



LESSONS LEARNED: Voluntary Mercury Thermostat Take-Back Programs

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The Product Stewardship Institute, Inc.

The Product Stewardship Institute (PSI) is a national, membership-based nonprofit committed to reducing the health, safety, and environmental impacts of consumer products across their lifecycle with a strong focus on sustainable end-of-life management. Headquartered in Boston, Mass., we take a unique product stewardship approach to solving waste management problems by encouraging product design changes and mediating stakeholder dialogues. With 47 state environmental agency members, hundreds of local government members, and over 110 corporate, business, academic, non-U.S. government, and organizational partners, we work to design, implement, evaluate, strengthen, and promote both legislative and voluntary product stewardship initiatives across North America.

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Project Contact

For more information, please contact Scott Cassel, PSI's chief executive officer and founder, at scott@productstewardship.us or (617) 236-4822.

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LESSONS LEARNED:

Voluntary Mercury Thermostat Take-Back Programs



Why do we need thermostat take-back programs?

Older thermostats contain mercury, a neurotoxin, which is harmful to humans and wildlife. At high levels of exposure, mercury can harm the human brain, heart, kidneys, lungs, and immune system, and can negatively affect the developing nervous system of unborn babies and young children. Microorganisms change mercury in the environment into methylmercury, a highly toxic chemical that builds up in fish and animals.

While mercury thermostats are no longer sold in the U.S., they have an extensive product life (about 30 years), and therefore remain in use in many buildings around the country. On average, each mercury thermostat contains approximately four grams of mercury. Improper disposal releases mercury into the environment, polluting air, waterways, groundwater, and land. The United States Environmental Protection Agency (U.S. EPA) restricts the amount of mercury in drinking water to 0.002 parts per million which is roughly equivalent to one household thermostat for every 500,000 gallons of water.

How can states increase mercury recovery through voluntary take-back programs?

Under “extended producer responsibility” (EPR) laws in 13 states, manufacturers are required to fund and operate mercury thermostat collection and recycling programs, which increase safe thermostat recovery. Yet several states without such laws also recover significant volumes of mercury thermostats each year, protecting air and waterways from the damaging effects of improperly disposed devices. Regardless of whether a state has a law or relies on voluntary initiatives, all states have access to a national mercury thermostat take-back program run by the Thermostat Recycling Corporation

(TRC), which is funded by thermostat manufacturers. The states with the most successful voluntary programs (see Figure 1) are geographically and politically diverse, and each has applied a different combination of elements to effectively collect thermostats (see Table 1). This fact sheet highlights the key features that unite them, providing an explanation of **five successful strategies that diverse entities within each state have used to drive thermostat recycling.**

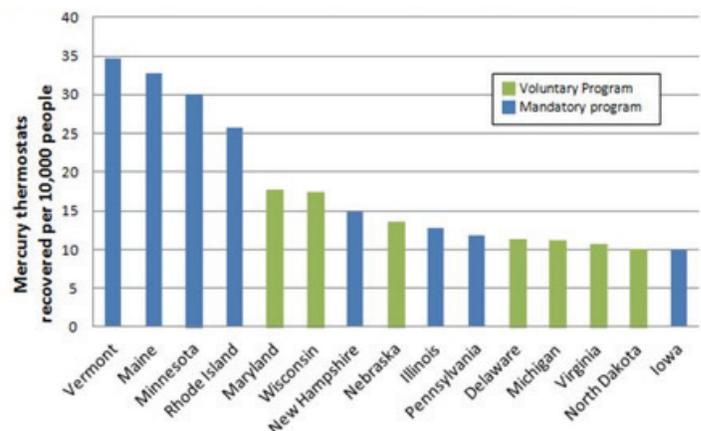


Figure 1. Mercury Thermostat Recycling Program Performance: 2014 (top 15 states)

LESSONS LEARNED: Voluntary Mercury Thermostat Take-Back Programs

To achieve high recovery rates, government agencies and other entities take the following actions:

1. Provide **financial incentives** for thermostat recycling.
2. Implement **supporting policies** in their businesses and municipalities.
3. Take steps to **increase convenience** for residents and contractors.
4. **Reach out** to wholesalers, contractors, residents, and other stakeholders about recycling opportunities.
5. **Educate** key stakeholders about the importance of mercury thermostat recovery.

Table 1. High-performing voluntary* mercury thermostat collection programs cited in this document

| STATE | Achievement (Rank in U.S. for all programs, mandatory and voluntary) | Financial Incentives | Supporting Policies | Convenience Measures | Outreach | Education |
|----------------|---|-------------------------|------------------------|-------------------------|----------|-----------|
| MARYLAND | #5 for recovery per capita in 2014 | ✓ | ✓ | | | ✓ |
| MICHIGAN | #9 for recovery per capita in 2013 | ✓ | | | | ✓ |
| MISSOURI | #5 for increase in recovery between 2010 - 2014 | | | ✓ | ✓ | ✓ |
| NEBRASKA | #8 for recovery per capita in 2014 | | | ✓ | ✓ | ✓ |
| NORTH DAKOTA | #5 for recovery per capita in 2013 | | ✓ | | | |
| SOUTH DAKOTA | #8 for recovery per capita in 2013 | ✓ | | | ✓ | ✓ |
| VIRGINIA | #8 for increase in recovery between 2010 - 2014 | ✓ | ✓ | | | ✓ |
| WISCONSIN | #6 for recovery per capita in 2014 | | ✓ | | | ✓ |
| MASSACHUSETTS* | #3 for increase in recovery between 2010 - 2014 | ✓ | ✓ | | | ✓ |
| MINNESOTA* | #3 for recovery in 2014 | | ✓ | ✓ | ✓ | ✓ |

* Massachusetts and Minnesota were included in this research on account of their high performance prior to implementing legislation in 2014.

STRATEGY 1:

Provide Financial Incentives for Thermostat Recycling

Where it's been done (top voluntary programs): Maryland, Massachusetts, Michigan, Virginia, South Dakota

Coordinating organizations: Covanta (waste-to-energy company); heating, ventilation, and air conditioning (HVAC) wholesalers

How it Works

Providing incentives, whether in the form of a rebate, cash bounty, or sweepstake entry, is an effective mechanism to increase mercury thermostat recovery. In several states (including Maryland, Massachusetts, Michigan, and Virginia), Covanta, a company that operates over 40 waste-to-energy facilities in the U.S., provides funds to local government agencies and wholesalers to offer incentives of \$5 gift cards and/or free programmable thermostats in exchange for returning mercury thermostats to participating collection locations. To further drive interest in some states, Covanta implemented "double incentive days," in which the gift card amount was increased from \$5 to \$10. Similarly, four HVAC wholesaler stores in South Dakota implemented a monthly incentive program for their communities. Customers who return mercury thermostats to their stores are entered into a raffle for various prizes (e.g., TV or Kindle). In Oklahoma, an HVAC wholesaler/retailer provided a \$10 discount on new thermostats for every old thermostat returned.

Tips for Implementing it in Your State

While two of the mandatory programs – Vermont and Maine – provide a sustainable funding source for the incentive by requiring manufacturers to fund a \$5 bounty for thermostat return, the main obstacle for voluntary programs is identifying an organization willing to pay for the incentive. In South Dakota, a wholesale chain voluntarily stepped forward to provide an incentive to its customers. Participating in a take-back program allows local stores to demonstrate their commitment to recycling and provide an additional service to their customers. Encourage wholesalers and retailers in your community to not only sign up for the program, but also to introduce a small incentive, such as a store coupon, to increase customer participation, foot traffic in the store, and store loyalty.



SUMMARY: Ways to Take Action

1. Encourage wholesale and retail collection sites to provide an incentive, such as a store coupon, to customers that drop off mercury thermostats.
2. Partner with waste-to-energy providers and other entities to finance a bounty for thermostat return.

STRATEGY 2:

Implement Supporting Policies in Businesses & Municipalities

Where it's been done (top voluntary programs): Maryland, North Dakota, Virginia, Wisconsin, Massachusetts, Minnesota

Coordinating organizations: State agencies (e.g., North Dakota Department of Health, Virginia Department of Environmental Quality, Wisconsin Department of Natural Resources, Massachusetts Department of Environmental Protection, Minnesota Pollution Control Agency), municipal and county government (e.g., City of Madison and Dane County, Wisconsin), public utilities

How it Works

State and local agencies can implement a number of policies that support mercury thermostat collection without mandating take-back program participation. These policies include:

- Landfill bans for mercury-containing thermostats¹ (ND, VA, WI)
- Sales ban for mercury products (MD, WI)
- Public utility policies requiring recycling of all thermostats recovered from customers' homes during programmable thermostat installation (MD)
- Requirements that demolition contractors implement a recycling plan for mercury thermostats (WI)
- Requirements for separating mercury products at waste-to-energy plants (MA)
- Requirements that mercury recycling questions are included on all HVAC licensing exams

These policies are implemented by individual organizations, state governments, and other entities. In 2010, the City of Madison implemented an ordinance requiring all parties seeking a demolition permit to submit a reuse and recycling plan for city approval. Within these plans, contractors must indicate how mercury thermostats and other recovered materials will be managed at the end of the project. Individual counties and waste management organizations in Wisconsin (e.g., Dane County) have also elected to ban mercury-containing products from landfills. In Maryland, Baltimore Gas and Electric's PeakRewards program includes an initiative to recycle mercury thermostats recovered from customers' homes during installation of new programmable thermostats through the TRC program.

¹ Many states exempt some entities from landfill bans. For example, in North Dakota, bans do not extend to household quantities. In Virginia, mercury thermostat disposal in landfills is only prohibited in localities that have implemented a thermostat recycling program.

Tips for Implementing it in Your State

A wide range of factors, from political climate to local government engagement, affect each city and state's capacity to pass policies to support mercury thermostat recovery. A model municipal demolition/remodeling ordinance that requires mercury thermostat recycling, including sample language to include in thermostat replacement or building demolition contracts, is available on PSI's website. Work with individual entities, such as public utility companies, private landfills, and agencies issuing demolition permits and contracts, to create policies and implement contract language for mercury thermostat recovery (e.g., that mercury thermostats recovered during 'swap-outs' or demolitions must be properly managed via the TRC program).

SUMMARY: Ways to Take Action

1. Support local and state policies that:
 - ban disposal of mercury thermostats
 - ban the sale and distribution of mercury thermostats
 - mandate collection by wholesalers and contractors, including a prohibition on leaving thermostats with residential and business customers
 - mandate responsible thermostat management as part of contractor licenses and construction, renovation, and demolition permits
 - include a responsible thermostat management clause in procurement and services contracts
 - require material separation plans that include mandatory mercury collection for waste-to-energy plants, landfills, and other potential disposal sites
2. Promote business and utility company policies that:
 - include a responsible thermostat management clause in procurement and services contracts
 - prohibit leaving thermostats with residential and business customers



STRATEGY 3:

Take Steps to Increase Convenience for Residents & Contractors

Where it's been done (top voluntary programs): Nebraska, South Dakota, Minnesota

Coordinating organizations: State agencies (Missouri Department of Natural Resources, Minnesota Pollution Control Agency), local government agencies (Hennepin County), local product stewardship organizations (Nebraska Product Stewardship Coalition), Covanta (waste-to-energy company)

How it Works

In all states, wholesalers, retailers, local government agencies, and select contractors are eligible to sign up to collect mercury thermostats through the TRC program. To sign up, these organizations pay a one-time \$25 collection bin cost. Agencies that cover the cost of a bin for new collection sites remove this barrier to entry, which can increase the number

of collection sites and make the program more convenient to residents and contractors. In Nebraska, for example, the Nebraska Product Stewardship Coalition (NEPSC) successfully added 50 new collection sites throughout the state as part of a fee-free sign up program and ongoing outreach to wholesalers and contractors. Through targeted outreach to fire departments and county health agencies, the Missouri Department of Natural Resources (DNR) successfully engaged nearly 50 sites spread across the state to collect thermostats. In Illinois (which has a law but also takes additional, state-driven actions to increase collections), the Illinois Environmental Protection Agency (IEPA) conducts in-person and postcard outreach to contractors and wholesalers, encouraging them to sign up for the program. Similarly, Minnesota Pollution Control Agency (MPCA) officials reached out to contractors and wholesalers by phone and mail to promote participation. To further increase resident and contractor convenience in Minnesota, Hennepin County worked with local stadiums to collect mercury thermostats during sports games, while Covanta offered collection bins to city offices. Municipal-run household hazardous waste (HHW) facilities also host thermostat recycling initiatives, funded by sponsors or as part of local government budgets.

Tips for Implementing it in Your State

The easier it is for wholesalers, retailers, local governments, and contractors to sign up for a collection bin, the more likely they are to do so. Fortunately, TRC has created online sign-up forms that allow these organizations to easily enroll in the program. Identify and reach out to potential collection sites via phone, email, and in-person visits. Provide ample opportunities for these sites to complete the sign-up form; during in-person visits encourage them to sign up on the spot and provide direct links to the form on your organization's website. If finances allow, offer to cover the one-time \$25 enrollment fee, which removes the predominant

barrier to entry and, if framed as a limited-time offer, can further galvanize programs to participate. Finally, voluntary programs can increase mercury thermostat collections by expanding channels for thermostat return. Seek out opportunities and partnerships to introduce thermostat drop-boxes at event venues (e.g., professional sports, conferences, and contractor/wholesaler trade association events) and city offices (with local governments partnering with waste-to-energy facilities and waste management companies) to further increase convenience to residents and contractors.



SUMMARY: Ways to Take Action

1. Conduct outreach to potential drop-off sites via phone, email, mail, and in-person activities.
2. Post the TRC sign-up form on your website.
3. Subsidize the \$25 sign-up fee for new collection sites.
4. Provide drop-boxes at events and city offices.

Strategy 4:

Reach out to Wholesalers, Contractors, Residents, & Other Stakeholders about Recycling Opportunities

Where it's been done (top voluntary programs): Missouri, Nebraska, South Dakota, Minnesota

Coordinating organizations: State agencies (Missouri Department of Natural Resources, Minnesota Pollution Control Agency, South Dakota Department of Environment and Natural Resources), local product stewardship organizations (NEPSC), local businesses, and HHW programs

How it Works

Once convenient collection infrastructure is in place (see Strategy 3), it is important to make sure that thermostat generators – including wholesalers, contractors, homeowners, retailers, construction and demolition companies, and architectural firms – are aware of drop-off sites in their communities. The South Dakota Department of Energy and Natural Resources (DENR) provides an interactive map of hazardous waste collection sites throughout the state to help residents easily identify nearby drop-off locations. In 2014, NEPSC members reached out to HVAC and plumbing contractors by phone, email, and postcards, sharing information about the TRC program. With the support of NEPSC, leaders of the Nebraska Plumbing, Heating, and Cooling Contractors Association (PHCC) shared information about thermostat recycling with its members during a statewide conference. HVAC wholesaler stores in South Dakota promoted the program to customers via mail and email, using free TRC promotional materials. Missouri DNR officials provided information about thermostat recycling to rural municipalities during workshops and conferences, encouraging them to follow up with residents to ensure proper management of mercury thermostats. In Minnesota, most municipal and county HHW programs have their own TRC collection bins and regularly promote the program to residents as part of regular hazardous waste outreach.

SUMMARY:

Ways to Take Action

1. Post a link to the TRC collection site locator tool and/or a list of nearby thermostat drop-off locations on your website.
2. Encourage contractor associations to promote the program to their members.
3. Ask drop-off sites to display promotional materials within their facilities.
4. Include a list of mercury thermostat collection sites in regular mailings to residents.
5. Print flyers from the TRC promotional toolkit or create your own, and have them available at community events.



Tips for Implementing it in Your State

TRC's website includes a collection site locator tool, which residents, contractors, and other generators can use to identify nearby thermostat drop-off points. Make sure that this link is easily accessible on waste management pages of local websites, or use the tool to create a full list of drop-off sites within your town. At the state level, designate a specific webpage of the environmental agency to mercury management, with information about existing thermostat drop-off sites and other programs offered by local governments, TRC, waste-to-energy facilities, utilities, and others. To strengthen outreach efforts, successful voluntary programs actively seek opportunities to promote responsible mercury management, including providing information at community events and contractor association meetings, placing reminders in local newsletters, reaching out to contractors by phone, and sending information via postcards and email to key organizations and individuals. TRC's free "Promotional Toolkit" includes a variety of flyers, brochures, and other materials government agencies and other stakeholders can use to promote collection opportunities. A few of Oklahoma's public utility companies (electricity and natural gas providers) provide information about thermostat recycling as part of their monthly fliers and customer "welcome" packets.

Strategy 5:

Educate Key Stakeholders about the Importance of Mercury Thermostat Recovery

Where it's been done (top voluntary programs): Maryland, Michigan, Missouri, Nebraska, South Dakota, Wisconsin, Virginia, Massachusetts, Minnesota

Coordinating organizations: State agencies (Nebraska Department of Health and Human Services, Wisconsin Department of Natural Resources), local product stewardship organizations (NEPSC), local businesses, HHW programs, and public utilities

How it Works

Education plays an essential role in the success of voluntary programs, not just in terms of providing information, but also in maintaining momentum to sustain program operations and participation. There is a significant need for ongoing reminders regarding the hazards of mercury and the importance of removing mercury from the waste stream. Public utility companies in Missouri remind customers that mercury thermostats are hazardous waste and provide clear disposal instructions. MassSave, a utility-sponsored initiative in Massachusetts that provides rebates for energy efficient thermostats, reminds residents of the proper steps for disposing of mercury-containing older models. In South Dakota, local HHW facilities and businesses that accept mercury thermostats put out radio advertisements and fliers about the importance of safe disposal. The companies also have information available on their websites

about the types of services that they provide, including collection events. Similarly, state and local agencies in Wisconsin, Minnesota, and Nebraska provide clear information and printable fact sheets about the importance of safe mercury thermostat management on their webpages. In several states, Covanta has stepped in to circulate information about safe mercury management, using local TV channels and news outlets to reach out to residents about recycling opportunities. Finally, in Illinois, thermostat recycling information is included on state asbestos and open burning permits to ensure that agencies working in dilapidated buildings know how to properly manage any mercury thermostats they encounter.

Tips for Implementing it in Your State

Use educational resources, including municipal websites, local media/newsletters, and direct mailings, to highlight to residents the environmental and public health benefits of recycling mercury thermostats. Partnerships between public agencies and private entities can help widen the reach of educational messaging. Key facts include:

- Mercury is an extremely potent neurotoxin.
- If mercury thermostats are sent to the landfill, mercury can leak out into the environment, contaminating our air, water, and land.
- Human exposure to mercury through food and air can affect the nervous system, cause kidney and liver damage, and impair child development.
- Each mercury thermostat can contain the mercury equivalent of approximately 1,000 compact fluorescent bulbs.

Make sure that this information reaches key entities that come in contact with mercury thermostats, including HVAC and demolition contractors, homeowners, and utility companies. Include pictures and instructions to help residents identify mercury-containing thermostats and provide repeated reminders using various media channels.

See this fact sheet from Central Contra Costa Sanitary District in California and the Product Stewardship Institute, Eau Claire Wisconsin, and Nebraska Department of Health and Human Services webpages for sample language. For additional mercury recovery resources see the U.S. EPA's webpage on mercury management.

SUMMARY: Ways to Take Action



1. Post key facts about the importance of mercury management on your website.
2. Provide mercury management information and instructions in local mailings to residents and businesses.
3. Ensure that all municipalities within your state have information about mercury management on their websites.
4. Encourage contractor associations to inform their members about the risks of improper mercury disposal.

