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Report to the Joint Standing Committee on the Environment and Natural Resources

Annual Product Stewardship Report

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APPENDIX A – Comments Received on Posted Report

I. Introduction

This report is prepared in accordance with Maine’s *Product Stewardship Law*, [38 M.R.S. §§ 1771-1776](#), which directs the Department of Environmental Protection (“Department”) to develop an annual report for the Legislature evaluating Maine’s product stewardship programs. Product stewardship is a public policy approach that can minimize the negative impacts of products and packaging throughout their lifecycles, from sourcing materials through end-of-life management, to creating more sustainable systems. Manufacturers (a.k.a. producers) have the greatest influence over the lifecycle impacts of their products, starting with material sourcing and design. The choices of distributors, retailers and consumers also have an impact on the lifecycle of products. Product stewardship laws that mandate some level of manufacturer (producer) responsibility for product management at the end-of-life are known as extended producer responsibility (“EPR”) laws, and may include incentives that improve design, minimize negative impacts related to toxicity, or promote reuse or recyclability. EPR induces manufacturers to consider the end-of-life impacts of their products and relieves the public sector of some of the burden of managing those products. Maine currently has 11 product stewardship laws related to the end-of-life management of specific consumer products.

This report provides the Joint Standing Committee on the Environment and Natural Resources (“ENR Committee”) with information concerning the performance of Maine’s current product stewardship programs, as well as candidate products for future consideration. Maine’s Product Stewardship framework law requires the Department to solicit and collect public comments on the content of the report for 30 days prior to submittal to the Legislature, and to append all comments received to the report.

II. Existing Programs’ Performance and Recommendations

Maine’s existing product stewardship programs are listed below in chronological order.

A. Beverage Container Redemption (“Bottle Bill,” 1978) – [38 M.R.S. §§ 3101-3119](#)

Maine’s *Manufacturers, Distributors, and Dealers of Beverage Containers*, a.k.a. the “Bottle Bill” has been under the purview of the Department since November 1, 2015. The program had been overseen by the Department of Agriculture, Conservation and Forestry since its enactment in 1976.

In 2022, over 40,000 tons of beverage containers were recycled (see [Table 1](#)), in addition to approximately 612 tons of external material collected through the program including corrugated cardboard, paperboard, and plastic film bags used to transport containers.¹ In addition to preventing widespread litter from improper disposal of beverage containers, the program remains a

¹Recyclers managing bottle bill materials recovered an estimated 257 tons of plastic film, 245 tons of corrugated cardboard, and 110 tons of paperboard.

successful collection system for beverage containers with estimated recovery rates in the 66 to 87% range, well above Maine’s overall statewide waste diversion rate of 33.8%² and the national recycling and composting rate of 32.1%.³

Table 1 – Quantity of Containers Recycled by Type

2022 Container Redemption (Tons)				
Material	Plastics	Glass	Metals	Total
Tons Recovered	9,759	28,351	5,475	43,585

The 2022 data shows strong redemption rates for all container types, with the lowest redemption rate for 15-cent metal beverage containers still being well above the statewide recycling rate (see Table 2 below). This data however is based on those initiators of deposit (“IODs”) who have submitted reports to the Department. Only approximately 67% of IODs are typically submitting reports. Tracking container sales and redemption numbers was identified in 2018 as an area for improvement per the recommendations of an Office of Program Evaluation and Government Accountability (“OPEGA”) report,⁴ and is still a work in progress. The Department continues to reach out to recalcitrant IODs to obtain sales and redemption information.

Table 2 – Container Sales Compared to Redemption

2022 Bottle Bill Sales vs. Redemption			
5 Cents	Sales	Redeemed	Percentage
Plastic	482,267,779	358,620,368	74%
Metal	577,071,734	459,786,449	80%
Glass	78,503,307	63,350,033	81%
Total	1,137,842,820	881,756,850	77%
15 Cents	Sales	Redeemed	Percentage
Plastic	474,597	410,975	87%
Metal	548,195	363,699	66%
Glass	16,003,224	13,150,066	82%
Total	17,026,016	13,924,740	82%
Overall	1,154,868,836	895,681,590	78%

² Based on available data, Maine’s estimated MSW recycling rate averaged 33.8% over 2020 - 2022, down slightly from an average of 36.56% over 2018 and 2019, which was in turn down slightly from 38.09% in 2017.

³ National recycling and composting rate estimate from EPA, available here: <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#recycling>.

⁴ OPEGA No. SR-BOTTLE -17, *Maine’s Beverage Container Redemption Program—Lack of Data Hinders Evaluation of Program and Alternatives; Program Design Not Fully Aligned with Intended Goals; Compliance, Program Administration, and Commingling Issues Noted*, May 2018 (<http://legislature.maine.gov/doc/2316>).

“Bottle Bill” program businesses (redemption centers, pickup agents, etc.) have been impacted by the labor issues and increased operational costs that have been plaguing the entire service industry, particularly since the COVID-19 pandemic. In addition to the increased costs of operation, the number of different beverages has increased on the retail landscape, complicating the container sorting process at redemption centers. Moreover, another issue impacting the program is the direct shipping of beverages to Maine consumers from online sales, which allows containers to enter the system without the deposit and handling fee being paid, increasing costs to Maine distributors of beverages. To address these and other issues, a number of bills were submitted during the First Regular and First Special Sessions of the 131st Legislature, with two of the bills ultimately becoming law. [P.L. 2023, ch.48](#) – *An Act to Increase the Handling Fee for Beverage Containers Reimbursed to Dealers and Redemption Centers*, increased the handling fee that is paid to redemption centers and dealers that accept returnable beverage containers from 4½ cents per container to 5½ cents per container on May 1, 2023, and further increased the fee to 6 cents on September 1, 2023. [P.L. 2023, ch. 482](#) – *An Act to Modernize Maine’s Beverage Container Redemption Law*, made a number of changes to the program that will go into effect over the next several years and ultimately streamline the program’s operation. On October 15, 2024, all IODs must enter into a commingling agreement in order to sell beverages in the State. Additionally, by October 15, 2024, the commingling groups must collectively establish a commingling cooperative (the “Co-op”) to provide for the management of the beverage container program. By January 15, 2025, the Co-op must submit a plan for operating the program, which, among other matters, will allow the program to transition from sorting beverage containers by brand at the redemption center to sorting containers by material type and size. The law also provides funding for three additional Department staff to provide oversight of the redemption program until June 7, 2025.

Given the widespread changes made to 38 M.R.S. §§ 3101-3119, the Department will need to substantially update the rules governing the beverage container redemption program. To encourage stakeholder input, the Department will conduct a robust outreach process, and anticipates hosting several stakeholder meetings to gather input regarding the changes that will need to be made to the rules. Anticipated issues include the following: commingling, Co-op implementation and processes, payments and reporting, redemption center pick-up, beverage registration, infrastructure development, refillable containers, program education, and evaluation of program performance. Once input has been gathered, the Department will submit and post updated rules to the Board of Environmental Protection (“BEP”) in October 2024 as part of the formal rulemaking process.

B. Lead-Acid Batteries (1989) – [38 M.R.S. § 1604](#)

Lead-acid battery disposal has been regulated since 1989. [38 M.R.S. § 1604](#) bans the disposal of lead-acid batteries by burial, incineration, deposit, or dumping. It also requires all sellers of lead-acid batteries to accept used lead-acid batteries from customers purchasing a new lead-acid battery. If the customer is not returning a used lead-acid battery at the time of purchase, the retailer must collect a \$10 dollar deposit and refund that deposit if the customer returns with a used lead-acid battery within 30 days. Wholesalers of lead-acid batteries must then collect used lead-acid batteries

from retailers. Additionally, the law requires the posting of signage at retail outlets informing the public of the state law and its requirements.

Numerous other states have similar programs for lead-acid batteries, and the collection and recycling of lead-acid batteries is considered a success. Lead-acid batteries are America's most recycled consumer product, with a national recycling rate of 99%.⁵ In 2022, an estimated 3,320 tons of lead-acid vehicle batteries were collected in Maine and recycled.

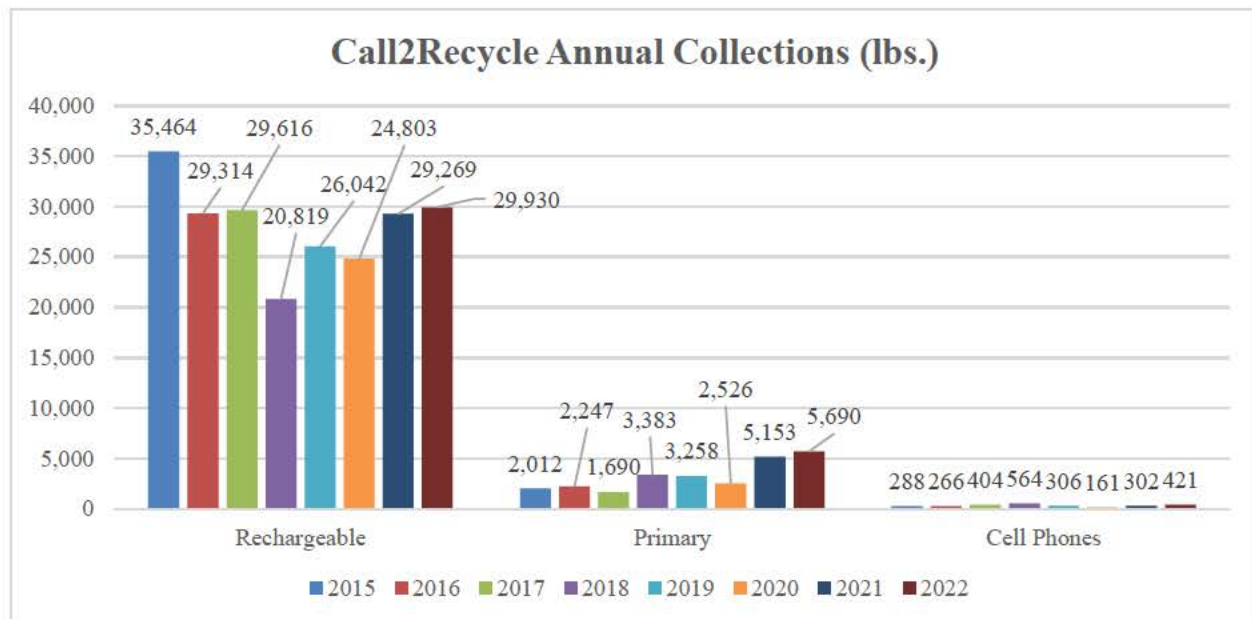
C. Rechargeable Batteries (1991) – [38 M.R.S. § 2165](#)

Regulation of certain dry-cell batteries, [38 M.R.S. § 2165](#) was enacted in 1991, and requires manufacturers of nickel cadmium and small sealed lead-acid batteries to provide a system for the recycling of their batteries. The program is implemented in Maine by [Call2Recycle](#) on behalf of the manufacturers. Until mid-2017, Call2Recycle offered a free rechargeable battery recycling program to any business, government entity, or retail location interested in acting as a collection location. However, due to increases in “free riders” (i.e., batteries that are not part of the program and therefore whose manufacturers do not provide financial support) in collection boxes, Call2Recycle now limits participation in its free rechargeable battery recycling program to municipal collection sites and certain national retail chains to limit the number of uncovered batteries being placed into their system.

While the law only requires that two specific rechargeable battery chemistries be covered by the manufacturer-sponsored program, Call2Recycle currently accepts all chemistries of dry-cell rechargeable batteries up to 11 pounds and cell phones through their collection system. In 2022, Call2Recycle collected a total of 29,930 pounds of rechargeable batteries and 421 pounds of cell phones (see [Figure 1](#)). Call2Recycle also collected 5,690 pounds of “free riding” primary (single use) batteries, following a recent trend of marked increase from prior years in their collection boxes. Batteries collected through the program are sorted by chemistry and sent to appropriate processing facilities for extraction of materials to use in new products. Cell phones are either refurbished and resold or recycled. Call2Recycle absorbs the cost of non-covered batteries, which unfairly adds to the cost burden for manufacturers who pay into the rechargeable battery program.

⁵ *National Recycling Rate Study*. SmithBucklin Statistics Group, Chicago Illinois. November 2019 ([BCI_433784-19_RecyclingRateStudy_19Update_FINAL.pdf \(batteryCouncil.org\)](#)).

Figure 1 – Annual Rechargeable Battery Collection (2015-2022)



As alluded to earlier, primary batteries are not required to be recycled by Maine’s law, nor are they accepted for free in the Call2Recycle program as the manufacturers of primary batteries do not contribute funds to the program. However, municipal collection sites participating in the rechargeable battery collection program can opt into Call2Recycle’s GreenVantage⁶ program, which allows them to incorporate primary batteries into their collection for a modest per-pound fee.⁷ Municipal collection sites that participate in the GreenVantage program may pass these fees onto residents individually as they utilize the service or may choose to incorporate the cost into their overall municipal budget. Most municipal collection sites do not currently incorporate primary batteries, either due to a lack of knowledge of the GreenVantage program’s existence or perhaps due to the extra cost to do so. In addition, there are many municipalities across the state that could participate in the free Call2Recycle program to accept batteries but have not signed up to participate. The limited municipal participation may be due to lack of awareness that the program exists. Retail sites that participate in the rechargeable battery collection program are not eligible to participate in the GreenVantage program and would need to purchase separate primary battery collection boxes in order to accept them from the public. These additional collection boxes would come at a cost of between \$55-\$135 per box⁸ on top of any staff labor needed to manage the program. Due to the added expense and effort for collection sites to accept primary batteries, access to primary battery recycling is very limited statewide.

⁶ Information on GreenVantage may be requested through Call2Recycle: <https://www.call2recycle.org/greenvantage-suite>.

⁷ The current per-pound fees are 70 cents for alkaline batteries and \$4.05 for smaller single-use lithium primary batteries (for example, lithium camera batteries and button cell and coin cell batteries).

⁸ See “all battery” collection box pricing on Call2Recycle’s online store: <https://www.call2recycle.org/store/>.

Incorporating primary batteries into the existing stewardship program would greatly expand access and reduce the barriers to battery recycling, while mitigating fire risks from improperly managed batteries. Without such a requirement, and with minimal options in the state for collection, the majority of the material resources contained in primary batteries are lost to disposal. Additionally, products from which rechargeable batteries cannot be removed are also not required to be recycled by Maine's rechargeable battery law,⁹ nor are they collected through the free rechargeable battery recycling program. Therefore, the resources present in these embedded batteries are lost since they are disposed of as trash and potentially pose fire and safety issues during processing and disposal. It should also be noted that only nickel cadmium chemistry batteries are included as a covered product in the rechargeable battery program, leaving out other "modern" battery chemistries, such as lithium-ion.

As described in the Department's [2022 Annual Product Stewardship](#) and [2023 Annual Product Stewardship](#) Reports, while batteries are necessary in a transition to clean energy, there are broader challenges including inadequate recycling infrastructure, a reliance on foreign supplies of critical materials, supply chains fraught with human rights concerns,¹⁰ environmentally detrimental mining practices,¹¹ and fire risks when batteries are improperly managed. In addition to U.S. jurisdictions recently enacting legislation to address battery recovery,¹² the federal government has focused on developing domestic battery recycling infrastructure in recent years, driven by the country's increasing reliance on battery technology and concerns over the critical mineral¹³ supplies essential to battery production.¹⁴ [The Bipartisan Infrastructure Law](#) includes a requirement for EPA to

⁹ While not required to be recycled under 38 M.R.S. § 2165, the sale of products with nickel cadmium or small-sealed lead acid batteries that cannot be easily removed by the consumer in products used primarily for personal, family, or household purposes is prohibited pursuant to 38 M.R.S. § 2166 "Rechargeable Consumer Products." It also requires that the battery, the product, and product packaging be labeled with the battery's electrode type and a message about the need for proper disposal. This law is not enforced; were it to be enforced a great number of consumer products would cease to be sold in the State.

¹⁰ World Economic Forum (2021). *Making mining safe and fair*.

https://www3.weforum.org/docs/WEF_Making_Mining_Safe_2020.pdf.

¹¹ Kosiorek, et. al., "Effect of cobalt on environmental and living organisms – a review," *Applied Ecology and Environmental Research* 17(5):11419-11449. http://dx.doi.org/10.15666/aecer/1705_1141911449.

¹² The Department recommended expanding the scope of 38 M.R.S. §2165 in its products stewardship report in 2011, 2017, 2019, and 2020. Other U.S. jurisdictions with product stewardship laws covering a broader scope of batteries include Vermont, which enacted a primary battery stewardship law in 2014; Washington DC, which enacted a battery stewardship law covering rechargeable and primary batteries, including those embedded in products, in 2021; and California, which will regulate battery-containing products through the system used for electronic waste management beginning in 2023.

¹³ The term 'critical material or mineral' means a material or mineral that serves an essential function in the manufacturing of a product and has a high risk of a supply disruption, such that a shortage of such a material or mineral would have significant consequences for U.S. economic or national security.

¹⁴ The U.S. Department of Energy has identified aluminum (bauxite), antimony, arsenic, barite, beryllium, bismuth, cesium, chromium, cobalt, fluor spar, gallium, germanium, graphite (natural), hafnium, helium, indium, lithium, magnesium, manganese, niobium, platinum group metals, potash, the rare earth elements group, rhenium, rubidium, scandium, strontium, tantalum, tellurium, tin, titanium, tungsten, uranium, vanadium, and zirconium as critical materials. Final List of Critical Minerals 2018, U.S. Department of the Interior, 83 Fed. Reg. 23295, 2018, <https://www.govinfo.gov/content/pkg/FR-2018-05-18/pdf/2018-10667.pdf>.

develop battery labeling guides as well as a “Best Practices” guide for battery recycling. To complete this work by September 10, 2026, the target deadline, Congress allocated \$10 million to U.S. EPA for the battery labeling guidelines and \$15 million for the “Best Practices” battery recycling guide.¹⁵ Noting that, “demand for critical battery minerals, such as lithium and graphite” is “projected to increase by as much as 4,000% in the coming decades,” the Energy Department targeted a recent round of grant funding to support “the recycling and reuse segment of the domestic battery supply chain,”¹⁶ awarding approximately \$74 million from the Bipartisan Infrastructure Law to ten projects in seven states. Given these efforts, the Legislature may wish to consider expansion of covered batteries in this program as new recycling opportunities come online and increase recovery of batteries at the consumer level.

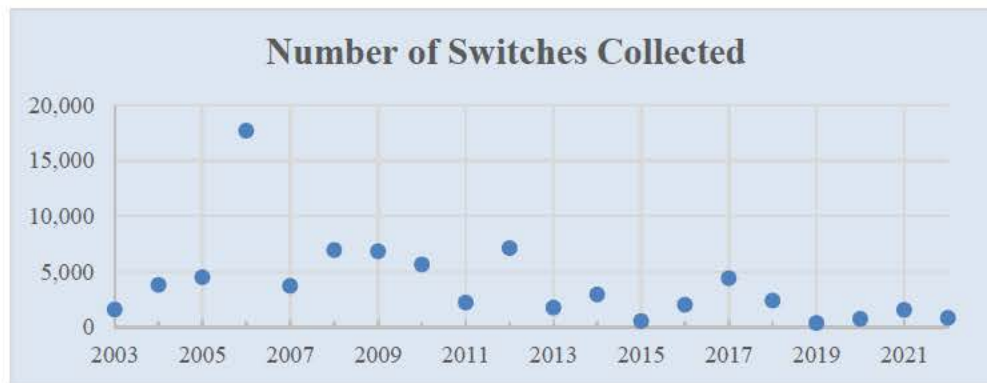
D. Mercury Auto Switches (2003) – [38 M.R.S. § 1665-A](#)

[38 M.R.S. § 1665-A](#) was enacted in 2001 and the program began in 2003. The original law prohibited the sale of new motor vehicles with mercury switches, required that mercury switches and headlamps be removed before a motor vehicle is crushed, and required motor vehicle manufacturers to pay for both the recycling of mercury auto switches and a \$1 bounty to the collector for each switch. In September 2005, the bounty was increased briefly to \$3 then to \$4 per switch. Since 2003, more than 170 pounds of mercury have been collected through the program, which amounts to approximately 25% of that estimated to have been present in the auto stock when the program began.

Complete 2023 numbers are not yet available, but 855 switches were collected during 2022 (see [Figure 2](#)). Switches are returned in relatively large quantities from relatively few participants, which can lead to variability in collection numbers from year to year. Department staff communicate with participants whose switches are due or overdue, which appears to increase returns.

¹⁵ Battery collection best practices and battery labeling guidelines: <https://www.epa.gov/infrastructure/battery-collection-best-practices-and-battery-labeling-guidelines>.

¹⁶ The Associated Press. (2022, November 16). *Energy Department awards \$74M for battery recycling, reuse*. <https://apnews.com/article/technology-business-california-recycling-climate-and-environment-e7c3f6e08995f8e9f4e81adedebda27e>.

Figure 2 – Quantity of Mercury Auto Switches Collected

The 2003 prohibition on the inclusion of mercury switches in new vehicles means the number of available switches is decreasing. Statute directs the Department to recommend repeal of the program once the Commissioner determines that the number of mercury switches is too small to warrant continued collection. In recent years the Department has been evaluating available data on the actual number of switches that remain. The best available data suggests there is still a substantial amount of mercury to collect.¹⁷ The National Vehicle Mercury Switch Recovery Program (“NVMSRP”), the organization set up by obligated manufacturers to realize responsibilities under this and similar laws, is not equitably funded, due to complications associated with General Motor’s 2009 bankruptcy. Fortunately, the End of Life Vehicle Association (“ELVS”), which runs NVMSRP, and the Steel Manufacturers Association have reached an agreement that will provide for the continuation of all services currently offered through July 1, 2027.¹⁸ The ELVS program is now administrated by the company Republic Services. Given this commitment by the steel and auto manufacturers, there appears to be no reason to discontinue Maine’s program at any point during this timeframe. The Department anticipates increasing outreach to work with towns to remove switches from cars sitting at formal and informal junkyards in order to recover the maximum number of switches possible by July 2027.

E. Mercury Thermostats (2005) – [38 M.R.S. § 1665-B](#)

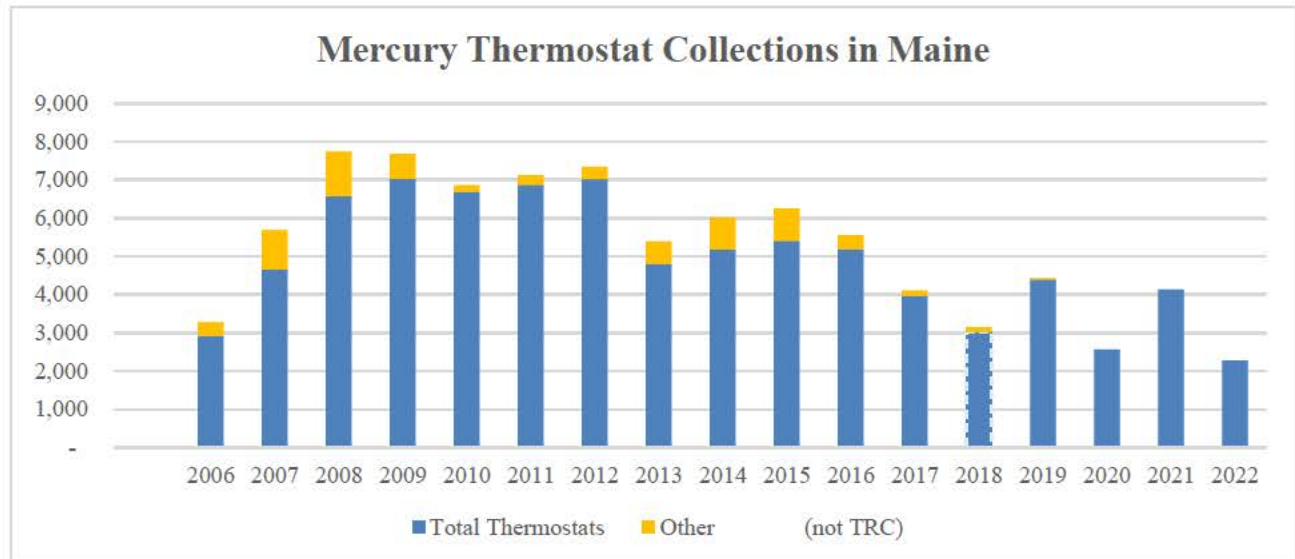
Maine’s mercury thermostat program, enacted in 2005, established EPR for the collection and recycling of mercury-added thermostats. For the first two years, the program required manufacturers to fund collection and recycling of mercury-added thermostats. Due to low initial

¹⁷This data shows that, in 2020, over 193,000 vehicles – approximately 16% of vehicles registered – were old enough to contain mercury switches; this data omits any vehicles that are not registered because they are not being actively used: those in junk yards, dealerships, or abandoned in back lots. The average switch has approximately one gram of mercury and, while not present in all vehicles, a single vehicle can have as many as three switches.

¹⁸ See the August 2021 joint press release by ELVS and the Steel Manufacturers Association, available here: <https://elvsolutions.org/wp-content/uploads/2021/09/ELVS-agreement-August-27-2021-one-pager-signed.pdf>

collection numbers, a \$5 incentive payment for every mercury thermostat returned was incorporated into the law beginning in 2007.

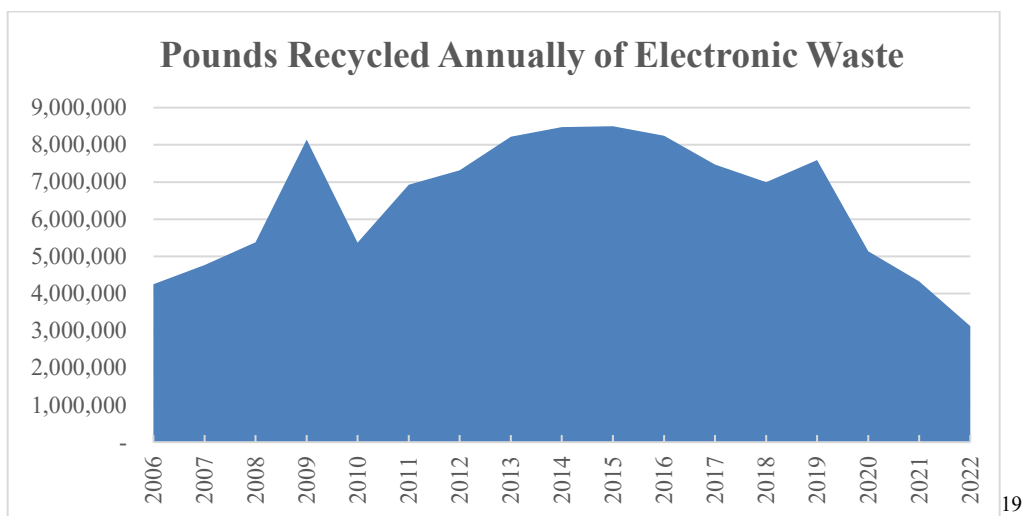
Figure 3 – Quantity of Mercury Thermostats Collected (2006-2022)



An estimated 2,286 mercury thermostats were collected in 2022 (see Figure 3) by the Thermostat Recycling Corporation (“TRC”). 2022 collections were an estimated 45% below 2021 collections. In recent years, mercury thermostat collections have shifted entirely to the TRC program. Many municipal sites and household hazardous waste (“HHW”) collection sites as well as retail collection sites have signed up to participate in the stewardship program for mercury thermostats. Collecting mercury thermostats through TRC allows the costs of safely managing mercury thermostats to be covered by TRC rather than paying a company to manage them with other universal waste items. TRC annually conducts outreach to Maine collection locations that have not returned their mercury thermostat bin within the past year including a “miss you” mailing campaign to reach any past-due collection locations that could not be targeted by a direct phone call or an in-person technical assistance visit. In 2022, TRC conducted 36 site visits and placed 173 “miss you” calls to collection sites in Maine. TRC also conducted an education and outreach campaign in Maine using online, print, and radio outlets to help raise public awareness of the mercury thermostat recycling program.

F. Electronic Waste (2006) – [38 M.R.S. § 1610](#)

Maine’s electronic waste (“e-waste”) program has facilitated the recycling of printers, televisions, interactive entertainment computers, and other devices with screens of at least four inches measured diagonally since 2006. Over 100 million pounds of covered electronic devices have been recycled through the program.

Figure 4 – Amount of Electronic Waste Recycled (2006-2022)

Returns during 2020, 2021, and 2022 were down significantly (see Figure 4). This decrease is likely due in part to collection and supply chain disruptions associated with COVID-19. Additionally, the program lost an important recycling company at the beginning of 2020. This company provided one-day events to towns whose transfer stations do not collect electronic waste on-site. The remaining recycling companies do not offer these one-day events due to inefficiencies inherent in hosting an event in which the amount of material to be managed is unknown. Having excessive capacity at an event wastes resources on the part of the hosts and consolidators and having insufficient capacity can lead to environmentally detrimental outcomes when people are turned away. Returns may remain at this lower level until municipalities are able to set up alternative collection arrangements.

The Department intends to conduct a review and update the e-waste rules ([Reasonable Costs for Handling, Transportation, and Recycling of Electronic Wastes, 06-096 C.M.R. ch. 415](#)), in 2024, as they have not been updated since 2018. This effort will include ongoing communications with stakeholders as part of the process.

¹⁹The total pounds recycled in 2018 includes an estimate of the number of pounds likely recycled by one consolidator, E-waste Recycling Solutions (“ERS”). ERS went out of business in April 2019. There is no evidence that it slowed collection before that point – any entities ERS stopped servicing would have been in touch with the Department and/or other consolidators looking for a new pickup agent. Unfortunately, ERS didn’t submit its report on collection from the second half of 2018. While uncertain, the estimation was figured using the following logic. If one assumes that ERS’s market share was the same in the second half of 2018 as it was in the first (35%), and that the North Coast Service (“NCS”) market share of 47% also remained unchanged, ERS would have recycled 1,763,280 pounds. If one assumes that ERS’s market share was the same in the second half of 2018 as it was in the first (35%), and that the Electronics End (“EE”) market share of 13% also remained unchanged, ERS would have recycled 1,491,130 pounds. If one takes the mean of the two estimates and rounds to significant figures, this results in approximately 1.6 million pounds.

G. Cellular Telephones (2008) – [38 M.R.S. § 2143](#)

Maine’s cellular telephone recycling law requires any retailer selling cellular phones to accept used cellular telephones at no charge from any person, and to post signage stating this requirement.

In 2021, a number of complaints from the public attempting to take advantage of this program revealed that several retailers were not fully educated and compliant with this law. The Department performed significant outreach to educate major cell phone retailers in 2021 and 2022 and bring these stores into compliance. Since that outreach the Department has received no complaints regarding lack of compliance.

H. Mercury-Added Lamps (2011) – [38 M.R.S. § 1672](#)

Maine’s mercury-added lamp law was enacted in 2011. It has been amended twice in recent years; first in 2019 by [P.L. 2019, ch. 286](#) - *An Act To Implement Recommendations of the Department of Environmental Protection Regarding the State's Mercury-added Lamp Law* to remove language restricting the program to residential bulbs, in addition to other changes described in more detail in the [2020 Product Stewardship Report](#), and again in 2023 by [P.L. 2023, ch. 384](#) - *An Act to Reduce Mercury in the Environment by Phasing Out Certain Fluorescent Light Bulbs* which will phase out the sale of certain mercury-containing lamps by January 1, 2026.

Once the sales ban is in effect, it will be illegal for anyone to offer for sale, sell or distribute Compact Fluorescent Lamps (“CFLs”) and all Linear Fluorescent Lamps (“LFLs”) regardless of the tube diameter and the shape. This includes straight linear fluorescent tubes ranging from 0.5 to 8 feet in length as well as u-bend and circline fluorescent bulbs. The mercury-added lamp law will also continue to require manufacturers to collect and recycle any lamp to which mercury has been added,²⁰ and will be implemented by the National Electrical Manufacturers Association (“NEMA”) on behalf of manufacturers. NEMA’s program provides free containers, shipping, and recycling services to voluntarily participating retail and municipal collection sites. The law limits free non-CFL drop-offs to ten per person per visit. Additional non-CFLs received above the allowable ten lamps per person per visit must be managed separately by the collection site. The cap does not apply to CFLs, which may be dropped off in any quantity provided a collection location has the capacity to accept them.

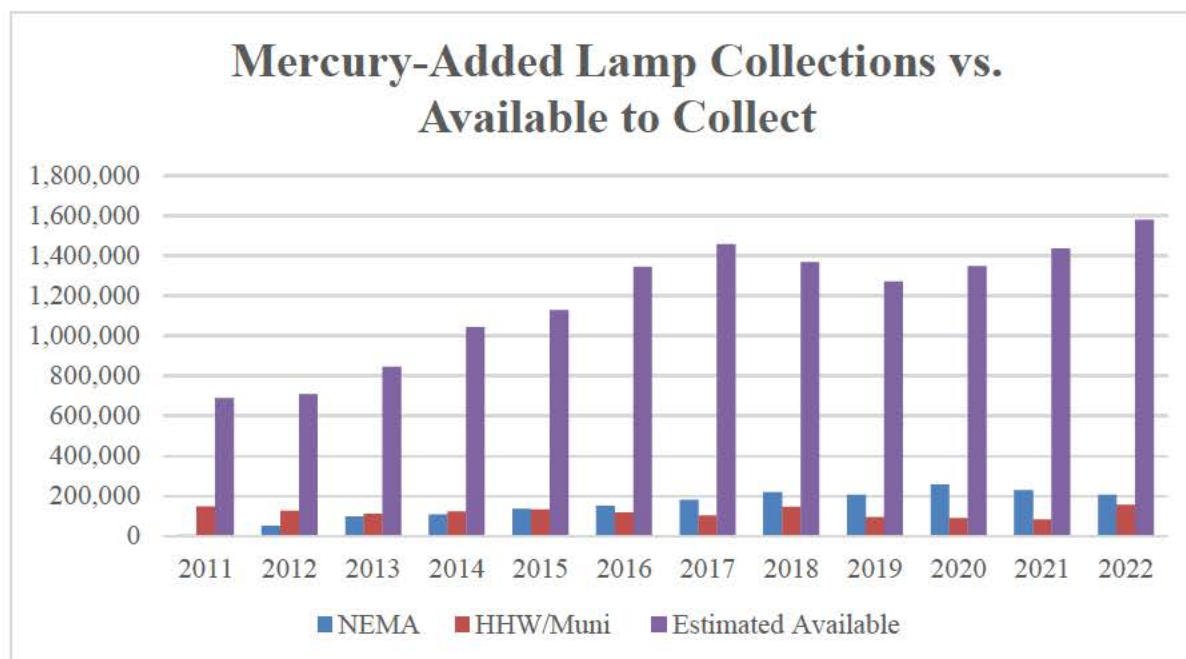
Based on sales data and average lifespan, NEMA estimated that approximately 1,578,573 mercury-added lamps sold to residents²¹ in Maine would be coming out of service and therefore available for

²⁰ The definition of covered lamps is as follows: "Mercury-added lamp" means an electric lamp to which mercury is intentionally added during the manufacturing process, including, but not limited to, linear fluorescent, compact fluorescent, black light, high-intensity discharge, ultraviolet and neon lamps.

²¹ Although the mercury lamp law was amended in 2019 and is no longer restricted to residents, the 2020 annual report from NEMA contained an estimated for available mercury lamps from residential sales only. The Department will follow up with NEMA to address this data gap in future reports.

collection in 2022; approximately 205,400 mercury-added lamps or approximately 13.01% of available lamps were recovered through the program. Mercury-added lamps are also collected outside of the stewardship program through HHW and municipal collections in Maine. Due to disparate reporting channels, it is difficult to avoid double-counting mercury lamps collected by municipalities as some numbers are received from the stewardship report, and others are received via hazardous waste shipping manifests. Therefore, while the manifests document an estimated 156,249 mercury lamps collected, the overall number of lamps recovered is likely lower due to potential double-counting of municipal lamps managed through the stewardship program that are also reported via manifest records.

Figure 5 – Quantity of Mercury-Added Lamps Collected Compared to Quantity Available for Collection



Historically, there has been a consistent gap between the number of lamps estimated to be coming out of service and the number of mercury-added lamps collected over the duration of the program (see Figure 5). This suggests that a significant percentage of the mercury-added lamps coming out of service may be improperly disposed of in the trash rather than recycled. With the passage of [P.L. 2023, ch. 384 - An Act to Reduce Mercury in the Environment by Phasing Out Certain Fluorescent Light Bulbs](#), Maine has joined a growing number of jurisdictions in passing legislation to begin phasing out mercury-containing lighting in favor of light emitting diodes (“LEDs”), which offer cost savings, are mercury-free, use significantly less energy, and typically last 1.7 to 2 times longer than fluorescents.

As noted in our [2023 Annual Product Stewardship Report](#), a Clean Lighting Coalition market report estimated that Maine could save around \$28,000 per year in energy costs and reduce carbon dioxide

emissions by approximately 19,000 metric tons per year by switching to LEDs.²² It is anticipated that phasing out mercury-added lighting sales by 2026 will ensure a transition from fluorescent to LED lighting, resulting in overall emissions reductions as well as reduced energy use and costs for Mainers.

I. Architectural Paint (2015) – [38 M.R.S. § 2144](#)

Maine’s architectural paint stewardship law, enacted in 2015, requires manufacturers to set up and operate a statewide collection system for post-consumer paint. [PaintCare](#) is a non-profit third-party organization established by the paint manufacturers to fulfill their responsibilities under Maine’s stewardship law and similar laws in nine other states and the District of Columbia. The program is funded by a consumer fee on each container of paint sold.²³ Consumers may return unwanted architectural paint at no cost to participating retail and municipal collection sites as well as HHW collection events where PaintCare is participating. PaintCare provides each collection location with storage containers for the returned paint, in-person training and a training manual, education, and outreach materials, and provides for transportation and recycling or disposal of the collected paint. To prevent collection sites from being overwhelmed with large quantities of paint, PaintCare also offers a free large volume pickup service for those with 200 gallons or more of paint.²⁴ See [Figure 6](#) for the quantity of paint disposed, recovered for energy, and recycled in 2022.

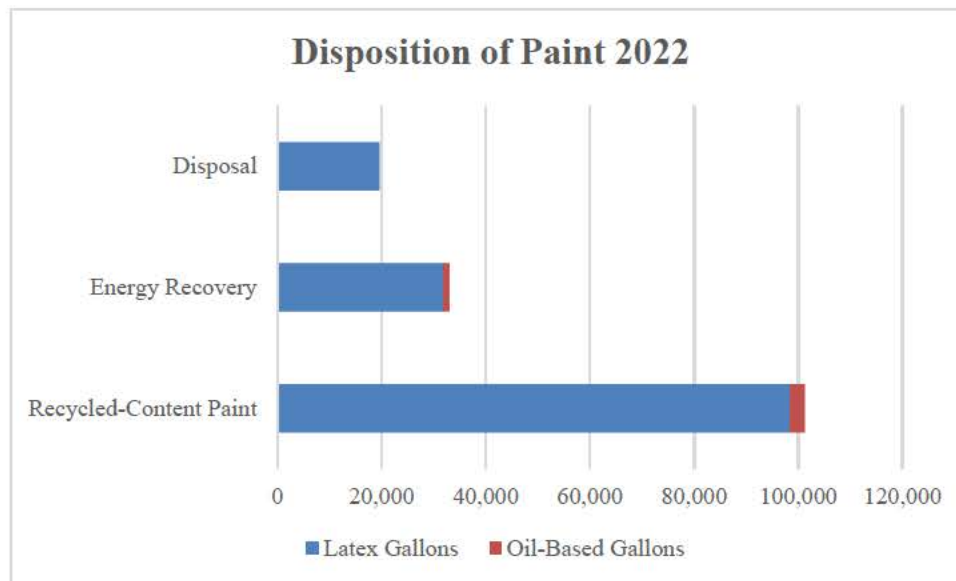
PaintCare Maine, LLC ended calendar year 2022 with a reserve level of approximately 43%, a reduction from the 49% reserve level reported at the end of calendar year 2021. This is a drop in reserves compared to recent years, but the reserve level remains significantly higher than the target reserve level agreed to between the Department and PaintCare in the approved [Maine Architectural Paint Stewardship Program Plan](#), which stated, “Reserves or ‘net assets’ represent the accumulated surplus (or deficit) of the program. PaintCare has a Reserve Policy to maintain net asset balances in each PaintCare state program. This policy establishes a minimum threshold of 16% (i.e., at least two months of operating expenses). The accumulated balance allows PaintCare programs to continue to operate in times of either higher than expected post-consumer paint collection or lower than expected paint sales – or a combination of the two.”

²² Clean Lighting Coalition (2021). *Mercury in Fluorescent Lighting: Unnecessary Health Risks & Actionable Solutions*. https://cleanlightingcoalition.org/wp-content/uploads/sites/96/Mercury-in-Fluorescent-Lighting_FINAL-1.pdf

²³ There is no fee on containers that are a half pint or smaller.

²⁴ [06-096 C.M.R. ch.858, Universal Waste Rules](#) prohibits accumulation of more than 55 gallons of oil-based paint at one time.

Figure 6 – Disposition of Paint by Type



PaintCare's analysis for calendar year 2022 shows that its collection network provides a permanent collection site within 15 miles of 95.9% of Maine residents, exceeding the 90% goal set in statute. PaintCare conducts outreach to ensure Mainers are aware of their options for managing excess and unwanted architectural paint through this collection network.

PaintCare's Program Manager, who also manages the Vermont program, visits each collection location throughout both states at least once annually.

J. Pharmaceuticals (2021) – [38 M.R.S. § 1612](#)

[P.L. 2021, ch. 94](#) - *An Act To Support Collection and Proper Disposal of Unwanted Drugs*, was enacted during the First Regular Session of the 130th Legislature. This law ([38 M.R.S. § 1612](#)) requires drug manufacturers to pay for and manage a drug take-back program for collection and disposal of household pharmaceuticals. Drug manufacturers, individually or jointly with other manufacturers, must operate a stewardship program that has been approved by the Department, or enter into an agreement with a stewardship organization that will operate a Department-approved program for collection of unwanted covered drugs. Covered drugs for the program are any substance recognized as a drug under [21 U.S.C. § 321 \(g\)\(1\)](#), including prescription and non-prescription drugs, drugs in medical devices, generic drugs, and drugs for veterinary use. Covered drugs do not include vitamin supplements, cosmetics, cleaning products, soap and shampoo, pet pesticide products in collars and shampoos, emptied syringes and other empty medical devices, home kidney dialysis, and drugs used solely in a clinical setting.

Stewardship programs operated by the drug manufacturers must make available free, convenient, and ongoing collection opportunities to all persons in the State. The program plan submitted to the

Department for approval certified that the stewardship organization will accept all drugs regardless of manufacturer. Program plans include the list of manufacturers participating with that specific organization, describe outreach and education programs, and outline the collection process, describing how collected drugs will be tracked, measured, and ultimately disposed.

All pharmacies licensed in the state are considered “mandatory pharmacy collectors” by the law and must provide for the collection of covered drugs by providing mail back envelopes, hosting a collection receptacle, or providing for another collection method approved through the stewardship plan. Out-of-state pharmacies that provide covered drugs by mail must offer a mail back option for unwanted drugs and provide information to customers about that service. The law does not prevent law enforcement agencies from collection activities or being a collection agent and requires that any authorized collector of covered drugs be added to a stewardship program if it wishes to participate.

The two stewardship organizations (“SOs”), Med-Project and INMAR, have been approved to operate stewardship programs by the Department. Operational approval is conditional and for a two-year period. After that two-year period, SOs may submit a request for renewal from the Department to continue operating. A cost sharing component is built into the process. Any SO that underperforms the other will share the cost of the leading SO.

Both SOs began operation in June 2023, establishing a joint website (medtakebackmaine.org) for the public to access and locate the nearest drop-off site available to them. This website identifies the locations of kiosks and instructions for getting and loading prepaid envelopes. The website is required to be kept up to date and any changes in locations identified within 10 business days to establish reliability for the public that the sites are operational. Both SOs have begun the installation of secure kiosks and mail-back venues throughout the state and are in the process of collecting unwanted and unused drugs from the kiosks in place. Drugs collected from kiosks are collected and placed in secured sequentially identified containers, weighed, and then transported directly to approved incinerators located out of state for disposal. Prepaid mail-back envelopes are also distributed upon request and available at public locations (libraries, municipal public offices, and more) in addition to pharmacies. Once mailed by the consumer, the prepaid envelopes go directly to the SOs where they will be weighed and then transported to be incinerated at an appropriately licensed out-of-state facility. Programs to educate and engage both the pharmacies and the public have begun from SOs and the Department. Program awareness goals will be measured against this baseline study, with goals set for the SOs that trend upward as the program accelerates.

During this initial year, monthly meetings have been held with each SO, initiated by the Department and focusing on overall program coordination. These meetings are intended to identify any problems or obstacles that the SOs are facing during the process of ramping up the program.

As part of its outreach efforts, the Department has developed presentations designed to provide an overview of this new program and to promote its positive impacts. Department outreach has been

extensive and has included presentations to Maine pharmacists, public healthcare organizations, the Department of Health and Human Services, Center for Disease Control and Prevention, and other entities that are potentially impacted by the new program. A special effort was made to inform municipalities, especially in the rural parts of Maine, about the program. Conversations and surveys of organizations that will be participants in the program, including pharmacies, healthcare organizations, veterinarians, libraries, colleges, and law enforcement have been positive.

K. Packaging (2021) – [38 M.R.S. § 2146](#)

In December 2022, Department staff began conducting outreach to stakeholders as part of the development process for the program's rules (06-096 C.M.R. ch. 428, *Stewardship Program for Packaging*). Outreach included 11 visits to solid waste management and processing facilities, 6 meetings with several municipalities' staff familiar with the management of solid waste, multiple meetings with key parties and regulators working on packaging laws that have been enacted in other states,²⁵ and 14 stakeholder meetings addressing specific topics for rulemaking. For each rulemaking topic, the Department prepared background documents that detailed statutory context and proposed questions to guide both comments and discussion. All stakeholder meetings were publicized on the Department's webpage created for the [Extended Producer Responsibility Program for Packaging](#) and using the program's 729-person stakeholder list and were offered both in person and virtually. Meetings were recorded, transcribed, and made available to all on the Department's webpage. Following the stakeholder meetings, the Department then distributed concept drafts, also through the program's stakeholder list and webpage, and solicited further comments. Based on the comments received, the Department made numerous revisions, resulting in [the proposed rule](#). The proposed rule characterizes packaging material, provides a method for determining municipal reimbursement and producer fees, provides a method and criteria for investing in infrastructure and education, details alternative collection programs, establishes a cap for the packaging stewardship fund, and provides mechanisms for ongoing assessment and updates to the program. On January 18, 2024,²⁶ the Department will present the proposed rule to the Board of Environmental Protection, commencing the formal rulemaking process.

Following adoption of the rule, the Department will initiate outreach as part of developing the list of materials that will be designated readily recyclable utilizing the readily recyclable criteria that will be established in the rule. This list will then be added to 06-096 C.M.R. ch. 428 through a second rulemaking process which will take place in 2024 and 2025.

Also in 2024, the Department anticipates moving forward with rulemaking in accordance with [38 M.R.S. § 2146\(13\)\(D\)](#), which addresses packaging material associated with the exclusion of certain

²⁵ Oregon enacted a producer responsibility law covering packaging shortly after Maine in 2021. Colorado and California both enacted similar laws in 2022.

²⁶ The date for presentation to the Board of Environmental Protection was originally scheduled for December 21, 2023, but was postponed due to a major storm that impacted the entire state.

federally regulated products from the program. The Department plans to conduct a detailed request for information about the extent to which content or construction standards required by federal law or regulation may preclude or significantly diminish a producer's ability to increase the recyclability or reduce the volume of packaging material. After completing its review, if the Department determines that any such packaging material should be excluded from the definition of packaging material, it will propose such exclusions as part of the rulemaking process.

In summary, progress for implementation of this program is on schedule. More information about the timeline is available at the Department's [Extended Producer Responsibility Program for Packaging webpage](#). In short, the Department anticipates adoption of routine technical rules by the end of summer 2024, adoption of major substantive rules in the spring of 2025, and issuance of the request for proposals ("RFP") for selection of the stewardship organization in the fall of 2025.

III. New Stewardship Programs Enacted in 2022

The 130th Maine Legislature 2nd Regular Session did not enact legislation to create additional product stewardship programs.

IV. Candidate Products and Suggestions for Updates to Stewardship Programs

The following products have been identified as potential program candidates for future consideration using the criteria outlined in Maine's Product Stewardship Law ("Framework Law") [38 M.R.S. § 1772](#). All of these have been identified in previous stewardship reports. This law charges the Department with the identification of products for which new product stewardship programs might be suitable and outlines the following five criteria upon which the Department should base that decision:

- The product category contains toxics that pose a risk to people or the environment.
- A program would increase materials recovery.
- A program would reduce costs to local governments and taxpayers.
- There are demonstrated successful programs for the product in other jurisdictions.
- Any existing voluntary management programs are insufficient.

The Department may identify a product or product category as a candidate for a product stewardship program if it determines that one or more of the five criteria are met.

At this time, the Department is not currently proposing additional product stewardship programs for the items identified below. However, the Department may elect to assess these products using the criteria outlined in the Framework Law as potential stewardship candidates in the future.

A. Carpet

Carpet has been identified in the previous stewardship reports as a product of concern. Carpet consistently meets four of the five criteria listed in the Framework Law for identifying stewardship candidate products, and certain carpets contain toxics and therefore meet all five. Research shows that some carpets may contain brominated flame retardants²⁷ and per- and polyfluoroalkyl substances (“PFAS”).²⁸ In 2021, the Legislature addressed PFAS in carpeting by authorizing [P.L. 2021, ch. 477 - An Act To Stop Perfluoroalkyl and Polyfluoroalkyl Substances Pollution](#), which prohibits the sale or distribution for sale of any carpet or rug that contains intentionally added PFAS beginning January 1, 2023.

B. Mattresses

Mattresses have been identified in previous reports as a product of concern. [Resolve 2019, ch. 36 - Resolve, To Require the Department of Environmental Protection to Study the Establishment of a Product Stewardship Program for Mattresses](#) directed the Department to study the establishment of a new stewardship program for mattresses and report the findings of its study to the ENR Committee. The report was submitted in December of 2019. The Department concluded that recycling does not appear to be economically or environmentally beneficial at this time, and the most appropriate course of action would be to proceed with pilot projects to address outstanding questions concerning waste mattress management, rather than implement a stewardship program.

Since 2019, the Department has continued to monitor the universe of mattress disposal in Maine. In 2021, the Department surveyed the three operating waste-to-energy incinerators, seven landfill facilities, and thirteen transfer stations to determine the status of mattress disposal at that time.²⁹ All the transfer stations surveyed indicated at that time they had disposal options for mattresses and all include them with either their bulky waste or construction and demolition debris (“CDD”). Two of the waste-to-energy incinerators accept mattresses as feedstock. The third facility has a physical restriction regarding bulky materials due to their boiler entry dimensions. This facility ships mattresses with other bulky waste it cannot accept to a landfill for disposal. Of the seven landfills surveyed, five accept mattresses for disposal. Of the two landfills that do not dispose of mattresses, one ships them to another landfill for disposal, and the other ships them to an industrial shredding facility due to a more favorable market price. It should be noted that mattress construction is slowly changing from multi-material construction with wood and steel components to a foam only

²⁷ *Environmental concentrations and consumer exposure data for selected flame retardants (TBB, TBPH, TBBPA, ATO)*, Consumer Product Safety Commission, 2015. <https://www.cpsc.gov/s3fs-public/Environmental%20Concentrations%20and%20Consumer%20Exposure%20Data%20for%20Selected%20Flame%20Retardants.pdf>

²⁸ Columbus, C. (2018, December 13). *PFAS detected in carpets from several U.S. manufacturers*. Retrieved from <https://subscriber.politicopro.com/article/eenews/1060109571>.

²⁹ *Memorandum Report – Update to the Mattress Stewardship Report, December 2019*. Brian Beneski & James Guerra, Maine Department of Environmental Protection. December 1, 2021.

construction, which may increase the recyclability of the mattress and also lessen some of the issues regarding their disposal in landfills.

As several states, such as Massachusetts, Rhode Island, and California, have mattress dismantling and recycling programs, the costs for dismantling mattresses can be extrapolated from those programs. However, the cost of developing collection stations, shipping to dismantling facilities, and then shipping components to recycling facilities is unknown. Given Maine's geography and the fact that there are no recycling facilities for mattress components located in Maine at this time, a full evaluation of cost should consider greenhouse gas emissions in addition to dollar figures. In a letter to the Department regarding comments on the 2023 Product Stewardship Report (a copy of which is provided as [Attachment 1](#) to this report), the International Sleep Products Association ("ISPA") indicated that they had completed initial modeling of a potential mattress collection and recycling program in Maine that would be funded by a fee on individual mattress sales. The model indicated that the needed fee would be approximately \$29 per mattress, substantially higher than the \$10.50 to \$16.00 per unit fee in other states. This elevated fee compared to other states was due to the lack of recycling infrastructure in the state, Maine's relatively small population, large rural areas to be served, the distance from Maine to out-of-state recyclers that process the units, and distant end markets for the reclaimed material.

In December of 2023, the Department became aware that Casella Waste Systems, operator of the State-owned Juniper Ridge Landfill, is planning to charge an approximately \$20 dollar fee per individual mattress for disposal at the landfill (actual amount has yet to be determined) in 2024. Upon receiving that update, the Department reached out to the other landfills operating in Maine to determine their plans for charging mattress-specific fees. Waste Management, operator of the Crossroads Landfill in Norridgewock, indicated that they will most likely add a fee similar to Casella's for mattress disposal in the near future. The City of Bath, which operates their own municipal solid waste landfill, does not place mattresses in their landfill but instead ships them out for disposal as part of their transfer station operation; they currently charge \$15 per mattress to its customers. The Hatch Hill Landfill, operated by the City of Augusta, indicated that they do not currently charge a fee for mattresses disposed of at the landfill and are able to handle the mattresses they currently receive with normal waste operations. They do not have any plans to charge an additional fee, as any fee change would need to be approved by the Augusta City Council. Aroostook Waste Systems ("AWS"), operator of the Presque Isle and Tri-Community Landfills, indicated that they do not currently charge a separate fee for mattress disposal, are able to handle the mattresses they receive as part of normal waste operations, and have no plans to implement a separate mattress handling fee. AWS indicated that due to their distance from those landfills that are planning to implement fees, they do not believe they will see a substantial increase in the mattresses they receive that might require them to reconsider. Hatch Hill Landfill and AWS both indicated an unwillingness to add a fee, as both believe an additional fee would lead to a rise in the number of mattresses "littered" in their area.

The Department will closely monitor whether mattress litter increases as a result of the new fees. Littering is one of the impetuses for the development of other successful stewardship programs, such as the beverage container redemption program and e-waste program. A mattress program may be appropriate if mattress littering increases significantly.

C. Gypsum Wallboard

Gypsum wallboard has been identified in the previous reports as a product of concern. Gypsum wallboard, also known as drywall, plasterboard, or sheetrock, is composed primarily of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (calcium sulphate dihydrate). Although gypsum is not hazardous, landfill disposal of the material can result in the generation of hydrogen sulfide (H_2S) gas which in turn causes odor issues and potential health impacts.³⁰ Due to the risks associated with landfilling of gypsum, it has been banned from landfill disposal in several jurisdictions including Massachusetts, which bans landfill disposal of clean gypsum wallboard³¹ and British Columbia, Canada, and Europe which have both reuse requirements and disposal restrictions.³² More recently, Seattle, Washington began requiring that all construction and demolition projects separate gypsum for reuse.³³ Gypsum is a good candidate for product stewardship because there is a strong environmental incentive to reduce landfill disposal, but at the same time, there is currently a lack of economic incentive and processing infrastructure in Maine.

D. Household Hazardous Waste

Household hazardous waste (“HHW”) has been identified in previous reports as a product of concern. HHW is a term used to describe common household products that exhibit the characteristics of hazardous waste as defined in the Resources Conservation and Recovery Act but are exempt from the precautionary handling requirements that apply to commercially generated hazardous waste.³⁴ HHW meets at least four of the five criteria.

Options to manage HHW are extremely limited in many regions of Maine, as there are only two operations open to all Maine residents. A third location that had previously accepted HHW from residents stopped doing so in 2020. Neither of the two remaining collection sites operates during the winter and their southern Maine locations are not convenient for many Maine residents.

³⁰ Northeast Waste Management Officials’ Association. (2010). *Policy Options White Paper: Promoting Greater Recycling of Gypsum Wallboard from Construction and Demolition Projects in the Northeast*. Retrieved from: <https://www.newmoa.org/wp-content/uploads/2022/06/GypsumWallboardRecyclingWhitePaperFinal9-17-10-1.pdf>.

³¹ See Massachusetts Guidance on Gypsum Wallboard: <https://www.mass.gov/doc/gypsum-wallboard-waste-ban-guidance-cd-handling-facilities/download>.

³² Waste Today. (2019, May 8) *NYC closes the loop on gypsum wallboard*. Retrieved from: <https://www.wastetodaymagazine.com/article/building-product-ecosystems-closed-loop-gypsum-wallboard-nyc>

³³ Ibid.

³⁴ Retrieved from <https://www.epa.gov/hw/household-hazardous-waste-hhw>.

Additionally, disposal at these facilities is expensive.³⁵ Due to the limited disposal options, the Department has experienced an increase in inquiries for HHW disposal but without much to offer regarding options. The Department does not anticipate an expansion in management opportunities unless a funding source can be identified. In the meantime, hazardous wastes such as cleaning solutions and other solvents, oils, waste gas, and pesticides from households are most likely being handled as if they were not hazardous and are disposed of in the trash like any municipal solid waste. HHW products may catch fire, react, or explode or may be corrosive or toxic if not managed properly. These risks to human health and the environment underscore the importance of managing HHW cautiously. It should be noted that Vermont has recently passed an HHW stewardship law ([Household Hazardous Waste EPR | Department of Environmental Conservation \(vermont.gov\)](#)).

E. Solar Panels

Solar Panels have been identified as a potential candidate product in previous Annual Product Stewardship Reports (2019-2023). [Resolve 2023, ch. 52](#) – *Resolve, to Evaluate Options for the Recycling of Solar Panels and Wind Turbine Blades* required the Department to evaluate if solar panels meet the criteria of [38 M.R.S. § 1772\(2\)](#) to be a candidate for a product stewardship program. The Resolve required that the evaluation include a collection of information regarding recycling facilities operating in the eastern United States, identification of costs for recycling, recommendations, and any proposed legislation. It is the understanding of the Department that the focus of the Resolve is on grid-scale solar panel developments and solar panels for residential and commercial facility use, and not for smaller solar panels used in consumer products. Solar panels meet three of the five criteria outlined in [38 M.R.S. § 1772\(2\)](#) as described below.

Solar panels are generally comprised of photovoltaic (“PV”) cells sandwiched between layers of plastic or glass for protection. The vast majority of current PV cells are made from silicon, though cells can be created using other semiconductor material, such as cadmium telluride or copper iridium gallium diselenide in thin-film cells used in flexible panels, or gallium and indium for much more expensive and high-performance panels used in satellites and unmanned aerial vehicles. Research continues into materials for solar cells, including those made from organic materials, quantum dots, and hybrid organic-inorganic materials (known as perovskites).³⁶

Some solar panels may be considered a hazardous waste according to 40 CFR Parts 239-282, the Resource Conservation and Recovery Act (“RCRA”), depending on the leachability of RCRA hazardous materials present in the solar panels. Heavy metals like cadmium and lead may leach at concentrations that would fail the toxicity characteristic leaching procedure (“TCLP”), a test

³⁵ Fee structures vary from \$3.50 per pound or \$6.50 per gallon to \$33-40 per unit, depending on the facility and whether the person dropping materials off is part of a municipality that has arranged for reduced fees.

³⁶ National Renewable Energy Laboratory, *Solar Photovoltaic Technology Basics*. Retrieved from <https://www.nrel.gov/research/re-photovoltaics.html>.

required to determine if a material is hazardous.³⁷ Solar panels that fail TCLP must be managed as hazardous waste. Currently, the U.S. EPA is considering federal legislation to characterize discarded solar panels as a “universal waste,” which would ease requirements on solar panel waste decommissioning, transport, storage, and recycling.³⁸ It should be noted that solar panel construction is evolving rapidly, and newer generation solar panels are being made with lesser amounts of hazardous substances and greater recyclability.³⁹

The regulatory and waste management climate indicates that the majority of decommissioned solar panels will likely be disposed of at a landfill (if not considered a hazardous waste) or transported to an out-of-state recycler. Though there is not a current solar panel recycling facility in Maine, there are at least 25 facilities throughout the United States that recycle various types of solar panels. The U.S. Department of Energy has developed a [web map](#) showing these current facilities in the United States that accept various solar panels for recycling. Additionally, some module manufacturers already operate take-back and recycling programs for their products.⁴⁰ Current estimates (not including shipping from Maine) for recycling solar panels) puts the cost between \$15 to \$45, and disposal can cost \$1 to \$5.⁴¹

[38 M.R.S. § 1305](#) requires municipalities to provide solid waste disposal services for domestic and commercial solid waste generated within the municipality and may provide these services for industrial wastes and sewage treatment plant sludge. Since a grid-scale solar energy project would be considered an industrial use, a municipality would be under no obligation to assist with the recycling or disposal of non-functioning solar panels or any other component or waste that is generated from a grid-scale solar energy development project in its municipality.

Most residential and commercial buildings with solar panels that require replacement would likely be handled by the solar panel installation contractor, which would include arrangement of recycling or disposal. However, there are some “do-it-yourself” panel installations that may find their way to a municipally operated facility. The municipality would be able to charge additional fees for handling such a waste if it chose to do so.

Currently, solar panels are not a covered electronic device according to the e-waste product stewardship requirements pursuant to [38 M.R.S. § 1610](#). Although solar panels are not a covered

³⁷ Environmental Protection Agency, *Solar Panel Frequent Questions*. Retrieved from <https://www.epa.gov/hw/solar-panel-frequent-questions>.

³⁸ U.S. Environmental Protection Agency, *Improving Recycling and Management of Renewable Energy Wastes: Universal Waste Regulations for Solar Panels and Lithium Batteries*. Retrieved from <https://www.epa.gov/hw/improving-recycling-and-management-renewable-energy-wastes-universal-waste-regulations-solar>.

³⁹ European Commission, *The new ultra-thin solar cell: low-cost, non-toxic and more efficient*. Retrieved from <https://cordis.europa.eu/article/id/435773-the-new-ultra-thin-solar-cell-low-cost-non-toxic-and-more-efficient>.

⁴⁰ Solar Energies Industry Association, PV recycling program. Retrieved from [SEIA National PV Recycling Program | SEIA](#).

⁴¹ National Renewable Energy Laboratory, *Solar Photovoltaic Module Recycling: A Survey of U.S. Policies and Initiatives*. Retrieved from <https://www.nrel.gov/docs/fy21osti/74124.pdf>.

product under Maine’s e-waste program, the approved e-waste consolidators that operate in Maine are able to arrange for the recycling of solar panels for an appropriate handling fee.

Solar panels have an average lifespan of more than 25 years.⁴² The overall proportion of waste to new installations is expected to increase over time from an estimated 4-14% in 2030 to more than 80% in 2050.⁴³ To provide scale of the number of solar field developments in the state, Table 3 below outlines the number of grid-scale projects approved by the Department in recent years.

Table 3 - Approved Grid-Scale Solar Energy Developments

Year	Total Acreage	Estimated MW
2019	74.6	16.67
2020	4233.01	907.79
2021	3758.7	600.98
2022	6837.08	1286.74
2023*	1567.15	336.29

*2023 may be incomplete due to ongoing licensing at the time of the report

Municipalities may receive solar panels from residential uses, and, although they could charge a fee for handling costs, may incur some costs for handling these units. Therefore, a municipality may incur some costs related to the handling of residential panels. Residential solar panels therefore meet this criterion.

The state of Washington⁴⁴ and Niagara County in New York⁴⁵ are currently the only state and municipal governments to have implemented product stewardship programs for solar panels. Washington’s program will begin in 2025 and while Niagara County’s program is being implemented, it is too new to determine success. California⁴⁶ recently added solar panels to their definition of universal waste, which will ease handler responsibilities.

Internationally, the European Commission created the Waste Electrical and Electronic Equipment (“WEEE”) Directive. Enacted in 2012, the WEEE Directive requires countries to define how PV

⁴² Environmental Protection Agency, *End-of-Life Solar Panels: Regulations and Management*. Retrieved from <https://www.epa.gov/hw/end-life-solar-panels-regulations-and-management>.

⁴³ Solar Energy Industry Association, *PV Recycling*. Retrieved from <https://www.seia.org/initiatives/pv-recycling>.

⁴⁴ State of Washington Department of Ecology – Our recycling Programs-solar panels <https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Our-recycling-programs/Solar-panels>.

⁴⁵ Niagara County Solar Panel Recycling Law: [Niagara County, NY](#).

⁴⁶ [The State of California Department of Toxic Substances Control, Final Regulations: Photovoltaic \(PV\) Modules – Universal Waste Management](#). Retrieved from <https://dtsc.ca.gov/regs/pv-modules-universal-waste-management/>.

modules will be managed in their national law and requires some level of producer responsibility for the recycling of solar panels. Of the member states, only the United Kingdom, Bulgaria, the Netherlands, and Luxembourg have transposed the WEEE Directive into national law.⁴⁷ These are new programs and there is limited information on compliance and effectiveness.

There are no product stewardship programs in Maine that are specific to solar panels, but several laws in the state are applicable to grid-scale solar panel developments. The *Solar Energy Development Decommissioning Law*, [35-A M.R.S. §§ 3491–3497](#), requires developers of ground-mounted solar energy projects that occupy three or more acres to have an approved decommissioning plan and financial assurance sufficient to cover the cost of decommissioning. For a solar project, “decommissioning” means the physical removal of all components of a solar energy development, including but not limited to solar panels and associated anchoring systems to a depth of at least 24 inches or to bedrock, whichever is less, and other structures, buildings, roads, fences, cables, electrical components and associated facilities and foundations. There is heightened requirements for decommissioning of any portion of a solar development that exist on land classified as farmland, where all components must be removed to a depth of at least 48 inches or to bedrock, whichever is less. Decommissioning also includes the grading to postconstruction grade and revegetation of all earth disturbed during construction and decommissioning, except for areas already restored, providing for the recycling of the waste components of the solar energy development that are recyclable, including, but not limited to, the solar panels, by a facility authorized to accept such materials for recycling and providing for the disposal of the waste components of the solar energy development that are not recyclable by a facility authorized to accept such materials for disposal. The entity responsible for decommissioning must demonstrate financial assurance to implement the plan at the time the plan is approved. Financial assurance must be updated 15 years after approval of the plan, and no less frequently than every 5 years thereafter. Since financial assurance must cover all costs, the plan must describe the removal of and ultimate recycling or disposal of the panels and all associated costs to calculate the financial assurance needed to cover the costs of decommissioning.

The *Solar Energy Development Decommissioning Law* only requires removal of solar panels and other components at the time of decommissioning the entire facility. However, typical decommissioning permits issued by the Department provide the developer 12 months to repair and bring the facility back online if it becomes partially or fully disabled.

Another applicable law for grid-scale solar panels would be Maine’s hazardous waste rules mentioned earlier. As previously discussed, a non-functioning solar panel may meet the definition of a hazardous waste under Maine’s [Identification of Hazardous Waste](#) (06-096 C.M.R. ch. 850, § 3(A)(5)(d)(vi)) if constructed from hazardous components and if the TCLP test indicates it is a

⁴⁷ European Commission, *Frequently Asked Questions on Directive 2012/19/EU Waste Electrical and Electronic Equipment* (WEEE). Retrieved from <https://ec.europa.eu/environment/pdf/waste/weee/faq.pdf>.

hazardous waste. If the solar panel is considered a hazardous waste, the developer would be required to remove the solar panel(s) within 180 days of the panel becoming inoperative and properly dispose of it as a hazardous waste.

The Department reached out to nine solar panel providers based in Maine and informed them of our intent to evaluate solar panels as a candidate for a product stewardship program. As part of the outreach, each provider was sent a questionnaire that asked specific questions regarding their thoughts on recycling solar panels and obstacles they faced with recycling. The Department has not received written responses at the time of this report but will continue to solicit feedback from these providers. Additionally, the Department sent the same questionnaire to the Maine Renewable Energy Association to distribute to their members. Again, the Department has not received any written responses. The Department has received some verbal responses which indicate a preference for classifying the solar panels as “universal waste” and establishing a recycling facility in Maine to reduce shipping costs.

It should be noted that in March of 2022 the U.S. Department of Energy (“USDOE”) released its “Action Plan for Photovoltaic Systems (“PV”) End-of-Life Management,” which is designed to enable the safe and responsible handling of photovoltaic end-of-life materials as part of the administration’s goal to decarbonize the electricity grid by 2035.⁴⁸

The Department is not recommending the development of a product stewardship program for recycling solar panels at this time. Instead, the Department recommends continuing to utilize current end-of-life handling requirements as discussed above for managing solar panels until such time as the U.S. EPA adopts rules for managing solar panels as a Universal Waste and more readily available options for recycling come on-line as USDOE continues its work in PV end-of-life management. In the meantime, the Department may consider more active monitoring of solar panel installations (as resources allow) for inappropriate handling of panels in addition to the continued review of grid-scale solar developers’ financial assurance for decommissioning. Additionally, if a solar panel meets the definition of a “hazardous waste,” the Department would require removal of inoperative panels within 180 days, pursuant to Maine’s Hazardous Waste Rules.

F. Wind Turbine Blades

Resolve 2023, Ch. 52 – *Resolve, to Evaluate Options for the Recycling of Solar Panels and Wind Turbine Blades* requires the Department evaluate if wind turbine blades meet the criteria of [38 M.R.S. § 1772\(2\)](#) to be a candidate for a product stewardship program. The Resolve required that the evaluation include a collection of information regarding recycling facilities operating in the eastern United States, identification of costs for recycling, recommendations, and any proposed legislation. This

⁴⁸ US Department of Energy; *DOE Releases Action Plan for Photovoltaic Systems End-Of-Life Management*. [DOE Releases Action Plan For Photovoltaic Systems End-Of-Life Management | Department of Energy](#).

evaluation will be specific to wind energy development projects of a grid-scale size, and not small wind energy generation systems designed for residential or commercial structures.

Wind turbine blades meet two of the five criteria in 38 M.R.S § 1772(2) as described further below. Wind turbine blades are generally manufactured from glass fiber, plastics, wood and carbon fiber and not toxic materials. Thus, toxicity is not generally a concern with management and disposal of these blades; however, end-of-life challenges do exist due to the size, bulk, and rigidity retention of the materials.

Between 85% and 90% of a wind turbine system's total mass (excluding the foundation, underground wiring, and other project-related infrastructure) is made up of materials that are easily recycled, including the aluminum, steel, copper, and iron used in the turbine tower and components.⁴⁹ The blades, due to their size, are not as easily recycled or disposed and require significant transportation logistics or on-site shredding, cutting, or otherwise dismantling in order to reduce their size for transporting to recycling or disposal facilities.

Disposal of wind turbine blades is expensive because of the size, bulk, and blade construction methods. The wind turbine blades are challenging to recycle because of the construction materials used in typical wind turbines (glass fiber, plastics, wood and carbon fiber) and the large size of the blades - typically 50-100 meters long and weighing approximately 6 tons.⁵⁰ The overall amount of turbine blade waste is anticipated to expand to 200 to 370 tons per year by 2050.⁵¹ A significant cost for recycling or disposal of wind turbine blades is the transport of the decommissioned blades or blade material. Currently, landfilling worn or obsolete wind blades is the cheapest option, provided they are cut or otherwise dismantled to a size the landfill is capable of handling.

Added governmental energy efficiency incentives are pushing commercial wind farms to repower and install newer, larger, more efficient blades and dispose of existing blades before the end of their designed and engineered useful life, increasing the need for a solution. A 20 to 30-year projected lifespan is often shorter in the United States because of national energy efficiency incentives which often compel wind turbine operations to upgrade to larger, more efficient blades at around 10 to 15 years, shortening the useful lifespan of the blades at that particular operation.⁵² In Europe, where the incentives for repowering are absent, the blades are utilized for a longer time period before replacement.

⁴⁹ U.S. Department of Energy, *Explore a Wind Turbine*. Retrieved from <https://www.energy.gov/eere/wind/explore-wind-turbine>.

⁵⁰ Environmental Protection Agency, *Renewable Energy Fact Sheet: Wind Turbines*. Retrieved from https://www.epa.gov/sites/default/files/2019-08/documents/wind_turbines_fact_sheet_p100i18k.pdf.

⁵¹ U.S. Department of Energy, *Explore a Wind Turbine*. Retrieved from <https://www.energy.gov/eere/wind/explore-wind-turbine>.

⁵² U.S. Department of Energy, *Explore a Wind Turbine*. Retrieved from <https://www.energy.gov/eere/wind/explore-wind-turbine>.

While repowering or decommissioning is the primary cause of blade disposal, single blades can also be damaged by lightning strikes, hail, or debris impacts. In such cases, the blades are typically removed and repaired where possible and returned to service.

Despite the challenges to recycling wind turbines as outlined above, there are recycling options available in the United States. One recycling option includes sectioning, grinding, or shredding, into a fine material that is used as an ingredient in the manufacturing of cement.⁵³ Another recycling option is available using pyrolysis to separate glass from the resins for reuse.⁵⁴ Additionally, researchers are developing new domestic recycling and repurposing solutions for blades and other composite components. Often, new processes that are pioneered in Europe are adopted in the United States, as many of the wind turbine blades are manufactured and utilized on a global scale. It should be noted that 38 M.R.S. § 1305 requires municipalities to provide solid waste disposal services for domestic and commercial solid waste generated within the municipality and may provide these services for industrial wastes and sewage treatment plant sludge. Since a wind turbine energy generation project would be considered an industrial use, a municipality would be under no obligation to assist with the recycling or disposal of a non-functioning wind turbine blade or any other component that was generated from a grid-scale size wind energy project in its municipality.

Grid-scale wind energy facilities are a relatively new infrastructure in Maine designed to reduce dependence on fossil fuels and lessen the carbon footprint of energy generation. Maine Department of Inland Fisheries and Wildlife records indicate that 23 grid-scale size wind turbine energy projects have come online since 2006, with a total of 458 turbine tower units generating up to 1,235 megawatts of power. There are no current federal regulations on the disposal of wind turbine blades. Some of the recycling processes (grinding for cement production and pyrolysis) have shown promise as potential recycling techniques in Europe to reduce disposal.⁵⁵ The success of this type of wind turbine blade recycling has led to discussions regarding a ban on disposal of wind turbine blades.⁵⁶ However, there are currently no product stewardship systems in place in Europe or the United States specific to wind turbine blades. The United States Department of Energy does have an ongoing program to develop wind blade recycling and enable a circular economy for the entire wind turbine.⁵⁷

In an attempt to provide for beneficial use of spent turbine blades as fill, Wyoming passed an act in 2020 to allow turbine blades to be used as backfill for surface coal mining sites as part of a mine's

⁵³ Veolia, *Wind Turbines are Recyclable Now*. Retrieved from <https://www.up-to-us.veolia.com/en/recycling/recycling-used-wind-turbine-blades>.

⁵⁴ Carbon Rivers, *Composites Recycling*. Retrieved from <https://www.carbonrivers.com/copy-of-composites-recycling>.

⁵⁵ European Commission, *More Circular, Less Carbon: Chemical Recycling Holds Promise for Wind-turbine Blade Waste*. Retrieved from: [More circular, less carbon: chemical recycling holds promise for wind-turbine blade waste \(europa.eu\)](https://ec.europa.eu/commission/presscorner/detail/en/ip19_1931).

⁵⁶ WindEurope, *Circular Economy: Blade recycling is a top priority for the wind industry*. Retrieved from <https://windeurope.org/newsroom/news/blade-recycling-a-top-priority-for-the-wind-industry/>.

⁵⁷ U.S. Department of Energy. *No Time to Waste: A Circular Economy Strategy for Wind Energy*. [No Time To Waste: A Circular Economy Strategy for Wind Energy | Department of Energy](https://www.energy.gov/eere/energy-efficiency/no-time-to-waste-a-circular-economy-strategy-for-wind-energy).

reclamation plan.⁵⁸ Washington state released a feasibility study evaluating wind turbine blade recycling in December 2023.⁵⁹ The feasibility study outlined several options available for managing wind turbine blades, including the possibility of a stewardship style end-of-life management program. The study identified the size of the blades and related transportation logistics to appropriate recycling or disposal facilities as the most significant end-of-life issue.

While there are no product stewardship programs specific to wind turbine blades, several laws in Maine are applicable to the regulation of the wind turbine blades at the end of their useful life. Wind turbine energy projects of grid-scale are regulated pursuant to the *Maine Wind Energy Act*, [35-A M.R.S. §§ 3401-3459](#), and the *Site Location of Development Act*, [38 M.R.S. §§ 481-489-E](#). Part of the license approval process pursuant to the *Wind Energy Act Standards*, [06-096 C.M.R. ch. 382](#), requires the:

1. Submission of a decommissioning plan for Department review and approval - Section 7(A);
2. Implementation of decommissioning by the licensee to take place when certain criteria are met and within twelve months - Section 7(B);
3. Demonstration of financial assurance at any time during construction, operation, and upon termination of the wind energy development - Section 7(C);
4. Notification to the Department in writing within two business days of any turbine failure or other incident that will result in a turbine being off-line for a period greater than six months - Section 7(D); and
5. Submission of a request for a time extension in situations where an unanticipated event caused damage to turbines rendering it inoperable, and where turbine repair or replacement may exceed twelve months - Section 7(E).

The decommissioning plan must include information about how components of the proposed wind energy development would be dismantled and removed from the site. This includes how subsurface components would be removed to a minimum of 24 inches below grade, how generating facilities would be removed and how disturbed areas would be revegetated. In addition, the plan requires that before decommissioning commences, a plan must be submitted to the Department for the continued beneficial use of any component(s) of the wind energy development proposed to be left on-site. Leaving any components on-site for permanent disposal would not be considered beneficial use.

The Department does not recommend the development of a product stewardship program for wind turbine blades at this time. The requirements under current wind power licensing and approval

⁵⁸ Wyoming State Legislature, *House Bill 0129 – Reclamation of surface coal mines-turbine blades*. Retrieved from <https://wyoleg.gov/Legislation/2020/HB0129>.

⁵⁹ Washington State University, *Wind Turbine Blade Recycling in Washington: A Feasibility Study*. Retrieved from https://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=Wind%20Turbine%20Blade%20Recycling%20in%20Washington%20-%20Feasibility%20Study_9bff5652-e532-4284-8f28-7afe7f021dbd.pdf.

should provide for appropriate end-of-life management for wind turbine blades, provided the wind developer can demonstrate appropriate financial assurance for costs associated with constructing, operating, maintaining, repowering, and eventual decommissioning the facility, including any changes due to re-powering or other improvement projects at the facility. The Department recommends following the growth of recycling technologies and management programs in other jurisdictions and the U.S. Department of Energy's efforts for turbine blade recycling.

G. E-Waste and Rechargeable Battery Recycling Program

With the proliferation of consumer electronics, more electronic devices and batteries are making it into the municipal waste stream, from laptop computers and tablets to disposable vape pens. Once in the waste stream, these products pose a fire hazard at landfills and recycling processing facilities. Even in a resident's trash can, these items can create fire hazards, as shown in 2023 when a vape pen thrown away in a trash can started a fire at a [University of Southern Maine dormitory](#).

Maine currently has a product stewardship program for certain electronics and batteries, but covered products is limited to electronic devices with screens (televisions, laptops), certain printers, specific types of rechargeable batteries, and cell phones. The devices covered by the current law do not include some of the most challenging electronics, such as lithium-ion batteries and devices with embedded batteries such as vape pens.

V. Conclusion

Maine's product stewardship programs continue to divert a significant amount of material for recycling and ensure the safe handling of products containing toxics. The Department is currently focused on implementing recent legislative changes and new programs, while it continues to oversee existing core product stewardship programs. Although the Department is not proposing new product stewardship programs at this time, the Department will continue to assess candidate products presenting end-of-life management challenges that may be addressed by carefully constructed programs in the future. However, as described in the Department's, [2022 Product Stewardship Report](#) implementation of any new product stewardship programs will require no less than one-half full time equivalent ("FTE") staff position. While the Department supports continuing to utilize product stewardship strategies to reduce waste, increase recycling, and further support the state's solid waste management hierarchy, evaluation and regulation development of new product categories will require additional resources for program administration.

Attachment 1

February 14, 2023 Comments from the International Sleep Products Association



February 14, 2023

Division of Materials Management
Maine DEP
17 State House Station
Augusta, ME 04333-0017

Dear Mr. Beneski:

On behalf of the International Sleep Products Association (ISPA), the trade association for the mattress industry, we appreciate the opportunity to comment on the Department of Environmental Protection's (DEP) January 2023 Annual Product Stewardship Report dated January 14, 2023 (the Report).

We support DEP's conclusions regarding mattresses.

Several years ago, ISPA formed the Mattress Recycling Council (MRC), a non-profit organization, to implement mattress recycling programs in California, Connecticut, and Rhode Island, each of which have enacted mattress recycling laws. The Connecticut program launched in May 2015, California in December 2015, and Rhode Island in May 2016. In 2022, Oregon passed a mattress recycling law and anticipates a recycling program launch in 2024. Since inception, these programs have processed over 11.5 million discarded mattresses and box-springs.

Based on MRC's experience, ISPA has collaborated with Maine officials and stakeholders to discuss how to implement mattress recycling efficiently in the state. Pursuant to DEP's recommendation in response to LD 710 to develop a pilot mattress recycling project, ISPA, in consultation with Maine stakeholders, submitted grant applications in 2020 and 2021 to the Waste Diversion Grant Program to help fund such a pilot. Unfortunately, ISPA's grant applications were not approved. As an alternative, ISPA collaborated with MRC, using the same analysis that MRC uses to prepare annual budgets for its state programs, to model the potential financial and environmental costs of a statewide mattress recycling program in Maine.

501 Wythe Street, Alexandria, VA 22314

571.482.5428 | WWW.SLEEPPRODUCTS.ORG



In the Report, DEP concluded that “recycling does not appear to be economically or environmentally beneficial at this time.” ISPA’s modeling supports this conclusion. Further, DEP stated that, “given Maine’s geography and the fact that there are no recycling facilities for mattress components located in Maine at this time, a full evaluation of cost should consider greenhouse gas emissions in addition to dollar figures.” Our modeling also supports this conclusion, since it is likely that mattress units discarded in Maine would need to be transported long distances to be recycled, adding high costs and resulting in high fuel consumption and greenhouse gas generation.

Mattress recycling in Maine will be challenging, given the lack of available recycling infrastructure in the state, Maine’s relatively small population, the large rural areas that would need to be served and the distance from Maine to either out-of-state recyclers that process the units or distant end markets for the reclaimed materials. No existing mattress recyclers operate in Maine. Furthermore, MRC experience suggests that the number of mattresses that Maine residents discard annually would likely be insufficient to support a recycler based in Maine.

As a result, units discarded in Maine likely would need to be transported to Massachusetts or elsewhere for recycling. ISPA estimates that on average, Maine units would be transported about 271 miles from the point of discard to a recycling facility (the recycler we used for this analysis is the existing recycler located closest to Maine, which in this case is based in northern Massachusetts). Compared to MRC’s experience with transporting units in its California program, units discarded in Maine would travel 3.5-4 times farther than the distance an average California unit travels to be recycled.

Long transport distances mean that over 50% of an estimated stewardship fee would be spent on trucks, fuel and drivers. Based on this and other costs that MRC advises ISPA would likely be incurred in order to recycle Maine units, our modeling led us to estimate the mattress stewardship fee for mattresses sold in Maine would be around \$29.00 per unit, a figure much higher than is charged by MRC’s current programs, which range from \$10.50 to \$16.00 per unit.

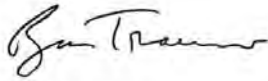
Long transport distances will also substantially increase the program’s carbon footprint and greenhouse gas emissions. Additionally, with units transported to neighboring states for processing, most of the economic activity (and jobs) that that program might generate (green recycling jobs, products made from recycled materials, etc.) would occur outside Maine.



Based on this analysis, we concur with DEP that a mattress recycling program in Maine does not appear to be economically or environmentally viable at this time. Nevertheless, ISPA looks forward to working with DEP to monitor the recycling infrastructure and needs of Mainers and to identify and evaluate possible recycling options in the future.

Please contact me if you have any questions.

Regards,



Ryan Trainer
President, ISPA

Appendix A– Comments Received on Posted Report

From: [Cheyenne Houle](#)
To: [Beneski, Brian](#)
Subject: Comments of Annual Product Stewardship Report
Date: Friday, February 2, 2024 4:33:35 PM
Attachments: [RECYCLING-SYMBOLS.webp](#)
[Multi material.jfif](#)

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To Whom It May Concern,

We are happy to hear about all of the good things happening in Maine for the recycling of packaging products. We all know more needs to be done to help reduce reusable materials in the waste stream. As a recycling center and transfer station we see many products and materials come through our gate. A major issue we see on a daily basis is consumers, our customers not knowing how or what to recycle. We see many products with the closed or chasing arrow symbol with or without a number. In our research we have found that this icon means little to nothing in telling a consumer if a product can be recycled. At one point the closed arrow meant that the product could not be recycled. This also seems to be the history with the chasing arrows. This is an issue when we have an icon on products where many consumers think it means the product can be recycled, but it cannot. We need to get to the bottom of what this icon means and how or if it should be used.

We have seen more products with chasing arrows than closed with a material number, such as 1,2 or 5. These do seem to be connected to this particular products recyclability but rather the polymer it is made from. At our facility we recycle #2 and 5 plastics as well as metal, cardboard, and mixed paper. We have many customers coming in not knowing where to put specifically, plastic items because the material number is too small to see or non-existent. With our experience we believe that every product, plastic, cardboard, paper food cartons or containers, etc., needs to have a clearly visible icon or mark that tells the consumer whether or not that item can be recycled. Paper juice cartons for example cannot be recycled due to the fact they are a mix of both plastic and paper. Recycling facilities are not designed to separate these two components when bonded to each other. Plastic milk jugs or laundry detergent bottles are typically made of #2 plastic which can be relatively easily recycled and reused for other products. Both of these examples should have an icon or symbol of some kind to let the consumer know its recyclability.

To make recycling easier for the every day consumer all companies that produce a packaging product have to use the same system. It must be easy to read and see on the packaging and clearly describe what type of product the packaging is made out of. Attached to this email is a picture of widely used icons for recycling items. The most widely used in the US are number 5 and 6. Number 6 only tells a consumer what polymer a plastic is made out of, this is the chasing arrow icon described earlier. From here a consumer can use this information to see if their local recycling center can take a particular plastic polymer but is still not clear on its recyclability, and the icon has to be visible or on the product for a consumer to be able to do their own research.

Number 5 in this photo is even more commonly used than number 6 but has little to no meaning when it comes to a products recyclability. This icon also does not tell a consumer whether or not this product is recyclable, made of recycled materials, compostable, or must be

thrown away. This is the most harmful icon we, at our transfer station we see every day. This icon makes people believe that the product it is on can be recycled even when it cannot or has no other information given about its recyclability. Chasing arrows makes people think about “Reduce, Reuse, and Recycle” which is a great slogan but should not be used on products to describe its recyclability or lack thereof.

We would recommend using an icon like 1,2,3,11, and 12 in the provided picture. Icons 1-3 clearly tells a consumer weather a product is widely accepted for recycling in many areas, must be cleaned before recycling, or if it cannot be recycled at all. These three use pictures and words to clearly get the message across. Icon 11 is a clear image of do not throw this specific product away which is typically found on batteries. Icon 12 uses both an image and words to clearly show that a specific product can be compostable. These are the types of images that are the most clear in telling a consumer what to do with a product for basic recycling. Icons like these are what should be found on all products to help consumers understand what to do with the packaging. Companies need to make it easy for a consumer to properly dispose of their products by having these icons be clearly visible with a clear message. This is the only way to help keep reusable materials out of the waste stream.

Another issue with packaging products is mixed material packaging. This is the hardest packaging to properly dispose of. In this case each separate components of the packaging should have to be labeled independently or specify which icon goes with witch part when using the product label for the icons. For example, a glass peanut butter jar with a metal cover. The glass and metal should be labeled on each part or the label of the product should specify the individual materials recyclability. An example of this can be found in the second attached picture that clearly states a bottle with the cap can be recycled but the sleeve must be taken off. If a mixed material product cannot be recycled, this must be relayed clearly to the consumer.

Thank you for taking the time to hear our thoughts regarding this program. We are excited to see how this program moves forward.

-Cj Houle

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February 7, 2024

Mr. Brian Beneski
Division of Materials Management
Maine DEP 17 State House Station
Augusta, ME 04333-0017

Via E-Mail - brian.beneski@maine.gov

Re: Annual Product Stewardship Report 2024 - Carpet

Dear Mr. Beneski,

I read with interest your January 2024, "Annual Product Stewardship Report." As president of the Carpet & Rug Institute (CRI), a not-for-profit trade association that represents carpet manufacturers who are responsible for more than 95% of the carpet produced in the United States, I am concerned about the possible ramifications of over-regulating post-consumer carpet products. Carpet is one of the last remaining major U.S. textile industries, and tens of thousands of American jobs depend on the U.S. carpet industry, in manufacturing, transportation, installation, retail sales, recycling, and more. Your report references the amount of carpet going into Maine's landfills, and while carpet is neither toxic nor hazardous, we understand that landfill space is significantly limited.

The carpet industry has been a leader in forging product sustainability. One of our significant accomplishments is The Carpet America Recovery Effort (CARE). CARE is a voluntary, non-profit organization dedicated to increasing landfill diversion, reuse, and recycling of waste carpet through market-based solutions that benefit the economy as well as the environment. Reduction in the amount of carpet going to landfills each year is already happening. Since 2002 U.S. carpet manufacturers, working with independent recyclers and processors, have diverted more than 5 billion pounds of used carpet from landfills. CARE's four hundred-plus members include independent carpet recyclers, carpet manufacturers, dealers, retailers, suppliers, and non-governmental organizations.

Unlike newspapers and aluminum cans which are relatively easy to recycle, carpet is a complex product that is difficult to separate into its component parts. However, there are multiple products currently in use that contain materials recovered from used carpet.

- o New carpet and carpet padding
- o Plastic components for automobiles and consumer products
- o Building materials – architectural moldings, boat docks, and decks
- o Sound barriers – along interstates and elsewhere
- o Erosion control, silt, and oil filtration materials
- o In addition, post-consumer carpet, which burns hotter and produces less greenhouse gases than coal, can be used as an alternative fuel when other uses are not practical.



CRI and its members have not only worked hard to ensure that their products are completely safe for the consumer, but they have taken great effort towards producing sustainable products. We are therefore particularly concerned that the carpet industry, which has been a leader in addressing environmental concerns in a proactive manner, would have carpet highlighted as one of the first non-hazardous products to be considered for extended producer responsibility.

Carpet is one of the safest and healthiest products in the home, office, or school. It adds comfort, warmth, and beauty to any home. In fact, carpet's use in virtually every residential and commercial interior setting is so accepted that we are not aware of any federal or state requirements covering its sale or use. As such, carpet, because of its long track record of performance and sustainability initiatives, should not be subjected to the kind of extreme product stewardship or take-back programs referenced in your report.

These approaches rely on the flawed premise that assigning product manufacturers the end-of-life costs of recycling or disposing of products will result in more environmentally preferred product designs, eliminate product disposal costs, and reduce disposal of products in landfills. However, current product-mandated manufacturer take-back programs have not successfully demonstrated positive cost-benefit results in collecting products at the end of their life cycles. It is unrealistic to expect that consumers will utilize individual and separate product take-back programs for diverse product categories or that those programs would use resources efficiently.

Manufacturers are continually producing more environmentally preferable products and using the most recyclable and environmentally friendly components and packaging available and feasible. These activities serve the best interests of the environment and are also necessary to be cost-effective with limited resources and responsive to consumer demands.

Mandates for product take-back and recycling can harm the environment in unforeseen ways, by forcing companies to switch from materials that are perhaps more energy-efficient to produce, lighter to transport, or safer, to heavier materials that are more recyclable, but require more energy to produce and use and could pose greater safety concerns. Market processes encourage innovation in the use of limited resources throughout a product's life cycle, while mandated product take-back programs override this natural research and development process, and only drive manufacturers toward materials that have more positive recycling or take-back attributes.

Even as the COVID 19 pandemic has ended, our industry and retailers still face economic challenges. In these times of extreme fiscal pressures on both industry and government, it seems prudent to include a requirement for cost-effectiveness or a cost/benefit analysis in any proposed new mandate. However, there appears to be no such requirement included in this program. Consequently, the mandates of this program could effectively put an industry and/or retailers out of business and drain state resources in staggering administration costs, while still mandating DEQ to move forward. We urge the inclusion of a cost-benefit analysis component in any extended producer program, to prioritize limited resources and prevent fiscally questionable mandates.

As an alternative to mandates, CRI supports continued voluntary initiatives to find cost-effective solutions. We feel a much more prudent and effective approach to the landfill diversion of carpet lies in using the power of government in a different way; by driving the use of products that



contain recycled or recyclable materials through the state's product specification process. Why not use the expertise of DEP to identify products containing post-consumer recycled and recyclable materials and requiring state purchase of such products? This approach would drive the market to develop products that meet these requirements, and thereby reduce the amount of material going to landfills.

On behalf of the members of the Carpet and Rug Institute, I thank you for your consideration of these concerns. If you have any questions, please do not hesitate to contact Jennifer Stowe, CRI Vice President, Government Relations at jstowe@carpet-rug.org or 571-435-7851.

Regards,



Russ Delozier
President





February 13, 2024

Comments on the Maine Department of Environmental Protection's Annual 2024 Product Stewardship Report to the Legislature

Dear Ms. Hopkins and Mr. Beneski:

Thank you for the opportunity to submit comments on the Department of Environmental Protection's January 2024 Annual Product Stewardship Report to the Maine Legislature. The Natural Resources Council of Maine (NRCM) is a strong supporter of policies that reduce waste, promote increased recycling, and save money for Maine's municipalities and taxpayers. We are proud of Maine's leadership in implementing eleven product stewardship programs¹ that provide sustainable management of challenging and hazardous materials, help protect public health and the environment, and save Maine municipalities millions of dollars each year.

Our comments on the 2024 report focus on the most pressing and timely issues related to Maine's EPR programs and actions that could be considered by Maine's 132nd Legislature.

Beverage Container Redemption "Bottle Bill"

Maine's Bottle Bill (Beverage Container Redemption Program) is the state's most successful recycling and litter-prevention program, recycling an estimated 40,000 tons of beverage containers in 2022 and additionally recovering 612 tons of other materials, including plastic films, corrugated cardboard, and paperboard packaging.

During the first session of the 131st Legislature, lawmakers provided critical support to Maine's redemption centers, passing LD 1909 to modernize Maine's 45-year-old beverage container redemption law, and passing LD 134 to increase the handling fees paid to redemption centers. These updates to the beverage container product stewardship law have saved countless small businesses in Maine from closing; saved hundreds of jobs at these redemption facilities; and preserved statewide access to recycling of plastic, metal, and glass beverage containers.

We look forward to participating in the upcoming rulemaking process with the Department to implement these new changes to the program and are excited at the potential for Maine's Bottle Bill to create further opportunities for waste reduction through the use of reusable containers.

¹ Maine's eleven EPR laws regulate the following product categories: beverage containers, lead acid batteries, rechargeable batteries, mercury auto-switches, mercury thermostats, electronic waste, cellular telephones, mercury-added lamps, architectural paint, pharmaceuticals, and packaging.

Rechargeable Batteries

According to the U.S. Environmental Protection Agency (EPA), each year Americans throw away more than 3 billion batteries – 180,000 tons in total— that contain toxic materials like nickel, cadmium, cobalt, and lead that should not be released into the environment. About half of these batteries are single-use alkaline batteries. If placed end-to-end, these dead alkaline batteries would circle the world at least six times. It's estimated that 28 million primary and rechargeable batteries are sold in Maine each year.

Proper battery disposal and recycling is a serious issue in Maine. When punctured or damaged, batteries can pose a fire risk, jeopardizing human health and safety when not managed properly. As mentioned in the Department's report, fires from batteries occur in waste processing facilities, collection vehicles, landfills, and residential trash cans.

Maine's existing product stewardship law provides safe, responsible, and effective collection of two different types of rechargeable batteries: nickel cadmium and small sealed lead acid batteries. However, the law does not cover primary (non-rechargeable) batteries, and it does not cover new battery types entering the marketplace. We believe that the current product stewardship law for batteries must be updated to more holistically address the challenges related to the disposal of both primary and rechargeable batteries, including lithium-ion batteries currently not included in Maine's product stewardship law.

Lawmakers have introduced several bills over the years to add primary batteries to Maine's program, but these bills have failed due to opposition from some manufacturers that don't want to be covered by a more comprehensive program. To ensure this law is fair and removes batteries from the waste stream to the maximum extent possible, it's important for everyone to participate. Previous legislation would have allowed for these manufacturers to opt out if they use covered batteries from participating battery manufacturers, but opponents argued they would like the ability to choose non-compliant battery brands for use in their products. NRCM does not believe that this is a good enough reason to let our rechargeable battery program struggle with the costs of free-riders, leaving Maine people confused about how to dispose of their single-use alkaline batteries and other rechargeable batteries. most of which end up in the trash.

We urge the Committee to reevaluate previous legislative attempts to expand the battery stewardship law by including both primary batteries and lithium-ion batteries in the Call2Recycle program. We believe the State of Maine should enact an expanded program.

Electronic Waste

In 2004, Maine became the pioneering state among 24 others to enact an Extended Producer Responsibility (EPR) program targeting electronic waste (e-waste). Consequently, numerous towns and cities across Maine offer convenient and affordable disposal options for a wide array of electronics, including televisions, portable DVD players, game consoles, computer monitors, laptops, printers, digital picture frames, and computers. This initiative effectively mitigates the risk of toxic substances such as lead, mercury, cadmium, lithium, brominated flame retardants, phosphorous coatings, and PVC plastics from permeating Maine's environment, incinerators, and landfills, thus safeguarding public health and environmental integrity.

Since 2019, there has been a significant decline in the amount of e-waste collected across the state, which is likely the result of changes in the supply chain and event coordination due to COVID-19. The Committee may want to request a briefing from the Department next year to learn more about the progress made and evaluate whether legislative action may be necessary, and NRCM would urge the Department to consider solutions that implement more “hub and spoke” models for efficient and convenient collection of residential e-waste to prevent this material from entering Maine’s waste stream.

Packaging

With many thanks to the Department staff and the Committee, Maine became the first state in the nation to enact EPR for Packaging legislation in 2021. Since then, three other states—Oregon, Colorado, and California—have adopted similar legislation, and more are likely to follow suit. This law is transformative and will create a fair, effective, and sustainable program for managing packaging waste in Maine in a way that aligns with our Solid Waste Hierarchy and saves Maine’s municipal taxpayers tens of millions of dollars each year.

To provide adequate recycling support to Maine’s municipalities, we need producers to pay their fair share of the cost for dealing with their packaging. The Department mentions in their 2024 Product Stewardship Report that some materials may be under consideration for exemption from the EPR for Packaging program based on construction requirements for their products, but NRCM strongly urges the Department to instead consider reducing or eliminating eco-modulated fees for those specific packaging materials, rather than exempting the packaging entirely. Producers who do not meet small producer exemption requirements should be expected to pay producer fees for the end-of-life costs for their packaging to help reduce the burden on Maine taxpayers.

NRCM is committed to ensuring the success of Maine’s EPR for Packaging program and is working to help inform the rulemaking process so that this program can get off to a strong start and set a good example for the nation. We look forward to providing education and support for Maine municipalities and helping the state achieve its recycling and solid waste diversion goals through this program.

Gypsum Wallboard

We believe that gypsum wallboard fits the criteria to be considered as a potential candidate for an EPR program in Maine. This material is used in drywall, plasterboard, and sheetrock, and its disposal in a landfill can result in the generation of hydrogen sulfide gas, which means that it poses a potential health risk to Maine’s people. It’s highly recyclable, but voluntary programs are insufficient. Demonstrated, successful programs for recycling these materials are operating in other jurisdictions. Such a program here in Maine would reduce costs to local governments and taxpayers that currently pay for wallboard disposal and management.

The Committee’s work to close the out-of-state waste loophole through LD 1639 in the previous Legislature illuminated the need to reduce the amount of construction and demolition debris sent

to Maine's landfills. That legislation highlighted the problems created when crushed gypsum wallboard is a component in daily cover materials, creating hydrogen sulfide gas when wet. Gypsum wallboard is a portion of this waste stream that is best managed separately through recycling and reuse. Ensuring that this happens will require a certain level of deconstruction of buildings, rather than demolition.

Deconstruction provides far more economic and environmental benefits than demolition because it provides the opportunity to reuse materials, or separate them for recycling, while creating jobs and keeping materials out of landfills. If Maine were to require the separation and recycling of gypsum wallboard, it would keep this problematic material from landfills and likely result in more deconstruction projects throughout the state. Such a requirement could spur the separation of other valuable building materials such as wood, metal, doors, and fixtures that could be reused and stay in Maine's local economy.

We strongly encourage the Department to consider potential avenues for funding diversion of CDD and deconstruction in Maine and urge the Committee to request that the Department returns in the 132nd Legislature with language that would support these diversion goals.

Household Hazardous Waste (HHW)

Household Hazardous Waste (HHW) covers a broad range of materials that include cleaning solutions, paint thinner, oils, waste gas, and pesticides, and is a particularly problematic waste stream for Maine's municipalities to manage. As addressed in the Department's report, collection opportunities for HHW are inconvenient for many Maine people and are limited to certain times of the year, making safe and responsible disposal of HHW a challenge in the state. Maine consumers do not currently have access to safe and convenient options for disposal of most of these chemicals, which means they end up in Maine's landfills and incinerators where they may react with other chemicals and create a health and safety issue.

Vermont recently passed a product stewardship law for the collection and management of HHW, providing a framework for how this might be replicated in Maine. We encourage the Committee to request that the Department provide draft language for an EPR for HHW program in Maine to be considered by the 132nd Legislature.

Conclusion

Maine is a leader in product stewardship and EPR laws, and our programs have been successful—diverting toxic and problematic materials from the waste stream, increasing recycling, and saving disposal costs for Maine taxpayers. For these programs to remain successful, the Legislature should act this session on several fronts. A summary of the action items recommended by NRCM in these comments include:

- Requesting that the Department provide a briefing on the electronic waste program, with any recommendations for changes in statute to address outstanding collection issues or to expand the program.
- Requesting that the Department consider implementing exemptions from eco-modulated fees rather than full exemptions under the EPR for Packaging program.

- Requesting that the Department return to the Committee during the 132nd legislative session with draft language that would achieve the following:
 - Disposal restrictions on gypsum wallboard;
 - Expansion of Maine’s rechargeable battery program to include all primary alkaline batteries and more types of rechargeable batteries found in consumer products; and
 - A new EPR program for HHW.

Sincerely, Vanessa Berry, Sustainable Maine Program Manager