



January 2017



Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**

**A Report on the
Effectiveness of the
Connecticut Mercury
Thermostat Collection
Program**



Statutory Language

Section 22a-625a (f)(2) Not later than January 1, 2017, the department, in accordance with section 11-4a, shall submit a report to the joint standing committee of the General Assembly having cognizance of matters relating to the environment concerning the effectiveness of the manufacturer mercury thermostat collection and recycling programs established pursuant to this section. Such report shall be based, in part, on the reports submitted by manufacturers to the department pursuant to subsection (b) of this section and shall include recommendations for any revisions to such programs, including, but not limited to, any necessary statutory revisions and any recommendations concerning the repeal of such programs.

I. Background

In 1998, after identifying the northeast as having particularly high rates of mercury deposition, the Environmental Protection Agency developed a *Road Map for Mercury* which outlined a plan for reducing mercury exposure and emissions. One of the strategies was to address the use of mercury in products, including thermostats. Connecticut joined with other northeast states to pass comprehensive mercury product legislation called the Mercury Education and Reduction Act (2002). As a result of this act, Connecticut was the first state in the nation to ban the sale of many products containing mercury, including thermostats in 2004.

The Thermostat Recycling Corporation (TRC) started a voluntary program to collect and process mercury containing thermostats in 1998. Under this program, thermostat manufacturers established a collection and recovery program for discarded mercury thermostats. The TRC provided electrical wholesalers a suitable storage container and allowed contractors to return mercury thermostats to participating wholesalers at no charge. In 2014, when Connecticut adopted Section 22a-625a requiring manufacturers to participate in a program to accept and recycle mercury thermostats, the TRC program went from voluntary to mandatory.

This legislation required the Department of Energy and Environmental Protection (DEEP) to submit a report to the environment committee on the effectiveness of the TRC program and suggest any changes to improve the program. To determine the effectiveness of the TRC program, and look at ways to improve recovery rates, DEEP considered:

- a.) Annual reports submitted by the Thermostat Recycling Corporation;
- b.) The recovery rates in Connecticut in comparison to other northeast states;
- c.) Interviews with participating wholesalers and contractors obtained from site visits;
- d.) Discussions with states with the highest recovery rates;
- e.) An estimate of the amount of thermostats still in use in Connecticut; and
- f.) An estimate of the amount of thermostats discarded each year.

II. What We Are Collecting

The Thermostat Recycling Corporation (TRC) provides an annual report of the number of thermostats TRC collects through their program. The program began in Connecticut in 1998 as a voluntary program. Connecticut's collection rates have always been historically below average but this report will focus on collection rates since the law passed in 2014 mandating participation in this program. Table 1 below indicates the collection rates for Connecticut for 2012 through 2015 in comparison to the other New England states. While the collection rate in Connecticut has increased by 84% since the onset of the mandatory program, the initial collection rate was comparatively low and remains the lowest in New England.

TRC reports the number of whole, intact thermostats collected on an annual basis. Although it is discouraged, some contractors remove the ampoule of mercury from the thermostat and drop off the ampoule only. Since some thermostats contain two ampoules and some contain just one, TRC provides data on whole thermostats and ampoules separately. In 2015 for example, TRC reported collecting 3,395 whole thermostats and the equivalent of 3,865 thermostats if loose ampoules are included.¹ The total amount of mercury collected from these thermostats equaled 30 pounds. For purposes of comparing Connecticut's rate of collection with other states, TRC uses a metric of the number of thermostats collected per 10,000 of population.

Table 1. Collection rates for all New England States 2012 – 2015²

	2012	2013	2014	2015
Maine	50.1	31.6	32.6	34.3
Vermont	48.4	33.7	34.7	31.9
Rhode Island	12.7	19.5	25.3	21.0
New Hampshire	18.0	13.5	14.1	19.9
Massachusetts	2.7	9.6	9.1	11.6 ³
Connecticut	5.1	4.4	6.9	9.4
USA avg.				7.9 ⁴

Thermostats collected per 10,000 residents from TRC annual reports

While Connecticut's rate may be above the national average, it is the lowest in New England. When looking at the national average it is important to note that only 13 states have mandatory laws similar to Connecticut. Of those 13, Connecticut was ranked eighth in collection rate in 2015.

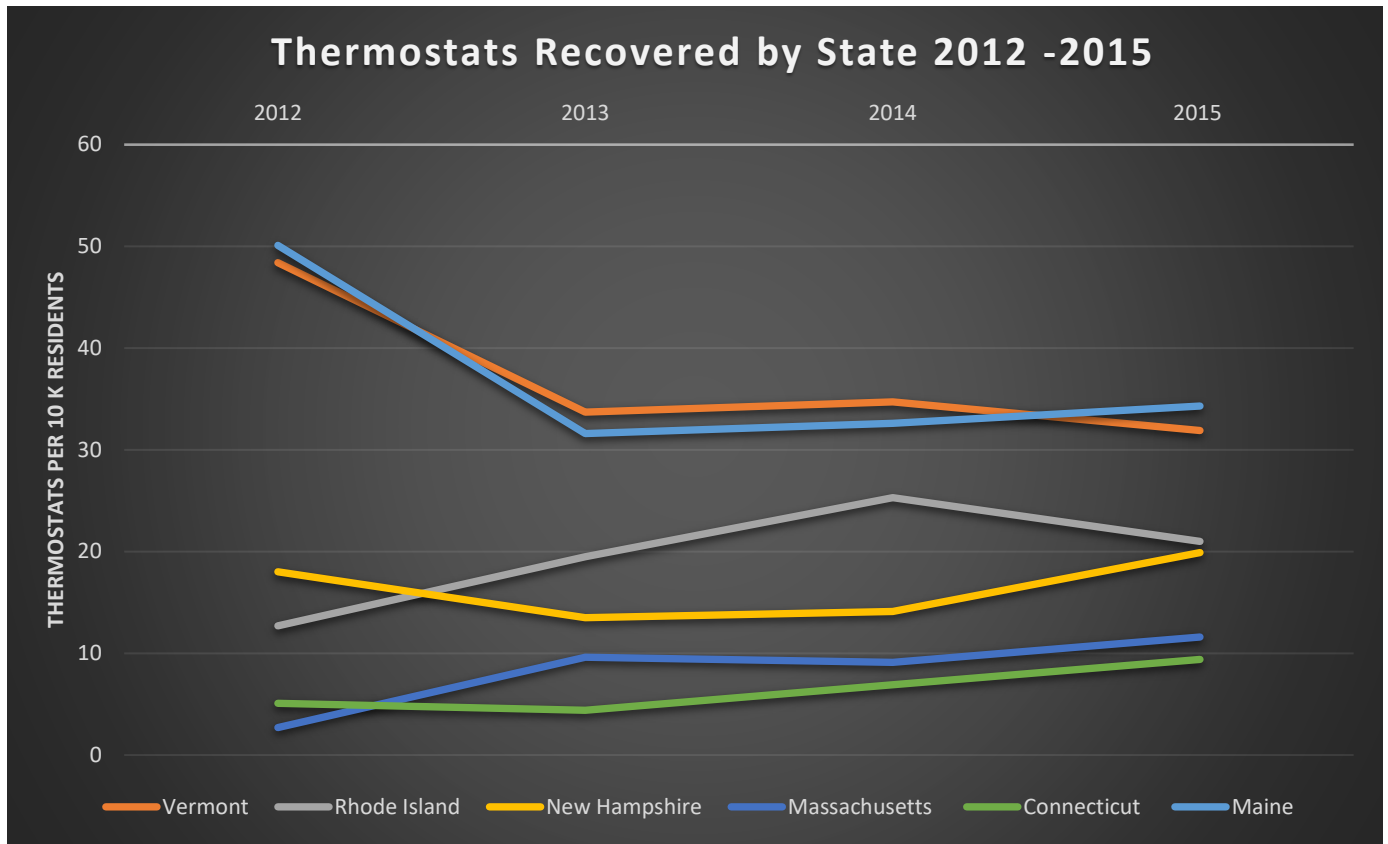
¹ TRC 2015 Annual Report cover letter

² All the data in this table comes from the TRC Annual Reports

³ Massachusetts requires waste combustor operators to run a program to collect mercury thermostats. The program offers a financial incentive for returned thermostats. When factoring in the thermostats collected under this program, the rate for Massachusetts would be closer to 19 per 10,000 residents.

⁴ RRS Evaluation of TRC 2015 Annual Report

Table 2



III. What We Are Not Collecting

In order to better understand the effectiveness of the current program, data is needed beyond how many thermostats are collected. DEEP also needs to estimate the number that are taken out of service each year and thrown in the garbage as well as the number that remain in service. These two variables are the foundation for establishing a collection goal.

a. Establishing a Collection Goal for Connecticut

One of the challenges in assessing the performance of this program is that there are no established collection goals for Connecticut. The TRC program only reports the number of thermostats collected, not the total number taken out of service or that remain in service. This report draws on studies done for other states to determine a reasonable collection goal for Connecticut and an estimate of the amount of mercury thermostats still in service.

Since 2011, the State of Illinois has had a mandatory thermostat collection program largely similar to Connecticut's. However the Illinois law requires the state EPA to establish a collection goal. The TRC operates the collection program in Illinois.

Table 3 – Illinois collection goals and rates⁵

	2011	2012	2013	2014	2015
Collection Goal	5,000	15,000	15,000	15,000	22,500
Thermostats Collected	7,229	13,061	12,479	15,266	10,193
Loose Switches	910	2,452	757	1,392	4,128

In Illinois, the TRC program met the goals for three of the first four years but fell well short in 2015. The goals will only continue to increase, rising to 25,000 in 2016 and 40,000 in 2020 when the program is due to sunset. Based on an extrapolation of Illinois’ population, Connecticut’s goal would be 6,100 thermostats per year.

Another way to analyze how many thermostats Connecticut could be collecting is to compare the rates of Maine and Vermont, the two highest performing programs in the country. Both states require manufacturers to pay \$5 per mercury thermostat returned through the program.

Table 5 – Collection rates for States with Highest Recovery

State	Collected per 10,000 residents	Number collected
Vermont	31.9	2,000
Maine	34.9	4,571
Connecticut	9.4	3,395

If Connecticut collected mercury thermostats at the same rate as Vermont and Maine, the state would have collected between 11,300 and 12,600 thermostats annually. In 2015, an estimated **9,000 mercury thermostats** were thrown in the garbage in Connecticut, representing the difference between what Vermont and Maine collect compared to the actual collection amount in Connecticut. That number would have been much higher in previous years when Maine and Vermont were collecting more than 50 thermostats per 10,000 people. The 9,000 thermostats equates to about 79 pounds of mercury – the equivalent of over 700,000 compact fluorescent light bulbs.

b. An estimate of the Number of Thermostats still in Service

The state of Rhode Island commissioned a survey to estimate the number of mercury thermostats still in service and the rate at which they will be replaced. Illinois and California commissioned similar studies to estimate the number of mercury thermostats still in service. A simple extrapolation based on population would provide a rough estimate for mercury thermostats still in service in Connecticut. Based on the estimated number of thermostats still in service in Illinois, California and Rhode Island, it is estimated that Connecticut still has between 500,000 and 900,000 mercury thermostats still in service.

⁵ All the numbers from Table 3 are from [Illinois EPA website](#) except 2015 collection numbers which come from [TRC 2016 annual report](#)

Table 4 – Estimated number of mercury thermostats still in service as of 2016

	Estimated Number of Mercury Thermostats
Illinois	1,864,000 ⁶
Rhode Island	258,831 ⁷
California	5,000,000 -10,000,000 ⁸
Connecticut	500,000 – 900,000 ⁹

IV. Incentive Programs

In order to maximize the number of mercury thermostats collected, Vermont and Maine have created an incentive program targeted to contractors, but including homeowners and businesses. Residents or contractors in Vermont and Maine can bring old mercury thermostats to local participating hardware stores or HVAC wholesalers for an in-store \$5.00 credit, but also have the option of receiving a \$5.00 check per thermostat from the TRC. For both programs, the drop-off locations and explanations of the incentive program can be found on Maine’s Department of Environmental Protection and Vermont’s Department of Environmental Conservation websites.

Connecticut currently does not have a cash incentive program. According to a TRC survey,¹⁰ contractors generally know that it is the law to properly dispose of mercury thermostats. DEEP staff conducted visits to 10 participating wholesalers in the fall of 2016 to discuss their experiences with the TRC program. Several wholesalers indicated that they do not get many thermostats on a regular basis and that anecdotally, in their experience thermostats not turned in are thrown in the garbage.

a. TRC Pilot Incentive Program in Connecticut

TRC tested a pilot incentive program with three R.E. Michel locations in Connecticut. For every 5 mercury thermostats collected, contractors or homeowners receive a \$5.00 gift card for Dunkin Donuts. During a site visit, the manager at the R. E. Michel in Hartford reported that they actively fill bins of thermostats and return them to TRC frequently because of the incentive. According to the TRC 2015 report, R.E. Michel returned the highest number of thermostats, 520

⁶ [Report to NRDC – Annual Outflow of Mercury-Containing Thermostats in IL](#)
Skumatz Economic Research Associates, Inc (SERA), January, 2014

⁷ [Report to NRDC – Annual Outflow of Mercury-Containing Thermostats in RI](#)
Skumatz Economic Research Associates, Inc (SERA), February, 2014

⁸ [Mercury-Containing Thermostats: Estimating Inventory and Flow from Existing Residential & Commercial Buildings](#), Skumatz Economic Research Associates, Inc (SERA), 2009 This study also estimated that 200,000 thermostats per year would come out of service in California so adjust for the seven years since the initial report, the number would be 3.6 – 8.6 million.

⁹ This is an average of the ratios of IL, CA and RI. Individually, the ratio for RI was 93,000, IL was 500,000 and CA was 460,000 – 900,000

¹⁰ TRC 2015 annual report

(15%) of the 3395 turned in statewide at. As mentioned in the report, “This result suggests that the incentive for a coupon to Dunkin Donuts likely has an overall positive impact on collection thermostats in CT...”

b. Maine

In 2006, Maine was the first state to pass a law that required the TRC to provide a \$5 financial incentive to wholesalers for every mercury thermostat collected through the mandatory collection program. In accordance with Maine law, TRC provides a financial incentive of \$5.00 to contractors, service technicians, or homeowners for turning in a mercury-switch thermostat as stated on TRC’s website. The incentive was originally only available to contractors and after the passing of Vermont’s program the law was amended so that homeowners were able to participate in the incentive as well.

c. Vermont

After observing the success of Maine’s incentive program, Vermont followed suit, first through a pilot campaign and then by passing a similar law to Maine’s. The pilot program was created to demonstrate that the general public would respond to an incentive just as contractors would and the collection program would be more effective. Starting from October 1st to November 31st in 2007, the program provided \$5.00 off the purchase of merchandise in the participating store where the thermostat was returned. Vermont’s DEC paid for the program through special funds provided by mercury reduction projects. During the two-month incentive program, almost 1,200 thermostats were collected, compared to 223 thermostats collected in the previous year. This number also exceeded the total annual collection of thermostats in 22 states through the TRC program. The majority of thermostats were brought in by homeowners.

Vermont’s incentive program was made law in 2008 stating in part, “...financial incentive is established with a minimum value of \$5.00 for the return of each mercury-containing thermostat to a thermostat wholesale by a contractor or service technician. The financial incentive shall be in the form of cash or coupons that are redeemable by the contractor or service technician.” As mentioned before, this incentive is also an option for homeowners and nonprofessionals protected under the law. The \$5.00 incentive is provided by TRC, not by the state of Vermont or Vermont Department of Environmental Conservation. The cash incentive not only benefits the contractor and homeowner, but the retailer and wholesaler through purchases made with the vouchers.

d. Conclusion

The purpose of citing these two incentive programs is to highlight the significant increase of participation once the laws were enacted. Both states have the highest collection rates in the country. After Maine passed their thermostat law which included the \$5.00 incentive in 2006, their rate increased to 50.1 per 10,000 residents in 2012. Connecticut’s rate in comparison was 5.1 per 10,000 residents in the same year. Similarly, Vermont’s rate peaked at 56.9 per 10,000 residents in 2011, while Connecticut’s rate was 4.2 per 10,000 residents.

Based on the most recent data provided by the TRC, the highest number of thermostats Connecticut has collected is 2,485 thermostats in 2014, with both Maine and Vermont surpassing

this number as early as 2005 and 2010. Maine and Vermont's incentive programs, have demonstrated consistent growth of thermostats collected. Though Connecticut has increased bins and thermostats collected, the rates are significantly lower than in Maine and Vermont. R.E. Michel's Dunkin Donuts incentive demonstrates that contractors can be motivated to participate in returning mercury thermostats.

V. Working With the Energy Efficiency Program

The thermostat stewardship law requires any mercury thermostat replaced as part of an energy efficiency program administered in whole or in part by the state should be managed through this program. DEEP does not have any data on how many thermostats have been managed through such programs although the TRC and DEEP have communicated this requirement to energy efficiency programs administered by DEEP.

Since most of these programs utilize professional contractors to change the thermostats, the program may still be accepting them even without information on disposal being supplied at the time. The message for contractors to properly dispose of mercury thermostats can be presented through other channels.

VI. Recommendations

Legislative Changes

1. Provide an Estimate for the Number of Mercury Thermostats Still in Service in Connecticut

Other states, including Maine, California, and Illinois, have performed studies to provide an estimate of the number of mercury thermostats still in service. Connecticut should consider performing a similar study. Manufacturers need to supply an estimate for the number of mercury thermostats still in service in Connecticut using an independent consultant. Having such an estimate will provide a baseline for setting future collection goals and measuring program performance. Based on other states evaluations, Connecticut may have as many as 900,000 mercury thermostats still in service. This is nearly four tons of mercury.

2. Establish a Collection Goal

The TRC has administered their program in Connecticut for 19 years, the last three of which have been mandatory. Because Connecticut's rates have been consistently below the northeast average, and considerably behind the highest performing states, the TRC should be responsible for meeting certain collection goals. The goals would be based on the collection rates achieved in other New England states.

Recommended collection goals for Connecticut:

7,000 thermostats per year in 2018

10,000 thermostats per year in 2020

12,000 thermostats per year in 2022

Collecting 7,000 thermostats in 2018 would increase the current rate from 9.4 thermostats per 10,000 residents to 20 thermostats per 10,000 residents. This is still below all New England states.

Table 5 – Collection rates under proposed goals

Year	Goal	Rate per 10,000	New England Avg.
2015	3,395 (actual)	9.4	21.35
2018	7,000	20	
2020	10,000	28.6	
2022	12,000	34.3	

3. Create an Incentive Program

If the collection goals are not met, Connecticut could consider mandating a financial incentive program. The amount of the incentive could be based on whether the goals were met. The collection results in Maine and Vermont demonstrate the success of an incentive program. Connecticut could consider emulating the Massachusetts model which provides an incentive to both the HVAC contractor and the wholesaler where both are encouraged to ensure that mercury thermostats are returned.

Other Recommendations

1. TRC and DEEP should partner to work more closely with energy efficiency programs and public utilities to promote the TRC program.
2. In its material developed for demolition contractors, DEEP will continue to promote the need to remove mercury thermostats before demolition.