

A Report to the Legislature
on
Mercury-added Thermostat Recycling
in
New Hampshire

RSA 149-M:59-a Mercury-Added Thermostat Collection Program

November 1, 2010

New Hampshire Department of Environmental Services





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November 1, 2010

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Table of Contents

Title	Page
I. Executive Summary	3
II. Background	4
III. Results and Conclusions	5
IV. Goals and Recommendations	6
Appendix A - 149-M:58-a Mercury-Added Thermostat Collection Program	9
Appendix B - NH Mercury Thermostat Recycling Results from 2001 to 2009	11
Appendix C - Methods to Determine End-of-Service Mercury Thermostats Available for Recycling in New Hampshire	12

A Report to the Legislature

as required by

RSA 149-M:58-a Mercury-Added Thermostat Collection Program

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I. Executive Summary

Beginning July 1, 2008, RSA 149-M:58-a (Appendix A) established requirements and responsibilities to ensure mercury-added thermostats are properly collected and recycled. Under this law, thermostat manufacturers are required to create and implement an outreach and education program and set up a manufacturer-funded collection, transportation and recycling infrastructure. Additionally, electrical wholesalers are required to act as a collection site for out-of-service thermostats and the Department of Environmental Services (DES) is charged with monitoring progress of recycling infrastructure development, assisting with an outreach and education component, determining success of the program and providing a report to the Legislature.

Organized in 1997 and funded by thermostat manufacturers Honeywell, White-Rogers and General Electric, the Thermostat Recycling Corporation (TRC) created a mercury thermostat recycling infrastructure to allow for the collection, transportation and recycling of out-of-service mercury thermostats manufactured by the funding corporations. From 2000 through 2008 DES promoted TRC's recycling infrastructure as a voluntary program and during that time period, 14 electrical wholesalers agreed to participate, accepting out-of-service thermostats from electrical contractors and homeowners. Following adoption of RSA 149-M:58-a and similar laws in Maine, Vermont and Iowa, most remaining thermostat manufacturers joined TRC and relied on TRC outreach and infrastructure to meet their obligations under the law. TRC members now account for more than 97 percent of all thermostats being recovered for recycling, although the TRC recycling program accepts thermostats from any manufacturer.

In February 2009, DES approved TRC's outreach and recycling program proposal as required by RSA 149-M:58-a. At the same time, DES and TRC began an outreach and education program focused on electrical wholesalers, contractors, municipal facilities, residents and retail stores. Following those efforts, 56 electrical wholesalers now accept mercury thermostats for recycling and in 2009, TRC recycled 790 thermostats containing a total of 5.2 pounds of mercury, which represents a 45 percent increase from 2008 when 546 thermostats containing 4.3 pounds of mercury were recycled (Appendix B). Although the 2009 results are encouraging, it is unclear whether the increased outreach and recycling infrastructure availability provided under RSA 149-M:58-a will result in continued increases in the annual number of thermostats collected and recycled, nor is it clear if the numbers of thermostats collected and recycled represent a significant portion of the total available out-of-service thermostats destined for disposal. Due to the length of time required to implement a recycling program like this, it is DES's recommendation that the existing TRC outreach and education program be allowed to run for an additional year in order to determine if the number of thermostats collected continues to increase and whether the program is capturing a reasonable percentage of the available end-of-service thermostats.

II. Background

Mercury

Mercury is a persistent, bioaccumulative, toxic pollutant. Unlike other toxic chemicals such as pesticides and dioxin, mercury does not break down into simpler, less toxic components. Exposure to mercury can cause numerous harmful effects in birds, mammals and humans, including neurological problems, neuromuscular effects, kidney problems and cardiovascular diseases. As a bioaccumulative chemical, even small amounts of mercury released into the environment can accumulate in the sediments of water bodies where they are ingested by plants, animals and fish, build up in their tissues and are passed up the food chain into humans. As a result, mercury contamination in the environment is a significant public health and environmental problem. Mercury contamination is so widespread and serious that all 50 states including New Hampshire have a fish consumption warning due to their mercury levels. Along with most states, the Food and Drug Administration (FDA) has issued advisories for pregnant women, women who may become pregnant, nursing mothers and young children to avoid consumption of some types of fish and to eat fish and shellfish that are known to be lower in mercury.

Mercury Reduction Efforts

In 1998, DES adopted the *New Hampshire Mercury Reduction Strategy* (Strategy) that proposed 40 specific activities to meet the Strategy's goals of 50 percent reduction of all human mercury sources by 2003 (which was achieved) and the eventual goal of the elimination of all human sources of mercury. The Strategy noted there were three major sources of mercury in New Hampshire: global background levels from volcanoes and forest fires; out-of-state sources, including mid-western fossil-fuel power plants; and in-state sources such as municipal waste combustors, fossil-fuel power plants and waste water treatment plant discharges. As a mercury source, municipal waste combustors emit mercury during the normal combustion of solid waste containing discarded mercury-added products like thermometers, thermostats and fluorescent lamps. Although the Strategy recommended the installation of emission control devices on municipal waste combustors and power plants, it also recognized the importance of pollution prevention strategies, that is, the elimination of sources of mercury in the waste stream before incineration or disposal.

In 1997, New Hampshire's municipal waste combustors' estimated mercury emissions were 622 pounds and the state's power plants discharged an estimated 328 pounds of mercury. Since then, the State's largest municipal waste combustors (Wheelabrator Claremont and Wheelabrator Concord) have installed activated carbon injection removing up to 96 percent of the mercury and the New Hampshire Legislature has enacted a bill to require the state's coal-fired power plants to install mercury controls by 2013. Currently, mercury thermostats and fluorescent lamps represented the two largest sources of mercury in the State's solid waste stream.

In addition, DES, working closely with the Legislature, has focused on the elimination of mercury-added products, including thermostats, from the solid waste stream. These efforts included the 2001 passage of RSA 149-M:53 that prohibited the sale of certain mercury products, including fever thermometers and "novelty items" (toys, games, ornaments), and banned the use and purchase of mercury in schools; and the 2007 passage of amendments to RSA 149-M:53 that prohibited the sale of most mercury-added measuring devices, thermometers (other than fever), switches, relays and thermostats. In addition, the legislature also enacted RSA 149-M:58 in 2007, that bans the disposal of all mercury products, including thermostats, in solid waste. In 2008 the legislature enacted a mandatory thermostat recycling program, described below.

Thermostats

Mercury-added thermostats use internal mercury tilt switches to control room temperature in heating, ventilating and air conditioning (HVAC) equipment. Mercury thermostats contain a coiled, bi-metal strip that expands and contracts (coils and uncoils) with changes in room temperature. As the strip moves, it tilts an attached glass ampoule containing mercury, causing the mercury to flow onto electrical contacts, closing a circuit and turning on the HVAC equipment. Non-mercury bi-metal thermostats have existed as long as mercury thermostats and work in the same fashion as mercury thermostats with the difference that non-mercury thermostats simply have two metal tabs that close or open as the bi-metal strip moves, completing or breaking the circuit. The disadvantage of non-mercury thermostats is the metal tabs may become corroded relatively quickly, resulting in a shorter lifespan. Over the past two decades, manufacturers developed digital thermostats which are long-lived and accurate replacements for mercury thermostats.

The average mercury thermostat contains about 3 grams of mercury, compared to a fever thermometer that has about 1 gram and a four-foot fluorescent lamp that contains about 20 milligrams (0.02 grams). If estimates are accurate, discarded mercury thermostats represent between 53 and 112 pounds of mercury being discarded as solid waste. In comparison, New Hampshire generates an estimated 2.6 million spent fluorescent lamps per year, representing about 114 pounds of mercury.

Thermostat Collection & Recycling

From 2001 through 2008, DES promoted thermostat recycling by purchasing and providing TRC recycling bins to volunteering electrical wholesalers and municipal recycling facilities. During this time DES also provided stakeholder outreach and education to raise awareness of mercury issues and to promote thermostat recycling. By 2008, however, it was determined that additional effort was needed to increase the thermostat recycling rate, and DES worked with the legislature to draft and enact RSA 149-M:58-a, which requires each thermostat manufacturer to develop or provide a manufacturer-funded thermostat collection and recycling program as well as outreach and education to increase thermostat recycling. This law also requires electrical wholesalers to serve as collection points for out-of-service thermostats and to provide information to contractors about the recycling program.

The statute became effective on July 11, 2008, and through the fall of 2008, DES contacted thermostat manufacturers to inform them of their legal responsibilities. Since TRC already had a collection and recycling infrastructure in operation, the vast majority of thermostat manufacturers joined TRC, allowing them to take advantage of TRC “services” to meet their legal obligation. The few remaining manufacturers who didn’t join the TRC program sold only a very limited number of specialty thermostats in New Hampshire (less than 10), and agreed to contact each customer offering to take the thermostats back for recycling when their service lifespan ended. Throughout 2008 and 2009, TRC and DES cooperatively provided outreach and education to HVAC wholesalers, contractors, residents, municipal programs and retail stores, providing recycling bins, training and outreach materials. At the beginning of 2009, 14 wholesalers were voluntarily collecting thermostats, but by the end of 2009, 56 wholesalers were offering the service.

III. Results and Conclusions

On February 22, 2010, TRC issued the first *Annual Report; Thermostat Recycling Corporation* as required by RSA 149-M:58-a. In this report, TRC indicated that in 2009, 790 thermostats and mercury switches were recovered for a total of 7.96 pounds of mercury. This number represents a 45 percent increase over the 546 thermostats collected in 2008 and the weight represents an 83 percent increase over the 4.3 pounds collected in 2008. Because TRC accepted mercury switches and other mercury-added products that were improperly added to the thermostat bins, a total of 7.96 pounds of mercury were collected, although at 3 grams of mercury per thermostat, about 5.2 pounds of the collected mercury would be of thermostat origin.

The ideal measures of success would be to determine if, in 2009, the TRC program captured a major portion of available out-of-service thermostats or if it has dramatically increased the annual number of available thermostats captured since collections first began in 2001. Since thermostat recycling first started in the late 1990s, states have struggled to establish an accurate methodology for determining their recycling program's level of success. Although some measures of success such as changes in the number of recycling locations established and number of recycling bins in use each year are easy to determine, most states prefer to consider the actual thermostat recycling rate, that is, the total number of thermostats recycled compared to the total number of end-of-service thermostats estimated to be available for recycling each year, as the best success indicator.

While TRC annually tracks and reports the number of thermostats and pounds of mercury recycled per state, it is difficult to determine the total number of end-of-service thermostats available for recycling each year. This is because there are several unknown factors affecting that number:

1. How many thermostats are in use?
2. How many thermostats are in residential use versus commercial use?
3. What is the lifespan of a thermostat?
4. How many thermostats are removed from use and discarded each year?
5. How many of the discarded thermostats contain mercury?

Since 1999, several attempts have been made to answer these questions and quantify the number of thermostats available for recycling. These methodologies have been applied to New Hampshire (Appendix C) with the results indicating that the estimated number of thermostats available for collection ranges from roughly 8,000 to 17,000 per year. At even the smallest estimated number available thermostats, New Hampshire's collection and recycling of 790 thermostats in 2009 represents a recycling rate of less than 1 percent. It should be noted that most of the assumptions used in developing those numbers have not been verified by actual measurement but instead represent a reasonable estimate by experts. Although there have been some pilot studies conducted in an attempt to verify assumption estimates, they are inconclusive because of the small population studied or because the results were not applicable to New Hampshire due to geographical, population, climate conditions.

Because it may be inaccurate at this time to use existing methods of determining New Hampshire's thermostat recycling rate, DES considered alternate methods of measuring program success. Appendix B – NH Mercury Thermostat Recycling Results from 2001 to 2009 Table 1 - shows the number of thermostats collected, each year. As the line graph in Table 2 indicates, there was a steady, gradual increase in the number of thermostats collected each year before the TRC program was implemented. Although the 2009 45 percent increase in the number of thermostats collected compared to 2008 is encouraging, it should be noted that prior to implementation of TRC's outreach program, New Hampshire

realized an average increase of 30 percent in the number of thermostats collected annually since 2001. As another method of measurement, DES compared New Hampshire's capture ratio, that is, the number of thermostats collected per 1,000 population, to similar programs in Iowa, Vermont, Maine and Iowa. These states have similar legislation to RSA 149-M:58-a although two states, Vermont and Maine, have legislation that also include the requirement for a manufacturer-funded per-thermostat rebate for the return of out-of-service thermostats. As shown in Appendix B, Table 3 – "States with Legislated Recycling: Thermostats collected per 1,000 residents in 2009," New Hampshire achieved a collection rate of 0.6 thermostats per 1,000 residents in 2009. In comparison, Iowa, which also does not have a rebate, achieved a collection rate of 1.0 thermostats per 1,000 residents while Maine and Vermont, whose legislation includes a rebate requirement, achieved collection rate of 4.8 and 2.2 thermostats per 1,000 residents, respectively.

IV. Goal and Recommendations

RSA 149-M:58-a V.(e) requires DES to establish a goal for the collection of thermostats. Such a goal might specify a minimum recycling rate (the number of thermostats collected versus the number or end-of-service thermostats available). However, there are many variables in calculating the number of end-of-service thermostats making it difficult to develop an accurate estimate at this time. Further, neither DES or its partners has the resources to quantify the variables that would allow for a more accurate estimate.

DES believes it is reasonable to expect that the number of thermostats collected should at least be consistent with other states that have adopted thermostat recycling legislation. As noted in Appendix B, Table 3 – "States with Legislated Recycling: Thermostats collected per 1,000 residents in 2009," at less than 1 thermostat per 1,000 residents being recovered New Hampshire currently has the *lowest* collection rate of any comparable state. Considering Maine's rate of 4.8 per 1,000 residents and Vermont's rate of 2.2 per 1,000 residents, DES believes, for calendar year 2011, that a doubling of New Hampshire's present collection rate of 0.6 thermostats per 1,000 residents to 1.2 per 1,000 residents is achievable.

To increase the numbers of thermostats collected annually, TRC's present outreach and education plan must be aggressive. TRC and DES should develop, continue or increase outreach and education strategies focusing on wholesalers, contractors, retailers, residents, municipalities and other stakeholders, as appropriate. These strategies should include:

1. **Wholesalers** – DES should ensure all wholesalers are acting as collection points for end-of-service thermostats as required by RSA 149-M:58-a. TRC should provide outreach and education information wholesalers can provide to contractors as well as a poster advising customers to save and recycle mercury-added thermostats at that location. DES should also work with TRC to develop additional outreach information for both wholesalers and contractors.
2. **Contractors/Technicians** – DES should work with state plumbing and electrical licensing boards to ensure HVAC contractors are familiar with their responsibility to collect and recycle out-of-service thermostats. TRC should work with trade associations providing information for newsletters and other association outreach media and at conferences such as NH Plumbing and Mechanical Contractors Association conference to ensure thermostat recycling information is provided to local HVAC contractors. TRC should also provide a direct, individual mailing of thermostat information to all New Hampshire licensed plumbers and electricians.

3. **Retailers** – Although RSA 149-M:50-a does not specifically require retailers to serve as thermostat collection points or provide consumer information, we believe these strategies should be pursued. TRC should contact home retail chains like Ace Hardware and TrueValue and seek their cooperation in providing information to thermostat purchasers. This information should consist of a “cling sticker” or “peg talker” that would appear where thermostats are displayed. DES should investigate whether “big box” stores like The Home Depot and Lowe’s that sell directly to contractors fall within the definition of “wholesaler” and if so, require their participation in the TRC program.
4. **Residents** – TRC should continue its advertising program in both national and regional press. DES should promote thermostat recycling by providing outreach and educational information to Household Hazardous Waste Coordinators, at homeowner events such as the Made in New Hampshire annual show and through press releases, fact sheets, etc.
5. **Municipalities** – DES should inspect municipal solid waste recycling and solid waste facilities to ensure they are complying with New Hampshire’s ban on solid waste disposal of mercury-added products and that participating municipal facilities are properly collecting and recycling thermostats along with other mercury-added products. DES should also use programs such as the Solid Waste Facility certification program to promote the TRC collection program among municipal facility operators and managers. Finally, TRC should provide educational materials, such as a large poster, that municipal recycling and solid waste facilities may display, informing customers about the need to recycle mercury-added thermostats and products.

Additional Recommendations

1. DES will continue to monitor and participate in national efforts to develop a more accurate thermostat recycling methodology and apply that methodology as appropriate.
2. Based on the results of 2010-2011 collection data, DES will consider changes to the thermostat recycling program, including possible legislative recommendations, prior to the 2012 legislative session.

Appendix A – 149-M:58-a Mercury-Added Thermostat Collection Program

I. (a) Each manufacturer of mercury-added thermostats sold in New Hampshire shall, individually or collectively, establish and maintain a department-approved collection and recycling program for out-of-service mercury-added thermostats from contractors, service technicians, and residents. For the purpose of this section, ""manufacturer" means the holder of the brand name of the thermostat.

(b) Such program shall:

- (1) Strive to maximize the capture and recycling rate of out-of-service mercury-added thermostats.
- (2) Provide assistance and education to contractors, service technicians, residents, and municipalities to encourage the return of mercury-added thermostats to established recycling collection points.
- (3) Ensure that the handling and recycling of mercury-added thermostats is performed in accordance with applicable laws.

(c) The program shall involve no direct cost to wholesalers, contractors, service technicians, or residents for participating in the program, except that wholesalers and contractors may be assessed a one-time administrative fee not to exceed \$25 for each authorized collection bin provided for their own use.

(d) Thermostat collection bins shall be provided to all wholesaler locations, and to all household hazardous waste, solid waste, and universal waste locations approved by the department for this purpose.

(e) The department may specify minimum safety training, operating conditions, and other requirements as needed to ensure the safe and efficient collection of mercury-added thermostats at household hazardous waste and universal waste facilities.

II. The program shall be operational 6 months after the effective date of this section.

III. (a) Each manufacturer, individually or as a group, shall propose to the department for review and approval the collection program required under paragraph I, no later than 3 months after the effective date of this section.

(1) The proposed program may be a new program or include appropriate enhancements to an existing program.

(2) The proposed program shall include an education and outreach component that identifies the mechanisms for providing the necessary information to contractors, service technicians, residents, retailers, and municipalities on an initial and ongoing basis, and identifies the appropriate persons to develop and utilize such mechanisms. Such mechanisms may include, but shall not be limited to, public service announcements, written materials, signage, and visual aids.

(b) If the program proposal is approved, with or without conditions, the manufacturer shall implement the program by the date required in paragraph II.

(c) If the entire program is disapproved, the department shall inform the manufacturer of the reasons for the disapproval. The manufacturer shall have 30 days thereafter to submit a new program.

(d) If the new program is disapproved, the manufacturer shall be out of compliance for the purposes of paragraph IV beginning on the date the new program is disapproved by the department, if that date is later than the implementation date specified in paragraph II.

(e) The department shall take into account the experience of relevant thermostat collection programs in other states, and shall approve a proposed manufacturer collection program if it contains terms and conditions sufficient for the department to conclude that the proposed program represents the best available approach for improving mercury-added thermostat collection in this state.

(f) The department shall provide opportunities for stakeholders, including representatives from wholesalers, contractors, retailers, and environmental groups to provide input into the development and implementation of the collection program, including opportunities prior to the submission of the initial proposals.

IV. A manufacturer not in compliance with this section is prohibited from offering any thermostat for sale in this state.

V. (a) Effective 6 months after the effective date of this section, a wholesaler shall not sell a thermostat in the state unless the

wholesaler acts as a collection site for thermostats that contain mercury. A wholesaler may meet the requirements of this paragraph by participating as a collection site in a manufacturer collection program described in paragraph I.

(b) A wholesaler shall distribute point-of-sale instructions, educational materials, and signage regarding the importance of recycling mercury-added thermostats.

(c) No wholesaler or retailer shall offer for sale in this state any thermostat of a manufacturer that is not in compliance with this section.

(d) A retailer may be required to facilitate the resident recycling program by:

(1) Distributing manufacturer provided, pre-paid mailing labels.

(2) Distributing manufacturer provided, educational materials.

(3) Posting signage regarding the importance of recycling mercury-added thermostats and the location of available collection locations for residents.

(e) The department shall set goals for the collection of thermostats within 4 months of the date of the first annual report of the manufacturer's program. In determining such goals, the department shall review and determine a percentage of thermostats, which may be more or less than the actual number reported in the annual program, to establish the next year's goal. The department may also obtain input from interested stakeholders, including but not limited to, manufacturers, non-governmental entities, municipalities, and the recycling community.

(f) The department may alter any element of the previously developed manufacturer collection program, including but not limited to, the number and location of the collection points and the roles of thermostat manufacturers, wholesalers, retailers, service contractors, and municipal governments in the collection programs, provided such alterations are consistent with the requirements of this and other applicable laws.

VI. (a) Beginning July 1, 2008, the installation of mercury-added thermostats is prohibited.

(b) Beginning July 1, 2008, any mercury-added thermostat removed as a result of new construction, renovation, maintenance installation of a new heating or cooling system, or any similar activity shall be recycled or disposed of as hazardous waste. Any contractor or service technician performing such removal shall be responsible for removing the thermostat from the premises and properly recycling or disposing of the thermostat.

VII. (a) For each collection program established under this section, the manufacturer associated with that program shall submit an annual report to the department, by a date to be determined by the department, that includes at a minimum:

(1) The number of mercury-added thermostats collected and recycled by that manufacturer under this section during the previous year.

(2) The estimated total amount of mercury contained in the mercury components collected by that manufacturer under this section.

(3) An evaluation of the effectiveness of the manufacturer's collection and recycling program.

(4) An accounting of the administrative costs incurred in the course of administering the collection and recycling program developed under this section.

(b) The department shall publish information on its Internet website about the collection and recycling of mercury-added thermostats in the state. This information shall be updated annually and shall include an estimate of how many mercury-added thermostats go out of service in the state each year, a description of the collection programs established under this section, and data on collection rates.

(c) The department shall review the progress of each program and submit a report to the general court by November 1, 2010. The report shall include an assessment of whether the program goals are being met, an assessment of whether any further requirements for retailers, or discounts, savings coupons, or similar programs, should be implemented, and a proposal for any other adjustments that may be required to ensure that the thermostat recycling program is effective. Prior to submitting the report, the department shall consult with all relevant stakeholders and provide a public comment period.

Source. 2008, 383:1, eff. July 11, 2008.

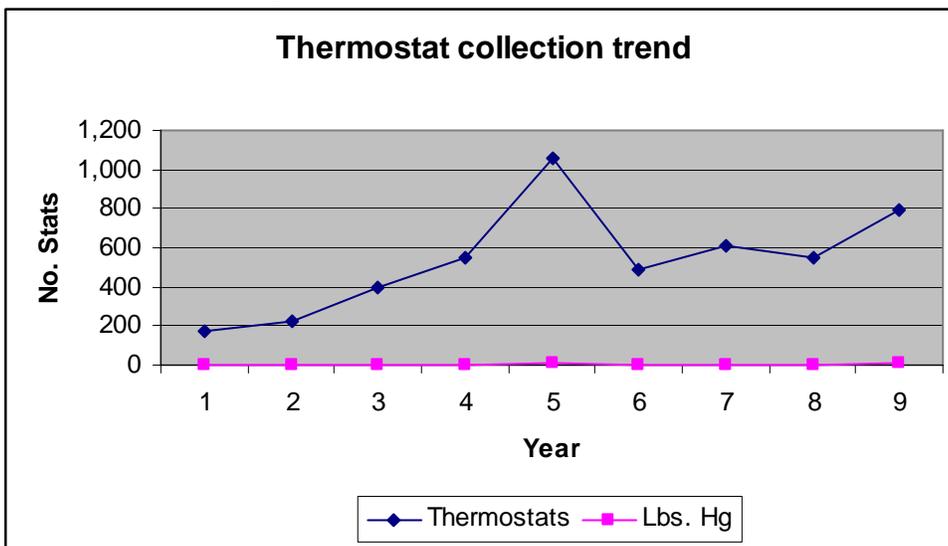
Appendix B – NH Mercury Thermostat Recycling Results from 2001 to 2009

Table 1 – New Hampshire Thermostats collected through TRC Recycling Program

Year	Thermostats Collected	Pounds of Mercury
2001	173	1
2002	226	2
2003	398	3.5
2004	545	4
2005	1,053	7.9
2006	484	3.9
2007	615	4.8
2008	546	4.3
2009	<u>790</u>	<u>5.2</u>
Total	4,830	36.6

Note: The 2005 collection spike is due to a summer intern contacting individual wholesalers and reminding them to ship full TRC bins.

Table 2 – New Hampshire Thermostat Collection Trend



Note: The 2005 collection spike is due to a summer intern contacting individual wholesalers and reminding them to ship full TRC bins.

Table 3 – States with Legislated Recycling: Thermostats collected per 1,000 residents in 2009

State	Rebate	# Stats	Population	Stats/1,000 Pop.
Maine	Yes	6,374	1,318,301	4.8
Vermont	Yes	1,367	621,760	2.2
Iowa	No	2,983	3,007,856	1
New Hampshire	No	790	1,324,575	0.6

Appendix C – Methods to Determine End-of-Service Mercury Thermostats Available for Recycling in New Hampshire

1. Product Stewardship Institute (PSI); *How Many Mercury Thermostats are Available for Collection in Your State; July 29, 2010 draft.*

Frost & Sullivan report; *North American HVAC Thermostat Markets*; 2003:

8,260,560 residential replacement thermostats sold in US in 2003
1,948,320 commercial replacement thermostats sold in US in 2003
10,209,880 total replacement thermostats sold in US in 2003

US 2009 population = 307,006,550 (US Census Bureau)

NH 2009 population = 1,324,575 (US Census Bureau)

NH population = 0.4% of total US population

0.4% of 10,209,880 total thermostats = 43,229 replacement thermostats sold in NH in 2003

Number of mercury thermostats replaced: Massachusetts contractor survey – April through June, 2010 revealed 40% of removed thermometers contained mercury.

43,229 NH replacement thermostats x 40% = **16,891 Hg thermostats available for recycling per year.**

2. Maine Land & Water Resources Council; *Labeling and Collection of Mercury Added Products report to Joint Standing Committee on Natural Resources, 119th Maine Legislature; January 1, 1999.*

Calculation Assumptions:

- Thermostats have a 35 year lifespan
- There are 1.5 thermostats per average housing unit
- There are 1.25 thermostats per average commercial building
- 83% of all thermostats contain mercury (field checked at 40% in Mass. study)
- There are 3 grams of mercury per average thermostat

NH Dept. of Employment Security; Economic & Labor Market Information Bureau; *2010 Vital Signs*:

NH has 600,090 housing units x 1.5 thermostats per housing unit = 900,135 thermostats
x 40% mercury thermostats = 360,054 mercury thermostats
x 35 year life span = 10,287 out-of-service mercury thermostats

NH has 35,065 businesses x 1.25 thermostats per business = 43,831 thermostats
x 40% mercury thermostats = 17,352 mercury thermostats
x 35 year life span = 495 out-of-service mercury thermostats

10,287 residential thermostats + 495 commercial thermostats = **10,782 Hg thermostats available for recycling per year.**

3. Northeast Waste Management Officials Association (NEWMOA) – Review of Thermostat Recycling Corporation Activities in the Northeast; 2001

Method 1 – Used to Estimate the Number of Mercury Thermostats Discarded Annually in the Northeast – U.S. EPA Risk Reduction Engineering Laboratory study; May 1994, stated that “thermostat manufacturers estimate 2 to 3 million thermostats are brought out of service each year” and that “90% of the thermostats contained a mercury switch.”

Based on U.S. population 2 million switches = 6.4 switches per 1,000 population.

NH population 1,235,786 x 6.4/1,000 = **7,910 out-of-service mercury thermostats available for recycling per year.**

Method 2 – Used to Estimate a Potentially Achievable Goal for Annual Mercury Thermostat Collection in the Northeast. Based on capture ratio of successful collection projects in Minnesota and Florida:

Hennipin County, Minn. – 5,700 thermostats collected per 2,800,00 population = 2.0 per 1,000

Pinellas County, Fla. – 4,800 thermostats collected per 3,500,000 population = 1.4 per 1,000

To achieve similar results in New Hampshire:

NH population 1,235,786 x 2.0/1,000 = **2,472 out-of-service mercury thermostats**

NH population 1,235,786 x 1.4/1,000 = **1,730 out-of-service mercury thermostats**

Note: Method 2 figures represent thermostats collected for recycling by other state programs, not the total number available for collection, but could serve as a comparison New Hampshire’s collection rate as well as other states’ rates.