

**VIA EMAIL and U.S. Mail**

March 31, 2014

Mr. Thomas Metzner  
Connecticut Department of Energy and Environmental Protection  
79 Elm Street  
Hartford, Connecticut 06106

Subject: Thermostat Recycling Corporation's 2013 Annual Report

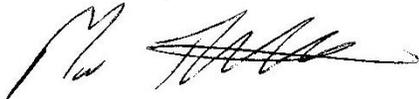
Dear Mr. Metzner:

Attached is TRC's annual collection report for calendar year 2013. TRC has made its best effort to provide a comprehensive report on its efforts to promote the collection program in Connecticut and improve the program's environmental outcomes.

TRC continues to promote its program in Connecticut. With the both the mandate to collect and the disposal ban coming into effect July 1, 2014 we are optimistic that by year's end we will see significant increases in program participation.

TRC welcomes the opportunity to review this report with you and discuss our 2013 promotion efforts and plans for 2014. I may be reached at 571-447-4315 or by email at [mark.tibbetts@thermostat-recycle.org](mailto:mark.tibbetts@thermostat-recycle.org).

Sincere Regards,



Mark Tibbetts  
Executive Director

# TRC Annual Report on Mercury-added Thermostat Collection and Recycling in Connecticut Calendar Year 2013 Activities

## Exhibit 1: 2013 Connecticut Collections by Brand<sup>1</sup>

Brand Holder	Total Thermostats	Total Switches	Pounds Mercury
Burnham Holdings	15	15	0.093
Carrier	71	159	0.986
Climate Master	1	3	0.019
General Electric Corporation	1	2	0.012
Goodman Global	1	3	0.019
Honeywell	1,281	1,589	9.852
Invensys	1	1	0.006
ITT Corporation	3	5	0.031
Lennox	28	33	0.205
Lux Products	2	2	0.012
Marley-Wylain Company	1	1	0.006
McQuay International	2	4	0.025
Nordyne Corporation	6	6	0.037
PSG Controls	0	1	0.006
Rheem	1	1	0.006
Sears Holdings	7	8	0.050
Taco, Inc.	5	5	0.031
Trane	17	34	0.211
White-Rodgers	104	136	0.843
York/Johnson Controls	9	11	0.068
----- Orphan Brands -----			
HB SMITH	4	4	0.025
REPCO	1	1	0.006
----- Nom -----			
NOM	39	46	0.285
Loose Bulbs	0	4	0.025

In Connecticut, TRC recovered the equivalent of 1,603 mercury thermostats from 1,600 whole mercury thermostats plus 4 thermostat mercury switches. A total of 15.85 pounds of mercury was diverted from solid waste.

TRC recovered approximately 36% of all thermostats from HVAC contractors, 7% from HHW locations, and 57% from HVAC wholesale distributor collection locations.

### Waste Mercury-Added Thermostat Management

Bins with waste mercury-switch thermostats are received at the fulfillment/processing center in Golden Valley, Minnesota. The facility is owned and operated by Honeywell International under contract with TRC.

Bins are received at the loading dock and sent to the TRC processing area. The bin and plastic liner are opened and the contents are identified, sorted, and tallied. The following data is recorded for each bin

returned and processed: bin number, business name (location name), city, state, zip code, date returned, number of thermostats and mercury switches by manufacturer and any non-conforming material.

The bin is returned to the location that sent it in with a new prepaid address label within 72 hours of receipt. The thermostats are stored and staged in a plastic lined carton in a storage area for final processing. The containers are dated and processed in order received, first in-first out.

The containers are returned from the storage area to the TRC processing area to have the mercury bulbs removed from the plastic housing. Universal Waste Regulations require the disposal of waste within 12 months of generation. TRC's processor requires that the disposal occur within 6 months of generation and TRC follows the more stringent requirement. Small quantities of thermostats are removed from the container, which is then closed again, and placed at the bulb removal workstation on a tray that contains any potential mercury spillage. The bulbs are removed from the thermostats and placed into a 2 quart container at the work station. If a bulb breaks and the mercury spills, the work area is designed to contain the spillage and the operators are trained in the clean-up and disposal of mercury. The TRC processing area is equipped with special mercury vacuum cleaners and the work area is vacuumed at the end of the work day to assure that any spillage is cleaned up and not left to evaporate.

<sup>1</sup> TRC began recording the brand name, when identifiable, of non-member thermostats in the third quarter, prior to that all non-member thermostats were identified as NOM.

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The 2 quart container is emptied into a special 55 gallon drum which is labeled and dated according to regulations. The drum is sealed with a band and is only opened when contents are being added to it. Special negative pressure venting assures any fumes are drawn away and vented when the drum is opened.

The 55 gallon drum is then shipped to Veolia Environmental Services in Port Washington, Wisconsin for final processing of the mercury ampoules (switches) Veolia Environmental Services meets or exceeds all local, state, federal and EPA regulations for the management of the product. Veolia's approvals for mercury recovery/recycling include:

- EPA - identification WIR000130591 (Veolia Environmental Services, Inc.)
- EPA BDAT Requirement - satisfied by all recovery operations
- CERCLA (Comprehensive Environmental Response Compensation and Liability Act)
- Wisconsin Department of Natural Resources

All facilities processing thermostats shipped to TRC follow all EPA guidelines and regulations. TRC has a facility license from Hennepin County Minnesota for the operation of the TRC. Honeywell, Inc. has a Hazardous Waste Generator license from Hennepin County. All persons who handle mercury thermostats as part of the TRC operation receive training in the handling of Hazardous Waste and Universal Waste.

## Program Education and Outreach

### Direct Mail

In April, May, June, and July TRC mailed a 6x5 full-color postcard to approximately 2,000 principals of HVAC contracting businesses of all sizes located in Connecticut. The postcard's key messages included ease and moral obligation. TRC sourced the mailing list from MailersHaven ([www.mailershaven.com](http://www.mailershaven.com)).

### Exhibit 2: Connecticut Direct Mail



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## Advertising

TRC's primary target audience remains HVAC contractors/technicians and distributors. The first group includes HVAC technicians working in residential and light commercial buildings, as they are the ones who remove the vast majority of mercury thermostats from service. The second group consists of HVAC wholesale distributor locations, as they are the most likely and convenient location for the majority of Connecticut-based technicians/contractors to purchase replacement thermostats and recycle waste mercury thermostats.

Homeowners are a secondary target audience as they represent a small segment of the market (+/- 10%). Since replacing a mercury thermostat is a rare event (if ever) for a consumer, TRC derives the greatest impact/value from its marketing budget by concentrating on the channel segment that yields the greatest benefit to program outcomes.

TRC's experience with previous advertising campaigns, the "Green" environmental message is less effective with our primary audience. Contractors/technicians are influenced mostly by cost, convenience and laws/regulations. TRC applied this lesson when planning and executing the 2013 advertising campaign. The campaign focused on "easy and free" and "It's the law", (where applicable, as only a limited number of states ban the disposal of mercury thermostats in solid waste and/or require HVAC contractors to recycle all mercury thermostats removed from service).

The purpose of TRC's advertisements were two-fold: 1) continue to build upon brand/program awareness of other promotional campaigns and 2) accelerate the pace of mercury thermostat replacement by helping contractors recognize opportunities to generate additional revenues by proactively replacing older mechanical (mercury) thermostats.

**Print-based advertising** — TRC focused on frequency for the 2013 advertising campaign to saturate the market with the program's brand by placing smaller ads more frequently throughout the year. The scope of the advertising campaign was significantly expanded in 2013 to include additional trade channel publications. TRC attempted to specifically target Connecticut, but trade channel options are limited. As such, TRC found regional trade publications like the *HVAC Insider New England* was the only option. TRC included the law message in publications that primarily served markets with disposal bans (e.g. *HVAC Insider New England*). In other cases the message was limited to ease/cost.

### **New advertising this year included:**

- ***HVAC Insider New England***, which has a monthly circulation of 8,731 that includes contractors, technicians, and wholesale distributors in New England, including Connecticut. The advertisement was 1/2 page in size in 2-color and ran in the April and May issues. (Exhibit 3)
- ***Contracting Business Magazine***, which has 43,000 monthly subscribers nationally who are primarily owners and managers of HVACR contracting companies. TRC ran a 2-color 1/4 page ad in March, June and August. (Exhibit 4)
- ***Indoor Environment & Energy Efficiency Magazine***, which is mailed bi-monthly to all Air Conditioning Contractors of America (ACCA) contractor-members who own, manage,

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lead, and make decisions for their business. TRC ran a 2-color 1/3 page ad in July, September and November. (Exhibit 5)

**Exhibit 3:**

1. *Easy and Free*  
2. *Protects the Environment.*  
3. *Complies with the law.*

Three very good reasons why it's time to recycle mercury thermostats.

State law\* prohibits disposal of mercury thermostats in the trash, and participating HVAC wholesalers can take mercury thermostats off your hands at no cost.

Thermostat Recycling Corporation is here to make mercury thermostat recycling easy. To find your nearest collection location, visit [thermostat-recycle.org](http://thermostat-recycle.org).

**Thermostat Recycling CORPORATION**  
an industry-funded non-profit

888.266.0550  
[thermostat-recycle.org](http://thermostat-recycle.org)

\*Disposal bans apply in the following states: CA, CT, IL, IN, ME, MA, MI, NY, ND, OR, PA, RI, and VT.

**Exhibit 4:**

1. *Save your customers money.*  
2. *Protect the environment.*

Two very good reasons why it's time to start a mercury thermostat upgrade crusade.

Round, square, rectangular. Thermostats come in many shapes and sizes. And when you come across an old mechanical mercury thermostat, there's a word you should share with your customers: **upgrade**. Newer, programmable thermostats help save energy costs and **don't contain mercury**.

You become a hero to your customers because you save them money. And you help protect the environment because you're recycling them properly. Contact us today to find out how you can get with our program. We're Thermostat Recycling Corporation and we're here to **make mercury thermostat recycling easy**.

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**Exhibit 5:**

1. *You replace a lot of thermostats.*  
2. *Many old thermostats contain mercury.*  
3. *Mercury thermostats should be recycled.*

Three very good reasons why you should directly participate in TRC.

TRC covers all recurring costs to transport and recycle mercury thermostats.

To order recycling containers call us at 888.266.0550.

*It's that easy.*

**Thermostat Recycling CORPORATION**  
an industry-funded non-profit

888.266.0550  
[thermostat-recycle.org](http://thermostat-recycle.org)

TRC also continued print-based advertisements in the following national HVAC trade publications:

- **Distribution Center Magazine**, the exclusive publication of Heating, Air Conditioning & Refrigeration Distributors International (HARDI) with 11,000 bi-monthly subscribers. TRC ran a full-color 1/3 page ad in August to promote the Big Man on Planet competition. (Exhibit 6)
- **HVACR Business Magazine**, a national publication with approximately 34,000 qualified subscribers, of which approximately 380 are within Connecticut. TRC ran a 2-color 1/4 page ad March – May. (Exhibit 7)

**Exhibit 6:**

**They're in it to Win it!**

Each time a mercury thermostat is recycled we protect the environment.

Let's recognize the following distributors who are one step closer to being the **2013 BIG MAN ON PLANET**. Winner(s) will be announced in December at HARDI's Annual Conference.

C.C. Dickson Company	Johnstone Supply, Inc.
Coburn Supply Company, Inc.	Minnesota Air
Duncan Supply Company, Inc.	US Air Conditioning Distributors, Inc.
Gustave A. Larson Company	Victor Distributing Company
G.W. Berkeheimer Inc., Co.	Winstel Controls
Johnson Supply	

[thermostat-recycle.org](http://thermostat-recycle.org)

**HARDI** resources that fuel your competitive advantage  
Heating, Air Conditioning & Refrigeration Distributors International

**Thermostat Recycling CORPORATION**  
an industry-funded non-profit

**Exhibit 7:**

**Thermostat Recycling CORPORATION**  
an industry-funded non-profit

1. *Save your customers money.*  
2. *Protect the environment.*

Two very good reasons why it's time to start a mercury thermostat upgrade crusade.

When you come across an old mechanical mercury thermostat, there's a word you should share with your customers: **upgrade**. Newer, programmable thermostats help save energy costs and **don't contain mercury**.

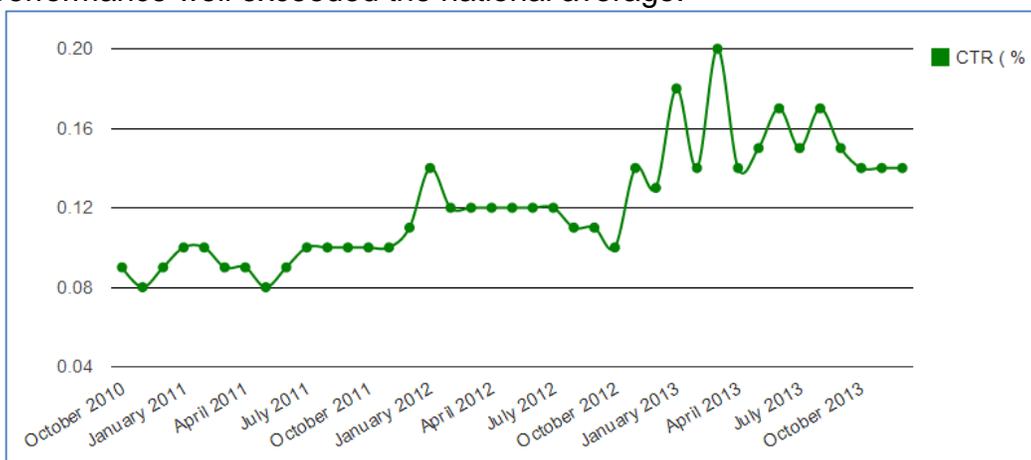
You become a hero to your customers because you save them money. And you help protect the environment because you're recycling them properly. Contact us today to find out how you can get with our program. We're here to **make mercury thermostat recycling easy**.

[thermostat-recycle.org](http://thermostat-recycle.org) | 888.266.0550

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**Web-based advertising** — TRC continued the use of rotating banner advertisements in 2013, with changes in scheduling and scope and the addition of new media outlets. New this year was the implementation of tracking URLs to better assess campaign performance. With these tracking URLs TRC was able to use Google Analytics to see exactly how much traffic each advertisement drove to the TRC website.

TRC's web-based ads gained a cumulative total of more than 770,000 impressions and an average click-through rate (CTR) of 0.6%. An impression is a measure of the number of times an ad is displayed, and a CTR is the number of times a click is made on the advertisement divided by the total impressions. The chart below presents benchmark data from Google's Display Benchmarks tool on average CTR's in the U.S. by year. As seen below, the highest average CTR was 0.2%, so TRC's CTR performance well exceeded the national average.



### New advertising this year included:

- **ACHRNews.com**, a website that assists the decision-makers from all branches of the air HVAC industry including contractors, manufacturers, distributors, parts and supply wholesalers, and service companies. More than 296,000 HVACR professionals visit the website every month. TRC ran two different banner ads in November and December that resulted in 56,423 combined impressions and an average CTR of 0.2%. (Exhibit 8 & 9)
- **ACHR Newsletter**, a weekly email blast with 10,000 subscribers. TRC ran a banner ad for 4 issues in December with a total open rate of 13,546 and an average CTR of 0.3%. (Exhibit 9)
- **HVACRBusiness.com**: TRC ran a banner ad in July that resulted in 5,063 impressions and a CTR of 2.6%. (Exhibit 10)
- **le3media.com**: ACCA's magazine's official website. TRC ran an animated banner ad June – December. Impressions and CTR not available from publication. (Exhibit 11)

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**Exhibit 8:**

1. You replace a lot of thermostats.

2. Many old thermostats contain mercury.

3. Mercury thermostats should be recycled.

Three very good reasons why you should directly participate in TRC.

TRC covers all recurring costs to transport and recycle mercury thermostats.

To order recycling containers call us at 888.266.0550.

It's that easy.

Thermostat Recycling CORPORATION  
thermostat-recycle.org

**Exhibit 9:**

Mercury Thermostat Recycling, the Easy Way.

Thermostat Recycling CORPORATION

**Exhibit 11 Frame 1:**

1. You replace a lot of thermostats.

2. Many old thermostats contain mercury.

Thermostat Recycling CORPORATION  
888.266.0550  
thermostat-recycle.org

**Exhibit 10:**

Thermostat Recycling CORPORATION  
an industry-funded non-profit

**Exhibit 11 Frame 2:**

So, why aren't you recycling with TRC?

To order recycling containers, call us at 888.266.0550.

It's that easy.

Thermostat Recycling CORPORATION  
888.266.0550  
thermostat-recycle.org

TRC also continued web-based advertisements on the following HVAC industry websites below:

- **ContractingBusiness.com**, which averages 32,000 monthly visitors. TRC ran a rotating banner ad in March and May-July which resulted in 34,099 total impressions and an average CTR of .09%. (Exhibit 12)
- **HVAC-Talk.com**, an online forum that averages 310,000 monthly visitors. TRC ran a rotating banner ad in March and May-July which resulted in 592,037 total impressions and an average CTR of .05%. (Exhibit 12)
- **OESP Advantage Enewsletter**, a weekly email with 3,000 subscribers predominantly from Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and Virginia. TRC ran a banner ad for 66 consecutive weeks February – November which resulted in 69,153 total impressions and an average CTR of .24%. (Exhibit 13)

**Exhibit 12:**

Frame 1

Fact 1:  
Recycling mercury thermostats is easy.

Frame 2

Fact 2:  
And easy is something you like.

Frame 3

So what's stopping you?

Frame 4

Thermostat Recycling CORPORATION  
Click here to find out just how easy, easy it is.

**Exhibit 13:**

1. You replace a lot of thermostats.

2. Many old thermostats contain mercury.

3. Mercury thermostats should be recycled.

Three very good reasons why you should directly participate in TRC's program.

To get started, call us at 888.266.0550.

Thermostat Recycling CORPORATION  
thermostat-recycle.org

Again, TRC's preference for this campaign in Connecticut would have been state-specific sites, but have been unable to identify trade channel advertising opportunities specific to Connecticut. The OESP Advantage is as close to a regional publication as possible.

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## Trade Shows

TRC attended and exhibited at the following trade shows relevant to Connecticut:

### **January 28 - 30: AHR Expo**

*Dallas, TX*

AHR Expo is the largest national trade show for the HVACR industry. TRC staff exhibited and promoted the program to HVAC contractors, manufacturers and distributors. The show had a total registered attendance of over 51,224. Specifically, just over 900 attendees were from New England.

### **February 27 – March 1: The Indoor Environment & Energy Expo**

*Orlando, FL*

Co-presented by ACCA, this expo is the largest marketplace for the indoor environmental and energy services contracting industry. TRC staff exhibited and promoted the program to attending HVAC contractors.

### **March 17 – 19: HVACR Excellence Educators & Training Expo (New)**

*Las Vegas, NV*

The nation's largest conference that is dedicated to providing professional development exclusively for HVACR educators and trainers. TRC staff exhibited for the first time and promoted the program to educators to include information on mercury thermostat recycling in their trainings.

### **March 4 – 5: Johnstone Supply Annual Membership Meeting**

*National Harbor, Maryland*

Johnstone Supply is a cooperative wholesaler distributor of HVAC parts and equipment with 350 locations nationwide, including three in Connecticut. Johnstone's Annual Membership meeting is invitation only and TRC was once again invited to attend and exhibit as part of an ongoing effort with Johnstone's corporate staff to encourage and expand the cooperative's members' participation in the program. The event is well attended by owners and senior staff and it was a unique opportunity to engage directly with key decision makers.

### **May 20: Environmental Industries Association Waste Expo (New)**

*New Orleans, LA*

TRC participated in a panel presentation with fellow product stewardship programs PaintCare, CARE and Call2Recycle.

### **May 21 - 22: National Association of Oil and Energy Service Professionals**

*Hershey, PA*

This was OESP's annual convention and trade show with a total of 2,677 attendees representing 264 individual service companies from 21 states. TRC again exhibited at this show.

### **June 3 – 4: Northeast Recycling Conference & Expo (New)**

*Manchester, NH*

This expo featured interactive, educational workshops on all aspects of the recycling and solid waste industry. TRC staff exhibited at the show for the first time this year.

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### September 23 – 27: The North American Hazardous Materials Management Association National Conference *(New)*

*St. Paul, Minnesota*

This is an annual conference that highlights industry trends and provides sessions, roundtable discussions and training opportunities for HHW professionals and those in related fields. TRC staff presented “Marketing: How to Improve Outcomes with a Constrained Supply” during a session to educate the audience about marketing a recycling program. TRC also sponsored and exhibited at this conference.

### December 7-10: Heating Air-conditioning and Refrigeration Distributors International (HARDI)

*Phoenix, AZ*

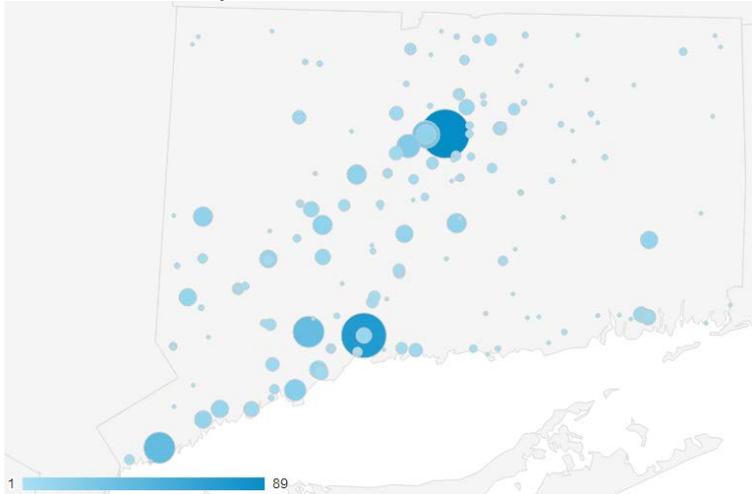
TRC exhibited and participated in the “Booth Program,” which provides for 1-on-1 sessions with senior executive staff from HARDI member companies. This event targeted representatives of approximately 80% of the wholesale market for HVACR products. TRC also presented its annual “Big Man on the Planet Award.”

## Website/Social Media

Website traffic continued to grow in 2013 as TRC increased its total annual visitors by 85% compared to 2012. There was a 90% increase of visitors from Connecticut to TRC’s website and the state ranked 15th among the country in terms of its share of visitors to the site, up from 19th place in 2012.

The increase in traffic reflects the impact of paid trade channel advertising and search engine optimization efforts.

### Exhibit 14: Map of TRC website Traffic in Connecticut 2013



## Earned Media

In 2013 TRC continued to enjoy positive and frequent coverage within the industry trade press, appearing more than 25 times through a variety of publications throughout the year. TRC issued a number of media releases and most were picked up generating additional exposure for the program.

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Notably, TRC continued to receive coverage in industry leading publications such as *The Air Conditioning and Refrigeration News* (110,000 circulation), *HVACR Business* (circulation 30,000), and editorial pieces in *Distribution Center Magazine* (circulation 11,000) and *Indoor Environment & Energy Efficiency Magazine* (mailed to every ACCA member who specializes in residential, commercial, and industrial applications).

### Other Program Activities

It is difficult to categorize and capture many of TRC's activities in a narrative based report. While paid placements and copy is easy to report, social media and other activities are more difficult to capture. Some examples of "miscellaneous" outreach include:

- Collection Location Recruitment—TRC's primary focus last year was increasing its footprint in the state. TRC sent correspondence to approximately 100 wholesale distributor locations informing them of Connecticut's law and the need to participate in the program. TRC sent similar correspondence to the senior management of larger HVAC distributors with multiple locations within the state.

TRC also participated in a webinar hosted by Connecticut DEEP which primarily targeted municipal household waste programs.

Additionally, TRC issued a media release on Connecticut's law that was picked up by several industry trade publications.

- Updates to TRC Search Utility on its website— TRC completed a major modification to its search utility on its public website in 2013. TRC is now filtering search results and excluding locations that do not return one or more of their bins within 14 months. This assists homeowners, contractors, and technicians in identifying convenient active collection sites. It also assists TRC in filtering out closed, consolidated or moved locations from search results. TRC has seen a noticeable decrease in complaints about site participation via email and phone following this change.
- Training videos— TRC developed two brief training videos about the program. One was for HVAC contractors/technicians to demonstrate how easy it is to recycle thermostats. The second was to support our wholesale distributor partners to educate staff of the simplicity of the program and to assist with compliance with critical health and safety policies.

TRC created a YouTube page to host the videos (<http://www.youtube.com/user/ThermostatRecycling>) online at the end of April, 2013 and posted the one video on its homepage and the other on its safety page.

TRC has aggressively pushed the availability of the video. TRC burned copies of the video and marketed its availability of the video to HVAC educators, HVAC distributors, and others within the channel. TRC mailed copies to all Air Conditioning Contractors of America (ACCA) chapter leaders and posted information on its availability on the HVAC Educators Twitter group with over 1,000 members nationally.

## **TRC Annual Report on Mercury-added Thermostat Collection and Recycling in Connecticut Calendar Year 2013 Activities**

The video for contractors was featured on ACHRNews.com from May-December, including one week on the homepage, and received 973 views from their website. ACHRNews enjoys over 296,000 website visits per month of which over 174,000 are unique browsers.

To date, the contractor video has been viewed over 1,700 times on YouTube, and the wholesaler video has been viewed over 300 times. In contrast, the California Department of Toxic Substances Control training video has been online since 9/27/11 and has only had 2,386 hits.

- **Social Media**— In 2013 TRC updated its social media strategy to focus on three main tactics:
  1. Inform – messaging about TRC’s program and news such as Big Man on Planet competition, new training videos, etc.
  2. Contribute – messaging about related industry news to contribute to trending conversations
  3. Engage – ask questions to encourage the community to actively participate in conversation

With this strategy and through more frequent updates and engagement, TRC’s Twitter account saw a 37% increase in number of followers in 2013, and its Facebook page enjoyed a 71% increase of page “Likes”.

- **BMOP**— TRC partnered with Heating Air-conditioning and Refrigeration Distributors International (HARDI) to launch the Big Man on Planet (BMOP) competition in 2013. This annual competition encourages HARDI members to promote TRC’s mercury thermostat collection program at their branches nationwide to see who can recover the most thermostats.

TRC mailed invitations to HVAC wholesale/distributor owners and principles throughout the nation to invite them to participate in the competition. In 2013, participation more than doubled and over 100lbs of mercury was recovered. Johnstone Supply was crowned the BMOP winner at HARDI’s annual conference. The presentation of the BMOP Cup created significant buzz at the show and the program was an unqualified success in 2013 (Exhibit 15).

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**Exhibit 15:** DeWight Wallace, CEO Johnstone Supply with TRC Executive Director with BMOP Cup



### Program Expenses

TRC is a national voluntary program that is also operating ten mandatory programs on behalf of its manufacturer members. As most promotional activities are run concurrently in multiple states, tracking and isolating expenses specifically to Connecticut is not possible. Below is a summary of TRC’s national program expenses for 2013. A copy of TRC’s 2012 IRS Form 990 is also available for inspection.

**Exhibit 16: 2013 Program Administrative Expenses**

<b>Program Component</b>	<b>2013 TRC Program</b>	<b>2012 TRC Program</b>	<b>Percent Change</b>
TRC Staff and Administration	423,400	\$246,162	72%
Recycling Costs	317,874	\$335,613	-5%
Insurance	15,437	\$2,430	535%
Statutory Incentive Payments	23,955	\$47,166	-49%
New Collection Containers	21,936	\$27,495	-20%
Travel	32,608	\$25,994	25%
Legal	27,696	\$66,303	-58%
Direct Expense for Marketing & Outreach	177,743	\$169,840	5%
<b>Total (expenses)</b>	<b>1,040,649</b>	<b>\$921,003</b>	<b>13%</b>

There was significant variance in many expense categories from 2012. Causes for changes include:

- TRC staff and administration increased by 72% in 2013. TRC added a full-time marketing staff person in January, effectively doubling TRC’s staff. Additionally, TRC relocated its

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offices from the National Electrical Manufacturers Association (NEMA) in December of 2012. TRC is now responsible for office lease expense that previously was provided at no cost by NEMA.

- Insurance Expense: There was no meaningful change. The variance reflects changes in how TRC accrued the expense in 2012/2013.
- Statutory incentive payments— Collections decreased by over 30% in both Maine and Vermont.
- Travel: With the addition of staff, TRC attended more industry events in 2013 and was able to increase the frequency of collection location visits.
- Direct Expense for Marketing/Outreach: In 2012 TRC expended \$34,000 for marketing consulting. TRC shifted that expense in 2013 to a full-time staff person (new annual staff expense of approximately \$87,000) TRC. Funds previously allocated to marketing consulting were used to expand the scope of paid advertising, up-date TRC's website, develop training videos, and expand the scope of field work.

### **Recommendations/Next Steps**

TRC estimates there are 100 HVAC wholesale distributor branch locations in the state. Currently, TRC has records of less than 50 with one or more of the program's recycling container, and only 6 returned a container last year. With the mandate to collect effective July 1, 2014 TRC will apply the following strategies among others to increase participation:

1. Accelerate mandatory participation through the direct provision of the recycling container in 2014. A TRC representative will visit the majority of existing and prospective HVAC wholesale collection sites in Connecticut in 2014. The representative will confirm participation with the presence of a bin, train staff on the program, and provide in-store program collateral. For those locations not participating, the representative will offer the location one TRC recycling container at no-cost.
2. Directly market the program to larger HVAC wholesalers in the state. TRC's account representative will identify contacts with Connecticut's larger distributors, contact them and engage them on the importance/value of their location's active participation in the program. TRC will use these calls to assess the location's willingness to support enhanced promotional efforts.
3. Direct mail to HVAC contractors with more than seven technicians. TRC will procure a mailing list of contractors and inform them on the legal obligation to participate in the program. The mailing will include a limited-time offer of a no-cost TRC container.
4. TRC will also seek one or more distributors to participate in enhanced promotions of the program.

In addition, TRC has firm plans for the following enhancements to the program:

- Website redesign: TRC launched an updated website in March. Changes include: updated search results to improve customer experience when searching for collection locations, a state map for easier navigation to specific state programs, a new blog and TRC program highlights section, better integration of participating wholesaler brands in the site, and search engine optimization. The redesign is also the first step towards optimizing the site for smart phones and tablets.

## TRC Annual Report on Mercury-added Thermostat Collection and Recycling in Connecticut Calendar Year 2013 Activities

- Dump Bin Displays: TRC will develop a “wrap” of its collection container for use by wholesale distributors. The purpose is to raise the visibility of program at HVAC wholesale distributors.
- Update Direct Mail: Direct mail remains the primary means to directly communicate with Rhode Island contractors and technicians. TRC is currently reviewing its direct mail program. TRC anticipates significant changes which may include better targeting of mail (focusing on smaller “owner/operator” contractors with postcards, use “lumpy” mail to reach key contacts at larger “professional dealers”), email, changes in the size, timing and frequency of mailings.
- More frequent collection location contact: TRC plans to implement rolling mailed reminders to Connecticut collection locations that have not returned a bin within 12 months. TRC plans to start this program by the end of March 2014.
- Implement Customer Relation Management (CRM) software: TRC plans to implement CRM software. The software aligns with the additional of the account representative a position. TRC will more aggressively sell the program in 2014, targeting specific distributors and contractors in key markets. Additionally, the software will enable TRC to better document program activities.

TRC also plans on continued adjustments to its paid advertising strategy. With the addition of a full-time marketing person last year, TRC’s 2014 advertising campaign is well underway with many planned insertion orders completed. Moreover, TRC will be updating its online advertisements this year in an effort to increase click-through rates.

Some additional planned advertising and promotion (subject to change) include:

- OESP *The Advantage* dedicated Email blast **(New)**
- Feature TRC program training video on ACHRNews.com on their “How-To” video section **(New)**
- Contracting Business Magazine dedicated Email blast to subscribers in states with disposal bans, including Connecticut **(New)**
- Banner ad 3x in HVACR Business Magazine’s Enewsletter, a monthly newsletter that reaches more than 10,000 opt in readers each month **(New)**
- 12 week buy in OESP’s email newsletter *The Advantage*
- Expand frequency of Google Adwords/pay-to-click campaign and geo-target the campaign to specific state landing pages enabling TRC to incorporate state-specific messaging.
- Ad placements in *The HVAC Insider* in targeted regions of the U.S. including New England.
- Revamp the “Big Man on Planet Award” program to include an opportunity for more winners, with the goal of doubling the level of participation.
- Continue to exhibit at regional and key national industry events.

**TRC Annual Report on Mercury-added Thermostat Collection and Recycling in Connecticut  
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**APPENDIX A: Thermostats Returned by Collection Location**

Collection Location Name	Business Type	Street 1	City	State	Zip	Count Bins @ Location	Date(s) of Bin(s)Receipt	Total Stats	Total Switches	Total Mercury
TORRINGTON SUPPLY	Wholesalers	100 N. ELM STREET	WATERBURY	CT	06723	2		0	0	0.00
Quality Mechanical Service LLC	Contractor	102 Ramstein Road	New Hartford	CT	06057	1		0	0	0.00
STAR SUPPLY COMPANY	Wholesalers	1040 STATE STREET	NEW HAVEN	CT	06511	1		0	0	0.00
CONNECTICUT REFINING CO.	Contractor	105 WATER STREET	WEST HAVEN	CT	06516	1		0	0	0.00
Wallingford Winnelson Co.	Wholesalers	1068 N. Farms Road Bldg. 1	Wallingford	CT	06492	1		0	0	0.00
STAR SUPPLY COMPANY	Wholesalers	118 GANDO DRIVE	NEW HAVEN	CT	06513	2	04/09/2013, 11/19/2013	349	405	2.51
MAIN ENTERPRISES	Contractor	1180 STRATFORD RD.	STRATFORD	CT	06615	2		0	0	0.00
ENVIRONMENTAL CONTROL, INC.	Contractor	1265 WOODEND ROAD	STRATFORD	CT	06615	1	10/18/2013	41	67	0.42
TOWER EQUIPMENT CO INC	Wholesalers	1320 WEST BROAD ST	STRATFORD	CT	06615	8	03/18/2013, 06/19/2013, 06/19/2013, 06/19/2013	284	610	3.78
Town of Granby	HHW Facility	15 N. Granby Road	Granby	CT	06035	2		0	0	0.00
SANTA FUEL	Contractor	154 ADMIRAL ST.	BRIDGEPORT	CT	06605	2		0	0	0.00
Johnstone Supply	Wholesalers	156 Magee Avenue	Stamford	CT	06902	2		0	0	0.00
Housatonic Resources Recovery Authority	HHW Facility	162 Whisconier Road	Brookfield	CT	06804	2	10/17/2013	44	55	0.34
M & O CORPORATION	Contractor	164 ALEX STREET	BRIDGEPORT	CT	06607	1		0	0	0.00
WESSON ENERGY	Contractor	165 RAILROAD HILL STREET	WATERBURY	CT	06790	2		0	0	0.00

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Sid Harvey Industries	Wholesalers	17 EAGLE RD.	DANBURY	CT	06810	1		0	0	0.00
United Refrigeration #G6	Wholesalers	17 Viaduct Road	Stamford	CT	06907	1		0	0	0.00
Reb Refrigeration Inc.	Wholesalers	18 Graves Avenue	Guilford	CT	06437	1		0	0	0.00
Carrier Enterprise	Wholesalers	185 Wallall Street	New Haven	CT	06511	1		0	0	0.00
Essex Winnelson Company	Wholesalers	186 Westbrook Road	Essex	CT	06426	1		0	0	0.00
United Refrigeration #48	Wholesalers	190 Wallace Street	New Haven	CT	06511	1		0	0	0.00
ABCO HVACR SUPPLY-STAMFORD	Wholesalers	198 LAWN AVE.	STAMFORD	CT	06902	1		0	0	0.00
Carrier Enterprise	Wholesalers	2 Northrop IND. Park Road	Wallingford	CT	06492	1		0	0	0.00
THE BELL PUMP COMPANY	Wholesalers	20 VICTORY STREET	STAMFORD	CT	06902	1		0	0	0.00
Sid Harvey Industries	Wholesalers	206 MURPHY RD.	HARTFORD	CT	06114	2		0	0	0.00
THE BELL PUMP COMPANY	Wholesalers	209 FORBES AVENUE	NEW HAVEN	CT	06512	1		0	0	0.00
Johnstone Supply	Wholesalers	21 Shady Street	Milford	CT	06460	1		0	0	0.00
R.E. MICHEL COMPANY, INC	Wholesalers	23 PERRY AVENUE	NORWALK	CT	06850	2		0	0	0.00
United Refrigeration #G1	Wholesalers	230 Wawarme Avenue	Hartford	CT	06114	1		0	0	0.00
Johnstone Supply	Wholesalers	255 Locust Street	Hartford	CT	06114	1		0	0	0.00
Sid Harvey Industries	Wholesalers	266 BRIDGE ST	GROTON	CT	06340	1		0	0	0.00
Sid Harvey Industries	Wholesalers	278 RAILROAD HILL ST	WATERBURY	CT	06708	1		0	0	0.00
R.E. MICHEL COMPANY, INC	Wholesalers	295 MURPHY ROAD	HARTFORD	CT	06114	2		0	0	0.00
Standard Oil of CT	Contractor	299 Bishop Avenue	Bridgeport	CT	06610	1		0	0	0.00
The Granite Group	Wholesalers	300 SACKETT POINT RD	North Haven	CT	06473	1		0	0	0.00
BELL SIMON CO.	Wholesalers	319 MURPHY ROAD	HARTFORD	CT	06114	1	06/19/2013, 07/24/2013	142	164	1.01
Town of Manchester Transfer Station	HHW Facility	321 Olcott Street	Manchester	CT	06040	2		0	0	0.00
MICHAEL R MADER CO,	Contractor	33 GREAT	Waterford	CT	06385	2		0	0	0.00

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INC		NECK RD								
VALLEY OIL	Contractor	36 BROWNSTONE AVE.	PORTLAND	CT	06480	3		0	0	0.00
Carrier Enterprise	Wholesalers	4 Wilton Ave.	Norwalk	CT	06851	1		0	0	0.00
TORRINGTON SUPPLY	Wholesalers	40 MEAD STREET	STRATFORD	CT	06615	1		0	0	0.00
DDLC Energy	Contractor	410 Bank Street	New London	CT	06320	3	04/24/2013	90	94	0.58
The Granite Group	Wholesalers	464 SOUTH MAIN ST	Colchester	CT	06415	1		0	0	0.00
TURNER AND HARRISON	Wholesalers	54 RESEARCH DRIVE	STANFORD	CT	06906	2		0	0	0.00
The Granite Group	Wholesalers	55 NORTH MAIN ST	Norwich	CT	06360	1		0	0	0.00
The Granite Group	Wholesalers	553 GOLD STAR HIGHWAY	Groton	CT	06340	1	04/03/2013	13	13	0.08
THE METROPOLITAN DISTRICT	HHW Facility	555 MAIN STREET	HARTFORD	CT	06103	1		0	0	0.00
Automatic TLC	Contractor	64 Oakland Avenue	East Hartford	CT	06108	3	03/08/2013, 03/08/2013, 03/26/2013	439	453	2.81
R.E. MICHEL COMPANY, INC	Wholesalers	640 ACCESS ROAD	STRATFORD	CT	06615	2		0	0	0.00
Carrier Enterprise	Wholesalers	650 Long Beach Bvld	Stratford	CT	06615	1		0	0	0.00
City of Bristol Solid Waste Transer Station	HHW Facility	685 Lake Avenue	Bristol	CT	06010	1		0	0	0.00
Southeast Connecticut Regional Resources Recovery Authority	HHW Facility	7 Hurlbutt Road	Gales Ferry	CT	06335	13	12/13/2013	69	77	0.48
Carrier Enterprise	Wholesalers	70 Meadow Street	Hartford	CT	06114	1		0	0	0.00
Portland Winair Co.	Wholesalers	70 Tuttle Road	Middletown	CT	06457	1		0	0	0.00
SID HARVEY INDUSTRIES	Wholesalers	700 LORDSHIP BLVD	STRATFORD	CT	06615	1		0	0	0.00
The Granite Group	Wholesalers	71 - 81 FRONT ST	Putnam	CT	06260	1		0	0	0.00
SHELTON WINAIR CO.	Wholesalers	740 RIVER ROAD	SHELTON	CT	06484	2		0	0	0.00
Sid Harvey Industries	Wholesalers	75 HAMILTON	NEW HAVEN	CT	06511	1		0	0	0.00

**TRC Annual Report on Mercury-added Thermostat Collection and Recycling in Connecticut  
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		ST								
The Granite Group	Wholesalers	75 JEFFERSON AVE	New London	CT	06320	1		0	0	0.00
The Granite Group	Wholesalers	8 CUSTOM DR	Old Saybrook	CT	06475	1		0	0	0.00
DANIELS OIL CO., INC.	Contractor	8 HIGH STREET PO BOX 32	PORTLAND	CT	06480	2		0	0	0.00
NEW ENGLAND HEATING SUPPLY	Wholesalers	805 WOOD AVENUE	BRIDGEPORT	CT	06604	1		0	0	0.00
RE MICHEL CO INC.	Wholesalers	840 ACCESS ROAD	STRATFORD	CT	06615	2		0	0	0.00
THE GRANITE GROUP	Wholesalers	873 NORWICH RD	PLAINFIELD	CT	06374	1	06/27/2013	4	4	0.02
Town of Watertown	HHW Facility	91 Burton Street	Watertown	CT	06795	1		0	0	0.00
THE BELL PUMP COMPANY	Wholesalers	91 CRYSTAL AVENUE	NEW LONDON	CT	06320	1		0	0	0.00
R.E. MICHEL COMPANY, INC	Wholesalers	91 PRESTIGE PARK CIRCLE, UNIT 4	EAST HARTFORD	CT	06108	4	03/13/2013	125	132	0.82
Thames Valley Winnelson	Wholesalers	975 North Road	Groton	CT	06340	1		0	0	0.00
CITY OF BRIDGEPORT, DEPARTMENT OF PUBLIC FACILITIES	HHW Facility	999 BROAD ST	BRIDGEPORT	CT	06604	1		0	0	0.00
MONTVILLE HARDWARE	Retailers	P.O. BOX 506, 907 RT 32	UNCASVILLE	CT	06382	1		0	0	0.00



FINAL REPORT

# CONNECTICUT MERCURY THERMOSTAT COLLECTION AND RECYCLING PROGRAM EFFECTIVENESS ASSESSMENT

COMMISSIONED BY:

Thermostat Recycling Corporation



PREPARED BY:



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# BACKGROUND AND PURPOSE

During the past two decades, it has become more widely recognized that mercury released into the environment can easily make its way into aquatic ecosystems, leading to damaging effects in humans and wildlife. While coal-burning power plants are the most significant source of mercury emissions in the U.S., other activities such as mining are also culprits. While significant steps have been taken to reduce the use of mercury in products in recent years, a variety of products manufactured in the past century utilize mercury, such products include thermometers, switches, certain types of light bulbs including fluorescents, and older types of thermostats. Many of these products, including thermostats, have relatively small quantities of metallic mercury encapsulated in a glass bulb. If this glass enclosure is compromised and the contents is released into the environment, microbes can convert this mercury into highly toxic organometallic compounds such as methyl mercury which is damaging to both humans and wildlife.

In response to this concern, the EPA and many state environmental departments have taken measures to restrict the quantity of mercury that is released into the environment by emissions, as well as through landfill disposal. A number of states have implemented sales restrictions, disposal bans and product stewardship statutes that focus on products containing mercury. Connecticut has recently joined a growing list of states that require thermostat manufacturers to ensure a disposal alternative for thermostats through implementation of a convenient take-back program. To help serve this purpose, in 1998 major thermostat manufacturers created and funded the Thermostat Recycling Corporation (TRC), and the organization now has take-back participants in 47 states, including 17 state programs that have imposed regulations on the sale and/or disposal of these thermostats.

The goal of this report is to provide for the Connecticut Department of Energy and Environmental Protection an evaluation of the TRC's effectiveness in meeting the goals and requirements of the take-back programs it conducts in peer New England states, with attention given to Connecticut's Public Act No. 12-54 requirements relative to those of other states. Included in this report is a summary of the program's current operations, including its access to return channels and the characteristics of those channels, and how they are marketed and publicized. This report does not attempt to assess the overall effectiveness of the TRC program in capturing a substantial fraction of wasted thermostats, nor the effectiveness of the program in substantively reducing the total amount of thermostat mercury entering the biosphere from these products.

# PROJECT DETAILS

## METHODOLOGY

In an effort to engage with the channel players in Connecticut and better understand how the program is currently being implemented, Resource Recycling Systems (RRS) conducted more than 20 interviews within the state of Connecticut, targeting a variety of wholesalers, retailers and contractors, as well as the Connecticut Department of Energy and Environmental Protection (DEEP).

RRS looked at four peer states that currently require manufacturer thermostat take-back which are implemented by the Thermostat Recycling Corporation: Maine, Vermont, Rhode Island, and New Hampshire. To inform this process, RRS reviewed legislative reports on mercury thermostat recycling in peer states, as well as historical reports generated by TRC, and conducted interviews with stakeholders in each of the targeted peer states. These interviews targeted state agency officials responsible for enforcement within each state, HVAC wholesalers, contractors and technicians, and Maine and Vermont retailers that participate in the TRC program.

RRS acquired annual state reports from TRC which formed the baseline of program information for this report. Additionally, RRS held numerous interviews with TRC leadership, discussing many of the operational aspects related to implementation of a growing number of state level EPR programs. In addition to historical TRC annual reports submitted to state environmental departments, RRS acquired detailed historical program performance data from TRC, including bin and thermostat submission data across the states where TRC has operated.

This assessment will review thermostat take-back statutory requirements, programs and performance, as well as present information specific to the state of Connecticut. This report focuses on the return and collection of mercury-containing thermostats, which will hereafter referred to simply as 'thermostats.'

# RESULTS AND DISCUSSION

## REVIEW OF PEER NEW ENGLAND PROGRAMS

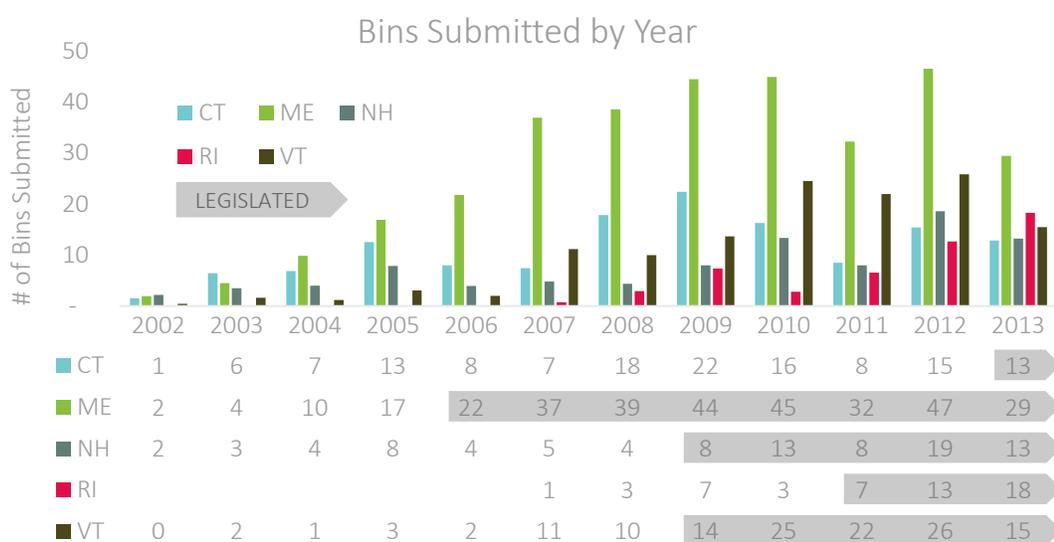


Figure 1. Bins Submitted Annually By State

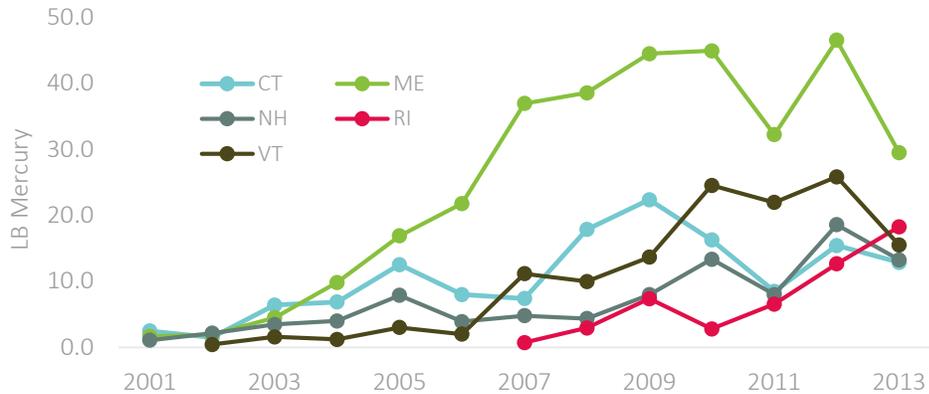
## OVERVIEW & ANALYSIS OF POLICIES

Connecticut is the most recent New England state to adopt a mandatory collection program for thermostats funded by manufacturers. Maine was the first to pass this legislation, and many states have modeled their own legislation closely after Maine’s bill, including Connecticut.

Common requirements across all laws are bans on the sale and disposal of thermostats, set up of collection points at wholesale locations, and requiring contractors to recycle thermostats. In addition, although varying slightly in requirements, all policies also require some form of annual report.

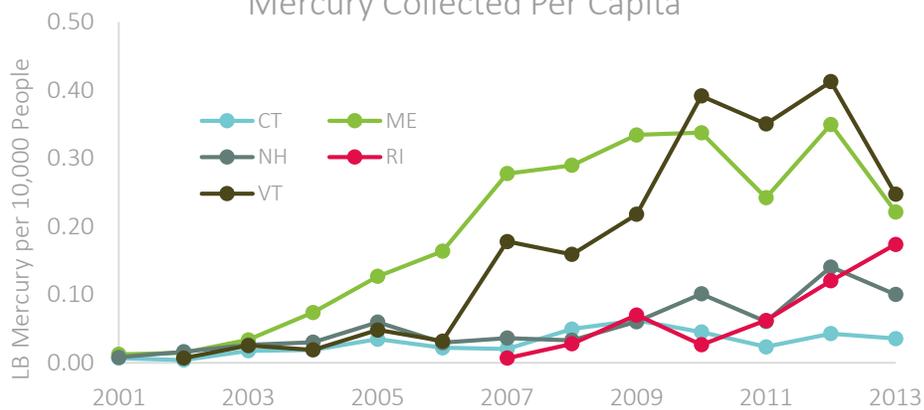
Notable differences across policies include cost of collection bin and the presence or absence of a monetary incentive program - currently only Maine and Vermont have rebate systems in place to incentivize returning thermostats to a collection site.

Total Lbs Hg Collected



Historically, Maine has been seen as the leader in recovering mercury through the TRC’s program due to their high number of thermostats collected relative to other states. When normalizing the amount of mercury to the states’ populations, Vermont actually comes out ahead, with Maine close behind. While Connecticut’s existing voluntary program has been successful relative to peer states in terms of raw number of thermostats collected, the state’s large population (comparable to Maine, New Hampshire, and Rhode Island combined) causes the results to drop dramatically when normalized.

Mercury Collected Per Capita



## MAINE

Maine's manufacturer responsibility program for thermostats is one of five stewardship programs in the state. A disposal ban was implemented on July 15, 2002, and the mercury added thermostats law was enacted in 2005, making product manufacturers responsible for the collection and recycling of mercury added thermostats. In 2006, the state organized a stakeholder group to design an incentive system, and beginning in 2007, \$5 incentives were offered for thermostats. Manufacturers are required to pay a rebate for each thermostat returned. Maine Department of Environmental Protection (DEP) assumed the initial cost of providing bins to wholesalers, but they are not responsible for wholesaler participation. Wholesalers are required to participate as collectors and the TRC is responsible for engaging wholesalers, while retailers of thermostats may or may not choose to participate in collection. Upon receipt of the thermostat a wholesaler/retailer will provide a five dollar coupon to customers and an invoice provided to the TRC who reports the record of the number of thermostats returned. State program managers believe the incentive plays a strong role in the program. In fact, Maine experienced a performance spike in performance in 2012, which may be attributable to matching \$5 incentives provided by the nonprofit *Ecomaine* in Portland that year.

## PROGRAM PERFORMANCE GOALS

Maine's law set an annual collection and recycling goal of at least 125 pounds of mercury by year two of implementation for contractors and service technicians, and 160 pounds from homeowners by the third year. However, the program has never come close to meeting this goal - the highest amount recovered was only 46.5 lbs in 2012.

## MAINE PROGRAM PERFORMANCE

Relative to other New England states, Maine's program is very successful.

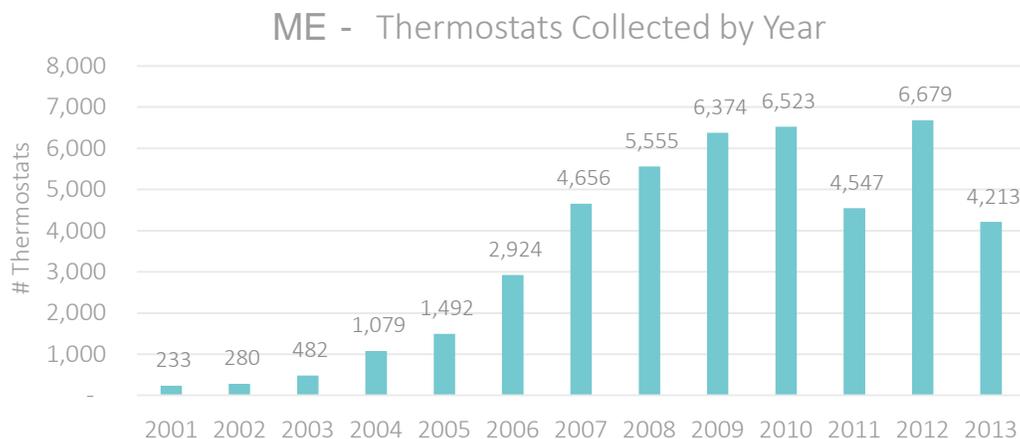


Figure 2. Thermostats Collected in Maine

## VERMONT

Vermont banned the sale of mercury thermostats in 2006, and implemented a state mercury thermostat recycling program in 2009. The thermostat law requires that manufacturers administer the collection program for wholesalers, retailers, and municipalities. Similar to Maine, wholesalers are required to participate as collection points while retailers may participate on an optional basis; the majority of the state's 73 hardware stores participate voluntarily, and nonparticipant stores have received display materials describing how and where to recycle thermostats. The law requires mandatory participants to offer a five dollar cash incentive for each thermostat; in most cases a five dollar in-store coupon is provided at retailers, while wholesale and municipal collection points distribute mail-in rebates for the same amount. Wholesalers were contacted directly by the state agency informing them of the participation requirement, and representatives from the state agency subsequently made site visits to all wholesale and retail locations in 2011.

### PROGRAM PERFORMANCE GOALS

Vermont's Agency of Natural Resources is required by the statute to establish a methodology for estimating how many mercury thermostats are generated annually, then allowing for estimations of capture rates to be made. The state has set an aggressive goal of maintaining a 65% capture rate, with the intent of making program modifications as needed to meet that goal. The department has not had the resources to collect the needed data to reliably estimate the inventory of thermostats in service, however the VT agency has recognized the importance of investing more resources into accurately projecting this number based on a study that TRC commissioned to be completed in California.

### VERMONT PROGRAM PERFORMANCE

Vermont's program, much like Maine's, is quite successful relative to peer states.

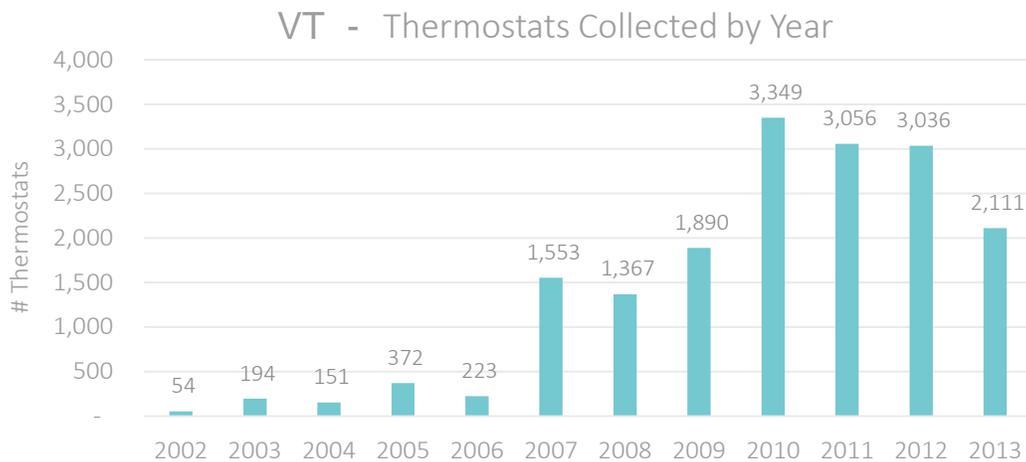


Figure 3. Thermostats Collected in Vermont

## NEW HAMPSHIRE

Mercury generation in the New Hampshire solid waste stream began receiving increased attention in the late 1990s, with particular interest in the state municipal waste combustors that have made strides to reduce levels of mercury emissions. RSA 149-M:53 was passed in 2001 which banned the sale of certain mercury products including thermometers and toys, and was amended in 2007 to also prohibit the sale of mercury -added thermostats. At the same time, RSA 149-M:58 was passed as a measure to ban the disposal of all mercury products in municipal solid waste. RSA 149-M:58 required a recycling program and outreach be launched, and TRC was approved in 2009 to implement the program. Since TRC had long been active in the state through voluntary participation, the majority of thermostat manufacturers joined TRC to fulfill their obligation under the new law. TRC staff made visits to nearly thirty distributors in New Hampshire in 2012 to provide technical assistance and assess participation.

## NEW HAMPSHIRE PROGRAM PERFORMANCE GOALS

The legislation does not set any target goals for collection, in either pounds of mercury or number of thermostats.

## NEW HAMPSHIRE PROGRAM PERFORMANCE

The TRC take-back program has been provided on a voluntary basis since 2001, and by 2008, 546 thermostats and 4.3 pounds of mercury were recovered. In 2009 when the program became mandatory, 790 thermostats containing 5.2 pounds of mercury were captured. Similar to Vermont, the New Hampshire Department of Environmental Services, which enforces the law's requirements, has commented on the challenge associated with estimating the total stock of thermostats containing mercury, while making a baseline for program performance and longevity of a difficult task.

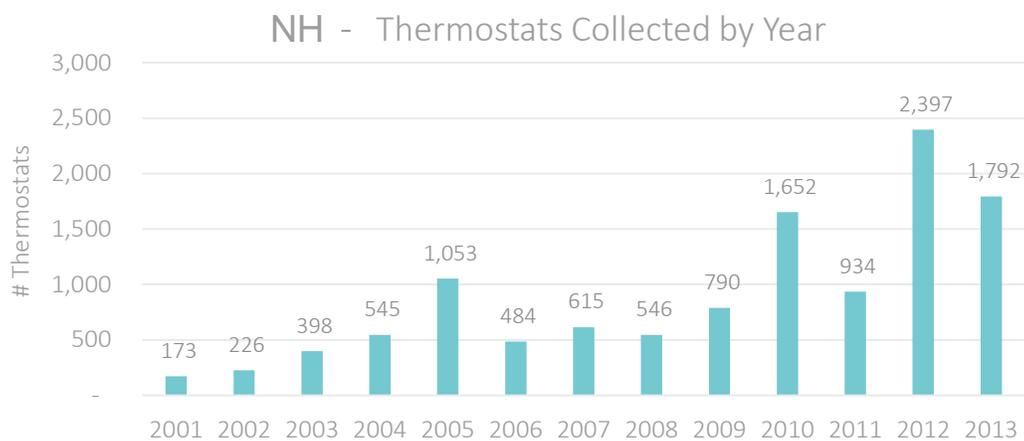


Figure 4. Thermostats Submitted by New Hampshire

## RHODE ISLAND

Rhode Island's Mercury Reduction and Education Act implemented a ban on sales and disposal of mercury added thermostats in July 2006. In 2010, the law was amended, requiring manufacturers to assume the expense of recycling these thermostats and provide collection containers to all qualified contractors, wholesalers, retailers and local governments. More specifically, in February 2011, all wholesalers were not to sell thermostats without concurrently acting as a collection site for replaced thermostats. Wholesalers and distributors were also responsible for consumer education by posting visible signage at counter locations. Manufacturers were instructed to provide wholesalers and distributors with this signage, written materials that could be reproduced and distributed, as well as advertising and communications about collection opportunities targeted at consumers. At the same time, any manufacturer that is out of compliance with the law is prohibited from selling thermostats in Rhode Island, and wholesalers and retailers are prohibited from distribution or selling any brand of thermostat offered by a manufacturer that is not in compliance with the law. To provide technical assistance and encourage participation, TRC staff visited over 30 wholesale locations in both 2012 and in 2013.

## PROGRAM PERFORMANCE GOALS

The Rhode Island Department of Environmental Management (RIDEM) set collection goals based on number of thermostats recovered. The initial goal in 2011 was 2,000 thermostats, with the target increasing to 2,500 by 2014.

## RHODE ISLAND PROGRAM PERFORMANCE

Rhode Island's rate of collection has seen drastic improvement since TRC implemented the mandatory program in 2011. TRC's intense focus in the state was rewarded as met its goal.

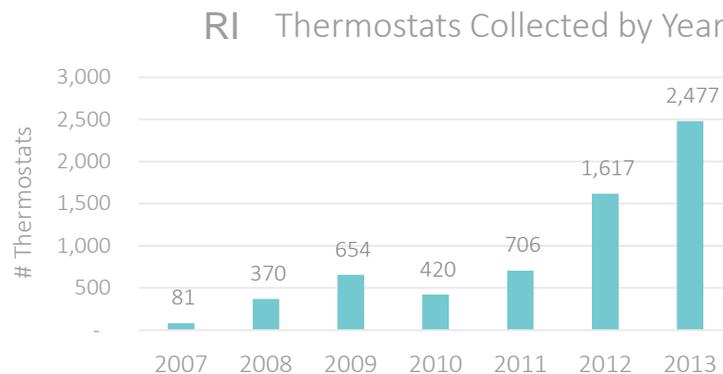


Figure 5. Thermostats Submitted by Rhode Island

## ESTIMATING CAPTURE RATES

Setting reliable targets for mercury collection performance standards through mandated collection programs, while placing full responsibility on manufacturers, is a difficult task, as there is a significant margin of uncertainty as to the size of the inventory of thermostats. The methodology for estimating the number of thermostats being removed from service annually should be tailored to specific state conditions. For instance, Vermont's agency indicated their state has the oldest housing stock in the United States, and the local ethic of maintenance and repair likely sees a lower replacement rate than comparable states. Additionally, the housing boom of the early 2000's might have seen an increased volume of older thermostats be replaced with newer models, leaving the stock of remaining thermostats significantly lower than projections made prior to the housing boom might suggest.

Nationwide collection data from TRC in 2013 saw bin returns hold steady while actual amounts of mercury recovered fell. This nationwide trend is mirrored in New England. If this trend holds in 2014, in light of continued outreach efforts and increased state-led policy, it suggests that inventory of thermostats is likely to be decreasing, and returns are likely to continue to diminish.

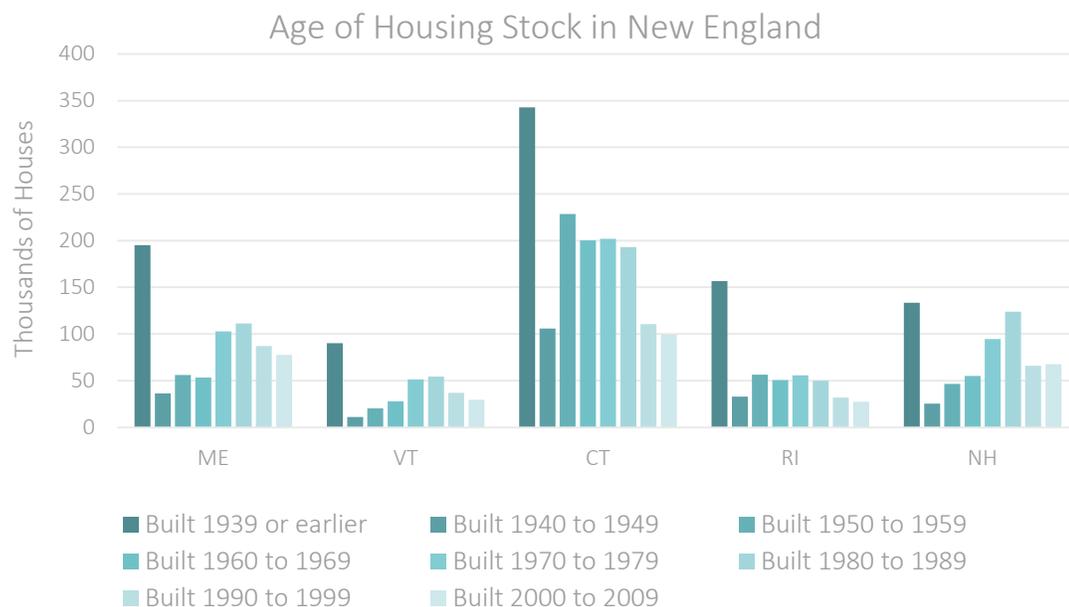


Figure 6. Comparative Age of New England Housing Stock

## REVIEW OF CONNECTICUT'S PROGRAM

### STATUS QUO

Currently Connecticut's voluntary program is underperforming relative to peer states on a per-capita basis. Recovery peaked in 2009, in terms of pounds of mercury collected, although numbers of returned thermostats to TRC has held relatively constant.

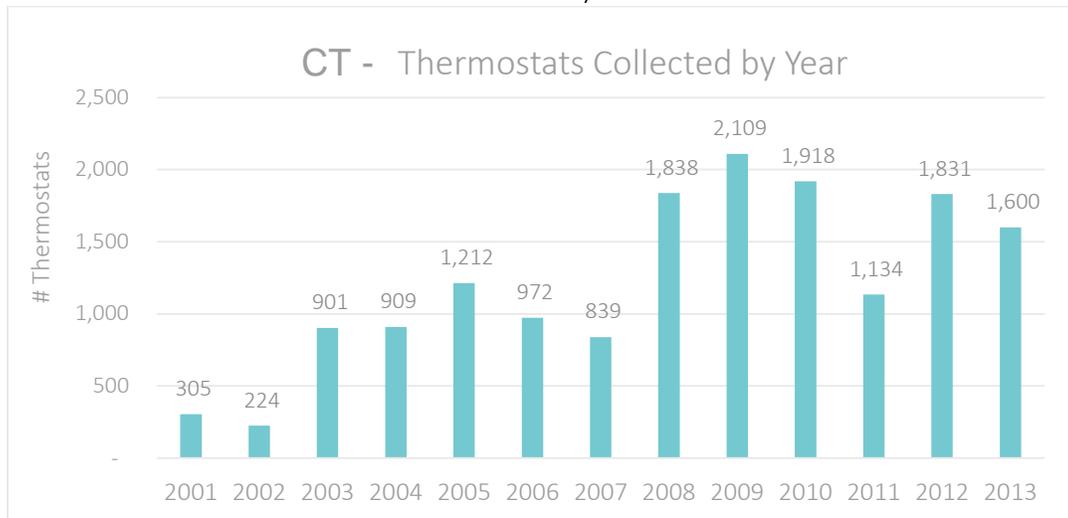


Figure 7. Thermostats Collected in Connecticut

### THE CT STATUTE – CT PUBLIC ACT NO. 12-54

Connecticut's law mandating producer-funded collection of thermostats is very much in line with the other peer states. While the state does not contain a mandatory incentive program like Maine and Vermont, it does include a clause that suggests improvements to the law may be made until 2017, based on the results of the program's initial performance.

## TRC MARKETING & EDUCATION

The TRC has utilized a variety of education and outreach tactics over the last decade, many of which are nationally-focused and targeted towards the public, or towards the HVAC industry channel players in particular. Specific tactics that are implemented regularly include outreach to media organizations for newsletter or article ads, paid advertising in newspapers and public-service announcements placed on a variety of television and radio stations. Working through the state agencies and NGOs, TRC also produces fact sheets and talking points, and press releases for distribution within the industry. The corporation has developed a website that carries state-specific program information and enables searching for regional disposal alternatives.

### MEDIA APPROACHES

#### WEBSITE

TRC's website has state program requirements for the public, including homeowners, contractors, wholesalers and municipalities who are seeking information about nearby collection areas, requirements, and information on how to become a collection point. The website has undergone regular enhancements, with more significant updates in 2012 and 2014.

#### DIRECT MAIL

Direct mail includes postcards mailed to contractors twice annually – at the beginning and middle of heating season. Direct mail has also targeted managers of plumbing companies and wholesalers.

#### ONLINE ADVERTISING

TRC utilizes banner ads and analytics to better track how traffic is routed to the TRC website, assess impressions, and click-through rates. This method is an efficient method of refocusing marketing messages and optimizing advertisements.

#### TRADE SHOWS

The Thermostat Recycling Corporation annually attends a variety of tradeshow throughout United States, consistently informing the heating and cooling industry about their take-back program.

### MISCELLANEOUS OUTREACH & ACTIVITIES

#### COMPETITIONS & AWARDS

In 2011, TRC joined Heating, Air-Conditioning & Refrigeration Distributors International (HARDI) to launch the Mercury Thermostat Recycling Awards, and sent direct mail and email messages to HARDI members to seek participation.

#### SITE VISITS

TRC makes occasional site visits, which are strongly encouraged and deemed effective by state agency representatives. Recent staff additions will facilitate increasing in-person communication.

## STATE-SPECIFIC OUTREACH IN PEER STATES

In addition to national marketing efforts, TRC has implemented a variety of state-targeted outreach approaches to reach local audiences. Some peer state agencies believe targeted messaging is essential, and if all outreach is national and/or regional, performance suffers. TRC has taken steps to message locally and has purchased state contractor listings for direct mailings, but have found that regional channels are often stronger and more effective at reaching certain target audiences including contractors. Below, we give accounts of select targeted outreach activities.

### MAINE

Shortly after the program launched in Maine, TRC reached out to a handful of state organizations for newsletter and ad placements, and coordinated with major newspapers for advertising across the state. In addition to urban centers, rural markets were also targeted across Maine. Environmental nonprofits were sought out, as well as local groups including Maine Plumbing Heating Cooling Contractor Association, the Maine Oil Dealers Association and the Maine Plumbing, Heating Cooling Contractors Association. In 2009, TRC launched a promotional campaign for Maine homeowners. In conjunction with TRC's outreach in 2010, the state agency in Maine sent letters to over 9,000 licensed contractors drawing attention to the retail program; however, the effort did not appear to significantly boost retail returns.

### RHODE ISLAND

TRC sponsored the 2012 Annual Convention of the National Association of Oil and Energy Service Professionals. While this is a national group, the meeting had a particular impact on the Rhode Island energy service trade since it was located in Providence. Additionally that year, Rhode Island was selected (in addition to CA and IL) as a pilot state for an advertising campaign that targeted consumers; for this campaign a large, prominent banner ad was placed in the Providence Journal. TRC directed even more attention to RI in 2013, making site visits at nearly every wholesale location in the state, and meeting directly with many state HVAC businesses.

### VERMONT

The Vermont state agency took a very active approach to direct wholesaler outreach and engagement at the launch of the program in 2009, which had positive impacts on initial compliance. In addition, the department voluntarily paid the initiation fee to provide bins to all wholesalers which later assisted their future efforts to track and follow up with particular HVAC stores that did not carry bins. TRC provided a variety of messages to the Vermont market, such as including biannual postcards targeted to HVAC contractors, which was a requirement in the plan.

The Vermont DEC also assisted the TRC in obtaining mailing lists for all licensed master plumbers in the state, facilitating the program's direct mailing of colored postcards twice over late summer and early fall 2009. In 2010, TRC reached out to targeted VT groups for partnership and support; groups included the state energy office, the Vermont Fuel Oil Dealers Association and the

demolition association. Additionally, banner ads we placed on a variety of newspaper websites, and beginning in 2011 there was a highly-visible social media campaign and new posters were added to the toolkit.

#### NEW HAMPSHIRE

At the beginning of the New Hampshire mandatory program in 2008 and 2009, both the Department of Environmental Services and the TRC worked together to provide outreach and education to various members of the HVAC channel. During 2009, wholesaler involvement jumped by 400% from the previous year, up to a total of 56 participation locations. NH licensed plumbers were mailed postcards encouraging them to inquire about thermostat recycling at their local wholesale outlet. Mailings went out twice – in late summer and early fall as is seasonal for these mailings. TRC reached out to various stakeholders in New Hampshire, seeking to have information on thermostat recycling included in their promotional materials. These groups included the New Hampshire Plumbing and Mechanical Contractors and the Oil Heat Council of New Hampshire.

# CONCLUSIONS & RECOMMENDATIONS

## EXPECTATIONS FOR ROLL-OUT OF MANDATORY PROGRAM

In order to get a better sense of how Connecticut's program might be expected to perform, RRS examined performance trends in the first five years of each peer program. On average, peer state collections grew by 65% over the first five years. Looking at these trends it is possible to apply them to Connecticut's current collection data to yield an estimate of potential growth over the first five years of the mandated program.

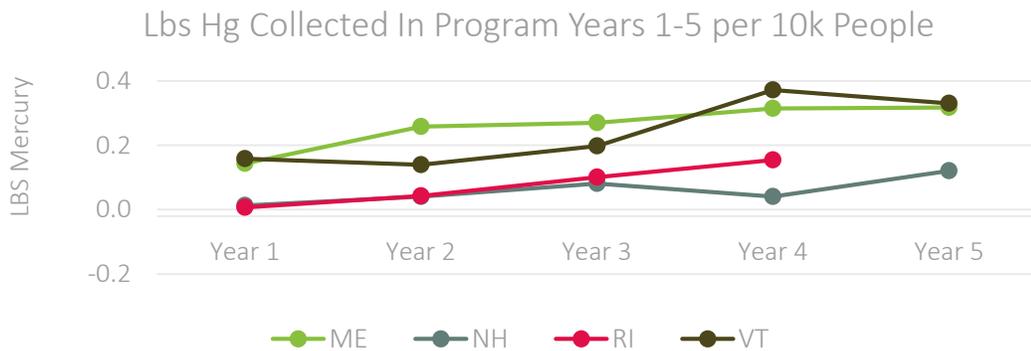


Figure 8. Lbs Mercury Collected in Peer States

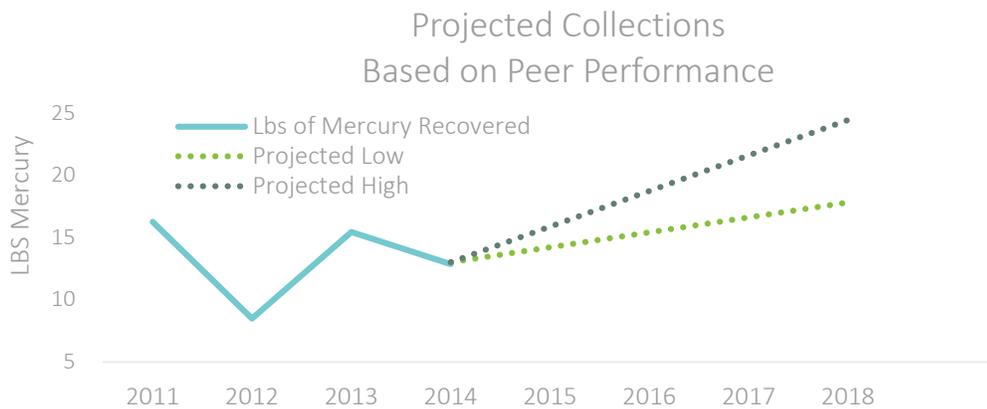


Figure 9. Projected Collection Volume in Connecticut

## RECOMMENDATIONS AND OBSERVATIONS

The TRC was formed in 1998, and has steadily become the dominant channel for recovery of replaced thermostats. In looking at remediation of these devices throughout Connecticut's peer states in New England and beyond, it is evident that better data is needed to develop a baseline for program performance. Studies have been commissioned by TRC in the past to provide estimates, and while this is a step in the right direction, each state needs to inform their predictive models in a way that can include their own unique assumptions.

### WHOLESALE ENGAGEMENT

RRS conducted interviews with 15 HVAC wholesalers throughout Connecticut. Our findings indicate that participation is nearly unanimous among wholesalers, as these players maintain bins in their stores. Bin location varies from store to store, with some shops keeping the bin conveniently located behind the counter, some stores maintaining the bin in the stockroom or warehouse, and other locations placing the bin visibly out in the open where it can be easily seen by contractors and/or technicians as they shop in the facility.

While nearly every wholesaler participates in the program, the majority of these participants have received very few thermostats from contractors. These results are an indication that significant gains might be attained by boosting the engagement and participation of contractors. The TRC has employed a variety of means to achieve this goal in different states, including a variety of education and outreach efforts as described above, leveraging incentives through coordination with local utility energy efficiency incentive programs, raffle prizes tied to thermostat donation, and monetary incentives in the form of store coupons. Incentives have proven to be an effective means of boosting participation, but the type of incentive requires further study to ensure it is cost-effective to implement relative to incremental gains.

### ENGAGING RETAILERS

RRS conducted interviews with several retail locations that are known to participate in the program. These hardware store participants have bins and are happy to participate in the program. These retailers expressed the need of ease of implementation as a top priority, as employees are fully occupied selling products and helping customers. One location stated they have had a steady stream of thermostats coming in, however the majority of thermostats that were found in the bin were delivered as a single batch. Similar to the other retail locations we surveyed across the five states, these retailers indicated they would be willing to build awareness by making program messaging more visible to customers by placing a sign on the counter or elsewhere.

Retailers did not find the coupon rebate program to be burdensome or inconvenient, and are readily willing to fulfill the redemption requirements. It became evident, however, that retailers did not seem to understand how the program functions, or who exactly funds the coupon

reimbursements. We found that most employees believed the state of Connecticut funded the program.

#### ENGAGING CONTRACTORS

The producer responsibility program mandates that manufacturers fully fund, market and administrate the program, and wholesalers generally have very little financial obligation outside of nominal bin purchases, door stickers and posters. Contractors single-handedly have the biggest impact on capture rates, and through reviewing available data and conducting interviews, the evidence suggests that these stakeholders are not recycling these devices.

In the past, TRC has suggested that other states explore approaches that would require HVAC contractors to certify compliance with disposal regulations, and use the process to engage in enforcement among other stakeholders. TRC does not have authority to enforce participation, and contractors presumably understand that there is little risk of noncompliance penalties; wholesalers have reinforced the sentiment that contractors, overall, are not motivated to comply. According to the opinions of these numerous stakeholders, reasons for noncompliance may include skepticism about the dangers of mercury to the environment or human health, lack of concern for the environment, and inconvenience of collection and return. Regardless of the specific motivation, it is clear that to achieve more meaningful mercury thermostat capture rates, significant attention will have to be given to incentivizing contractors and technicians.

#### MOTIVATION THROUGH INCENTIVES

The collection data in Maine and Vermont, when compared with data from peer states, suggests that Incentives can be a highly effective tool to drive participation by technicians, contractors, and other end users.

Our research indicates that the monetary incentives are often not implemented according to the intent of the law. For instance, we found wholesale operators in neighboring states who were collecting these thermostats to return for a fee, presumably over state lines.

Anecdotal evidence suggests that many thermostats appear to be returned by individuals that are not removing them directly from service and delivering to collection points, but rather giving them to an individual who is not a technician or homeowner, who may return them in bulk to collect multiple coupons. TRC has discovered significant instances where wholesaler employees collect thermostats without remitting a \$5 coupon in return, only to personally submit the thermostat for their own redemption. Vermont's law prohibits this practice.

Retailers who participated in our peer state stakeholder interviews voluntarily participate in the TRC program, and recently received new in-store coupons to distribute. These \$5 coupons were originally intended for homeowners and as a system not unfavorable to retailers. However, there

were stories of contractors who would, on occasion, return a bucket of thermostats and immediately redeem the aggregate stack to subsidize an expensive in-store equipment purchase. This practice was unfavorable to retailers, and reflected poorly upon the program as being unaligned with the program's intent.

#### RECOMMENDATIONS FOR INCENTIVES

RRS recommends continued exploration of cost effective and meaningful incentives for participation. Previous incentive-based case studies conducted in Washington (\$4) incentive, Oregon (\$4) and Indiana (\$3), gave an indication that higher rebates may bring about more participation. Since other aspects of the pilots varied, however, there is uncertainty around the incentive price elasticity. We anticipate that a lower incentive would still have a strong impact, and our interviewees consistently indicated that even \$1-\$2 per thermostat may be sufficient. More research should be conducted to better determine the total cost accounting effectiveness.

In addition to rebate value, we recommend that more research be conducted on various structures of incentives targeted at contractors and technicians. Our research indicates that other strategies for incentives would likely be far less costly to administer and more effective for the purpose of incentivizing returns. Since incentive payments are made months, or even years, after a contractor returns the devices, the current rebate system likely has limited impact as an incentive to recycle. TRC has explored other motivational strategies that show potential to be more cost-effective; these include raffles or drawings for scratch-off tickets tied to more significant prizes conducted for distributors and tradespeople, or coupon marketing partnerships with a retailer that has an interest in co-branding to this demographic. Some wholesalers suggested an effective approach might include distributing coupons for food or drinks at popular donut shops in New England.

## FINAL THOUGHTS

#### PRODUCER RESPONSIBILITY FOR MERCURY THERMOSTATS

There has been considerable discussions in recent years questioning if existing thermostat take-back programs are effectively reducing the amount of mercury that is disposed. According to estimations by the EPA, approximately 2-3 million mercury-containing thermostats come out of service each year. At an average of 3g of mercury per device this implies that between six and nine tons of mercury is being disposed of on a yearly basis. These numbers are commonly cited from an EPA paper written in 2002, referencing thermostat disposal trends from the early 1990s; a concern exists that the numbers are dated. It is likely that many of these thermostats have been replaced now, and an unknown fraction of those 2-3 million thermostats actually contain mercury. We recommend that states invest the appropriate resources to study and build updated models to assess the inventory of mercury containing thermostats.



In every state that has implemented a mandatory thermostat take-back program, manufacturers bear full responsibility for both operational and fiscal aspects of the program. This situation is rather unique for thermostat manufacturers; unlike other product stewardship programs for hazardous or hard-to-recycle materials, responsibility is not shared by other stakeholders such as wholesalers, retailers and consumers. For instance, paint stewardship programs similar to the program that was established in 2011 in Connecticut, typically empower the manufacturer to incorporate a fee to the consumer which is directed towards proper end-of-life disposal. Manufacturer-implemented programs for car batteries and tires also benefit from support of disposal fees paid by consumers.

Material recovery approaches must be embraced by all stakeholders to be truly effective. The TRC has successfully developed a collection and return program that is simple and practical for intended participants. We have found that wholesalers are very willing to participate, appreciate the simplicity of the program, and are ready to actively increase the presence of educational materials displayed in stores. Despite willingness to participate in collection, many feel they just don't receive returns from contractors.

We have found that opportunities exist for TRC to expand its state program impact and to broaden and reinforce its message. To maximize success, the TRC, state governments, wholesalers and contractors must all play a strong role in delivering the messaging and motivation that will continue to drive the return of these devices.

# APPENDIX

## THERMOSTATS & MERCURY COLLECTED ANNUALLY BY STATE

<b>ME</b>		
Year	T-Stats Collected	LBs Hg Collected
2001	233	1.7
2002	280	1.9
2003	482	4.5
2004	1,079	9.8
2005	1,492	16.9
2006	2,924	21.8
2007	4,656	36.9
2008	5,555	38.5
2009	6,374	44.5
2010	6,523	44.9
2011	4,547	32.2
2012	6,679	46.5
2013	4,213	29.5
<b>Grand Total</b>	<b>45,037</b>	<b>329.6</b>

<b>CT</b>		
Year	T-Stats Collected	LBs Hg Collected
2001	305	2.5
2002	224	1.5
2003	901	6.4
2004	909	6.9
2005	1,212	12.5
2006	972	8.0
2007	839	7.4
2008	1,838	17.8
2009	2,109	22.4
2010	1,918	16.2
2011	1,134	8.5
2012	1,831	15.4
2013	1,600	12.9
<b>Grand Total</b>	<b>15,792</b>	<b>138.3</b>

<b>NH</b>		
Year	T-Stats Collected	LBs Hg Collected
2001	173	1.1
2002	226	2.1
2003	398	3.5
2004	545	4.0
2005	1,053	7.9
2006	484	3.9
2007	615	4.8
2008	546	4.4
2009	790	8.0
2010	1,652	13.3
2011	934	8.0
2012	2,397	18.6
2013	1,792	13.2
<b>Grand Total</b>	<b>11,605</b>	<b>92.7</b>

<b>VT</b>		
Year	T-Stats Collected	LBs Hg Collected
2002	54	0.4
2003	194	1.6
2004	151	1.2
2005	372	3.0
2006	223	2.0
2007	1,553	11.1
2008	1,367	10.0
2009	1,890	13.6
2010	3,349	24.5
2011	3,056	21.9
2012	3,036	25.8
2013	2,111	15.5
<b>Grand Total</b>	<b>17,356</b>	<b>130.7</b>

<b>RI</b>		
Year	T-Stats Collected	LBs Hg Collected
2007	81	0.7
2008	370	2.9
2009	654	7.4
2010	420	2.8
2011	706	6.5
2012	1,617	12.6
2013	2,477	18.2
<b>Grand Total</b>	<b>6,325</b>	<b>51.3</b>

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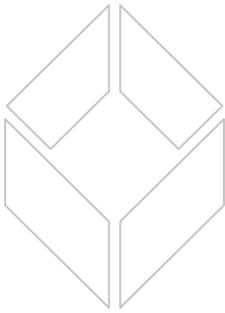
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# ABOUT RRS



## MANAGING CHANGE IN A RESOURCE-CONSTRAINED WORLD

RRS is a consultancy with a vision. We see a world where resources are managed to maximize economic and social benefit while minimizing environmental impact. A world where abundance keeps pace with societal needs.

We have assembled a unique team of strategists, engineers, economists and communications specialists with core strengths in materials and recovery, coupled with expertise in life cycle management and applied sustainable design. These experts operate confidently across the supply chain, identifying the most leveraged opportunities to affect change, and developing pathways to long-term value.

RRS has been working toward this vision since 1986. Our clients are leaders in materials management, and in partnership we have achieved outstanding results. We remain nimble and responsive, providing informed, innovative, actionable solutions to the sustainability challenges of our time.