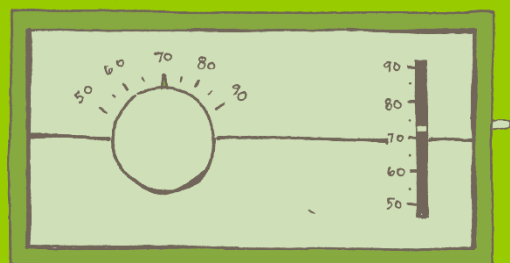
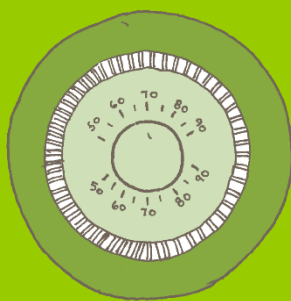


# 2021 ANNUAL REPORT

## PENNSYLVANIA



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# THERMOSTAT RECYCLING CORPORATION GOVERNANCE (AT CLOSE OF 2021)

## Thermostat Recycling Corporation Board Members

Arnie Meyer (Chairman)  
*Resideo / Honeywell Home (f/k/a Honeywell)*

Charles Ketterer (Vice-Chairman)  
*Emerson Technologies (White Rodgers)*

Bob Johnson (Treasurer)  
*Lennox Industries*

Loretta Damron (Secretary)  
*STLPC Corporation (f/k/a Lux Products Corporation)*

## Thermostat Recycling Corporation Dues Paying Members

Bard Manufacturing	Burnham Holdings	Carrier Corporation
ecobee Inc.	Empire Comfort Systems	General Electric
ITT	Lennox International Inc.	Nest Labs
Nortek Global HVAC, LLC	Rheem Manufacturing	Johnson Controls Inc.
TPI Corporation	Trane Residential Systems	White-Rodgers (Emerson)
	W.W. Grainger	Chromalox
Climate Master, Inc.	Crane Company	Goodman Global
Honeywell Home	Hunter Fan Company	STLPC Corporation (f/k/a Lux Products Corporation)
Marley-Wylain Company	McQuay International	Schneider Electric (Invensys)
Dwyer Instruments	Taco Comfort Solutions	Uponor

## Thermostat Recycling Corporation Staff

Ralph Vasami  
*Executive Director*

Danielle Myers  
*Operations and Compliance Manager*

# LETTER FROM THE EXECUTIVE DIRECTOR

As anticipated, TRC experienced a modest increase in national collections in 2021. While the COVID-19 pandemic continued, most businesses returned to some sense of normal, including TRC. Our outreach activities were able to be utilized to the full extent. The program continues to work in new and interesting ways to keep collecting mercury-containing thermostats and responsibly recycling every mercury thermostat collected every time. While 2021 collections were up 5% over 2020, it is important to remember that TRC collects and recycles a product that has not been sold in the marketplace since 2007; and as there is a decreasing number of mercury-containing thermostats in use, our collections will continue to decline.

In 2022, TRC will continue to target mercury thermostat collections and work with our partners in the HVAC industry, the waste sector, the energy sector and the regulatory community to achieve positive results. For a program such as TRC's to be successful year after year, we require support from our industry members, collection partners, marketers, allied industries, regulatory agencies and staff. These strategic partnerships allow TRC's effectiveness to grow as it continues to move forward successfully in the collection and proper disposal of mercury-containing thermostats.

We are happy to provide you with this year's annual report. Please do not hesitate to contact us with comments or questions.



A handwritten signature in black ink, appearing to read 'Ralph Vasami', with a stylized flourish at the end.

Ralph Vasami

Executive Director

# PENNSYLVANIA

## 2021 Collections and Evaluation

The following analytical report details the annual program performance for mercury thermostat collection in the state of Pennsylvania in 2021. A few of the program highlights for 2021 are included below:

- In 2021 the program **collected 81.2 lbs. of mercury** in Pennsylvania. Since 2001, the annual quantity of mercury collected in Pennsylvania has averaged 79.1 lbs.
- The program collected **7,572 whole thermostats in 2021**. This was a 32% increase over the number of thermostats collected in 2020. Since 2001, the average thermostat count per year is 8,233.
- The **number of whole thermostats collected per bin in 2021 was 48 thermostats**, a decrease from 49 in 2020.
- The counties with the most bins and thermostats returned in 2021 were **Montgomery County (16 bins, 1,170 thermostats)**, **Lehigh County (13 bins, 782 thermostats)**, and **Bucks County (15 bins, 639 thermostats)**.
- In 2021, **45% of the partner locations returned at least one bin**.
- **A total of 86 'Miss You' calls were placed and 48 site visits in 2021** which identified a positive relationship between activities and bins returned.
- In addition to 7,572 whole thermostats, **2,586 loose switches were collected, bringing the total number of "thermostat equivalents" returned in 2021 to 9,435**, an increase of 58% from 2020.

## Section 1: Program Analytics

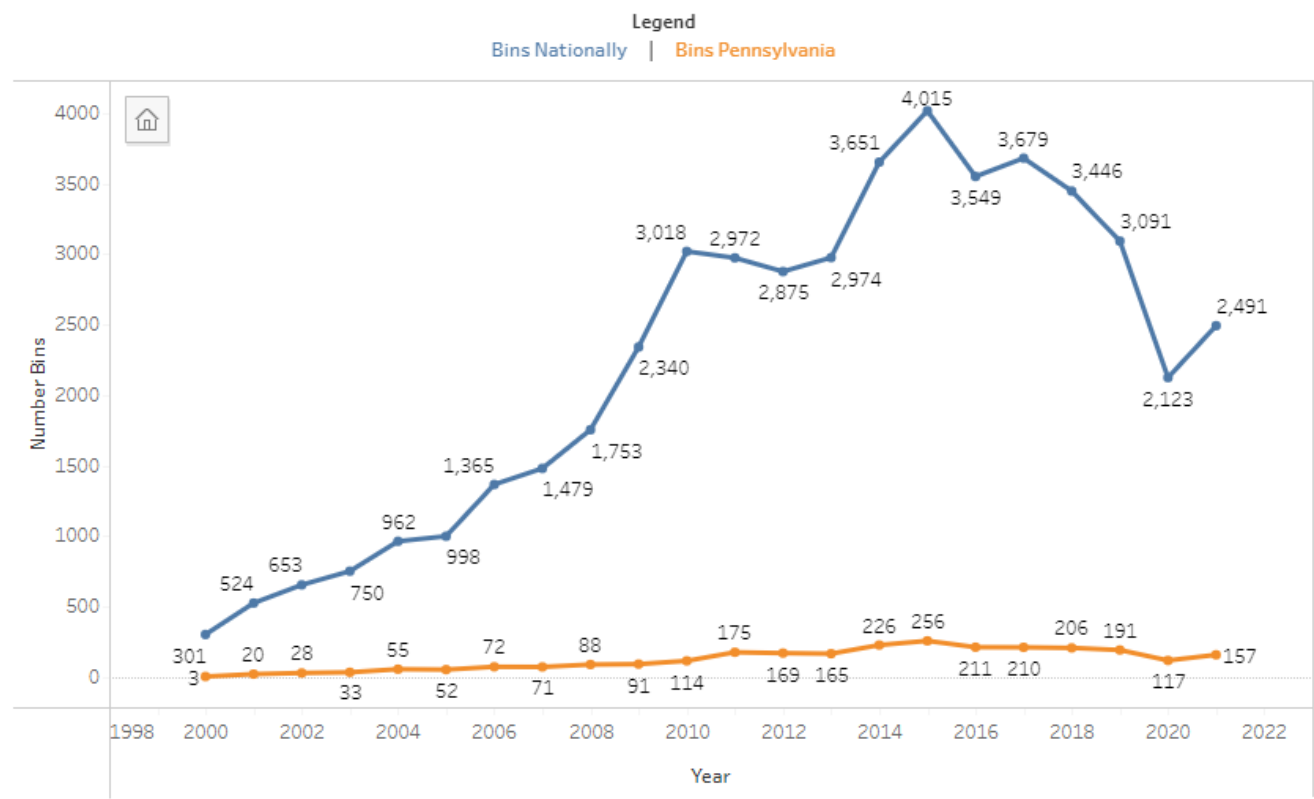
Section 1 of this report examines the annual performance of the thermostat collection recycling program in terms of bins, thermostats, and mercury collected as well as the year-over-year progression of the program. On average, the program has collected 79.1 lbs. of mercury and 8,233 whole thermostats per year since 2001. In 2021, the program collected 81.2 lbs. of mercury from 7,572 thermostats and 2,586 loose switches. Figure 1 below displays the total number of bins, the total number of thermostats, and the quantity of mercury collected in Pennsylvania since the beginning of the program.

Figure 1 - Program Performance Over Time

Year	Number Bins	Number Thermostats	Mercury (Lb)
2001	20	1,632	16.8
2002	28	2,242	25.8
2003	33	2,548	25.8
2004	55	4,632	46.2
2005	52	4,968	46.0
2006	72	7,019	59.4
2007	71	6,175	64.2
2008	88	7,560	72.2
2009	91	7,320	82.7
2010	114	9,500	99.1
2011	175	14,411	133.2
2012	169	11,406	114.8
2013	165	12,696	119.5
2014	226	14,201	133.0
2015	256	14,338	130.1
2016	211	9,676	88.8
2017	210	10,674	94.4
2018	206	9,763	92.5
2019	191	9,213	80.6
2020	117	5,733	49.4
2021	157	7,572	81.2
Total	2,867	181,129	1,739.4
Average	130	8,233	79.1

Figure 2 displays the number of bins collected in Pennsylvania since the initiation of the collection program, as well as the total number of bins collected in the U.S. over the same period. The number of bins collected in Pennsylvania has generally increased from 2000 to 2011. In 2014, bin returns increased again, peaking with highest number of bins returned in 2015 with 256 bins. In 2021, the number of bins returned was 157 bins.

Figure 2 - Bins Collected Over Time in Pennsylvania and Nationally



The 81.2 lbs. of mercury collected in Pennsylvania in 2021 was 64% higher than the 49.4 lbs. collected in 2020. Figure 3 displays the quantity of mercury collected in Pennsylvania over time as well as the annual percent change in Pennsylvania and nationally.

Figure 3 - Quantity (Lb) of Mercury Collected in Program and Annual Changes to Pennsylvania and Nationally

Year	Mercury (Lb)	% Change Pennsylvania	% Change Nationally
2001	16.8	570%	89%
2002	25.8	54%	14%
2003	25.8	0%	11%
2004	46.2	79%	17%
2005	46.0	0%	11%
2006	59.4	29%	32%
2007	64.2	8%	2%
2008	72.2	12%	16%
2009	82.7	14%	16%
2010	99.1	20%	26%
2011	133.2	34%	4%
2012	114.8	-14%	-5%
2013	119.5	4%	-5%
2014	133.0	11%	13%
2015	130.1	-2%	-1%
2016	88.8	-32%	-15%
2017	94.4	6%	-7%
2018	92.5	-2%	-42%
2019	80.6	-13%	5%
2020	49.4	-39%	-35%
2021	81.2	64%	5%
Average	79.1		



Pennsylvania collected 7,572 thermostats in 2021. This was a 32% increase over the number of thermostats collected in 2020. Figure 4 displays the total number of thermostats collected in Pennsylvania and nationally, and Figure 5 shares the underlying data as well as the calculated annual percent change.

Figure 4 - Number of Whole Thermostats Collected Over Time in Pennsylvania and Nationally

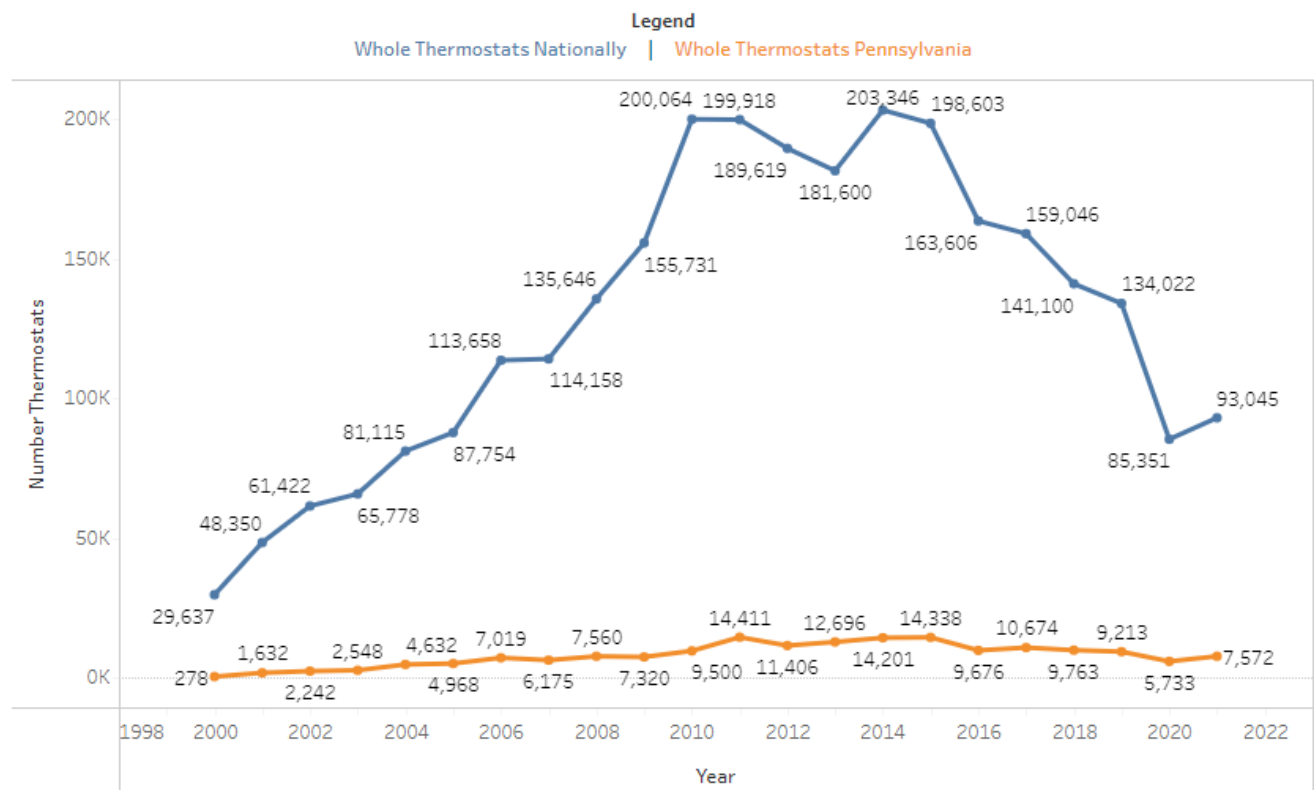
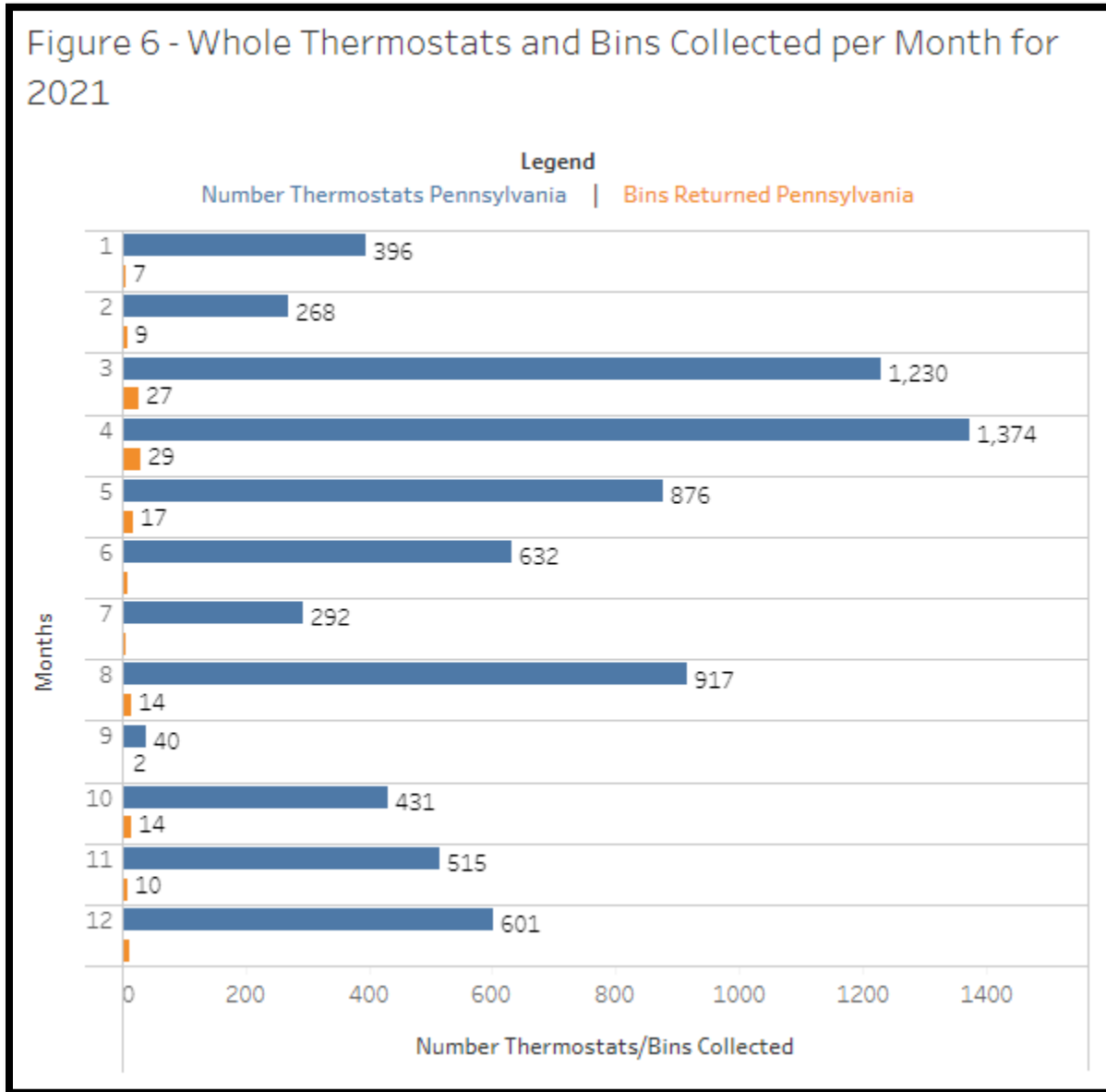


Figure 5 - Whole Thermostats Collected in Pennsylvania and Nationally Over Time and Annual Percent Change

Year	Number Thermostats	% Change Pennsylvania	% Change Nationally
2001	1,632	487%	
2002	2,242	37%	27%
2003	2,548	14%	7%
2004	4,632	82%	23%
2005	4,968	7%	8%
2006	7,019	41%	30%
2007	6,175	-12%	0%
2008	7,560	22%	19%
2009	7,320	-3%	15%
2010	9,500	30%	28%
2011	14,411	52%	0%
2012	11,406	-21%	-5%
2013	12,696	11%	-4%
2014	14,201	12%	12%
2015	14,338	1%	-2%
2016	9,676	-33%	-18%
2017	10,674	10%	-3%
2018	9,763	-9%	-11%
2019	9,213	-6%	-5%
2020	5,733	-38%	-36%
2021	7,572	32%	9%
Average	8,233		

Figure 6 displays the monthly distribution of bins and thermostats collected in Pennsylvania in 2021. The months with the greatest number of thermostats returned were March (1,230 thermostats, 27 bins) and April (1,374 thermostats, 29 bins). The month with the greatest number of bins returned was April (29 bins). Conversely, the month with the least activity in 2021 was September.



The highest number of thermostats per bin returned occurred in June and August (63.2 and 65.5 thermostats per bin each month, respectively). Figure 7 shows the average number of thermostats per bin returned per month for the year.

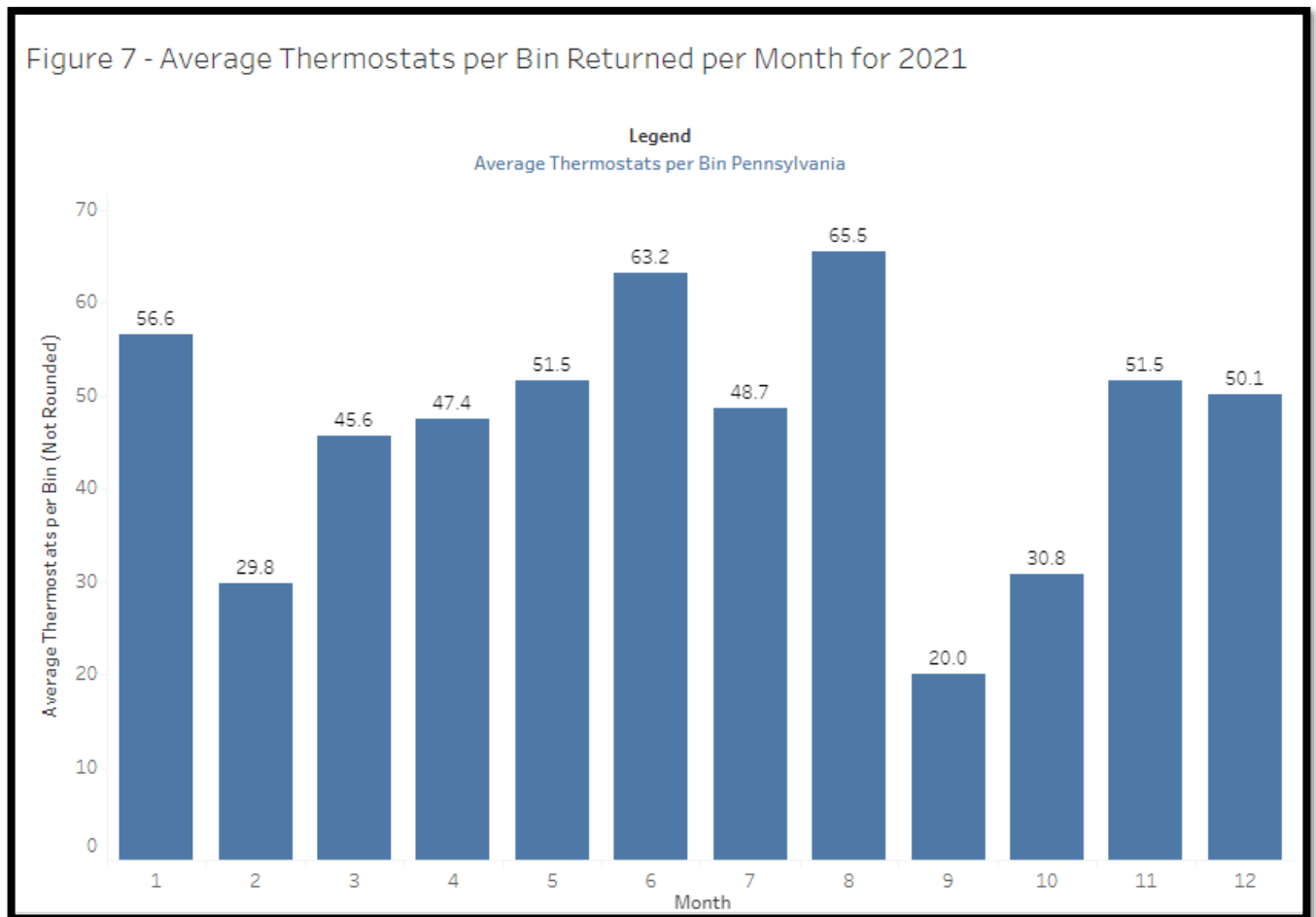


Figure 8 displays the average number of thermostats returned per bin in Pennsylvania and in the U.S. since the beginning of the Pennsylvania program. Nationally, the number of thermostats per bin has been decreasing annually since 2000. In Pennsylvania a similar pattern is observed, with the exception of a few years. The number of thermostats per bin in 2021 (48 thermostats per bin avg.) decreased from 2020 (49 thermostats per bin avg.).

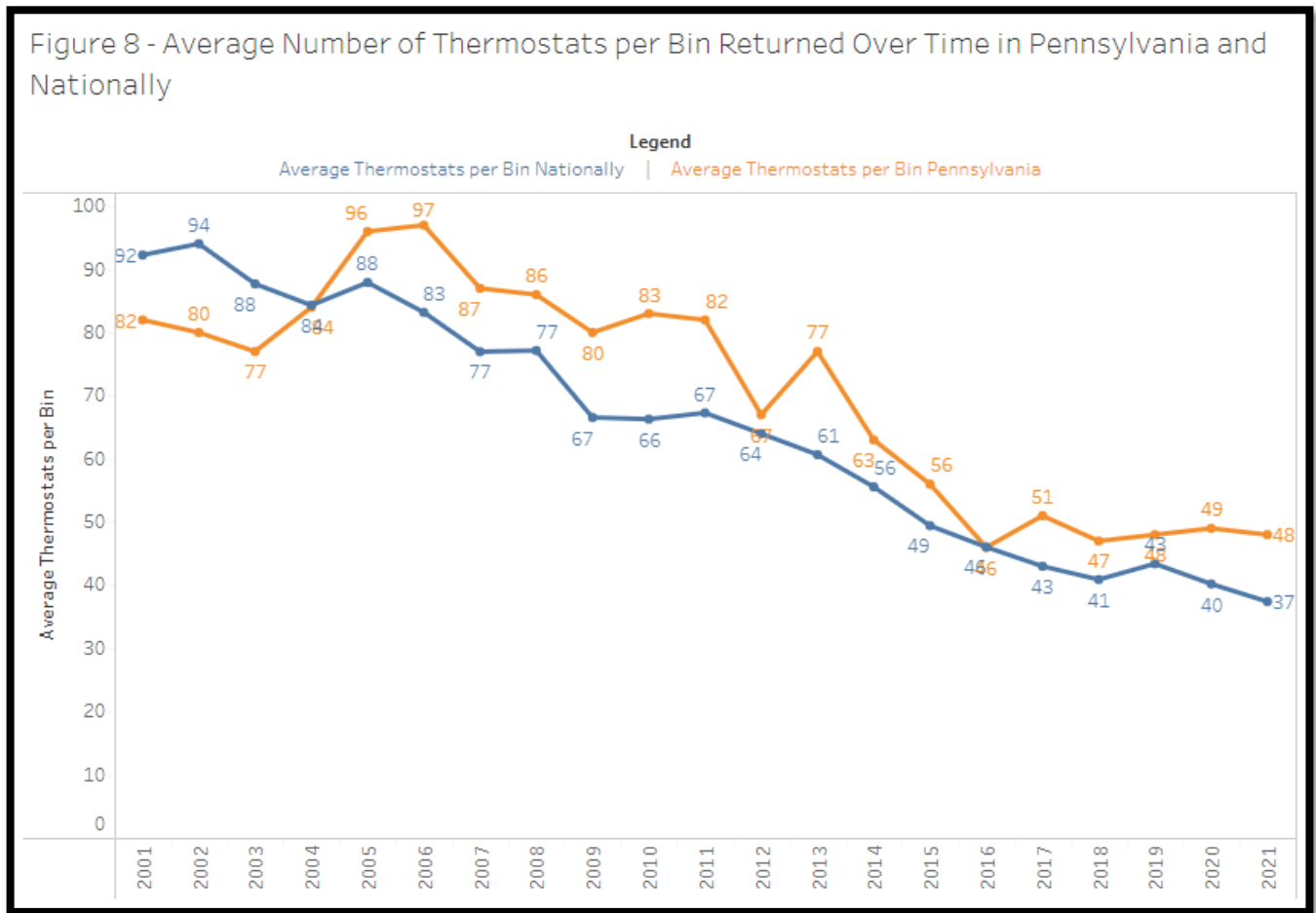
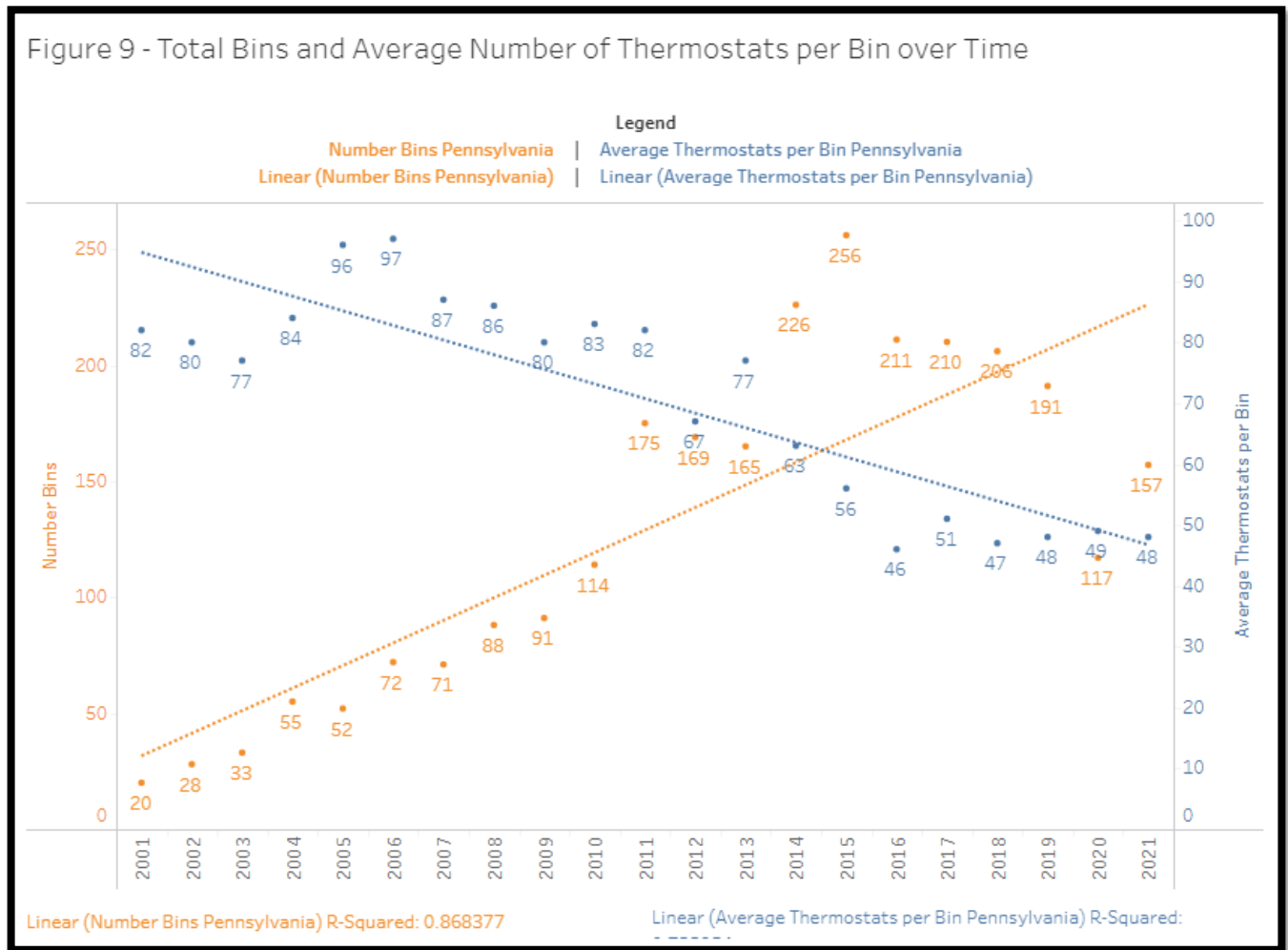


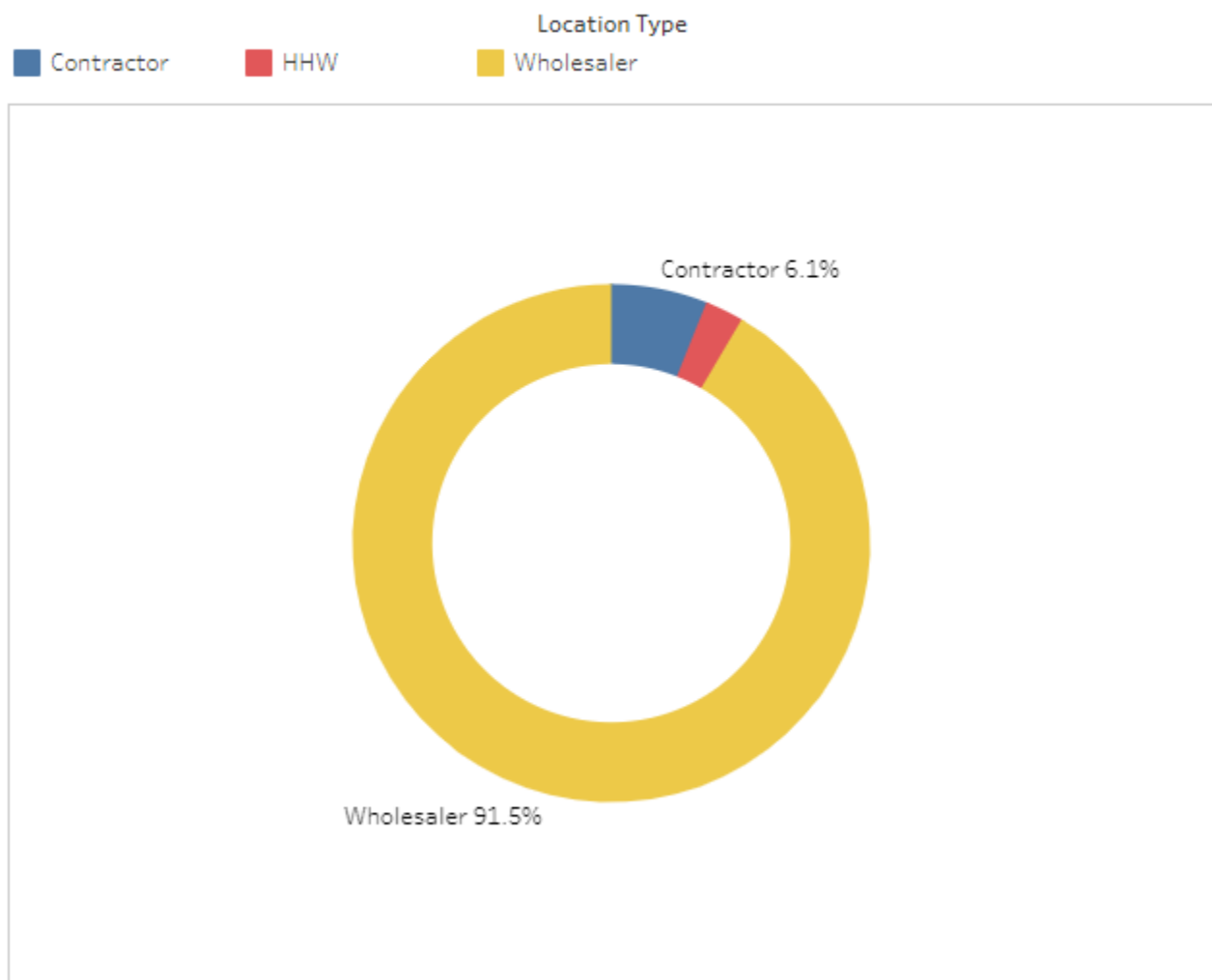
Figure 9 plots the total bins returned over time along with the average number of thermostats per bin over the same period. In general, the number of bins returned in Pennsylvania increased steadily from 2000 to 2015. At the same time, thermostats per bin generally grew until 2006, after which the trend in thermostats per bin dropped. A negative correlation has been identified between the number of bins returned and the number of thermostats per bin.



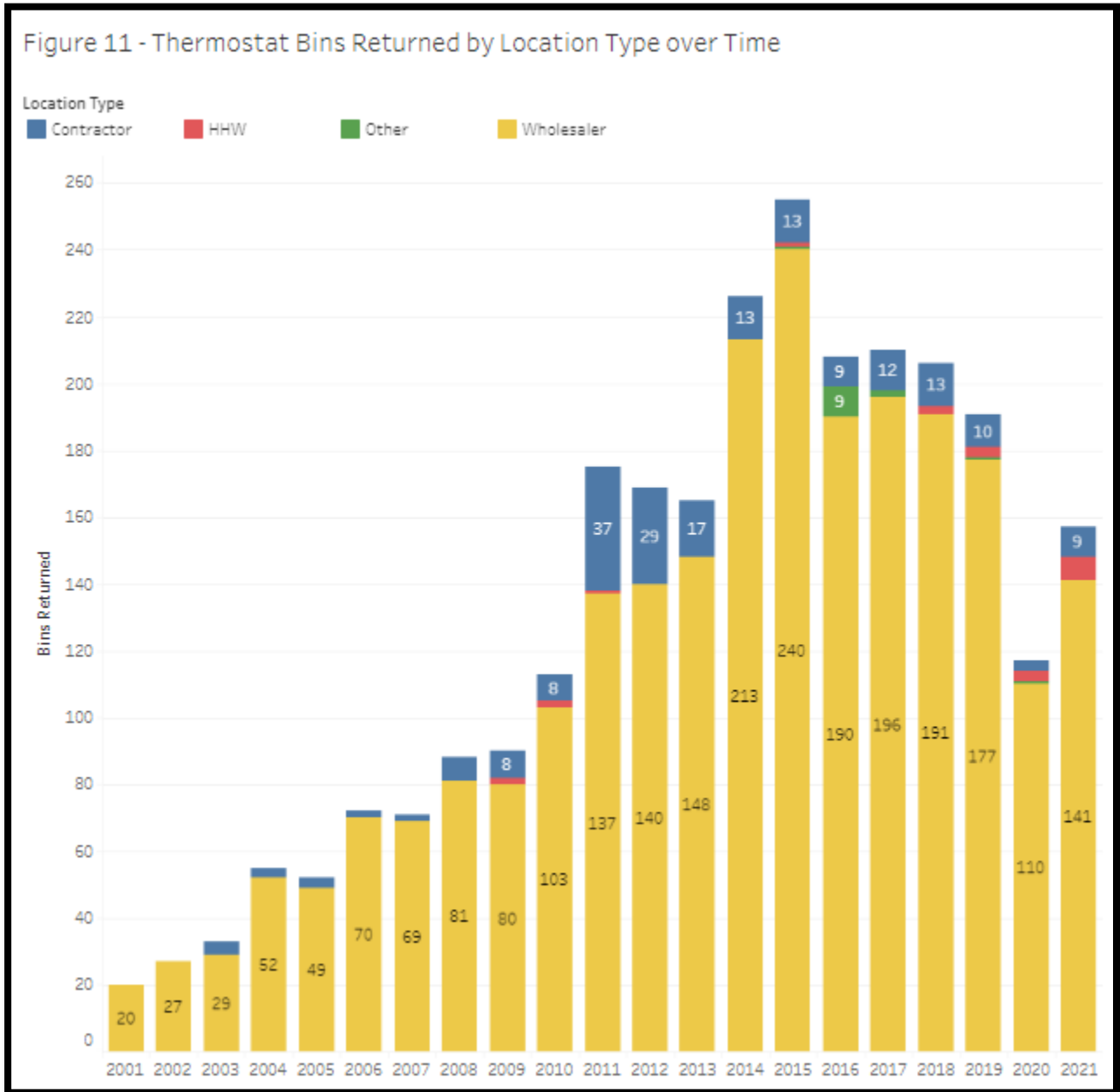
## SECTION 2: Channel Partner Analysis

Section 2 of the report examines the partner locations in more detail. Most thermostats collected in Pennsylvania were through wholesalers (91.5%) with the remaining thermostats collected by contractors and HHWs. Figure 10 shows the distribution of thermostats collected by location type in 2021.

Figure 10 - Thermostats Collected by Location Type in 2021



The number of bins returned in 2021 increased across wholesalers, HHWs and contractors from 2020 levels. Figure 11 displays the change in the number of bins returned by thermostat collection type over time in Pennsylvania.





In 2021, 45% of Pennsylvania locations possessing a collection bin sent back at least one bin for recycling. The distribution is displayed in Figure 12.

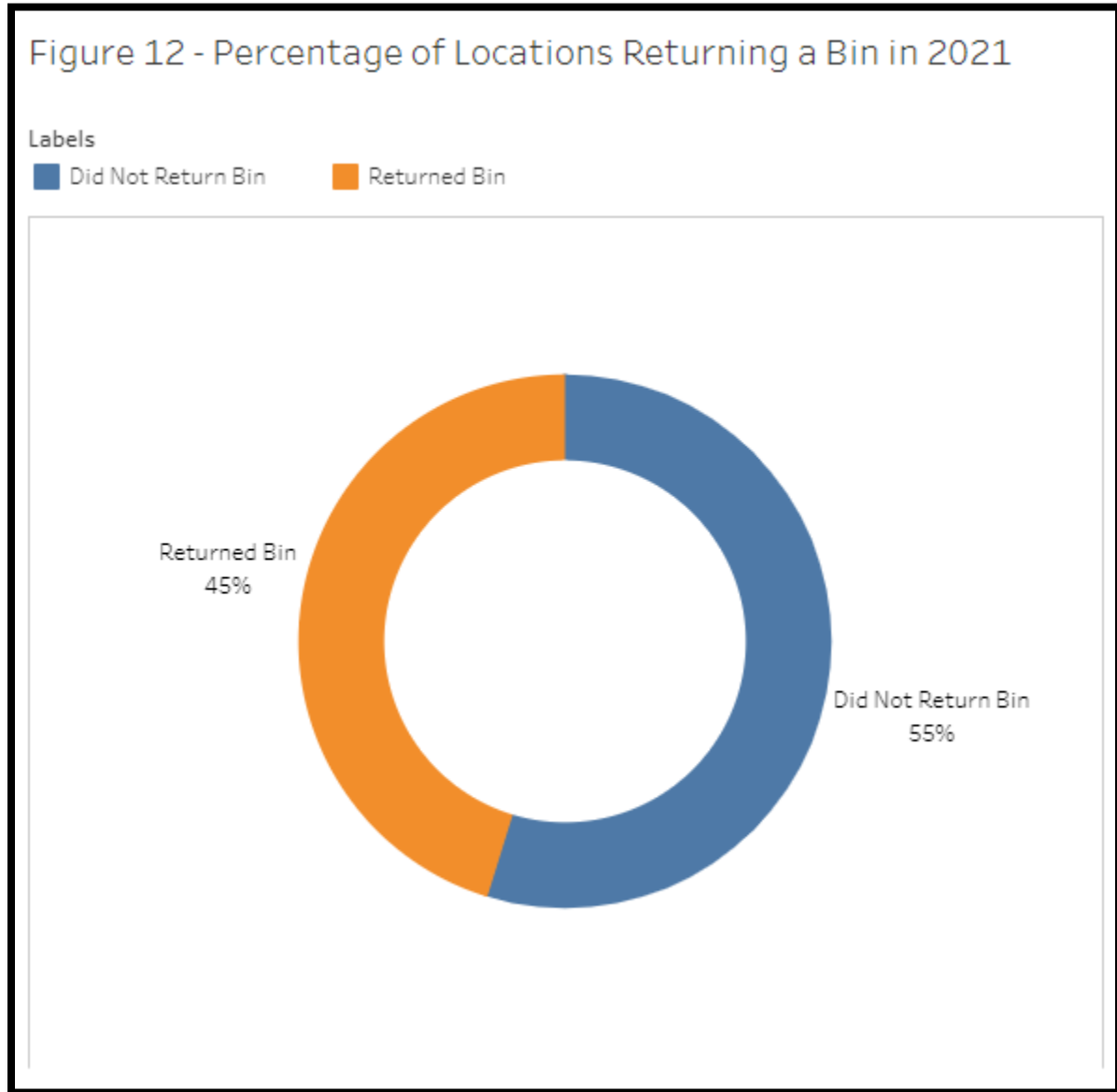


Figure 13 displays the total bins and thermostats returned by county in 2021. An analysis of the top performing counties revealed that Montgomery County (16 bins, 1,170 thermostats), Lehigh County (13 bins, 782 thermostats), and Bucks County (15 bins, 639 thermostats) returned the greatest number of bins and thermostats in 2021.

Figure 13 - Bins Returned and Total Thermostats Returned 2021 by County

	Number Thermostats	Number Bins
Montgomery	1,170	16
Lehigh	782	13
Bucks	639	15
Chester	407	7
Lancaster	383	7
Allegheny	381	9
Berks	348	4
Cumberland	339	5
York	292	6
Northampton	244	3
Philadelphia	243	11
Westmoreland	235	8
Lebanon	234	3
Delaware	201	4
Mercer	151	2
Erie	129	3
Cambria	122	2
Dauphin	119	5
Crawford	104	1
Washington	98	2
Mifflin	92	2
Fayette	91	1
Adams	76	1
Luzerne	72	4
Lycoming	69	2
Somerset	57	2
Bedford	54	1
Blair	53	2
Monroe	51	3
Centre	48	2
Butler	26	1
Indiana	18	1
Franklin	17	1
Lackawanna	12	2
Wayne	4	1
Tioga	2	1

TRC partner R. E. Michel (2,968 thermostats) returned the highest number of thermostats in Pennsylvania in 2021, followed by Johnstone Supply (1,269 thermostats) and APR Supply (540 thermostats). Apart from these locations, 3 program partners returned more than 200 thermostats each. Figure 14 displays the top performers in terms of total thermostats returned in 2021.

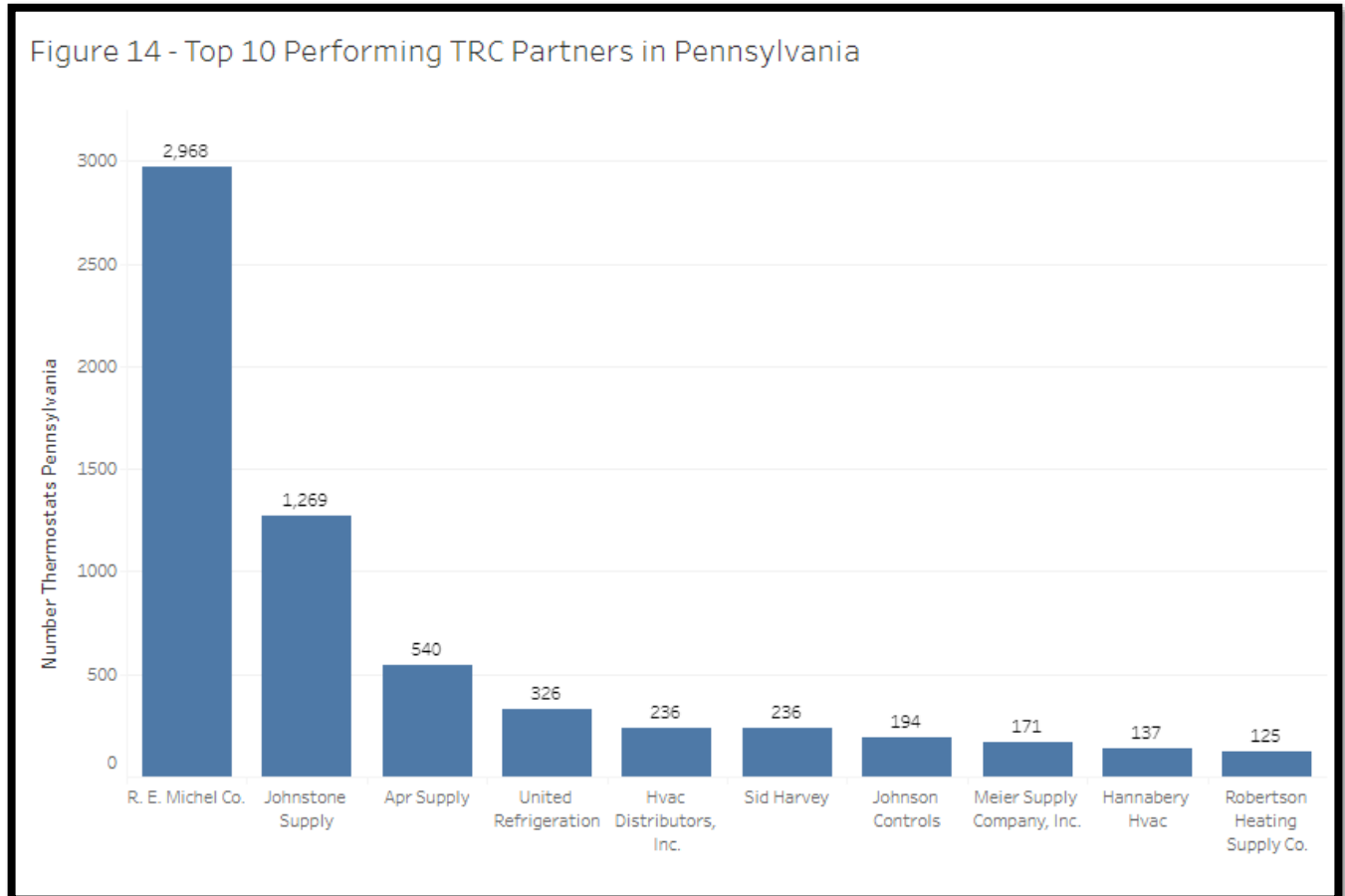


Figure 15 includes the top performers for 2021 by each of the following categories: total bins returned, total thermostats returned, and average number of thermostats per bin.

Figure 15 - Top 10 Performing Partners by Total Bins, Total Thermostats, and Average Thermostats per Bin

	Number Thermostats	Number Bins	Average Thermostats per Bin
R. E. Michel Co.	2,968	41	72
Johnstone Supply	1,269	19	67
Apr Supply	540	10	54
United Refrigeration	326	13	25
Hvac Distributors, Inc.	236	4	59
Sid Harvey	236	4	59
Johnson Controls	194	5	39
Meier Supply Company, Inc.	171	7	24
Hannabery Hvac	137	2	69
Robertson Heating Supply Co.	125	2	63

TRC conducted several activities in 2021 to increase the number of bins and thermostats returned in Pennsylvania. These activities included 'miss you' calls to collection locations that may not have returned a bin recently. In 2021, a total of 48 site visits were made. Figure 16 displays the relationship between the number of site visits per month, the bins returned per month, and the number of thermostats (in 100's) returned per month.

Figure 16 - Relationship Between Site Visits and Bins and Thermostats Returned Per Month in 2021

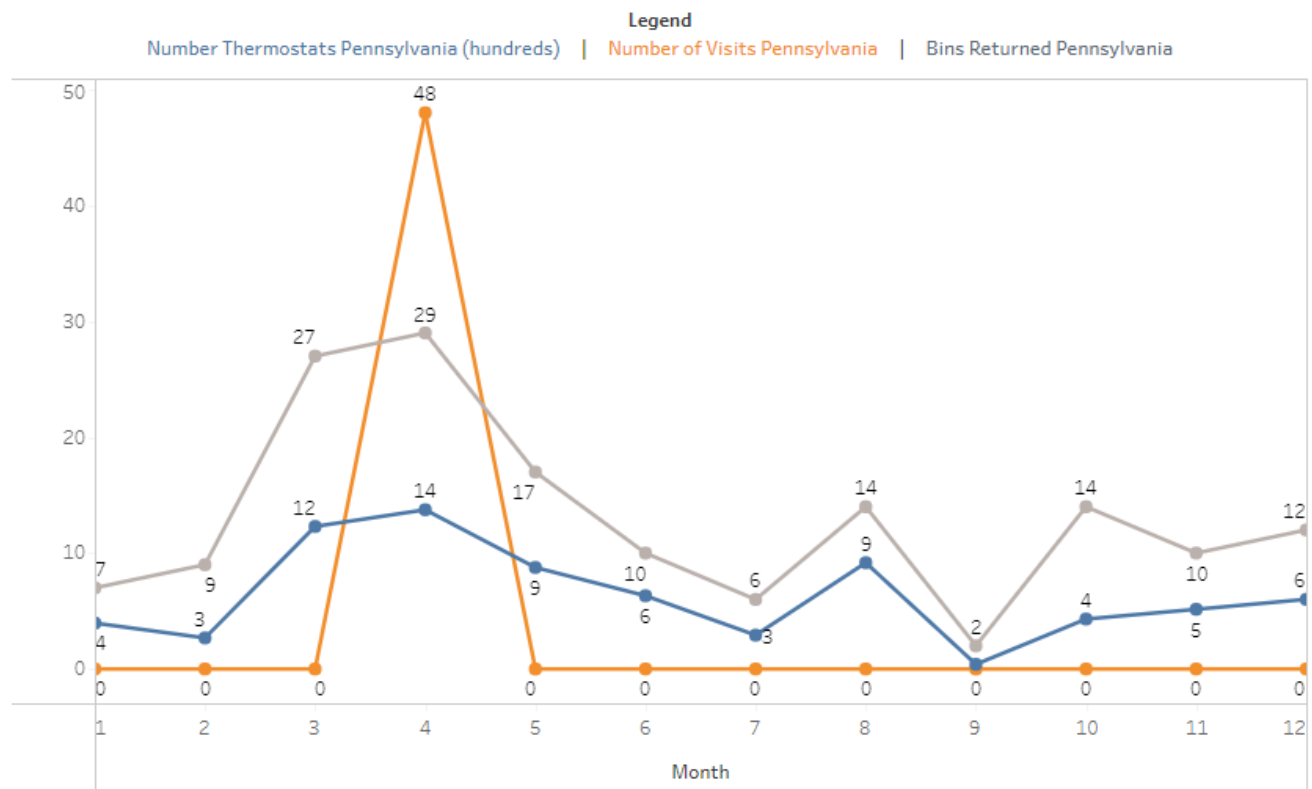
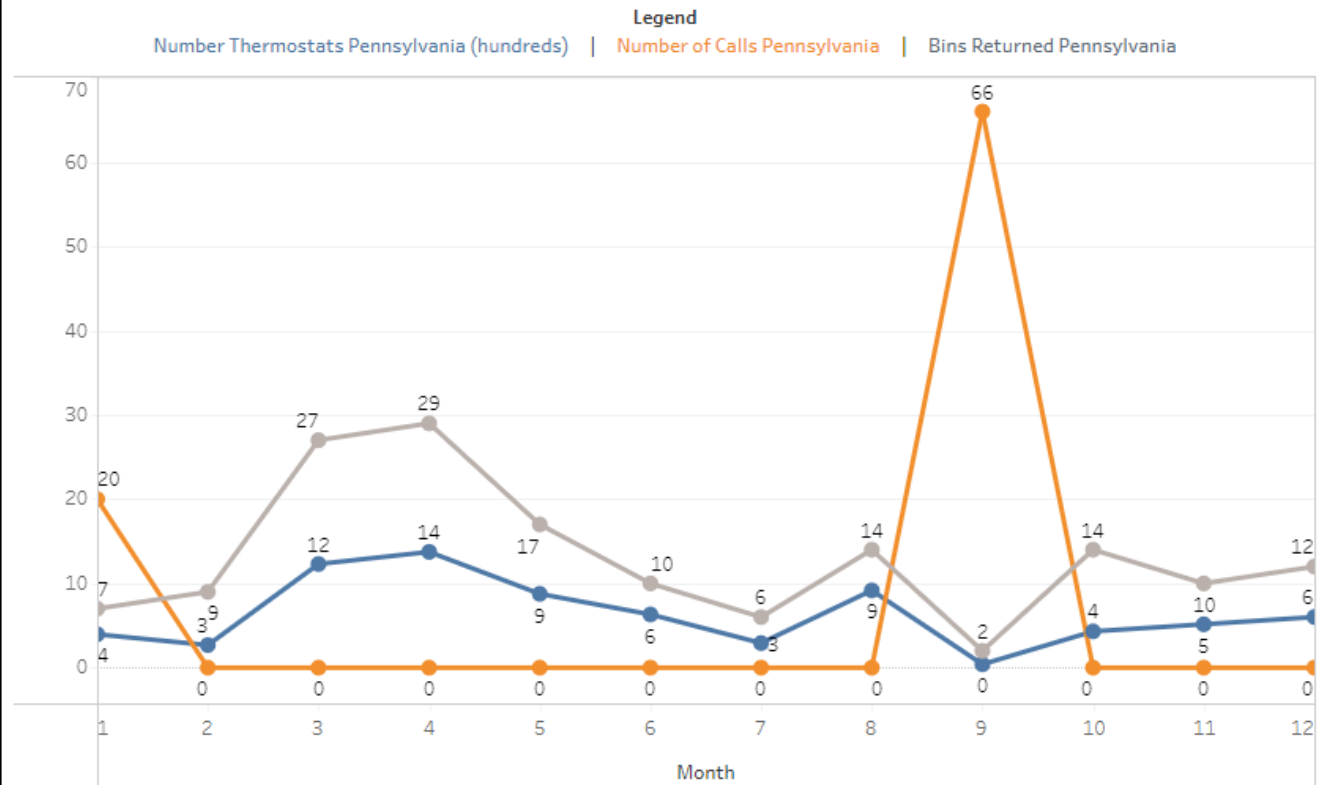


Figure 17 displays the relationship between the number of calls per month, the bins returned per month and the number of thermostats (by 100's) returned per month. In 2021, a total of 86 'miss you' calls were placed. Calls were placed in the months of January and September.

Figure 17 - Relationship Between 'Miss You' Calls and Bins and Thermostats Returned per Month in 2021



### SECTION 3: Comparisons to National and Other States' Data

To compare how the Pennsylvania collection partners performed in 2021, the national average for the number of bins returned per location that returned at least one bin was calculated and compared to the Pennsylvania average since 2012. The average number of bins does not include locations that did not return any bins in that year. It should be noted that when making comparisons each state has different regulations, a different mix of housing types, local policies, and incentives that may have a unique impact on returns. Overall, the average number of bins returned per location per year was lower in Pennsylvania than the U.S. average, as shown in Figure 18.

Figure 18 - Average Number of Bins Returned Per Location Per Year

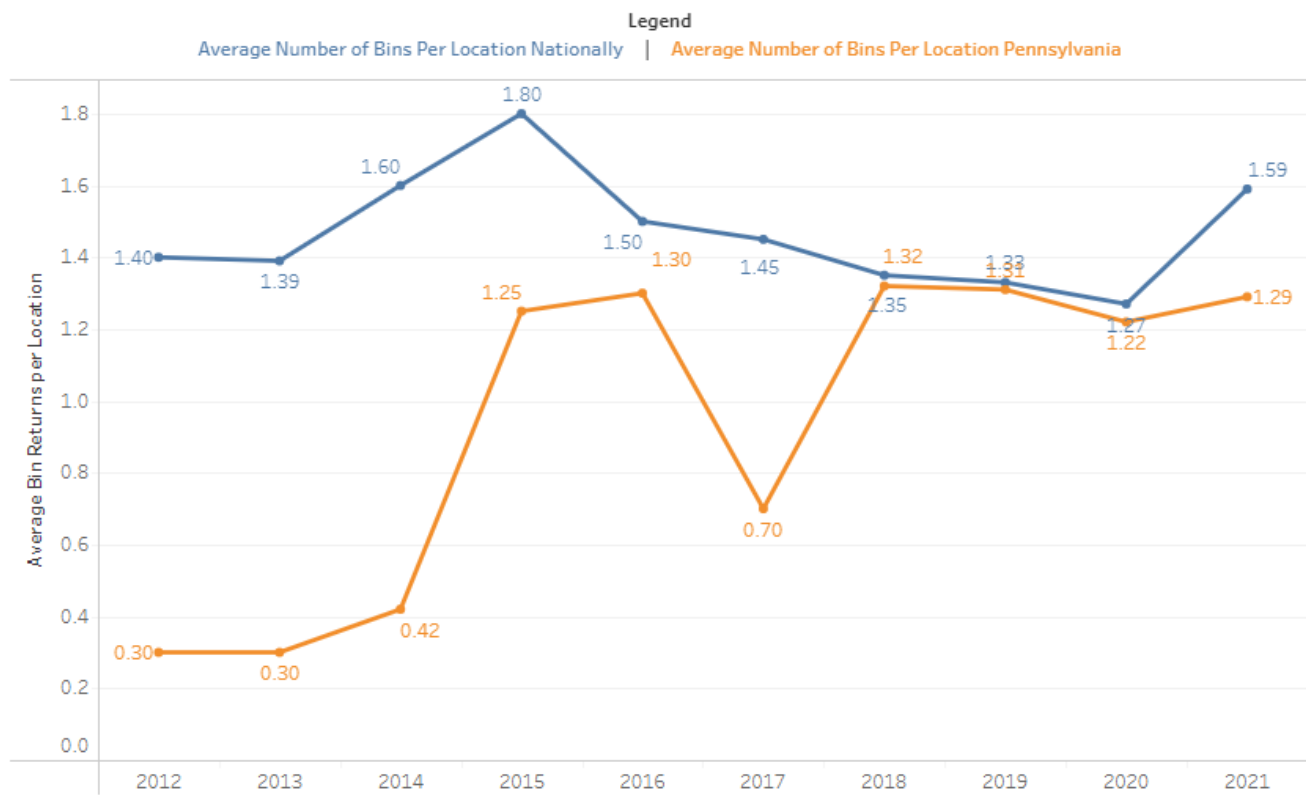


Figure 19 displays the locations in Pennsylvania that returned more than one bin in a given year since 2018, and Figure 20 displays the top 10 partners in the U.S. over the same period in terms of the number of bins returned.

Figure 19 - Partner Locations in Pennsylvania Returning More than 1 Bin per Last 4 Years

2018		2020	
R.E. Michel Co.	38	R. E. Michel Co.	31
Apr Supply	20	Johnstone Supply	18
United Refrigeration	17	Apr Supply	9
Johnstone Supply	15	United Refrigeration	9
Johnson Controls	13	Ferguson	5
Sid Harvey	12	Lennox	4
Peirce-Phelp, Inc	10	Peirce-Phelp, Inc.	4
Ferguson	9	Hvac Distributors, Inc.	3
Lennox	9	Robertson Heating Supply Co.	3
Hvac Distributors, Inc.	6	Trane	3
Meier Supply Company, Inc.	4	Grove Supply Inc.	2
Robertson Heating Supply Co.	4	Sid Harvey	2
Thos. Somerville Co.	4	Thos. Somerville Co.	2
Epsco	3	Us Supply	2
Goodman Distribution	3		
Trane	3		
Binghamton Hardware & Hvac	2		
Burkholder's Hvac	2		
Hannabery Hvac	2		
Us Supply	2		
2019		2021	
R.E. Michel Co.	42	R. E. Michel Co.	41
Johnstone Supply	20	Johnstone Supply	19
United Refrigeration	15	United Refrigeration	13
Apr Supply	11	Apr Supply	10
Hvac Distributors, Inc.	10	Meier Supply Company, Inc.	7
Ferguson	9	Johnson Controls	5
Meier Supply Company, Inc.	7	Hvac Distributors, Inc.	4
Johnson Controls	6	Lennox	4
Robertson Heating Supply Co.	5	Sid Harvey	4
Us Supply	5	R.F. Fager Co.	3
Lennox	4	Allentown Recycling & Solid Waste	2
Peirce-Phelp, Inc.	4	Bucks County Planning Commission	2
Grove Supply Inc.	3	Epsco	2
Clyde S. Walton, Inc	2	Ferguson	2
R.F. Fager Co.	2	Goodman Distribution	2
Refrigeration Sales Corp	2	Grove Supply Inc.	2
Riley Sales	2	Hannabery Hvac	2
		Robertson Heating Supply Co.	2
		Thos. Somerville Co.	2
		Tom Antonelli Inc	2
		Trane	2
		Us Supply	2



Figure 20 - Top 10 Performing Partner Locations Nationwide in Bins Returned Last 4 Years

2018		2020	
Johnstone Supply	364	Johnstone Supply	247
R.E. Michel Co.	258	R. E. Michel Co.	158
United Refrigeration	213	United Refrigeration	87
Lennox	129	Ferguson	72
Ferguson	108	Us Air Conditioning Distri..	56
Wheelabrator	74	Lennox	47
Us Air Conditioning Distri..	69	Sid Harvey	36
Watsco	60	F.W. Webb	30
Goodman Distribution	55	Wheelabrator	22
Sid Harvey	50	Rise Engineering	13
2019		2021	
Johnstone Supply	374	Johnstone Supply	303
R. E. Michel Co.	229	R. E. Michel Co.	190
United Refrigeration	155	United Refrigeration	123
Ferguson	106	Ferguson	69
Lennox	89	Lennox	60
Us Air Conditioning Distri..	68	Goodman Distribution	46
Goodman Distribution	64	Refrigeration Supplies Distributor (RSD)	39
Wheelabrator	62	Watsco	38
Refrigeration Supplies Di..	53	F.W. Webb	37
Watsco	51	Us Air Conditioning Distributors (USACD)	37

Figure 21 displays total percentage of locations that actively participated in the program (active participation defined as sending back at least one bin) in 2021, for all the states that mandate thermostat returns reporting as well as the U.S. national average for all states (reporting and non-reporting). In 2021, 45% of the locations in PA returned at least one bin compared to a national average of 16%. The highest percentage of locations returning a bin in 2021 amongst states that mandate thermostat returns reporting was Rhode Island (74%).

Figure 21 - Percent of Locations Returning a Bin in 2021

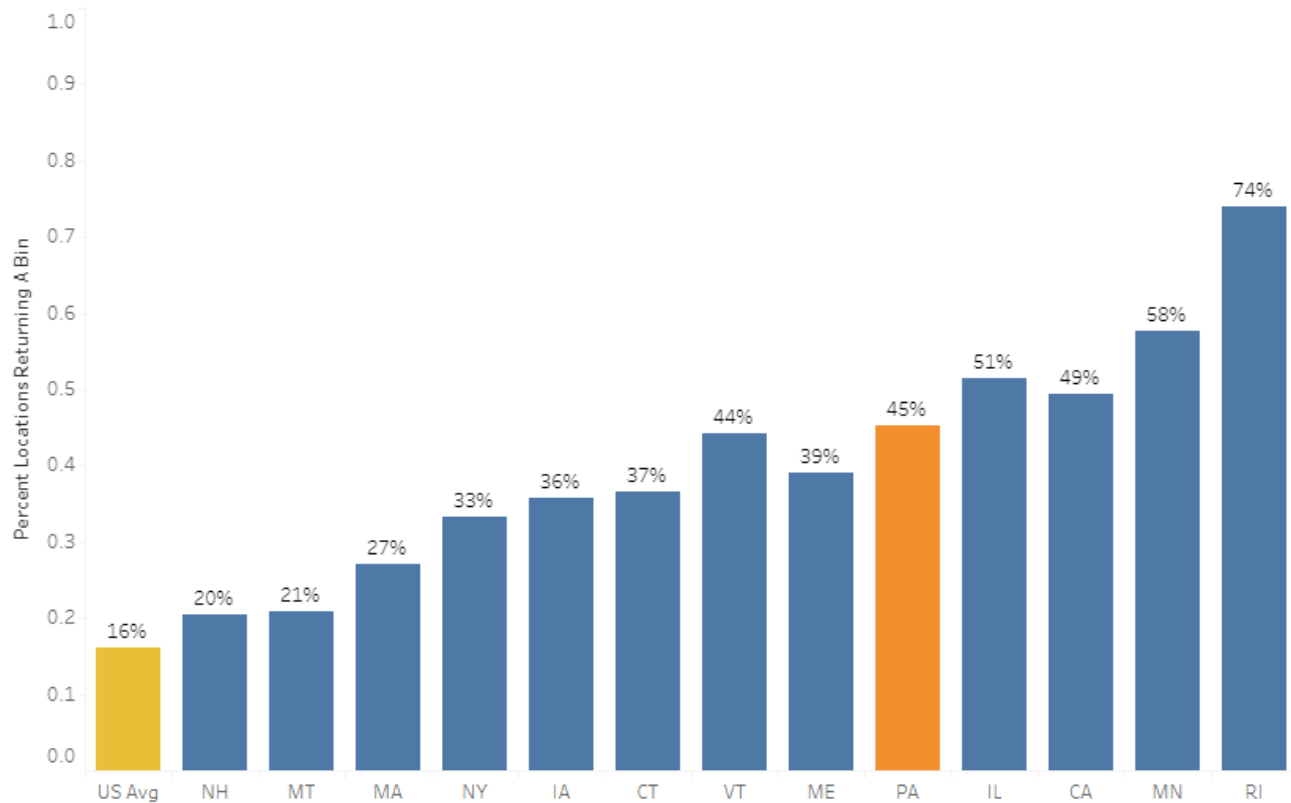


Figure 22 compares the Pennsylvania and national rates for several analytics. These include: total whole thermostats, bins, and loose switches collected, number of thermostats collected by total locations and per actively participating locations, number of thermostats per bin returned on average, equivalent average, number of mercury thermostat equivalents returned in 2021, and finally percent change in mercury thermostat conversion from 2020 to 2021. The equivalent average is an average of the number of switches in whole thermostats collected in Pennsylvania, and it is used to represent an equivalent number of thermostats from returned loose switches. The thermostat equivalent number includes the total of whole thermostats returned plus the number of thermostats estimated from loose switches. The states displayed are those that mandate thermostat returns reporting and the U.S. average is for all states that return bins (reporting and non-reporting).

Figure 22 - Comparison of States and US Average Among Several Categories

State	Whole Thermostats	Bins	Loose Switches	Thermostats returned per total # of locations with bins	Average Thermostats per bin	Average Thermostats collected per location that returned	Equivalent Average	Thermostats Equivalent in 2021	% Change over previous year
CA	9,333	414	5,531	13	23	22	1.5807	12,832	31%
CT	2,713	60	653	14	45	36	1.2311	3,243	-15%
IA	814	40	262	7	20	18	1.2359	1,026	-25%
IL	6,904	325	1,461	19	21	32	1.1993	8,122	0%
MA	5,585	125	575	17	45	61	1.1443	6,087	-11%
ME	4,145	105	551	21	39	48	1.0685	4,661	59%
MN	7,752	105	630	59	74	99	1.1898	8,282	50%
MT	218	6	486	9	36	44	1.0917	663	108%
NH	1,219	48	97	6	25	30	1.0935	1,308	-16%
NY	3,639	111	443	7	33	21	1.4053	3,954	-4%
PA	7,572	157	2,586	23	48	49	1.3880	9,435	58%
RI	2,381	42	0	52	57	68	1.0752	2,381	-4%
VT	1,864	80	162	12	23	24	1.0826	2,014	2%
US Avg	1,861	38	530	17	49	17	1.3390	2,257	9%

Figure 23 further compares this state and national data by showing how each state ranked in each of these categories, from highest to lowest. The states compared are those that mandate thermostat returns reporting and the U.S. average is for all states that return bins (reporting and non-reporting).

Figure 23 - Comparison of States and US Average Among Several Categories, Rankings

	Whole Thermostats	Bins	Loose Switches	Thermostats returned per total # of locations with bins	Average Thermostats per bin	Average Thermostats collected per location that returned at least one bin in 2021	Equivalent Average	Thermostat Equivalents in 2021	% Change over previous year
1	CA	CA	CA	MN	MN	MN	CA	CA	MT
2	MN	IL	PA	RI	RI	RI	NY	PA	ME
3	PA	PA	IL	PA	US Avg	MA	PA	MN	PA
4	IL	MA	CT	ME	PA	PA	US Avg	IL	MN
5	MA	NY	MN	IL	CT	ME	IA	MA	CA
6	ME	ME	MA	MA	MA	MT	CT	ME	US Avg
7	NY	MN	ME	US Avg	ME	CT	IL	NY	VT
8	CT	VT	US Avg	CT	MT	IL	MN	CT	IL
9	RI	CT	MT	CA	NY	NH	MA	RI	NY
10	VT	NH	NY	VT	NH	VT	NH	US Avg	RI
11	US Avg	RI	IA	MT	VT	CA	MT	VT	MA
12	NH	IA	VT	IA	CA	NY	VT	NH	CT
13	IA	US Avg	NH	NY	IL	IA	RI	IA	NH
14	MT	MT	RI	NH	IA	US Avg	ME	MT	IA

## 2021 Collections by Brand

In Pennsylvania, Thermostat Recycling Corporation (TRC) recovered the equivalent of 9,435 mercury thermostats from 7,572 whole mercury thermostats plus 2,586 mercury switches removed from thermostats. A total of 81.2 pounds of mercury was diverted from solid waste. \*Please note the explanation of the converted thermostats or thermostat equivalents below.<sup>1</sup> An example of the mercury ampoule is shown below.



As required by the state statute, a table of thermostat brand holders with their corresponding thermostats, the number of switches and the pounds of mercury recycled is below. It is important to note that there remain non-members whose thermostats the TRC collection program recycles. They are listed in the table as “Non-Member Brands”.

<sup>1</sup> A mercury thermostat contains a variable amount of mercury ampoules or “switches” attached to the subbase of the thermostat. These glass ampoules often are collected in the recycling container without the intact thermostat attached to them. TRC collects and counts these loose ampoules and recycles them. To derive the converted thermostat or thermostat equivalent, the program takes the following calculations to develop the converted thermostat or thermostat equivalent. First, TRC will count the total whole (intact) thermostats collected in the recycling bins. From these units, there is an intact ampoules count. TRC then takes the intact ampoules divided by the whole (intact) thermostats or otherwise known as the conversion ratio. After the conversion ratio is calculated, TRC will multiply the loose mercury switches by the conversion ratio. Lastly, we add this result to the whole (intact) thermostats to produce the converted thermostats or thermostat equivalents.

Brand Holder	Thermostats	Count Switches	Pounds Mercury
Bard Manufacturing Corporation			
Burnham Holdings, Inc			
Carrier Corporation	22	50	0.3100
Chromalox			
Climate Master, Inc.			
Crane Company			
Daikin Applied			
Dwyer Instruments			
ecobee			
Emerson Electric Corporation/White Rodgers	485	499	3.0938
Empire Comfort Systems			
General Electric Corporation	31	77	0.4774
Goodman Global	62	123	0.7626
Honeywell Home	6,617	9,043	56.0666
Hunter Fan Company			
ITT Corporation	2	2	0.0124
Lennox International Inc.	64	126	0.7812
Marley-Wylain Company			
Nest			
Nortek Global HVAC	7	14	0.0868
Rheem Manufacturing Company	25	51	0.3162
Schneider Electric (Invensys Controls)	16	16	0.0992
STLPC Corporation (f/k/a Lux Products Corporation)			
Taco Comfort Solutions			
TPI Corporation			
Trane Residential Systems	229	490	3.0380
Uponor, Inc.			
Vaillant Corporation			
W. W. Grainger			
York/Johnson Controls	7	14	0.0868
<b>Non-Member Brands</b>			
American Stabilis	1	1	0.0062

Lear Siegler (Original Charter Corporation)			
PSG Controls	3	3	0.0186
Sears Holdings	1	1	0.0062
<b>NOM (Manufacturer not identifiable)</b>			
Loose Switches		2,586	16.0332
NOM			
<b>Total</b>	<b>7,572</b>	<b>13,096</b>	<b>81.1952</b>

## 2021 Summary of the Program Expenses

Below is a summary of program expenses for the Pennsylvania collection program in 2021. 2021 program expenses (reported in the annual report) are unaudited and are for management purposes only. Prior to submittal of this annual report, the expenses were reviewed by Kellen Company.

Program Component	2020	2021	Difference
Direct Expense for Marketing & Outreach	\$ 2,430.00	\$ 6,480.00	\$ 4,050.00
Incentive/Promotional Payments			\$ -
Legal			\$ -
New Collection Containers			\$ -
Recycling Costs	\$ 21,433.66	\$ 30,984.97	\$ 9,551.31
Travel			\$ -
TRC Staff & Administration	\$ 475.00	\$ 500.00	\$ 25.00
<b>Total Expenses</b>	<b>\$ 24,338.66</b>	<b>\$ 37,964.97</b>	<b>\$ 13,626.31</b>





## 2021 PENNSYLVANIA ANNUAL REPORT

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1-888-266-0550

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Questions about this annual report?

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All state specific annual reports are posted on our website at the following weblink:

<https://thermostat-recycle.org/program-info/state-reports/>

Recycle every mercury thermostat, every time.

# APPENDICES

How Mercury Thermostat Waste is Handled

## HOW MERCURY THERMOSTAT WASTE IS HANDLED

### WASTE MERCURY-ADDED THERMOSTAT MANAGEMENT THROUGH VEOLIA ES TECHNICAL SOLUTIONS, LLC.

TRC containers with waste mercury-switch thermostats are received at a fulfillment/inventory center in Port Washington, Wisconsin (WIR000130591). The facility is owned and operated by Veolia ES Technical Solutions, L.L.C. (Veolia) under contract with TRC.

All recycling containers, including pails and bins are received at the loading dock and sent to the TRC inventory room. The container 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 containers are returned to the location that sent it in with a new prepaid address label within 3 weeks 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 thermostats and any loose bulbs collected from the containers are consolidated 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 captured and vented when the drum is opened.

The 55-gallon drum is then shipped to Veolia's mercury recovery facility (WID988566543) for final processing of the mercury ampules (switches). Veolia Environmental Services meets or exceeds all local, state, federal and EPA regulations for the management of the product.

The containers are returned from the storage area to the mercury recovery processing area to have the mercury bulbs removed from the plastic housing. Universal Waste Regulations require the recycling and disposal of waste within 12 months of acceptance at the processing facility.

Small quantities of thermostats are removed from the container, which is then closed again. The bulbs are removed from the thermostats and placed into processing vessel at the work station. Once the processing vessel is full, the vessel is loaded into the mercury recovery retort oven.

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 inventory

and processing areas are equipped with special mercury vacuum cleaners and the work area is vacuumed at the end of the work day to ensure that any spillage is cleaned up and not left to evaporate.

Veolia meets or exceeds all local, state, federal and EPA regulations for the management of the product. The mercury recovery facility and process are permitted by the Wisconsin Department of Natural Resources. Veolia's approvals for mercury recovery/recycling include:

- EPA - identification WID988566543
- Hazardous Waste Storage License #6008
- Hazardous Waste Treatment License (Mercury Recovery Operations) #4585
- Air Operation Permit #246076050-S01
- Storm Water General Permit #WI-S067857-4

In addition to the regulatory permits, both Veolia Port Washington facilities have developed and maintain management systems in accordance with ISO 14001-2004, OHSAS 18001-2007, and Responsible Recycling (R2:2013) Practice. All persons who handle mercury thermostats as part of the TRC operation receive training in the handling of Hazardous Waste and Universal Waste.

The mercury containing ampules are retorted at Veolia's Port Washington Mineral Springs facility. The mercury is removed during the retort process. The post retort debris consists of broken glass ampules. The debris is tested for residual mercury to document the removal of the mercury to levels below the US EPA Land Disposal Restriction (LDR) levels. The debris is then disposal of as a non-hazardous solid waste at Advanced Disposal Glacier Ridge Landfill, LLC in Horicon, Wisconsin.