



Thermostat Recovery Program Annual Report to the Director 2019 Calendar Year

Submitted to: Director, Extended Producer Responsibility Programs
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June 2020

This annual report is issued by the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) in accordance with the British Columbia Recycling Regulation (Reg. 449/2004). The 2019 annual report documents the Thermostat Recovery Program's activities and results in British Columbia from January 1 to December 31, 2019.

Any questions or comments about this report as well as the Thermostat Recovery Program operations should be directed to HRAI at:

A handwritten signature in black ink, appearing to read 'C. Czajko', written in a cursive style.

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Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)
Date: June 29, 2020

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1. Executive Summary

Products within plan	Thermostats (electronic and mercury-containing)
Program website	www.hrai.ca/trp

Recycling Regulation Reference	Topic	Summary (5-bullet maximum)
Part 2, section 8(2)(a)	Public Education Materials and Strategies	<ul style="list-style-type: none"> • Outreach through HRAI, the Mechanical Contractors Association of Canada (MCAC), & Mechanical Service Contractors of Canada (MSCC) • Print ads and eblasts with the Municipal Leader, and the HPAC magazines; ads in regional district recycling calendars • Collaboration through Stewardship Agencies of BC (SABC) • Recycling Council of British Columbia (RCBC) hotline and Recyclepedia
Part 2, section 8(2)(b)	Collection System and Facilities	<ul style="list-style-type: none"> • 11 new collection points • 11 new drop-off locations • 398 total collection points • 1 main collection facility (1 was fully phased out by end of 2017) • Collection points in 27 regional districts • See Section 4 for details
Part 2, section 8(2)(c)	Product Environmental Impact Reduction, Reusability and Recyclability	<ul style="list-style-type: none"> • 4,453 mercury-containing vessels collected (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)** • 2,153 electronic thermostats recycled • 66.90 kilograms of metals recycled • 242.89 kilograms of plastics collected, but not recycled due to a global plastics recycling issue (details outlined on *Page 16 & Section 6). Will continue to investigate new options for possible solutions to recycle/dispose of the plastics. • 0 new mercury-containing thermostats sold into the market • See Page 7 & Section 5 for details

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Recycling Regulation Reference	Topic	Summary (5-bullet maximum)
Part 2, section 8(2)(d)	Pollution Prevention Hierarchy and Product / Component Management	<ul style="list-style-type: none"> • New thermostats do not contain mercury, and also help reduce energy consumption • Recovered thermostats are not suitable for re-use • Greater than 99% of metal components are recycled, with a high degree of certainty • Due to a global plastics recycling issue (details outlined on *Page 16 & Section 6) occurring in 2018 and 2019, TRP's plastic components were not recycled • Mercury vessels collected in 2019 are still currently being securely stored in cold storage and will be sent for retort in the US during the summer of 2020. Once sent for retort, all mercury collected will be recycled and sent for reuse in CFL and fluorescent production due to market economic up-turn in U.S. • In 2019 approximately 75.16% of all components were not recycled due to a global plastics recycling issue (details outlined on *Page 16 & Section 6). New options will be continue to be investigated to find possible solutions for recycling/disposal of the plastics. There is no better option in the pollution prevention hierarchy for recycling the other components; therefore, no targets are in place
Part 2, section 8(2)(e)	Product Sold and Collected and Recovery Rate*	<ul style="list-style-type: none"> • Collected 3,187 mercury containing thermostats, 2,153 electronic thermostats, and 1,772 loose mercury vessels • Adjusted total: 4,453 mercury containing thermostats and 2,153 electronic thermostats, for a total of 6,606 collected • 17.84% increase from 2018 collection results
Part 2, section 8(2)(e.1)		See Section 9 for breakdown per regional district
Part 2, section 8(2)(f)	Summary of Deposits, Refunds, Revenues and Expenses	N/A

* As of summer 2016 the Switch the 'Stat (S.T.S.) program transitioned over to full management and delivery by HRAI from Scout Environmental. The name of the program changed from S.T.S. to the Thermostat Recovery Program (TRP); it was fully re-branded and the new program website is www.hrai.ca/trp. For the purposes of this report the program will be referred to by its new name Thermostat Recovery Program (TRP).

*Thermostat Recovery Program does not report on Product Sold or Recovery Rate; see [Section 7](#) for details.

**The industry standard measurement of 1 – 4 switches per mercury thermostat (or average 1.4 mercury switches per vessel) is substantiated by sampling of thermostats conducted by Veolia on behalf of the U.S.'s Thermostat Recycling Corporation, which is a statewide thermostat collection program. Based on their sampling they have concluded that the number of mercury switches per stat ranged from 1.41 to 1.46; therefore, averaging 1.44 (rounded off to 1.4) mercury switches per stat.

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Comparison of Key Performance Targets		
Part 2 section 8(2)(g); See full list of targets in Plan Performance		
Priority Stewardship Plan Targets*	Performance	Strategies for Improvement
<p>1. Mercury Thermostat Collection: 4,153 thermostats (as agreed with Ministry file lead)</p>	<p>4,453 mercury thermostats collected (adjusted total) (7% over target)</p>	<ul style="list-style-type: none"> • Increase number of public drop-off locations • Increase number of collection points** • Improve communication with wholesalers so that all staff can effectively market the program at their location • Improve communication with contractors throughout BC to increase awareness of the program.
<p>2. Electronic Thermostat Collection: 1,206 thermostats (as proposed in revised 2015 – 2020 5 Yr. Plan)</p>	<p>2,153 electronic thermostats collected (79% over target)</p>	<ul style="list-style-type: none"> • Increase communication, awareness, and education for contractors and wholesalers to place whole electronic thermostats and/or minimum electronic thermostat housing including branding in TRP pails.
<p>3. Collection points/Participants: 420 (as agreed with Ministry file lead)</p>	<p>398 participants (95% of target)</p>	<ul style="list-style-type: none"> • Increase outreach to wholesaler locations, especially those with multiple locations in the province. • Continue face-to-face communication at trade shows • Explore new recruitment options (eg. new marketing plan, and increased targeted outreach in regions with poor coverage, increased utilization of municipality outreach) • Increase outreach to HVAC contractor training facilities/schools for participation to increase awareness & education with new technicians who will be responsible for old thermostat removal.

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting. **see [Section 4](#) for descriptions of drop-off locations versus collection points*

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2. Program Outline

The Thermostat Recovery Program is the designated program for managing thermostats in British Columbia, both electromechanical (mercury-containing) and electronic models. The British Columbia Stewardship Plan for Thermostats is the unofficially approved five year plan for recovering these products, and spans a timeline of July 1, 2015 to June 30, 2020.

- Electromechanical thermostats (also referred to as "mercury-containing thermostats"), which contain internal mercury switches (mercury in a sealed glass bulb) or snap switches to control the flow of electrical current; and,
- Electronic thermostats, which use sensors instead of switches to detect temperature levels and electronically control the flow of electrical current.

Thermostat Recovery Program is funded by thermostat manufacturers who have sold thermostats into Canada and a complete list of manufacturers is available online at www.hrai.ca/trp. The program is delivered and fully administered on behalf of the manufacturers by the Heating, Refrigeration, and Air Conditioning Institute of Canada (HRAI). Additionally, the program is supported by the Canadian Institute of Plumbing and Heating (CIPH).

In accordance with the program plan, the Thermostat Recovery Program collects thermostats in the province of British Columbia through one main collection channel (HVAC contractors/wholesalers & municipal/regional district collection) and two secondary collection channels (drop-off locations and a send-back option).

Based on estimates that 85 to 90 percent of thermostats sold in British Columbia are sold through contractors and wholesalers in the heating, ventilation and air-conditioning (HVAC) industry, this group logically makes up the primary channel through which to recover all types of thermostats. In order to support this channel and make the program more accessible to members of the public, any participating collection point can also register to be a drop-off location (typical drop-off locations are wholesalers, regional districts, and municipal locations). An up-to-date list of drop-off locations, searchable by postal code, is always available on the Thermostat Recovery Program website. Finally, the send-back option provides access to the program to individuals who are not close to a drop-off location. A small pail and a pre-paid waybill addressed to the collection facility are shipped to the individual's home (or desired location), making the program accessible to individuals in remote areas. Together these channels comprise all of the program participants, or "collection points" as they shall be identified throughout this report. See [Section 3](#) below for a definition of "collection points" as distinct from "collection facilities."

As per the requirements under the British Columbia Recycling Regulation, this report has been prepared to summarize the program activities undertaken during the calendar year of 2019, and will be posted on the program website at www.hrai.ca/trp.

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3. Public Education Materials and Strategies

Initiatives

Thermostat Recovery Program operates by collecting thermostats through existing businesses and infrastructure, referred to in the program plan as “collection channels.” As described in [Section 2](#), the program uses one main collection channel (HVAC contractors/wholesalers) and two secondary collection channels (drop-off locations and send-back option) to recover mercury-containing and electronic thermostats. In 2019 the focus of the program continued to be on increasing registrations, particularly in the contractor/wholesaler channel, also on increasing collection in order to meet the participation and collection targets, as well as ensuring that the program is as accessible as possible.

In 2019, the program continued to build on the foundation laid in previous years to broaden the audience that is reached by Thermostat Recovery Program messaging. Key areas of focus in 2019 were:

- Increased communication with participants (to keep them engaged and informed)
- Increased marketing and outreach efforts to non-participants (particularly contractors and wholesalers)
- Increased public outreach (info about the program and how to participate)

To achieve these goals, the following initiatives were undertaken:

Initiative	Details	Audience/ Channel Reached	Type of Outreach
Ongoing outreach with HRAI national office	<ul style="list-style-type: none"> • Information about the program and a call to register were included in the HRAI Spring & Fall review newsletters, sent to all HRAI members. • Information about the Thermostat Recovery Program (TRP) and accomplishments was included in the HRAI Accomplishment List, accompanying renewal letters sent to all HRAI members 	Contractors/wholesalers	<ul style="list-style-type: none"> • Industry outreach (print)
BC Stewards/Stewardship Agencies of BC (SABC)	<ul style="list-style-type: none"> • Formalized association of all BC stewardship associations allows all stewards to present a united front, and to collaborate on 	General Public	<ul style="list-style-type: none"> • Print media • Online

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	<p>communicating to various stakeholder groups</p> <ul style="list-style-type: none"> • Website (bcstewards.com) provides an overview of each of the programs (including Thermostat Recovery Program) • Recycling Handbook provides an overview of each of the programs (including Thermostat Recovery Program) • Action Plan developed by SABC to ensure the success of all programs, investigate potential gaps, and address feedback from BC Ministry of the Environment. 		
<p>Regional District waste calendars/brochures:</p> <ul style="list-style-type: none"> • Invermere Regional District • District of Chilliwack • Penticton Regional District • Town of Oliver • District of Summerland • Peace River Regional District 	<ul style="list-style-type: none"> • Program ad and link to drop off locations in calendar 	General Public	<ul style="list-style-type: none"> • Print media
<p>Recycling Council of British Columbia (RCBC)</p>	<ul style="list-style-type: none"> • Info about the program (materials accepted at nearest drop-off locations) made available to the public through a hotline, website and online tool (the Recyclepedia) <ul style="list-style-type: none"> ○ 129 hotline inquiries ○ 451 website searches ○ 188 Recyclepedia searches 	General Public; BC waste management industry	<ul style="list-style-type: none"> • Online • Phone

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Sustainable Building & Design Magazine	<ul style="list-style-type: none"> Key TRP program info, logo and URL posted on magazine's website. 	Contractors/General Public	<ul style="list-style-type: none"> Online
HPAC/Canadian Contractor ads & eblasts	<ul style="list-style-type: none"> Print ads appeared in all 7 issues of HPAC magazine (with a readership of approximately 20,000) Eblasts to BC, MB, and ON subscribers of HPAC in Sept. had a reach of approx. 8,240 viewers 	Contractors/wholesalers	<ul style="list-style-type: none"> Business-to-business print media
Google TRP Ads	<ul style="list-style-type: none"> TRP ads appear every time an individual enters the word "thermostat(s)" into their phone or computer Google search engine. 	General Public	<ul style="list-style-type: none"> Online

In addition to the efforts listed above, the program was promoted through numerous voluntary channels. See examples in [Appendix B](#).

Resources

To support these initiatives, a variety of educational and marketing materials were used. These materials are described below.

1. **Program Website:** The program's website www.hrai.ca/trp is the primary educational tool, and features content directed at educating contractors and wholesalers as well as the general public. This site provides a comprehensive overview of the program, the benefits of participation, education about mercury and the dangers it presents. It has a list of drop-off locations that is searchable by postal code and it is updated in real time as participants join the program. The site has a convenient online registration form, which is particularly useful for residents who want to return a thermostat using the send-back option. The site is also kept up-to-date with cumulative totals of thermostats and mercury vessels that have been collected and the weight in kilograms of the mercury that has been recovered.
2. **Introduction letters:** Each collection kit issued to a newly registered collection point contains an outreach letter that includes educational information about the program and about mercury. They act as important educational tools that help develop commitment from newly recruited participants. These letters also help new participants with their future outreach to the public, by providing them with information about the importance of recycling mercury-containing and electronic thermostats.

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3. **Posters:** Promotional posters are continually available for participants to use in displays on-site at the collection locations. They are quite eye-catching to increase their effectiveness as a tool for drop-off locations.
4. **Brochures:** There are two different program brochures available; separate industry-facing and public-facing versions with tailored messaging. A stack of printed brochures was provided to participating collection points for distribution to their customers (in the case of contractors/wholesalers) or at public events, throughout 2019. These brochures include facts about mercury and information about the Thermostat Recovery Program that is used to educate customers and the public.
5. **Monthly Newsletter:** In order to remain in communication with existing participants, an e-newsletter on program milestones, collection sweeps and other news is published and sent to participants monthly. The goal of the newsletter is to keep participants up to date with program happenings; to keep the program on participants' minds; to keep participant satisfaction high; and ultimately to increase collection results. As of December 31, 2019, the newsletter had 727 subscribers nationally, approximately 28% of who are in BC.
6. **Collection sweep postcards:** As part of our bi-annual collection sweep, reminder postcards were sent to all active collection points in May and September. Participants were asked to return their pail if it was at least half full, and given the opportunity to request new program materials.
7. **Print ads and eblasts:** Print ads were published in all 7 issues of HPAC magazine, which has a readership of approximately 20,000 HVAC and plumbing contractors. Ads were also developed for the District of Chilliwack, Invermere Regional District, Penticton Regional District, Peace River Regional District, District of Summerland, and Town of Oliver recycling calendars.
8. **Banner stands:** To support in-person events such as trade shows, banner stands are used to be versatile and eye catching. These banners support site-specific signage, and were used throughout 2019.

4. Collection System and Facilities

Collection System Overview

The Thermostat Recovery Program collection system is comprised of the following:

1. Collection points (participants)
 - made up of the 3 collection channels described above
 - use collection containers to collect thermostats and send them to the collection facility
2. Collection facilities
 - Aevitas Inc. is the program's sole collection facility as of 2018, and receives the collection containers from various collection points and process the thermostats (count, dismantle)

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- The use of Tri-Arrow Industrial Recovery (previously the secondary facility) was completely phased out in 2018. (See *“Collection Facilities” section below*)
3. Consolidation points
 - In previous years Tri-Arrow Industrial Recovery was contracted as a secondary consolidation point for the program; however, from 2016 to 2019, Aevitas Inc. was contracted as the sole consolidation point (See *“Collection Facilities” section below*)
 - All vessels are shipped to a retort facility at least once a year (2019’s vessels will be shipped in summer of 2020)
 4. Retort facility
 - Final processing of Hg vessels

IMPORTANT CHANGE: During 2019 the TRP thermostat plastics collected were neither sent to West Coast Plastics or Durham Shred facilities for processing, etc. as outlined in the flow chart below. (See *“Pollution Prevention Hierarchy and Product / Component Management” section *on pages 17 - 19 for full explanation*).

The relationship between these facilities is demonstrated in the flow chart below:



Notes:

-mercury thermostats can contain 1 to 4 Hg vessels, and participants occasionally include loose vessels that they have removed from thermostats in the collection pails, so we track both total number of thermostats and total number of Hg vessels.

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Collection Facilities

As described above, historically the Thermostat Recovery Program has used two collection facilities: Aevitas Inc. located in Ayr, Ontario and Tri-Arrow Industrial Recovery located in Surrey, BC. However, in order to tighten up processes, such as processor reporting, and streamline program operations, the program has been transitioning to use only Aevitas (who has always been the primary collection facility used). Unfortunately, due to the issue of participants still possessing old Tri-Arrow shipping waybills sent to them in the past for shipping their collection containers, some BC participants continued to use overcome them throughout 2016 and up until the end of 2017. However, throughout 2018 TRP was finally able to the issue and use Aevitas as the sole collection facility for the program, as zero thermostat shipments were collected from this facility. This continued to be the case throughout 2019.

Aevitas receives collection containers full of thermostats directly from all collection points in BC, and begin processing the thermostats. Aevitas acted as the sole consolidation point for the thermostat vessels from BC in 2019, as well they operate the only approved mercury retort in Canada (Aevitas' website: <http://aevitasweb.wixsite.com/aevitas1/mercury-recovery>).

The shipper of each pail is recorded in a monthly tracking sheet by Aevitas, as are the number of thermostats per pail (in total, and broken down by brand), the number of mercury vessels contained, the weight of the plastic and metal components, and any off-spec materials included in the collection containers.

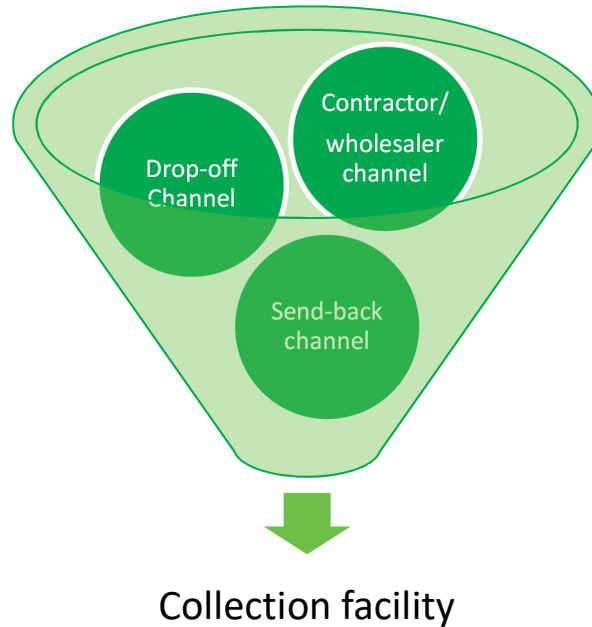
Collection Points

As described in section 3 above, Thermostat Recovery Program uses 3 main collection channels: the contractor/wholesaler channel, public drop-off locations, and the send-back channel. The individual participants in each of the collection channels are referred to as "collection points" or "participants."

These collection points are a key part of the collection system, as they recover end-of-life thermostats and send them to the collection facility.

Participants use the collection containers provided by the Thermostat Recovery Program to collect end-of-life thermostats, and when the container is full, they use their pre-paid Purolator waybill to return the thermostats to Aevitas the collection facility. All Purolator waybills are addressed to Aevitas, and the thermostats are processed at Aevitas. This process is illustrated below.

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According to the stewardship plan, the goal was to have 420* registered collection points in 2019. Through outreach initiatives described above, 11 new businesses registered as collection points for end-of-life thermostats in 2019, all of which elected to act as drop-off locations (see description in [Section 2](#)).

The following chart provides information regarding the businesses registered, including the types of businesses registered, if they have opted to be a drop-off location and the city where the business is located.

Company Name	Type	Drop Off	City
Keremeos Landfill	Municipal	Yes	Keremeos
Okanagan Falls Landfill	Municipal	Yes	Okanagan Falls
Oliver Landfill	Municipal	Yes	Oliver
Courtenay Return-It Depot	Recycling Center	Yes	Courtenay
Refrigerative Supply Ltd. - Nanaimo	Wholesaler	Yes	Nanaimo
Sundawn Integrated Services Inc	Contractor	Yes	Vancouver
Island Return It - Duncan	Recycling Center	Yes	Duncan
Island Return It - Campbell River	Recycling Center	Yes	Campbell River
Island Return It - South Cowichan	Recycling Center	Yes	Cobble Hill
Island Return It - Sidney	Recycling Center	Yes	Sidney
Island Return It - Esquimalt	Recycling Center	Yes	Victoria

*targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting. See explanation in [Section 9](#), below.

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Coverage in Regional Districts

In 2019 there were no changes to any existing collection points.

Combining the new participants with existing collection points as of December 31, 2019 there were 398 collection points in British Columbia.

These collection points are located in the following regional districts:

Region	Number of Collection Points
Alberni–Clayoquot Regional District	2
Capital Regional District	42
Cariboo Regional District	5
Columbia–Shuswap Regional District	19
Comox Valley Regional District	12
Cowichan Valley Regional District	9
Fraser Valley Regional District	35
Metro Vancouver (Greater Vancouver Regional District)	134
Northern Rockies Regional District	3
Peace River Regional District	12
Powell River Regional District	3
Regional District of Bulkley–Nechako	6
Regional District of Central Kootenay	5
Regional District of Central Okanagan	17
Regional District of East Kootenay	6
Regional District of Fraser – Fort George	10
Regional District of Kitimat–Stikine	8
Regional District of Kootenay Boundary	6
Regional District of Mount Waddington	2
Regional District of Nanaimo	12
Regional District of North Okanagan	9
Regional District of Okanagan–Similkameen	10
Skeena – Queen Charlotte Regional District	3
Squamish–Lillooet Regional District	5
Strathcona Regional District	6
Sunshine Coast Regional District	7
Thompson–Nicola Regional District	10

As this list demonstrates, there are collection points in 27 of British Columbia’s 29 regions. The regions in which we do not yet have participants are as follows:

- Central Coast Regional District
- Stikine Region

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Throughout 2019, we will continue to make efforts to register participants in the remaining 2 regional districts. However, please note that all people throughout the entire province of BC can participate in the program by taking advantage of our free send-back channel even if there is not a registered collection point in their region.

5. Product Environmental Impact Reduction, Reusability and Recyclability

Historically, through the Thermostat Recovery Program all components of the recovered thermostats were sent for recycling, including the plastics, metals, glass, mercury and any electronics associated with the thermostat. However, as of 2018 a global issue arose that resulted in TRP's plastics not being sent via down processors to be further processed and sold as commodity. In 2019 the same global issue continued, and as a result approximately 75.16% of the program's total thermostat materials collected during the year was not sent to down processors. Also, the mercury vessels (representing total kg's of mercury and glass combined) collected throughout 2019, will be sent for retort to the US during the summer of 2020 (See "[Pollution Prevention Hierarchy and Product / Component Management](#)" *section on pages 17 - 19 for full explanation). Therefore, we estimate in 2019 and 2020 approximately 24.83% of TRP's materials will be recycled. The breakdown of materials recovered, recycled, and not recycled from the province of British Columbia during 2019 included:

- 5,585 mercury-containing vessels (there can be anywhere between 1 to 4 mercury vessels contained in each thermostat)
- 2,153 electronic thermostats
- 13.96 Kg of mercury (calculated based on 2.5 grams of Hg per vessel)
- 5.59 Kg of glass (calculated based on 1 gram of glass per vessel)
- 66.90 kilograms of metals
- 242.89 kilograms of plastics (not recycled)

The recyclability of mercury-containing thermostats cannot be improved, nor can the reusability of these products because they are obsolete. As compared to older set-back models, new programmable thermostats are more environmentally responsible as they do not contain mercury and are much more energy efficient. Further, it is dangerous to attempt to reuse mercury-containing thermostats due to potential incompatibility with newer HVAC systems, thus replacing them with newer thermostats and recycling the older models is the best choice for reducing the environmental impact of these products.

Due to the global issue that arose in 2018 and continued throughout 2019, the thermostat plastics collected were not able to be sent for recycling (See "[Pollution Prevention Hierarchy and Product / Component Management](#)" *section on pages 17 - 19 for full explanation). The Thermostat Recovery Program will continue to focus on investigating new ways to ensure our program's plastics will not continue to be sent to landfill, so that we are able to increase our thermostat materials recyclability percentage up towards our historical level of greater than 99%. The other materials collected via the program such as the metals and glass are recovered with a high level of certainty, and efforts to continually reduce environmental impacts will continue to focus on improving the program's collection processes. Another area of focus has been the reduction of non-thermostat materials which are

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sometimes sent back in collection pails. Efforts have included communications with participants, and the development of new pail stickers including the wording “thermostats only” (as described in [Section 3](#)) for the sides of the collection pails to act as a reminder for participants.

As the program expands and matures, additional reductions in environmental impact will continue to be sought in order to ensure the program is effective in having a positive outcome for the environment and the citizens of British Columbia.

6. Pollution Prevention Hierarchy and Product / Component Management

As per the stewardship plan for thermostats, pollution prevention efforts have focused on recycling, rather than reduce/redesign or reuse. The breakdown as to why recycling is the preferred management technique out of the four “Rs” is provided below.

Reduce/redesign: The main environmental concern with thermostats is the mercury contained in many older models. While many of these thermostats may still be in use, they are no longer made by the major manufacturers and are no longer sold in Canada. New thermostats have been redesigned to eliminate mercury and to be more energy efficient, therefore reducing energy consumption.

Reuse: The plan does not encourage the reuse of old thermostats collected through this program for the reasons outlined below:

- Our primary goal is to collect old mercury-containing thermostats and ensure that the mercury and other component parts are properly managed, not to see them in continued use.
- Old non-mercury-containing thermostats may not meet the technical/safety specifications of new HVAC systems and do not have the same ability to reduce energy use that new programmable thermostats do, and therefore we recommend that these be recycled rather than reused.

Recycle: As per the program plan, the thermostats recovered from the province of British Columbia are counted, documented, and dismantled. The components from the thermostats are then separated for recycling. However, due to global recycling issues that began in 2018 (as explained in the first bullet below) at this time one of TRP’s components is not currently being recycled as outlined in the plan:

- The plastic components recovered are of mixed types; these are consolidated at the collection facility with other plastics from the facility. Up until the end of December 2017, these plastics were being sent to a downstream recycler by our primary collection facility Aevitas (either to Durham Shred and Recycle or West Coast Plastics). Once at the recyclers the plastics were then baled and sold as a commodity overseas. However, unfortunately as of 2018 the plastics recycling industry began to undergo many changes because China implemented a ban on the importation of global waste plastics. Due to this ban, recyclers are now very limited with the types of plastics they are willing to receive, because plastics such as the type used for manufacturing thermostats are not able to be sold for further use. Therefore, plastics generated from thermostats, which used to be referred to in the industry as e-waste plastics,

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are no longer economically viable. Therefore, Aevitas has confirmed no substantial amount of the plastics generated by the TRP thermostats during 2018 or 2019 were sent for recycling. This marks the first and second year in TRP's history the program's plastics were not recycled. The downstream recyclers have communicated due to this issue they have not been successful in finding any recyclers that will accept TRP's plastics. This means, Aevitas along with other waste processing facilities who also collect e-plastics, have had no other option but to dispose of them into landfills until such time as they find other solutions. This issue will now be the same for all producer responsibility programs with products containing e-waste plastics that were previously purchased by plastic recyclers, and then purchased and shipped to China for recycling.

Aevitas along with many other processing facilities will continue to search for other suitable and viable options to take back these waste plastics they collect, including TRP's plastics. TRP will also commit to continuing to investigate possible options for recycling TRP plastics; focusing on all developments with the current plastics market, along with any government negotiations or developments directly affecting the current China plastics ban. TRP will also work with other stewardship responsibility programs who are facing this issue to come up with possible joint options and solutions.

- The metals collected are a mix of iron, nickel and aluminum which all have high reuse/recycling value. The metals are consolidated with other metals at the collection facility and then sent to the downstream processor. Aevitas sends them to Triple M Metals (a.k.a. M Metals). Once at the processors the metals are shredded, baled and then sold as a commodity.
- The glass vials containing the mercury are consolidated at the collection facility Aevitas until a large volume has been collected. Aevitas acts as the primary consolidation point for all glass vials collected for the program.

At Aevitas these vessels are consolidated with vessels collected across Canada and then sent to an appropriate retort facility. In 2020, Aevitas will send 2019 vessels to either Bethlehem Apparatus or Veolia totalling 16,974.

During the retort process at Bethlehem Apparatus, the glass vials are crushed and glass and mercury are separated. The mercury is triple distilled and sent for resale/reuse in products and processes or put into long term storage (sequestered), depending on market demand. The glass is crushed, distilled and sent for recycling in fibreglass applications. The next shipment will be scheduled for shipping during the summer of 2020. It will be sent to either Bethlehem Apparatus or Veolia, and will include the total number of TRP's mercury-containing vessels collected in 2019.

The following table describes the acceptable end fates for each of the components of a thermostat:

Thermostat Recovery Program 2019 Report to Director, Waste Management

Component	Reuse	Recycle	Energy Recovery	Landfill	Other
Plastics	X	Preferred	X	X	See comments below
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	See comments below

For metals and the glass components, greater than 99% of the materials collected by the program are recyclable and were managed in accordance with the program plan and the principles of pollution prevention. The program’s plastics collected in 2019 were not recycled; however, as outlined on [*pages 17 - 19](#) solutions to rectify this issue are currently being worked on. The percentage of mercury that is normally sold for re-use versus how much is put into long-term storage varies greatly depending on market demand in the US (their mercury export ban, enacted in January 2014 prohibits any mercury from being exported; since the US market for mercury is relatively small, in recent years large percentages were being put into long-term storage, though specific percentages were not available). However, all mercury collected in 2019 will be scheduled to be shipped to the US for retort during the summer of 2020, and it will be recycled and sold for re-use due to a market economic up-turn.

The following table describes processing pathways and criteria used to assess product end fate by product component:

Nature of Processing						
	Transfer to direct processor (BC or ON)	Transfer to direct processor elsewhere in North America	Transfer to direct processor outside of North America	Multi-step processing (BC or ON)	Multi-step processing elsewhere in North America	Multi-step processing outside of North America
Basis of evidence for product treatment	<ul style="list-style-type: none"> Due diligence in process for supplier selection (including detailed qualification of downstream suppliers by Aevitas) Detailed contracts with collection facility Monthly reporting from collection facilities 					
	<ul style="list-style-type: none"> Annual site visit to review processes 					<ul style="list-style-type: none"> Official shipping manifest with product weights Certificate of Destruction/Recycling

Thermostat Recovery Program 2019 Report to Director, Waste Management

					provided by retort facility	
Component (% of component sold/transferred for processing that is treated under each processing pathway)						
Plastics	During 2019 0%	0%	0%	0%	0%	0%
Metals	>99%	0%	0%	0%	0%	0%
Mercury Vessels (glass and mercury)	0%	0%	0%	0%	100%	0%

7. Product Sold and Collected and Recovery Rate

The amount of product sold is not currently tracked as mercury-containing thermostats are no longer sold into Canada, thus there are no sales to report. As for newer programmable models, the sales of these devices are not currently tracked by the manufacturers with sufficient detail to produce reporting at the provincial level as sales are currently only tracked at the national level. It is also worth noting that thermostats can have a life span of 20-30 years, though renovations can reduce that life span to 7-10 years. These timelines are long enough to make any direct correlation between product sold into the market and product available for recovery per year quite difficult, even if sales data were available.

Given the above, the Thermostat Recovery Program does not use a recovery rate as a measure of program performance, but instead measures the total amount of product collected measured against targets set out in the approved program plan. Collection totals and progress against targets will be discussed in [Section 9](#), below.

8. Summary of Deposits, Refunds, Revenues and Expenditures (N/A)

As the Thermostat Recovery Program does not charge deposits, this section is not applicable.

9. Plan Performance

The following table describes progress made towards the approved targets set out in the stewardship plan for the Thermostat Recovery Program:

Plan Target	2019 Results	Strategies for Improvement in 2020
<i>Performance Targets*</i>		

Thermostat Recovery Program 2019 Report to Director, Waste Management

Plan Target	2019 Results	Strategies for Improvement in 2020
1. Mercury Thermostat Collection: 4,153	Adjusted total: 4,453 thermostats collected (7% over target)	<ul style="list-style-type: none"> • Increase number of public drop-off locations • Increase number of collection points through targeted outreach in areas of low coverage • Continue to improve communication with wholesalers so that they can effectively market the program at their locations
2. Electronic Thermostat Collection: 1,206 thermostats (as proposed in revised 2015 – 2020 5 Yr. Plan)	2,153 electronic thermostats collected (79% over target)	<ul style="list-style-type: none"> • Increase communication, awareness, and education for contractors and wholesalers to place whole electronic thermostats and/or minimum electronic thermostat housing including branding in TRP pails.
3. Participants: 420	398 participants (95% of target)	<ul style="list-style-type: none"> • Increase outreach to wholesaler locations, especially those with multiple locations in the province. • Improved face-to-face communication at trade shows • Explore new recruitment options (eg. new marketing plan, new outreach events)
<i>Communication Targets</i>		
4. Program website: monthly updates	<ul style="list-style-type: none"> • Website is updated in real time with any new drop-off locations • Quarterly updates are made to ensure that all information is as up to date as possible • There were 544 visits to www.hrai.ca/trp from BC in 2019 	
5. Printed brochures: a minimum of 500 brochures will be printed and distributed on an annual basis	<p>Approximately 2,135 brochures distributed.</p> <p>25 brochures are distributed to each new participant (275); brochures have been sent to participants upon request (1,325); approx. 180 distributed various BC Municipal depot locations for consumer distribution and public outreach events; and 355 distributed to specific Regional District offices for consumer distribution.</p>	<ul style="list-style-type: none"> • Increase registration numbers (each new participant receives 25 brochures for distribution to their clients/stakeholders) • More public outreach (using program brochures as a tool to spread the word about the program)

Thermostat Recovery Program 2019 Report to Director, Waste Management

Plan Target	2019 Results	Strategies for Improvement in 2020
6. Printed posters will be distributed to all new drop-off locations to be displayed on site.	41 posters distributed to new (11) and existing (30) drop-off locations and as requested by participants	<ul style="list-style-type: none"> Regularly follow-up throughout the year to ensure participants always have posters to promote themselves as TRP drop-off locations.
7. Industry facing advertising - a minimum of 5 ads per year will target industry	Print ads appeared in all 7 issues of HPAC magazine	<ul style="list-style-type: none"> HPAC magazine is an industry publication with a readership of approximately 20,000.
	<p>In addition to the targeted communications described above, as outlined in Section 3 the TRP engaged in public facing advertising in 6 regional district calendars; as well the program was promoted through the SABC “British Columbia’s Recycling Handbook”, which provides a simple guide to what can be recycled under BC stewardship programs.</p> <p>A total of 5,000 handbooks were distributed to various stakeholders, including regional districts, community centers and libraries, school districts, and other relevant groups.</p> <p>A digital version is available at www.bcstewards.com.</p>	

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting.*

Thermostat Recovery Program 2019 Report to Director, Waste Management

Progress Toward Collection Targets

The following table provides further information regarding the amount of product collected by the Thermostat Recovery Program during the period of January 1 to December 31, 2018, measured against the targets outlined in the official stewardship plan, as well as the program growth as compared to the same period in 2017 and demonstrates the program’s commitment to continuous improvement.

Collection of Mercury-Containing Thermostats: Progress Against Targets and Program Growth				
	Targets (January 1 to December 31, 2019)*	Results Achieved from January 1 to December 31, 2019	Results Achieved from January 1 to December 31, 2018	Percentage difference in 2019
Number of Mercury Thermostats Collected	4,153 mercury thermostats	3,187 intact mercury thermostats; 1,772 loose vessels (1,772/1.4 = 1266 equivalent mercury thermostats); Adjusted Total: 4,453	3,749 intact mercury thermostats; 1,060 loose vessels (1,060/1.4 = 757 equivalent mercury thermostats); Adjusted Total: 4,506	7% increase over target 1% decrease from 2018’s results
Number of Electronic Thermostats Collected	1,206 electronic thermostats	2,153 electronic thermostats	1,100 electronic thermostats	79% over target set in revised 2015 – 2020 5 Yr. Plan

**targets are calculated based on the calendar year rather than the previously used program year in order to align it with the calendar year reporting.*

***Although all participating collection points are encouraged to return only intact mercury thermostats, loose vessels (which have been clipped out of thermostats) are occasionally returned as well. However, as you will see above even though there was communication outreach with the participants, etc., the number of loose vessels collected has increased compared to 2018. Therefore, TRP will continue to ramp up communication outreach to participants in 2020. Using the industry-accepted standard of 1.4 vessels per mercury thermostat, the number of loose vessels returned in 2019 is equivalent to 1266 mercury thermostats. The adjusted total number of mercury thermostats collected in 2019 is then 4,453.*

Amount Collected by Regional District

The following chart presents the number of thermostats collected in each regional district.

Thermostat Recovery Program 2019 Report to Director, Waste Management

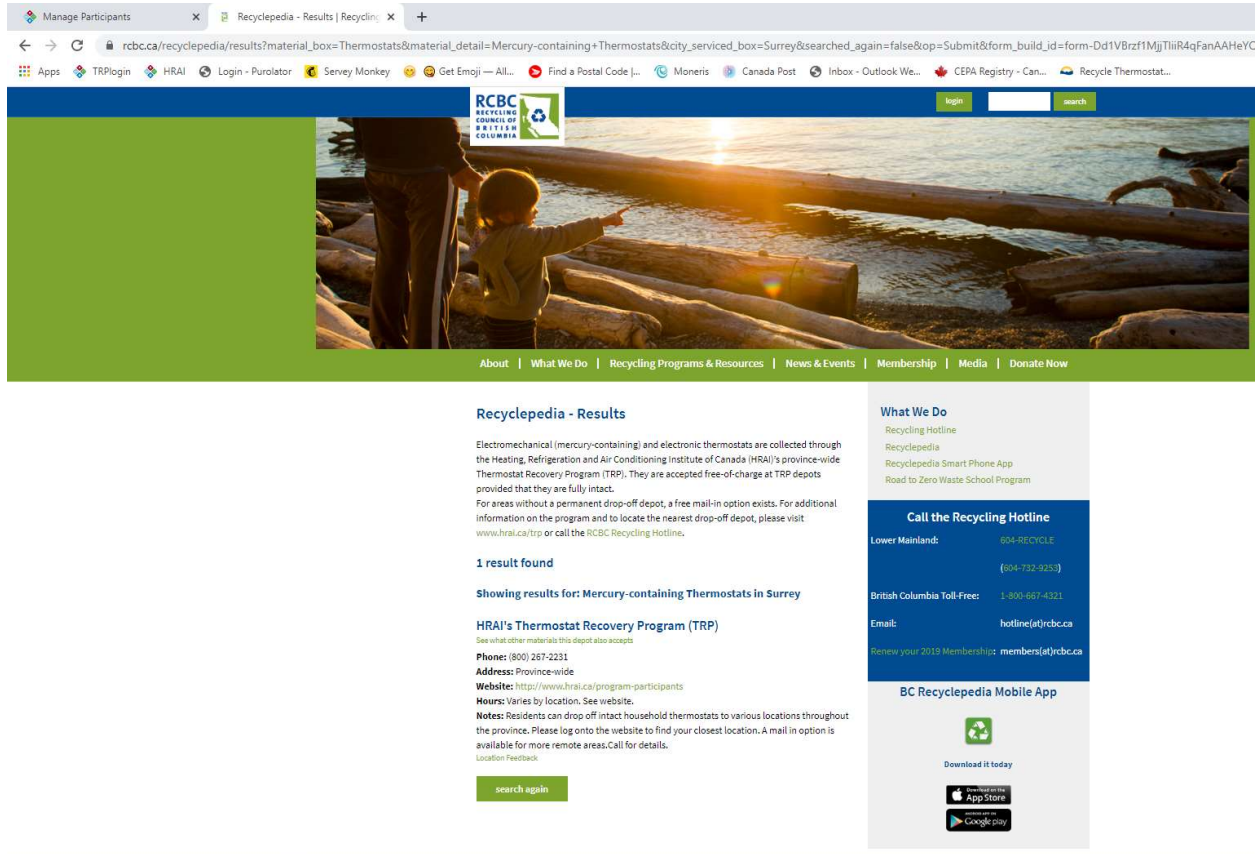
Region	Number of Mercury Thermostats Collected	Number of Electronic Thermostats Collected	Number of Loose Vessels Collected
Alberni - Clayoquot Regional District	31	16	1
Capital Regional District	274	552	4
Cariboo Regional District	16	27	0
Comox Valley Regional District	7	19	0
Fraser Valley Regional District	89	4	16
Metro Vancouver (Greater Vancouver Regional District)	2079	1258	1698
Northern Rockies Regional District	28	41	0
Peace River Regional District	31	1	0
Regional District of Buckley Nachako	48	0	0
Regional District of Central Kootenay	57	1	0
Regional District of Central Okanagan	290	50	48
Regional District of Fraser – Fort George	21	0	0
Regional District of Kitimat-Stikine	29	8	2
Regional District of Kootenay Boundary	13	27	0
Regional District of North Okanagan	38	11	1
Regional District of Okanagan-Similkameen	116	138	2
Thompson Nicola Regional District	20	0	0
TOTAL	3187	2153	1772

Thermostat Recovery Program 2019 Report to Director, Waste Management

Appendices / Additional Information and Third Party Assurance

Appendix A – Earned Media

RCBC Recyclepedia



The screenshot shows a web browser window with the URL rcbc.ca/recyclepedia/results?material_box=Thermostats&material_detail=Mercury-containing+Thermostats&city_serviced_box=Surrey&searched_again=false&op=Submit&form_build_id=form-Dd1V8rzf1MjTtiR4qFanAAHeYC. The page features a header with the RCBC logo and navigation links. The main content area displays search results for "Mercury-containing Thermostats in Surrey".

Recyclepedia - Results

Electromechanical (mercury-containing) and electronic thermostats are collected through the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)'s province-wide Thermostat Recovery Program (TRP). They are accepted free-of-charge at TRP depots provided that they are fully intact.

For areas without a permanent drop-off depot, a free mail-in option exists. For additional information on the program and to locate the nearest drop-off depot, please visit www.hrai.ca/trp or call the RCBC Recycling Hotline.

1 result found

Showing results for: Mercury-containing Thermostats in Surrey

HRAI's Thermostat Recovery Program (TRP)
See what other materials this depot also accepts

Phone: (800) 267-2231
Address: Province-wide
Website: <http://www.hrai.ca/program-participants>
Hours: Varies by location. See website.
Notes: Residents can drop off intact household thermostats to various locations throughout the province. Please log onto the website to find your closest location. A mail in option is available for more remote areas. Call for details.
Location Feedback

[search again](#)

What We Do

- Recycling Hotline
- Recyclepedia
- Recyclepedia Smart Phone App
- Road to Zero Waste School Program

Call the Recycling Hotline

Lower Mainland: 604-RECYCLE
(604-732-9253)

British Columbia Toll-Free: 1-800-667-4321

Email: hotline@rcbc.ca

Renew your 2019 Membership: members@rcbc.ca

BC Recyclepedia Mobile App

Download it today

Available on the App Store and Google play.

HPAC Magazine August 2019 Ad

PEOPLE >

Robyn Brookhart has been elected to the position of president of Liberty Pumps. She replaces Charlie Cook who will remain CEO and Chairman. Brookhart has been with Liberty for 22 years in a variety of positions including executive vice president, as well as its CEO – a position she will retain.



Brookhart

Dan Milroy has joined Equipco Ltd. as managing partner. Milroy most recently held the position of director of sales and marketing at Bradford White in Canada. As managing partner, Milroy will lead the company's Eastern Canada operations.



Milroy

Enviroair has tapped Maxime Boivin to take over as sales director of consulting firms for Quebec. Boivin spent the last five years gaining sales experience with HVAC engineered products. He is involved in the Quebec City chapter of ASHRAE.



Boivin

Independent Mechanical Supply Inc. has added Ed Lupson to its heating department at the company's head office in Rexdale, ON. In this role, he will service all three locations in the Greater Toronto Area (Rexdale, Scarborough and Oakville).



Lupson

Martin Knieps, director of technical marketing for Viega LLC, has been selected to join the board of directors of Plumbing Manufacturers International (PMI). Knieps will serve a two-year term on the seven-member board. Knieps, who joined Viega in 2006, has been active with PMI since 2015. He most recently served on its Advocacy/Government Affairs Committee. Michael Martinez, product compliance manager at Delta Faucet Co., also was named to the board.



Knieps

Superior Boiler-Hutchinson has promoted Danny Lane to vice president of operations. In this role, Lane will lead and oversee all company operations and facilities maintenance and management. He has been with the company for more than 30 years.



Lane



Stelpro has appointed Pierre-Yves Martin as vice president of sales and business development. Martin joined the company as national retail sales manager in June 2018.



Martin

Mark Williamson has been promoted to the position of director, sales and marketing, for Bradford White in Canada. Williamson will be responsible for the company's water heater and Laars Heating System sales throughout the region.



Williamson



Knipex Tools has hired Patrick Mooney as national sales manager for Canada. In this position, Mooney is responsible for brick and mortar wholesale distribution and dealer accounts throughout Canada. He has held several regional and national sales management roles with Ingersoll-Rand, Stanley Black & Decker and the BeA Group.



Mooney

We recycle all elements of the thermostat; plastic, metal, electronics and mercury (which is particularly hazardous).



Danfoss has appointed John Sheff as its director of public and industry affairs for North America. Sheff succeeds Mark Menzer, who retired from the role in July. He previously held the title of business development manager for Danfoss in North America.



Sheff



Menzer

Do your part and join the more than 1,500 contractors already participating in the program.

FOR MORE INFORMATION
www.hrai.ca/trp
 1(800) 267-2231, x 224

Administered & delivered by: HRAI
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Copy of City of Penticton Collection Calendar 2019 Ad

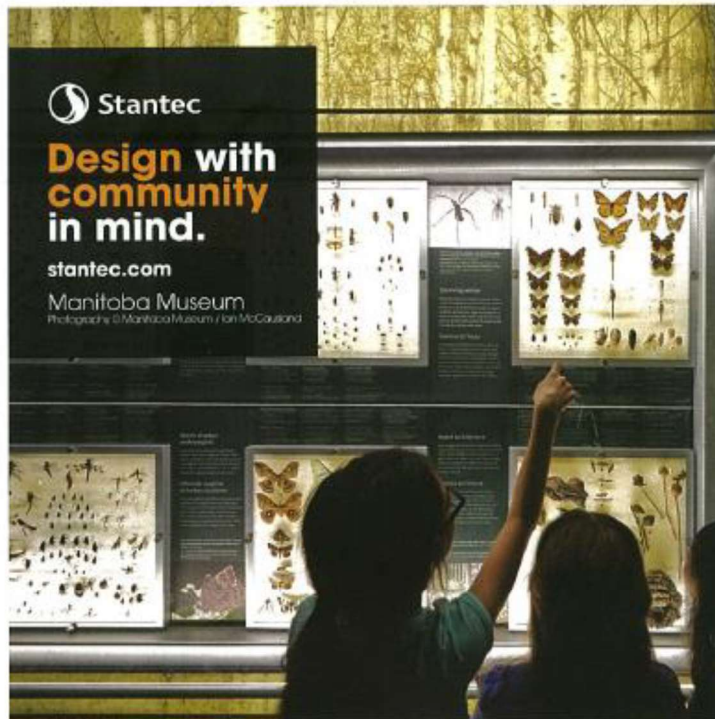
B.C. Product Stewardship Programs 2019-2020

PRODUCT	STEWARD	PROGRAM	For more details and depot locations
<p>Paint, Pesticides, Gasoline and Flammable Liquids</p> 		<p>Take paint, pesticides, gasoline and flammable liquids to your local ReGeneration collection site for safe recycling.</p> <p>Ensure they are properly sealed and labelled in their original container.</p>	<p>www.productcare.org or 1-888-772-9772.</p>
<p>Medications</p> 		<p>Return unused and expired prescription medications, over-the-counter drugs and natural health products through the British Columbia Medications Return Program (BCMRP) to your nearest pharmacy.</p>	<p>www.healthsteward.ca or call the Recycling Council of B.C. Hotline at 1-800-667-4321.</p>
<p>Small Appliances and Power Tools</p> 		<p>Recycle your small appliances and other household products that are electrical, use batteries or plug in to 120V or 12V power sources. This includes items such as kitchen countertop appliances, electric personal care items, small power tools and more.</p>	<p>www.ElectroRecycle.ca or call the Recycling Council of B.C. Hotline at 1-800-667-4321.</p>
<p>Lights, Bulbs and Fixtures</p> 		<p>Bring your residential light fixtures and bulbs/tubes to your nearest drop-off depot for safe recycling.</p> <p>Includes lamps, ceiling & wall fixtures, light strings, fluorescent tubes & CFL bulbs, and most household bulbs.</p>	<p>www.LightRecycle.ca or call the Recycling Council of B.C. Hotline at 1-800-667-4321.</p>
<p>Batteries and Cellphones</p> 		<p>Bring your household single-use and rechargeable batteries and cellphones for safe recycling and disposal.</p> <p>Includes cell phones and batteries under 5kg (alkaline, NiCd, lithium, etc); batteries from cell- and cordless phones, power tools, laptops, etc. Excludes car batteries.</p>	<p>www.call2recycle.ca/british-columbia or 1-888-224-9764.</p>
<p>Smoke or Carbon Monoxide Alarms</p> 		<p>Bring your smoke or carbon monoxide alarms to your nearest depot for safe recycling.</p>	<p>www.productcare.org 1-888-772-9772 or call the Recycling Council of B.C. Hotline at 1-800-667-4321.</p>
<p>Thermostats</p> 		<p>Bring your thermostat in for safe recycling and disposal to keep all its components, especially mercury, out of the waste stream.</p> <p>Includes all mercury-containing, electronic and mechanical thermostats.</p>	<p>www.hrai.ca/trp</p>
<p>Large Appliances</p> 		<p>Recycle all major household appliances such as refrigerators, freezers, dehumidifiers, air conditioners, clothes dryers, dishwashers, ovens, trash compactors, electric beverage dispensers, and more.</p>	<p>www.marrbc.ca</p>

Municipal Leader Magazine Fall 2019 Ad

**Our concern
for the
environment
is more than
just talk**

This publication is printed on Forest Stewardship Council® (FSC®) certified paper with vegetable oil-based inks. Please do your part for the environment by reusing and recycling.



EASY. SAFE. FREE.
THERMOSTAT RECYCLING

We recycle all elements of the thermostat; plastic, metal, electronics and mercury (which is particularly hazardous).

Do your part and join the more than 1600 active participants in the program.

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Independent practitioner's reasonable assurance report on Heating, Refrigeration and Air Conditioning Institution's Annual Report to the Director of Extended Producer Responsibility Programs at the Ministry of the Environment, Government of British Columbia.

To the Directors of Heating, Refrigeration and Air Conditioning Institution

We have undertaken a reasonable assurance engagement on the following information (the "subject matter information") of Heating, Refrigeration and Air Conditioning Institution (HRAI), as detailed in Appendix A, and also included within HRAI's 2019 Annual Report (the "report") to the Director of Extended Producer Responsibility Programs at the Ministry of Environment, Government of British Columbia ("MOE") during the period from January 1 to December 31, 2019

- The location of collection facilities, and any changes in the number and location of collection facilities from the prior year in accordance with Section 8(2)(b) of the British Columbia Regulation 449/2004 Recycling Regulation ("Recycling Regulation");
- The description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with 8(2)(d) of the Recycling Regulation;
- The total amount of the producers' product collected for the year ended December 31, 2019 in accordance with 8(2)(e) of the Recycling Regulation; and
- The description of performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(e), in accordance with Section 8(2)(g) of the Recycling Regulation.

Management's responsibility

Management is responsible for preparation of the subject matter in accordance with sections 8(2)(b), 8(2)(d), 8(2)(e) and 8(2)(g) established in the British Columbia Regulation 449/2004 Recycling Regulation (the criteria), as detailed in Appendix A. Management is also responsible for such internal control as management determines necessary to enable the preparation of the subject matter that is free from material misstatement.

Our responsibility

Our responsibility is to express a reasonable assurance opinion on the subject matter information based on the evidence we have obtained. We conducted our reasonable assurance engagement in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3000, *Attestation Engagements Other than Audit or Reviews of Historical Financial Information*.

This standard requires that we plan and perform this engagement to obtain reasonable assurance about whether the subject matter is free from material misstatement.

Reasonable assurance is a high level of assurance, but is not a guarantee that an engagement conducted in accordance with this standard will always detect a material misstatement when it exists. The nature, timing and extent of procedures selected depends on our professional judgment, including an assessment of the risks of material misstatements, whether due to fraud or error, and involves examining evidence about management's preparation of the subject matter in accordance with the criteria.

PricewaterhouseCoopers LLP
PwC Tower, 18 York Street, Suite 2600, Toronto, Ontario, Canada M5J 0B2
T: +1 416 863 1133, F: +1 416 365 8215

PwC refers to PricewaterhouseCoopers LLP, an Ontario limited liability partnership.



We believe the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our independence and quality control

We have complied with the relevant rules of professional conduct/code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

The firm applies Canadian Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance Engagements* and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Opinion

In our opinion, Heating, Refrigeration and Air Conditioning Institution's subject matter information for the period January 1, 2019 to December 31, 2019 has been prepared, in all material respects, in accordance with the criteria.

Emphasis of matter

We draw your attention to Appendix B, which describes why certain items required by the Assurance Requirements have been excluded. Our opinion is not modified in respect of this matter.

Purpose of statement and restriction of use and distribution

The subject matter information has been prepared to report to the MOE Director, Extended Producer Responsibility. As a result, the subject matter information may not be suitable for another purpose.

Our report is intended solely for HRAI and the MOE Director, Extended Producer Responsibility, in accordance with the terms of our engagement, and should not be distributed to or used by parties other than HRAI and the MOE Director, Extended Producer Responsibility.

PricewaterhouseCoopers LLP

Chartered Professional Accountants

Toronto, Ontario
June 29, 2020

Appendix A – Results and criteria

1. **The location of collection facilities, and any changes in the number and location of collection facilities from the previous report as presented on page 4 and 11 of HRAI's 2019 Annual Report to the Director.**

Result:

There is one main collection facility as at December 31st 2019.

Reference: Page 4 and 11 of HRAI's 2019 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st 2019.
- HRAI considers Aevitas Inc. to be the only Collection Facility. HRAI uses many Collection Points as partners in the collection of products. These are not considered collection facilities under the stewardship plan, and accordingly are not reported here.
- The number of Collection Facilities is reported on the basis of the number of Collection Facilities who have a signed contract with HRAI to collect, process, ship, and report on collected program products during the reporting period.
- The changes in number and location of Collection Facilities are calculated by tracking the additions and removals of Collection Facilities throughout a given reporting year. This information is further compared with the equivalent data from the end of the prior year.

Definitions:

- "Program Products" are all products included in the program as listed in the revised product stewardship plan 2015-2020, Section 2.4.
- "Collection Facilities" are considered to be locations with a signed contract with HRAI for the purpose of collecting, processing, shipping, and reporting on Program Products at any point during the reporting year.
- "Collection Points" are mechanisms for collection. This term was new to the program as of the 2012 reporting year. In prior years, the collection points were considered the collection facilities. Collection Points may include the following types of businesses (also known as 'participants') and have either signed a formal document or a had a verbal discussion outlining their agreement with the Agency to take part in the program:
 - Contractors
 - Wholesalers
 - Local or regional government recycling centers or transfer stations
 - Direct send-back

Thermostat Recovery Program 2019 Report to Director, Waste Management

2. The description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with 8(2)(d) of the Recycling Regulation as presented on pages 5, 16, 17, 18 and 19 of HRAI's 2019 Annual Report to the Director.

The descriptions of how components (i.e. plastic, metals, glass vials containing mercury) are processed, is presented in a list on pages 16-19 of the 2019 Annual Report for Aevitas Inc.

The acceptable end fates for each of the components of a thermostat, is presented within the table on page 19 of the 2019 Annual Report.

Component	Reuse	Recycle	Energy Recovery	Landfill	Other
Plastics	X	Preferred	X	X	See page 19
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	See page 19

Reference: Pages 5, 16, 17, 18 and 19 of HRAI's 2019 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st, 2019.
- Program Products collected are reported by end of fate both by commodity and by process on the Pollution Prevention Hierarchy:
 - Reuse: N/A – No Program Products are reused per the revised product stewardship plan 2015-2020.
 - Recycle: Products are reported by each separately identifiable end of fate commodity (e.g. metals, glass, etc.) either based on the number of units for the mercury vessels; or based on weight in Kgs for the plastics, metals, mercury and glass:
 - The weight in kg of glass is calculated by multiplying the total number of mercury vessels by the industry standard of 1 gram of glass per vessel
 - The weight in kg of mercury is calculated by multiplying the total number of mercury vessels by the industry standard of 2.5 grams of mercury per vessel
 - Recovery: N/A - No Program Products are recovered.
 - Waste: In 2019, the plastics generated from the TRP thermostats were disposed of into landfills.

Definitions:

- The Pollution Prevention Hierarchy includes the following:
 - “Reuse” includes all Program Products that are refurbished or can be reused “as-is” through either, resale, return to inventory, or given away as a donation.
 - “Recycle” includes:

- Any Program Product that cannot be Reused.
- Any Program Product where the sales agreement strictly prohibits the reuse of that product or requires its destruction.
- Any Program Product that is harvested for parts.
- Any commodities that are captured from the recycling process.

“Energy Recovery” relates to processing activities after the recycling stage and includes any element of the Program Product that is harvested to generate energy.

“Waste” includes any products not captured in the three streams above.

- “End of fate” is defined as final processed state of each commodity before entering a re-use stream or shipment to landfill / sequestration.

3. The total amount of the producer’s product sold and collected and the recovery rate as presented on pages 5, 22 and 23 of HRAI’s 2019 Annual Report to the Director.

Total amount of producer’s product collected in 2019 is:

- Collected 3,187 mercury containing thermostats, 2,153 electronic thermostats, and 1,772 loose mercury vessels
- **Adjusted total: 4,453 mercury containing thermostats and 2,153 electronic thermostats, for a total of 6,606 collected**

Adjusted total mercury containing thermostats are estimated as follows:

$$\begin{aligned} & \text{Intact mercury containing thermostats} + \text{Loose mercury vessels} \\ & \div \text{average mercury switches per vessel} = 3,187 + \frac{1,772}{1.4} = 4,453 \end{aligned}$$

Reference: Pages 5, 22 and 23 of HRAI’s 2019 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st, 2019.
- Quantification of Product Collected is based on the number of Thermostats and Hg vessels reported by the Collection Facilities as having been received/collected and diverted during the reporting year.
- These amounts are monitored on a monthly basis through information collected that includes the number of thermostats and Hg vessels collected by geographic location.
- Although all participating collection points are encouraged to return only intact thermostats, loose vessels (which have been clipped out of thermostats) are occasionally returned as well. The equivalent number of thermostats is calculated by dividing the number of loose vessels by the industry-accepted standard of 1.4 vessels per thermostat (determined through averages provided by the industry and confirmed during a pilot study conducted by the Agency in 2006).
 - The “Adjusted total number of thermostats” collected is calculated by summing the total number of thermostats collected and the equivalent number of thermostats calculated above.

Definitions:

- "Program Products" are all products included in the program as listed in the revised product stewardship plan 2015-2020, Section 2.4.

"Product Collected" is the amount of all Program Products collected from sources known to be located within the province of BC that occurred through the Collection Facilities. The amount of Product Collected is reported as the total number of thermostats, Adjusted total number of thermostats, total number of Mercury ("Hg") vessels, and number of loose Hg vessels received by the Collection Facilities during the reporting year.

4. The performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(b), (d) and (e) in accordance with Section 8(2)(g) of the Recycling Regulation as presented on pages 6, 22 and 23 of HRAI's 2019 Annual Report to the Director.

Result:

The target number of thermostats to be collected in 2019 is 4,153 and the result is an adjusted total of 4,453 mercury thermostats. This is 7% above the target.

Reference: Pages 6, 22 and 23 of HRAI's 2019 Annual Report to the Director.

Method of Reporting:

- Reporting period: January 1st to December 31st, 2019

Specific 2019 targets set out in the revised stewardship 2015-2020 are:

- i. Section 8(2)(b) - target is set for collection points, not collection facilities and therefore, no assurance provided.
- ii. Section 8(2)(d) - no target set for how the product is managed in accordance with the pollution prevention hierarchy because the Thermostat Recovery Program is already able to recycle greater than 99% of materials recovered through the program, efforts to continually reduce environmental impacts have centered on improving the program's collection processes.
- iii. Section 8(2)(e) - no targets set for product sold (Product sold is not calculated or reported).
- iv. Section 8(2)(e) - 100% capture rate of the estimated number of mercury-containing thermostats available for collection (4,153), which equals a target of 4,153 thermostats to be collected.

Appendix B - Exclusions

HRAI has not reported the recovery rate for the year in accordance with 8(2)(e) of the Recycling Regulations for the year ended December 31, 2019 as the approved stewardship plan does not outline the requirement to report recovery rates. If the stewardship program does not report a recovery rate in the approved plan, assurance for producers' product sold data is not required as outlined in the Assurance Requirements.

HRAI has not reported its performance for the year in relation to targets under 8(2)(b) and (d) in accordance with 8(2)(g) of the Recycling Regulation for the year ended December 31, 2019 as HRAI is not required to report this to the Director as there are no targets set in the revised stewardship plan for these sections applicable to the reporting year.



Independent practitioner’s reasonable assurance report on Heating, Refrigeration and Air Conditioning Institution’s Annual Report to the Director of Extended Producer Responsibility Programs at the Ministry of the Environment, Government of British Columbia.

To the Directors of Heating, Refrigeration and Air Conditioning Institution

We have undertaken a reasonable assurance engagement on the following information (the “subject matter information”) of Heating, Refrigeration and Air Conditioning Institution (HRAI), as detailed in Appendix A, and also included within HRAI’s 2019 Annual Report (the “report”) to the Director of Extended Producer Responsibility Programs at the Ministry of Environment, Government of British Columbia (“MOE”) during the period from January 1 to December 31, 2019

- The location of collection facilities, and any changes in the number and location of collection facilities from the prior year in accordance with Section 8(2)(b) of the British Columbia Regulation 449/2004 Recycling Regulation (“Recycling Regulation”);
- The description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with 8(2)(d) of the Recycling Regulation;
- The total amount of the producers’ product collected for the year ended December 31, 2019 in accordance with 8(2)(e) of the Recycling Regulation; and
- The description of performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(e), in accordance with Section 8(2)(g) of the Recycling Regulation.

Management’s responsibility

Management is responsible for preparation of the subject matter in accordance with sections 8(2)(b), 8(2)(d), 8(2)(e) and 8(2)(g) established in the British Columbia Regulation 449/2004 Recycling Regulation (the criteria), as detailed in Appendix A. Management is also responsible for such internal control as management determines necessary to enable the preparation of the subject matter that is free from material misstatement.

Our responsibility

Our responsibility is to express a reasonable assurance opinion on the subject matter information based on the evidence we have obtained. We conducted our reasonable assurance engagement in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3000, *Attestation Engagements Other than Audit or Reviews of Historical Financial Information*.

This standard requires that we plan and perform this engagement to obtain reasonable assurance about whether the subject matter is free from material misstatement.

Reasonable assurance is a high level of assurance, but is not a guarantee that an engagement conducted in accordance with this standard will always detect a material misstatement when it exists. The nature, timing and extent of procedures selected depends on our professional judgment, including an assessment of the risks of material misstatements, whether due to fraud or error, and involves examining evidence about management’s preparation of the subject matter in accordance with the criteria.

*PricewaterhouseCoopers LLP
PwC Tower, 18 York Street, Suite 2600, Toronto, Ontario, Canada M5J 0B2
T: +1 416 863 1133, F: +1 416 365 8215*



We believe the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our independence and quality control

We have complied with the relevant rules of professional conduct/code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

The firm applies Canadian Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance Engagements* and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Opinion

In our opinion, Heating, Refrigeration and Air Conditioning Institution’s subject matter information for the period January 1, 2019 to December 31, 2019 has been prepared, in all material respects, in accordance with the criteria.

Emphasis of matter

We draw your attention to Appendix B, which describes why certain items required by the Assurance Requirements have been excluded. Our opinion is not modified in respect of this matter.

Purpose of statement and restriction of use and distribution

The subject matter information has been prepared to report to the MOE Director, Extended Producer Responsibility. As a result, the subject matter information may not be suitable for another purpose.

Our report is intended solely for HRAI and the MOE Director, Extended Producer Responsibility, in accordance with the terms of our engagement, and should not be distributed to or used by parties other than HRAI and the MOE Director, Extended Producer Responsibility.

PricewaterhouseCoopers LLP

Chartered Professional Accountants

Toronto, Ontario
June 29, 2020

Appendix A – Results and criteria

1. The location of collection facilities, and any changes in the number and location of collection facilities from the previous report as presented on page 4 and 11 of HRAI's 2019 Annual Report to the Director.

Result:

There is one main collection facility as at December 31st 2019.

Reference: Page 4 and 11 of HRAI's 2019 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st, 2019.
- HRAI considers Aevitas Inc. to be the only Collection Facility. HRAI uses many Collection Points as partners in the collection of products. These are not considered collection facilities under the stewardship plan, and accordingly are not reported here.
- The number of Collection Facilities is reported on the basis of the number of Collection Facilities who have a signed contract with HRAI to collect, process, ship, and report on collected program products during the reporting period.
- The changes in number and location of Collection Facilities are calculated by tracking the additions and removals of Collection Facilities throughout a given reporting year. This information is further compared with the equivalent data from the end of the prior year.

Definitions:

- "Program Products" are all products included in the program as listed in the revised product stewardship plan 2015-2020, Section 2.4.
- "Collection Facilities" are considered to be locations with a signed contract with HRAI for the purpose of collecting, processing, shipping, and reporting on Program Products at any point during the reporting year.
- "Collection Points" are mechanisms for collection. This term was new to the program as of the 2012 reporting year. In prior years, the collection points were considered the collection facilities. Collection Points may include the following types of businesses (also known as 'participants') and have either signed a formal document or a had a verbal discussion outlining their agreement with the Agency to take part in the program:
 - Contractors
 - Wholesalers
 - Local or regional government recycling centers or transfer stations
 - Direct send-back

2. The description of how recovered product was managed in accordance with the pollution prevention hierarchy in accordance with 8(2)(d) of the Recycling Regulation as presented on pages 5, 16, 17, 18 and 19 of HRAI's 2019 Annual Report to the Director.

The descriptions of how components (i.e. plastic, metals, glass vials containing mercury) are processed, is presented in a list on pages 16-19 of the 2019 Annual Report for Aevitas Inc.

The acceptable end fates for each of the components of a thermostat, is presented within the table on page 19 of the 2019 Annual Report.

Component	Reuse	Recycle	Energy Recovery	Landfill	Other
Plastics	X	Preferred	X	X	See page 19
Metals	X	Preferred	X	X	NA
Mercury Vessels (glass)	X	Preferred	X	X	NA
Mercury Vessels (mercury)	Optional	X	X	X	See page 19

Reference: Pages 5, 16, 17, 18 and 19 of HRAI's 2019 Annual Report to the Director.

Method of Reporting:

- Reporting Period: January 1st to December 31st, 2019.
- Program Products collected are reported by end of fate both by commodity and by process on the Pollution Prevention Hierarchy:
 - Reuse: N/A – No Program Products are reused per the revised product stewardship plan 2015-2020.
 - Recycle: Products are reported by each separately identifiable end of fate commodity (e.g. metals, glass, etc.) either based on the number of units for the mercury vessels; or based on weight in Kgs for the plastics, metals, mercury and glass:
 - The weight in kg of glass is calculated by multiplying the total number of mercury vessels by the industry standard of 1 gram of glass per vessel
 - The weight in kg of mercury is calculated by multiplying the total number of mercury vessels by the industry standard of 2.5 grams of mercury per vessel
 - Recovery: N/A - No Program Products are recovered.
 - Waste: In 2019, the plastics generated from the TRP thermostats were disposed of into landfills.

Definitions:

- The Pollution Prevention Hierarchy includes the following:
 - “Reuse” includes all Program Products that are refurbished or can be reused “as-is” through either, resale, return to inventory, or given away as a donation.
 - “Recycle” includes:

- Any Program Product that cannot be Reused.
- Any Program Product where the sales agreement strictly prohibits the reuse of that product or requires its destruction.
- Any Program Product that is harvested for parts.
- Any commodities that are captured from the recycling process.

“Energy Recovery” relates to processing activities after the recycling stage and includes any element of the Program Product that is harvested to generate energy.

“Waste” includes any products not captured in the three streams above.

- “End of fate” is defined as final processed state of each commodity before entering a re-use stream or shipment to landfill / sequestration.

3. The total amount of the producer’s product sold and collected and the recovery rate as presented on pages 5, 22 and 23 of HRAI’s 2019 Annual Report to the Director.

Total amount of producer’s product collected in 2019 is:

- Collected 3,187 mercury containing thermostats, 2,153 electronic thermostats, and 1,772 loose mercury vessels
- **Adjusted total: 4,453 mercury containing thermostats and 2,153 electronic thermostats, for a total of 6,606 collected**

Adjusted total mercury containing thermostats are estimated as follows:

$$\begin{aligned} & \text{Intact mercury containing thermostats} + \text{Loose mercury vessels} \\ & \div \text{average mercury switches per vessel} = 3,187 + \frac{1,772}{1.4} = 4,453 \end{aligned}$$

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Method of Reporting:

- Reporting Period: January 1st to December 31st, 2019.
- Quantification of Product Collected is based on the number of Thermostats and Hg vessels reported by the Collection Facilities as having been received/collected and diverted during the reporting year.
- These amounts are monitored on a monthly basis through information collected that includes the number of thermostats and Hg vessels collected by geographic location.
- Although all participating collection points are encouraged to return only intact thermostats, loose vessels (which have been clipped out of thermostats) are occasionally returned as well. The equivalent number of thermostats is calculated by dividing the number of loose vessels by the industry-accepted standard of 1.4 vessels per thermostat (determined through averages provided by the industry and confirmed during a pilot study conducted by the Agency in 2006).
 - The “Adjusted total number of thermostats” collected is calculated by summing the total number of thermostats collected and the equivalent number of thermostats calculated above.

Definitions:

- "Program Products" are all products included in the program as listed in the revised product stewardship plan 2015-2020, Section 2.4.

"Product Collected" is the amount of all Program Products collected from sources known to be located within the province of BC that occurred through the Collection Facilities. The amount of Product Collected is reported as the total number of thermostats, Adjusted total number of thermostats, total number of Mercury ("Hg") vessels, and number of loose Hg vessels received by the Collection Facilities during the reporting year.

4. The performance for the year in relation to targets in the approved stewardship plan under Section 8(2)(b), (d) and (e) in accordance with Section 8(2)(g) of the Recycling Regulation as presented on pages 6, 22 and 23 of HRAI's 2019 Annual Report to the Director.**Result:**

The target number of thermostats to be collected in 2019 is 4,153 and the result is an adjusted total of 4,453 mercury thermostats. This is 7% above the target.

Reference: Pages 6, 22 and 23 of HRAI's 2019 Annual Report to the Director.

Method of Reporting:

- Reporting period: January 1st to December 31st, 2019

Specific 2019 targets set out in the revised stewardship 2015-2020 are:

- i. Section 8(2)(b) - target is set for collection points, not collection facilities and therefore, no assurance provided.
- ii. Section 8(2)(d) - no target set for how the product is managed in accordance with the pollution prevention hierarchy because the Thermostat Recovery Program is already able to recycle greater than 99% of materials recovered through the program, efforts to continually reduce environmental impacts have centered on improving the program's collection processes.
- iii. Section 8(2)(e) - no targets set for product sold (Product sold is not calculated or reported).
- iv. Section 8(2)(e) - 100% capture rate of the estimated number of mercury-containing thermostats available for collection (4,153), which equals a target of 4,153 thermostats to be collected.

Appendix B - Exclusions

HRAI has not reported the recovery rate for the year in accordance with 8(2)(e) of the Recycling Regulations for the year ended December 31, 2019 as the approved stewardship plan does not outline the requirement to report recovery rates. If the stewardship program does not report a recovery rate in the approved plan, assurance for producers' product sold data is not required as outlined in the Assurance Requirements.

HRAI has not reported its performance for the year in relation to targets under 8(2)(b) and (d) in accordance with 8(2)(g) of the Recycling Regulation for the year ended December 31, 2019 as HRAI is not required to report this to the Director as there are no targets set in the revised stewardship plan for these sections applicable to the reporting year.