Producers

Producers are typically considered as the battery brand (whether a manufacturer, retailer, or private label) or the first-time importer of the battery into the state, although they may also be the producer of a battery-containing product. Producers must register with Call2Recycle and/or the state oversight agency. They cannot sell in a state with a battery EPR law if they are not registered. Producers also report their sales and pay fees to Call2Recycle to fund the program.

## Consumers

Consumers can recycle batteries for free at any collection location that is part of an approved program plan, including HHW facilities and certain retailers, or pay for premium collection service for added convenience.

## Transporters and Processors

Transporters pick up batteries from collection locations. Processors receive the material and are required to process the batteries in environmentally responsible ways. In some cases, transporters or processors might offer premium services to consumers, like curbside battery pick-up or mail-back programs.

## Retailers

Typically, retailers that sell batteries in states with EPR laws may opt to serve as voluntary collection sites. In New York, however, retailers must serve as a collection site for those batteries they sell and also provide education. In California, any retailer that sells batteries and has five or more locations must serve as a collection site and educate consumers about the

program. Retailers that are collecting batteries as part of an EPR program plan are typically required to provide educational materials to consumers. Those materials, however, are paid for by the producers. Retailers that are not collection sites may also play a role in educating consumers about the program, and may offer premium collection services, like mail-back boxes, for sale. No retailer is allowed to sell covered batteries if the producer of those batteries is not part of an approved EPR program plan.

### *Municipalities*

Municipal and county governments often serve as collection sites at HHW and other locations and provide outreach and education about the program. In some cases, they may also offer premium services, such as curbside pick-up, or provide mail-back boxes for a fee.

# 4. Battery EPR Opportunities for Mass.

### *Leftover Battery Generation Estimates*

Massachusetts residents purchase about 63 million batteries each year,[3] many of which replace old, spent batteries that are then discarded. About 6,000 tons of these batteries are discarded in the trash each year, according to Massachusetts waste characterization studies.[4] The remainder may be stored in the home or recycled.

### *Current State of Battery Recycling in Massachusetts Today*

There is a mix of producer-funded, consumer-funded, and government-funded battery recycling taking place in Massachusetts today. Call2Recycle operates a voluntary program paid for by producers that has a national battery collection rate between 12% and 15%, as mentioned previously. Municipalities also collect household and lithium batteries[5] at HHW locations and through events that are funded by taxpayers directly or through MassDEP grants. Consumers may also purchase premium collection services. Data on the quantity or weight of batteries recycled in Massachusetts is not currently available.

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[3] Based U.S. Environmental Protection Agency estimates that U.S. residents purchase 3 billion batteries per year scaled to the Massachusetts population. Accessed July 8, 2025 at https://web.archive.org/web/20110202212818/http://www.epa.gov/waste/conserve/materials/battery.htm

[4] According to waste characterization studies, batteries comprised about 0.1% of 6 million tons of Massachusetts solid waste disposed – or approximately 6,000 tons. Accessed July 8, 2025 at https://www.mass.gov/guides/solid-waste-master-plan#-waste-characterization-&-capacity-studies-

[5] The Massachusetts Department of Environmental Protection CY2024 Recycling and Solid Waste Survey results use the categories of *household batteries and lithium batteries*. Household batteries is understood to mean all batteries used at home. Lithium batteries is understood to mean any battery chemistry that uses lithium.

# Increase Battery Recycling Access and Rates

## Current Collection Access

In Massachusetts, approximately 56% of the population has access to year-round household battery recycling services, and 53% of residents have access to year-round lithium battery recycling services.[6] Another 27% to 30% have limited access to household and lithium battery recycling services, respectively. That leaves up to 17% of Massachusetts residents without access to battery recycling services. Tables 2 and 3 below summarize Massachusetts resident access to municipally provided battery recycling services, as reported by municipalities to the MassDEP in the 2024 recycling and solid waste survey.

*Table 2: Access to Household Battery Collection in Massachusetts in 2024*

| Collection Opportunity | % Communities | % of Population |
|---|---|---|
| **Year round** | 63% | 56% |
| **Once a week** | 1% | 1% |
| **Once a month** | 2% | 4% |
| **Between 6 and 11 months per year** | 3% | 6% |
| **Less than 6 months per year** | 7% | 16% |
| **None** | 5% | 6% |
| **No Data** | 18% | 11% |

*Table 3: Access to Lithium Battery Collection in Massachusetts in 2024*

| Collection Opportunity | % Communities | % of Population |
|---|---|---|
| **Year round** | 60% | 53% |
| **Once a week** | 2% | 1% |
| **Once a month** | 2% | 4% |
| **Between 6 and 11 months per year** | 3% | 5% |
| **Less than 6 months per year** | 10% | 20% |
| **None** | 5% | 6% |
| **No Data** | 18% | 11% |

## Collection Access with Battery EPR would Increase from 52% to 95% of Residents

EPR laws require a certain number of year-round collection sites to be available to residents based on criteria that vary by state. Some laws require a minimum number of sites per county (e.g., Vermont), or one collection site per 10,000 people (e.g., District of Columbia). Others, like New York State, require that retailers serve as collection sites to help ensure convenient access.

[6] Massachusetts Department of Environmental Protection CY2024 Recycling and Solid Waste Survey results. Accessed July 8, 2025 at https://www.mass.gov/doc/2024-municipal-solid-waste-recycling-survey-responses/download

In Washington State, the battery EPR law requires there be at least one permanent, year-round collection site for portable batteries within a 15-mile radius of 95% of residents in the state and at least 1 site per 30,000 residents in urban areas. If Massachusetts adopted a law with similar convenience standards to Washington's law, Massachusetts could see an increase in access to lithium battery recycling from the current baseline rate of 53% of the population to 95% of the population – an increase of 42 percentage points.

## Municipal Savings

### Municipal Battery Recycling Costs Today

Data about municipal and other spending on battery recycling in Massachusetts is not currently available, although PSI is currently conducting a survey of municipalities to gather data about municipal costs of battery management in the Commonwealth.

### Battery EPR in Mass. Would Bring $3.9 million in Battery Recycling Funding

Under EPR programs, battery producers, but *not* municipalities, would pay for battery collection, transportation, and recycling. Municipal governments also do not pay for education and outreach materials and safe storage supplies for collection sites. Whatever municipalities are paying now – likely millions of dollars, would be covered by the producer-funded program. In Vermont in 2024, Call2Recycle spent $392,925 to collect and recycle 154,596 pounds of batteries[7] – about $2.54 per battery and $1.40 per household.[8] An EPR program in Massachusetts would bring at least $3.9 million in financial benefits to Massachusetts municipalities and residents.[9]

# 5. Policy Elements & Considerations

## Covered Products

### Common Scope of Products

All state battery EPR laws enacted since 2020 include primary batteries under 4.4 pounds, portable rechargeable batteries under 11 pounds, and medium-format batteries (e.g., for e-bikes). Some state laws also include battery-containing products (e.g., electric toothbrushes), and three state laws require a study on the inclusion of embedded batteries (those not intended to be removed from the product by the consumer). Still under consideration is whether to also include damaged, defective, and recalled batteries (known as DDR). Section 2 above shows examples of products that contain covered batteries, as well as covered products.

[7] Call2Recycle 2024 Vermont Annual Report, page 16. Accessed July 8, 2025 at https://dec.vermont.gov/document/call2recycle-vermont-annual-report-2024

[8] Based on 279,612 households in Vermont as of 2023.

[9] Based on 2.8 million households in Massachusetts and $1.40 per household.

### *Key Consideration: Embedded Batteries*

Embedded batteries are batteries sold within products that were never intended for the consumer to remove or replace themselves. Many electronics (e.g., laptops) now come with embedded batteries. It is challenging to assign responsibility for these batteries if they are collected with the product. In addition, many embedded batteries in electronic devices are already part of electronics EPR programs. There is growing interest in ensuring that both embedded batteries and the products in which they are contained are covered under EPR programs. Studies underway seek to determine how these batteries and products should be safely managed and equitably financed.

### *Key Consideration: DDR (Damaged, Defective, Recalled batteries)*

Damaged, defective, and recalled batteries – DDR – are particularly challenging and costly to manage. Because they are damaged, they are at a higher risk for causing fires and present multiple safety issues. Although recalled batteries are often part of a manufacturer's product warranty, they are sometimes managed outside EPR programs through contracts between manufacturers and Call2Recycle or other carriers. However, government HHW facilities report that they receive many recalled batteries, in addition to those that are damaged and defective. Proponents of new battery EPR bills are seeking ways to include all, or most, DDR batteries in EPR laws.

## Collection Requirements

All battery EPR laws have established collection requirements that guarantee convenient and equitable collection services throughout the state. Collection sites must be furnished with containers appropriate for safe storage, training, safety guidance, and signage, as well as educational materials at no cost. Collection sites and processors must use environmentally sound management practices, and must comply with all applicable federal, state, and local laws. Additionally, programs must meet collection goals, recycling efficiency goals, and public awareness goals by specific dates set out in regulation or in an approved program plan.

### *Key Consideration: Allowing collection outside the EPR program*

There are a few battery recyclers that seek to conduct battery recycling activities outside of the EPR programs established in certain states. These companies might have contracts with original equipment manufacturers for EV battery recycling and for other types of batteries, especially lithium batteries. They perceive EPR programs as creating unnecessary regulation. Others believe that these operations seek to collect only the most valuable batteries, leaving lower value batteries to others. Additional conversations will be needed to address these ongoing issues.

## Collection Convenience

All recent battery laws include convenience standards that must be met. Convenience standards are important since access and ease of use are correlated to higher collection

volumes. Convenience metrics are designed to meet the needs of each state, since each state population is unique. Common metrics include the following:

- Recycling must be as easy as trash collection
- A minimum number of collection sites must be established – for example 1 site per 10,000 people and at least 1 site per county, or 1 site per 30,000 people in urban areas
- Minimum distance to a collection sites – for example, there must be a site within a 15-mile radius for 90% of residents.
- Other metrics as appropriate, such as sites must be available on tribal lands, or there must be free, year-round access.

Some programs permit premium collection service for an additional consumer fee in order to provide greater convenience. For example, mail-back boxes or curbside collection.

## Covered Entities

Covered entities are the entities and locations that may use the EPR program. These include households, businesses, schools, local governments, and nonprofits in battery EPR programs.

## Governance

Producers of covered batteries are responsible for the program collectively under a Stewardship Organization (SO). The SO is usually organized as a 501(c)(3) nonprofit organization.

The SO is overseen by a government oversight agency, typically the environmental department of a state (e.g., Massachusetts Department of Environmental Protection). The government oversight agency is responsible for reviewing and approving, seeking amendments to, or rejecting the SO's program plans. The oversight agency also reviews annual reports, ensures compliance with the law and regulations, and conducts enforcement actions against non-compliant producers. Recent EPR laws have often included an Advisory Council (or Board) – a multi-stakeholder committee convened to provide advice and recommendations to the government oversight committee to ensure that all stakeholders involved in the program have input into the program.

## Funding

Recent battery EPR laws require that the SO pay all costs associated with the following: collection, transportation, and processing of covered batteries; collection sites costs, including containers, training, signage, safety guidance, and educational materials; public education and outreach; costs of managing DDR batteries (damaged, defective, and recalled batteries); and state government oversight and enforcement costs.