



BRITISH COLUMBIA STEWARDSHIP PLAN FOR THERMOSTATS

FINAL

Submitted by:

Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)
with the support of the Canadian Institute of Plumbing and Heating (CIPH)

Prepared by:

Clean Air Foundation

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Table of Contents

1. INTRODUCTION

- 1.1 Overview
- 1.2 Program Participants
- 1.3 Program Products

2. PRODUCT STEWARDSHIP PLAN

- 2.1 Plan Development
- 2.2 Collection Infrastructure
- 2.3 Pollution Prevention Hierarchy

3. PROGRAM PERFORMANCE

- 3.1 Program Accessibility
- 3.2 Consumer Awareness
- 3.3 Collection Targets

4. PROGRAM ADMINISTRATION

- 4.1 Program Financing
- 4.2 Steward Compliance
- 4.3 Dispute Resolution
- 4.4 Cooperation with Other Thermostat Collection Programs

5. STAKEHOLDER CONSULTATION

APPENDICES

Appendix A — List of Manufacturers and Distributors Responsible for Selling Thermostats into British Columbia

Appendix B — List of Thermostats Manufacturers and Distributors Signed-on to Participate in the Stewardship Plan

Appendix C — Existing Switch the 'Stat Program Resources

Appendix D — PowerPoint Presentation from the Public Consultations/Webinars

Appendix E — Summary of Feedback from the Public Consultations/Webinars with Associated Responses

Appendix F — Section on Mercury-containing Thermostats in the “Final Consolidated MHSW Program Plan V. II — July 30, 2009” from the Ontario Municipal Hazardous or Special Waste Program

1. INTRODUCTION

1.1 Overview

In accordance with the British Columbia Recycling Regulation (Reg. 449/2004), the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI), with the support of the Canadian Institute of Plumbing and Heating (CIPH), is submitting this Stewardship Plan on behalf of manufacturers and distributors responsible for selling thermostats into British Columbia.

The ultimate goal in preparing this Plan is to develop and deliver a harmonized program across Canada for the collection and recycling of thermostats. The intention of this Plan is to create a program that satisfies the obligations of the thermostat manufacturers under the British Columbia Recycling Regulation and the Ontario Municipal Hazardous or Special Waste (MHSW) Program, and then expand that program to a national scope.

The Plan will build on the program infrastructure of the existing Switch the 'Stat program managed by Clean Air Foundation (CAF), which has focused on thermostat collection from heating, ventilation and air conditioning (HVAC) contractors and wholesalers in Ontario, to expand this collection channel across British Columbia and include additional collection channels, such as return-to-retail and individual send-back options.

This version of the Plan covers a five-year period from July 1, 2010 to June 30, 2015, and as such sets five-year targets for accessibility and collection. Details are provided in the document below. As per the Recycling Regulation guidelines, while the collection program for thermostats will be ongoing, the Plan will be reviewed after five years of operations, and will make any needed amendments at that time.

1.2 Program Participants

HRAI, with the support of CIPH, has taken the lead in developing this Plan on behalf of manufacturers and distributors responsible for selling thermostats into British Columbia. Appendix A includes a list of the manufacturers and distributors that sell thermostats into British Columbia. Appendix B lists the thermostat manufacturers and distributors that have already signed onto this Plan.

HRAI and CIPH will be contacting the manufacturers and distributors listed in Appendix A to notify them about this Plan and, as a result, the list in Appendix B will continue to evolve. The list of participating manufacturers and distributors will also be posted on the program website (www.switchthestat.ca), and will be updated regularly as new participants register for the program.

As the agency appointed by the manufacturers and distributors listed in Appendix B to fulfill their legal obligation to develop and deliver a collection and recycling program for thermostats in British Columbia, HRAI has contracted CAF to provide overall program management and delivery.

1.3 Program Products

This Plan covers all “thermostats” as defined as a product that senses and controls room temperature through communication with heating, ventilation and air conditioning equipment from all sectors (residential and commercial), including:

- Electromechanical 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.

The designed lifespan of an electromechanical thermostat is 20–30 years. However, in reality, the majority of thermostats are replaced more frequently than that — on average every 7–10 years — as a result of renovations and/or replacing furnaces and other HVAC equipment.

2. PRODUCT STEWARDSHIP PLAN

2.1 Plan Development

In 2006, Clean Air Foundation developed and operated a pilot program to collect mercury-containing thermostats. This program — Switch the ‘Stat — became a permanent, ongoing initiative of Clean Air Foundation in 2007. In delivering Switch the ‘Stat to more than 1,300 contractors and wholesalers in Ontario, Clean Air Foundation provides education and outreach for both the participating home and/or business owners and contractors/wholesalers, as well as free collection containers and shipping for all thermostats collected.

In early 2009, Clean Air Foundation, HRAI, CIPH and a number of thermostat manufacturers and distributors discussed the opportunities and value in using the existing Switch the ‘Stat program model and infrastructure as the basis for the Stewardship Plan for thermostats to meet the obligations of the British Columbia Recycling Regulation.

2.2 Collection Infrastructure

The Plan will use the following four channels to collect end-of-life thermostats in British Columbia:

1. Contractors/wholesalers — removal and collection by contractors/wholesalers, as well as act as drop-off locations for general public
2. Return-to-retail pilots
3. Send-back pilot for remote regions of the province
4. Regional district/municipal collection

1. Contractor/Wholesaler Channel

- This channel will be used as the primary collection channel for the Plan because it is estimated that 85 to 90 per cent of thermostats sold into British Columbia are sold via the contractor/wholesaler channel and, as such, we expect to see a similar proportion of thermostats collected and returned through this channel.
- CAF and HRAI will identify and engage HVAC contractors and wholesalers via letters, advertising in industry publications, and participation in industry meetings (via presentations and tradeshow).
- Contractors and wholesalers can register for Switch the ‘Stat either via the program website (www.switchthestat.ca) or by call CAF directly.
- CAF sends registered contractors and wholesalers the following material — a collection container (United Nations approved for shipping), an introductory letter, program instructions, information brochures to leave behind with their customers and a pre-paid courier waybill.
- Contractors remove old thermostats from homes or businesses and replace them with new thermostats.

- Contractors place old thermostats intact in the provided collection containers.
- Contractors continue to collect thermostats until their containers are full, or until they are requested to return their container during a collection “sweep”.
- The full containers are shipped using the provided pre-paid courier waybill.
- The courier picks the containers up from the contractor or wholesaler and ships them directly to the recycling facility.
- The Plan will ensure that the courier and recycling companies used in the program have the appropriate certificates of approval to transport and receive all types of thermostats, including mercury-containing ones.
- Once at the Recycler, the thermostats will be counted, documented, dismantled and recycled, the mercury will be removed and stored, the metal and plastic components of the thermostats will be recycled, and the number of thermostats collected by each contractor will be reported back to CAF on a monthly basis.

For do-it-yourselfers, the Plan will promote the contractors and wholesalers that participate in the program as year-round drop-off locations. The Switch the ‘Stat website will have a map or search by postal code function that will allow the general public to locate a participating contractor/wholesaler in their area.

The Plan will also engage retail locations that sell new thermostats to voluntarily display permanent signage with program information and website to be displayed at the point-of-sale (with new thermostats).

2. Return-to-retail Collection Channel

- This channel will be used as a secondary collection channel for the Plan, and will operate as pilots in Year 1 to determine the effectiveness as a permanent on-going collection channel.
- CAF will engage a number of retail locations to voluntarily participate in timed take-back campaigns using a request for proposal process.
- A timed campaign, with associated outreach, will increase promotion and participation opportunities.
- In-store signage will be displayed near the new thermostats, at cash, and as a take-away reminder to promote the return-to-retail pilots before the collection weekends to notify customers of the upcoming event.
- The Switch the ‘Stat website will also promote the return-to-retail events prior to the actual collection weekends.
- The campaign could be timed to coincide with other energy conservation messages from the participating retailers.
- CAF will hire program representatives to be in-store to manage the collection of returned thermostats, answer questions and administer a survey to all participants to gather useful information regarding consumer behaviour.

- CAF will work with the participating retailers/manufacturers to determine the feasibility of including a financial incentive (toward the purchase of a new thermostat with the return of an old one) for the pilots.
3. Send-back Channel
- This channel will be used as a secondary collection channel for the Plan, and will operate as a pilot project in Year 1 to determine the effective as a permanent on-going collection channel.
 - This channel will be provided as an option for British Columbia residents living in remote areas.
 - The Switch the 'Stat website will list a toll-free phone number and an on-line request option where the public can request a shipping container with a pre-paid courier waybill to ship their individual old thermostat directly to the recycler.
 - The Plan will document and track the number of thermostats that come back through this channel to judge effectiveness.
4. Regional District/Municipal Collection
- This channel will be used as a secondary collection channel for the Plan, and will operate as a pilot project in Year 1 to determine the effective as a permanent on-going collection channel.
 - To determine the volume of thermostats being returned through this channel, CAF will consult past municipal collection data from the regional districts, as well as provide collection containers and free shipping and processing to municipal depots that collect thermostats in Year 1.
 - The Plan will document and track the number of thermostats that come back through this channel in Year 1 to judge the relative proportion of collection results.

One hundred per cent of the thermostats collected through the Plan will be recycled and diverted from landfill.

2.3 *Pollution Prevention Hierarchy*

Reduce/Redesign — The main environmental concern with thermostats is the mercury contained in many of the older models. While mercury-containing thermostats have been in use for more than 50 years, they are no longer manufactured by the major manufacturers. Honeywell stopped selling mercury-containing thermostats in Canada in 2006 and Emerson/White Rodgers stopped in December 2008. As well, the government of Canada is working on a risk management strategy that will ban the sale, manufacture and import of all mercury-containing products (excluding lamps and dental amalgam) into Canada by 2012. This ban will guarantee that mercury-containing thermostats are an obsolete material.

Reuse — The Plan will not encourage the reuse of old thermostats collected through this program for a number of reasons. First, many of the old thermostats contain mercury and this Plan will ensure that the mercury is properly managed and recycled once in our collection channels. Second, for the non-mercury-containing thermostats, the risk in reusing them is that they will not meet the technical/safety specifications of new HVAC systems.

Recycle — The following steps will be taken to manage the materials recovered through the Plan:

- Once at the recycler, the thermostats will be counted, documented, dismantled and recycled.
- The glass vial that contains the mercury will be removed from the thermostat. The glass vial will be crushed and the glass and mercury separated. The mercury will be quadruple distilled and then sent for re-sale/re-use in products and processes. The glass will be crushed, distilled and sent for recycling in fiberglass applications.
- The metal and plastic components from the thermostats will be separated and sent for recycling. The plastics recovered from thermostats are mixed types, and therefore are best if bailed together then shredded into pellets which can be sold to manufacturers to be used in new products in a 30/70 mix of recycled to new plastics. The metals found in thermostats are a mix of iron, copper, nickel and aluminum, which all have high re-use/recycling value.

3. PROGRAM PERFORMANCE

3.1 Program Accessibility

1. CONTRACTOR/WHOLESALER CHANNEL — The Plan will use the existing HRAI and CIPH contractor/wholesaler memberships to engage members to participate in the program. As well, the Plan will identify and engage additional contractors and wholesalers who are not HRAI or CIPH members to participate in the program via letters, advertising in industry publications, and participation in industry meetings (via presentations and tradeshow). These contractors and wholesalers will provide on-site collection for thermostats that they remove from homes and businesses, as well as act as year-round drop-off locations for general public who want to dispose of a thermostat. CAF will contact contractors and wholesalers in all regional districts, with the intention of having participants in each regional district of the province.

The Plan will aim to have a minimum of 200 contractors/wholesalers registered for the program in Year 1 and then increase registration by at least 20 per cent each year. While the exact number of contractors/wholesalers operating in British Columbia is not known, it is estimated that there are approximately 400–450 businesses that could eventually act as collection points for thermostats.

The Plan will also work to engage wholesaler branches as drop-off points for thermostats because all small contractor businesses will visit at least one wholesaler branch on a regular basis to pick-up supplies. Rather than every one-person business having an individual pail, we will use the wholesaler branches as a point of promotion for the program and will encourage the contractors to use these branches for collection. Having said that, if a one-person business wants to have an individual collection container, the Plan will supply it, along with free shipping.

2. RETURN-TO-RETAIL CHANNEL — This Plan will run pilot return-to-retail events at 10 retail locations in Year 1. Depending on the results from the Year 1 events, the Plan will potentially increase the number of retail locations in Years 2–5 (by at least five locations per year if results show benefit). Manufacturers report that 85–90 per cent of thermostats are sold through wholesale channels; therefore, only 10–15 per cent of the thermostats are sold via retail and we would expect to see proportionate collection results through these two channels. However, the Plan will review the collection results achieved in Year 1, and if the proportion of thermostats collected at return-to-retail is higher than expected, we will consider further increasing the number of collection points in this channel in Years 2–5.

The table below shows the five-year targets for the number of collection points for the contractor/wholesaler and return-to-retail channels.

Year	Number of Participating Contractors, Contractor Branches and Wholesaler Branches	Number of Return-to-Retail Events
Year 1	200	10
Year 2	240	15
Year 3	288	20
Year 4	346	25
Year 5	415	30

3. SEND-BACK COLLECTION — This Plan will run a send-back pilot project for remote areas of the province. We will look to the program model used and lessons learned from a similar program that ran in the state of Maine, which saw a collection rate of approximately seven per cent through their mail-back pilot.

4. REGIONAL DISTRICT/MUNICIPAL COLLECTION — There are currently a few regional districts in British Columbia that list thermostats as acceptable items for their Household Hazardous Waste roundups (including Thompson Nicola Regional District, Central Okanagan Regional District and the Hartland Landfill in the Capital Regional District). While the intent of this Plan will be to educate British Columbians that the correct channel to dispose of old thermostats is through the contractor/wholesaler channel or via the designated return-to-retail events, we will also supply collection and processing of any thermostats returned to municipal depots, via collection containers and pre-paid shipping. The Plan will document and track the number of thermostats that come back through this channel in Year 1 to judge the relative proportion of collection results. If the results are sufficiently low, this Plan may consider phasing out the municipal channel as a disposal option for thermostats.

3.2 Consumer Awareness

The Plan will expand on existing Switch the 'Stat program resources, such as the website, and the communications pieces for the contractors (program instructions) and the general public (information brochure), as well as develop new resources. Appendix C provides physical examples of the existing Switch the 'Stat program resources. The types of information that will be communicated to participants and the public are why old thermostats need to be recycled (in particular because of the risks associated with the mercury found in many older thermostats), who funds the program, disposal options (contractor channel, return-to-retail options, send-back), and program contact information for more information.

The types of resources and distribution channels that will be used to increase consumer awareness are:

- Program website — will present a comprehensive overview of the program, with periodic updates and an up-to-date list of disposal locations (i.e., participating contractors and wholesalers, return-to-retail and send back options)
- Printed brochures — to be distributed by contractors/wholesalers, at retail locations that sell new thermostats, and at public events (i.e., festivals, Green Living shows, etc.)
- Printed posters — to be displayed at retail locations that sell new thermostats and participate in the return-to-retail events
- Industry communications via newsletters and industry publications to inform the contractors/wholesalers about the program and how to register and participate
- Advertising for the general public via the Recycling Council of British Columbia's website and hotline, as well as in waste reduction/community calendars for regional districts
- Wholesalers, distributors and manufacturers will promote the program to contractors and the general public via their websites, newsletters, signage, etc.
- Wholesalers and distributors will provide on-site promotion and education for the small, one-person contractors via signage and printed information, as well as allowing the contractors to use their collection containers if they want to (instead of acquiring their own collection pail)
- HRAI's existing communications channels for contractors/wholesalers — website, newsletters, meetings, email updates, etc.
- HRAI has a feature on the consumer section of its website that provides listings for all member contractors with a "finder" feature — this Plan will add the Switch the 'Stat logo to the listings of program participants
- This Plan will link to other initiatives and programs that HRAI is part of, such as the Refrigerant Management Canada (RMC) program and outreach to the Building Owners and Managers Association (BOMA) and Green Building Council to target the IC&I sector

In addition, manufacturers currently provide information on the packaging of new thermostats sold into North America to inform the customer that their old thermostat may contain mercury, along with a website (www.thermostat-recycle.org) and a toll-free phone number so that customers can find out where and how to properly dispose of it in the United States. This Plan will utilize this existing US infrastructure by adding a link to the Switch the 'Stat program onto the US website and a recording from the US toll-free number directing customers to the Switch the 'Stat phone number. These links from the US program will be operational by July 1, 2010.

The following metrics will be used as benchmarks to measure the effectiveness of the communications tools listed above:

- Program website — the portion of the website that is specific to British Columbia will be operational by July 1, 2010, and updates (including the list of participating contractors/wholesalers and upcoming return-to-retail events) will be made on a monthly basis.

- Printed brochures — a minimum of 5,000 brochures will be printed and distributed on an annual basis.
- Printed posters — a minimum of 20 posters will be printed and displayed in Year 1; this number will increase in Year 2–5 as the number of retail events increase.
- Advertising via the Recycling Council of British Columbia’s website and hotline — information about the Switch the ‘Stat program will be supplied to RCBC by July 1, 2010 for use on their website and hotline.
- Advertising in waste reduction/community calendars for regional districts — CAF will contact at least 25 municipalities throughout Year 1 about advertising the Switch the ‘Stat program in their calendars and/or websites; CAF will determine the effectiveness of this form of outreach via participant feedback and may look to engage additional municipalities in Years 2–5.

In addition to the metrics listed above, the Plan intends to monitor awareness rates among British Columbia citizens and is committed to having a consumer awareness plan, with targets and methods, developed by the end of Year 1.

3.3 Collection Targets

Throughout 2009, HRAI, CIPH and CAF all participated in a working group convened by Stewardship Ontario to gather data for the development of the “Final Consolidated MHSW Program Plan V. II — July 30, 2009” for the Ontario Municipal Hazardous or Special Waste (MHSW) program. Using the data gathered through this process for the number of thermostats available for collection in Ontario (the relevant section of the MHSW program plan is provided in Appendix F), and adjusting on a per capita basis for British Columbia, it is estimated that there are approximately 13,500 thermostats available for collection in British Columbia on an annual basis.

The table below provides the five-year collection targets for British Columbia on a per cent capture basis.

Collection Targets — Per Cent Capture

Year	Estimated Number of Thermostats Available for Collection	Number of Thermostats to be Collected	Per Cent Capture
Year 1 (July 2010–June 2011)	13,500	3,375	25%
Year 2 (July 2011–June 2012)	13,500	5,400	40%
Year 3 (July 2012–June 2013)	13,500	7,425	55%
Year 4 (July 2013–June 2014)	13,500	8,775	65%
Year 5 (July 2014–June 2015)	13,500	10,125	75%

In order to achieve the increase in collection year after year, the Plan will focus on the contractor/wholesaler channel through the following actions:

- Increasing the number of contractors/wholesalers registered for the program;
- Increasing the communications and outreach to the registered contractors/wholesalers;
- Enforcing active participation among HRAI and CIPH member contractors/wholesalers;
- Increasing communications to do-it-yourselfers to use the contractors/wholesalers as drop-off points for thermostats.

In addition, the Plan will review the collection results achieved through the return-to-retail pilots, send-back and regional district/municipal channels in Year 1, and will increase the number of events and/or outreach efforts if the proportion of thermostats collected through these channels is sufficiently high.

Monitoring — The quantities collected and diverted as a result of the Plan will be monitored via monthly reporting from the recycler to CAF and will include the number of thermostats collected from specific contractors and wholesalers, as well as collection numbers from the individual return-to-retail events and the send-back and municipal channels.

Remedial Actions — If the collection targets are not met, the Plan will increase communication and enforcement through the contractor/wholesaler collection channel, as well as examine the results achieved through the return-to-retail and send-back channels and consider increasing the number of events and promotion, if the collection results and feedback show these channels to be effective.

4. PROGRAM ADMINISTRATION

4.1 *Program Financing*

The Plan will be managed and funded by the manufacturers and distributors that sell and/or import thermostats into British Columbia. The manufacturers and distributors will pay a flat fee toward the administrative costs associated with the program and then will pay per unit fees based on return share of the thermostats collected.

4.2 *Steward Compliance*

CAF and HRAI will actively identify and recruit manufacturers and distributors that sell and/or import thermostats into British Columbia who are not participating in the Plan. Techniques to identify these companies will include audits of collected materials and information received from the industry associations and member companies.

Once a company is identified, CAF and HRAI will issue communications (letter, email or phone call) to advise the steward of their regulatory obligation to participate in a stewardship program. If the company does not comply, CAF and HRAI will issue a letter to the British Columbia Ministry of the Environment advising of the circumstances and requesting investigation and appropriate enforcement.

4.3 *Dispute Resolution*

CAF will contract with all suppliers and service providers by the use of formal contracts and agreements. Any disputes arising will be resolved using appropriate legal procedures.

4.4 *Cooperation with Other Thermostat Collection Programs*

HRAI is committed to working with any other agencies that operate approved stewardship programs for thermostat collection in British Columbia to ensure the programs operate cooperatively and as effectively as possible.

5. STAKEHOLDER CONSULTATION

On October 9, 2009, CAF posted the final draft version of the “British Columbia Stewardship Plan for Thermostats” on the public Switch the ‘Stat program website at www.summerhillgroup.ca/eng/impact/programs/switch-the-stat-bc-plan.php.

On October 12, 2009, a notice of the draft Plan and the four associated consultations was sent to a list of 143 stakeholders, which included representatives from local, regional and provincial government departments, thermostat and controls manufacturers and distributors, retailers, recyclers/material processors and environmental non-governmental organizations.

Stakeholders were also informed that if they were unable to participate in the consultations at the specified dates/times/locations, they were invited to contact CAF to make alternative arrangements to share their feedback, or they could submit written comments to the Plan until November 16, 2009.

The consultation meetings/webinars were held at the following locations and dates:

Monday, October 19, 2009 from 11:00 am – 12:30 pm
Sheraton Vancouver Airport Hotel
7551 Westminster Highway, Richmond, BC
(immediately following the stakeholder consultation for the BC Portable and Floor Care Appliance stewardship plan)

Wednesday, October 21, 2009 from 2:00 – 3:30 pm
Westin Bear Mountain Golf Resort & Spa
1999 Country Club Way, Victoria, BC
(same date and location as the Coast Waste Management conference)

Monday, October 26, 2009 from 10:00 – 11:30 am
via webinar

Friday, October 30, 2009 from 10:00 – 11:30 am
via webinar

A total of 28 individuals participated in the four consultations. The breakdown of representatives by stakeholder sector was as follows — eight from regional or municipal government, four from recycling depots, three from the retailer sector, two from processing facilities, two from environmental non-governmental organizations, two from provincial government and one thermostat manufacturer.

The consultations/webinars included a PowerPoint presentation that provided an overview of the Plan, as well as opportunities to ask questions and provide feedback to

the Plan either in-person at the meetings, via the associated conference call or chat function during the webinars. The PowerPoint presentation that was used for the consultations/webinars is provided in Appendix D. Appendix E includes a summary of the questions, comments and feedback that were received through the consultations/webinars, and responses to that feedback.

In addition, where relevant, the questions and comments received from the participants in the consultations/webinars have been incorporated throughout the Plan to reflect the feedback we received and to provide greater clarification about how the Plan will operate.

Appendix A — List of Manufacturers and Distributors Responsible for Selling Thermostats into British Columbia

Aprilaire	Lux Products
Bard Manufacturing Corporation	McQuay International
Britech Corp.	MetalWorks
Burlington Metal Supplies Ltd.	Noma
Burham Holdings, Inc.	NORDYNE/Nordyne Corporation
Carrier Canada Ltd.	Polytherm Hydronics Ltd.
CCI Thermal Technologies Inc.	PSG Controls, Inc.
Chromalox	Rheem Manufacturing Company
Climate Master, Inc.	Rite Temp
Crane Company	Roth Industries, Inc.
Cristal Controls	SBK Hydronics Inc.
Danfoss Inc.	Sears Holdings
Duro Dyne Canada Inc.	Taco, Inc.
Ecotherm Inc.	Tekmar Control Systems Ltd.
Emerson Electric Corporation/White-	Thermolec Ltd.
Rodgers	Thomas & Betts Corporation
Empire Comfort Systems	TPI Corporation
General Electric Corporation	Trane Commercial Systems
GeoSmart Energy	Uponor Ltd.
Hazloc Heaters Inc.	Vaillant Corporation
Heatlink Group Inc.	Vanguard Piping Systems (Canada) Inc.
Honeywell Corporation	Viconics Electronics Inc.
Hunter	Waterfurnace International Inc.
ITT Corporation	Watts Industries (Canada) Inc.
Johnson Controls Inc.	Watts Radiant
Johnson Controls-UPS Division (York)	Wiegand Precision Heat & Control
KMC Controls Inc.	W.W. Grainger
Lear Siegler	ZCP Manufacturing Inc.
Lennox International Inc.	

Appendix B — List of Thermostats Manufacturers and Distributors Signed-on to Participate in the Stewardship Plan

Emerson Electric Corporation/White-Rodgers
Honeywell Corporation
Johnson Controls-UPS Division (York)

Appendix C — Existing Switch the 'Stat Program Resources

PROGRAM WEBSITE HOMEPAGE — www.switchthestat.ca

The screenshot shows the homepage of the Switch the 'Stat program, a website for the Clean Air Foundation. The header includes the Clean Air Foundation logo and navigation links: "Clean Air Foundation Home", "Site Map", "Contact Us", "Français", "Our Programs", "The Team", "Media", "Awards", "Sponsor a Program", and "Careers".

The main content area features a large background image of a thermostat dial. On the left, a sidebar lists navigation options: "Switch the 'Stat Home", "About the Program", "For Homeowners", "For Contractors & Wholesalers", "Facts & Info", "News", "Partners & Funders", "Links & Resources", and "Program Contacts". Below these is a red "REGISTER with Switch the 'Stat" button and a link to the "Switch the 'Stat Brochure (1.7 MB PDF)".

The main text area states: "The Clean Air Foundation's SWITCH THE 'STAT program helps encourage the installation of energy-efficient programmable thermostats and responsibly recovers older mercury-containing thermostats." To the right, statistics are displayed: "MILLIONS of old, inefficient mercury-containing thermostats still used today", "26,200 mercury thermostat switches removed and recovered", and "65 KILOGRAMS of mercury not released into the environment*", with a footnote: "* Just one gram of mercury is enough to contaminate an eight-hectare lake".

Below the statistics, a section titled "What is Switch the 'Stat?" explains the program: "Switch the 'Stat is a residential and commercial thermostat exchange program. The Clean Air Foundation works with heating and cooling contractors and wholesalers to encourage the installation of energy-efficient programmable thermostats, while simultaneously, diverting the older mercury containing thermostats from landfill to a safe storage facility. Switching to newer and more energy-efficient programmable thermostats and responsibly disposing of older mercury-containing thermostats reduces energy consumption, greenhouse gas emissions, and prevents mercury from contaminating our air, soil, and water." A link "Learn how to Make the Right Switch!" is provided.

On the right, a sidebar highlights "Boonstra's One Hour Heating & Air Conditioning" in Dundas, Ontario, with the website www.boonstrasonehour.com. It mentions that the Clean Air Foundation is pleased to feature Boonstra's for their participation in the Switch the 'Stat program. It also notes that since October 2007, Boonstra's Dundas, Ontario location has recovered 436 mercury-containing thermostat switches, preventing more than one kilogram of mercury from entering landfill. A final note states: "These excellent collection results are not surprising when put in the context of their dedication to customer service. Not only does Boonstra's One Hour Heating & Air Conditioning..."

The footer of the webpage shows the URL "switchthestat.ca/..." and a Windows taskbar with various open applications like "2 Microsof...", "Ontario Ther...", "STS Interim...", "Switch the 'S...", and "Ontario".

PROGRAM INSTRUCTIONS FOR PARTICIPATING CONTRACTORS AND WHOLESALERS



A program
of the



Thank You for Participating in Switch the 'Stat!

By collecting old mercury thermostats and returning them to us, you are helping to make a real difference in the health of our environment. To date, *Switch the 'Stat* contractors and wholesalers have collected more than 31,800 mercury-containing thermostat switches, meaning that more than 79 kilograms of mercury have been prevented from polluting our air, soil and water.

Participation Instructions

1. The Clean Air Foundation has sent you a collection container with a pre-paid return Purolator waybill. **Do not lose this waybill!** Keep it in a safe place until you are ready to send in the container.
2. Bring the collection container with you on jobs.
3. When you are asked to replace old thermostats with new programmable thermostats, place the old thermostat in the collection container.
4. **Do not dismantle the mercury switch** from the thermostat.
5. Continue to collect thermostats in the containers. If your container gets full and you need a new one, contact Janet Taylor at 416-922-9038 x241.
6. When the container is full, or when you are requested to send it in, please call Purolator and ship the container using the pre-paid waybill. The container will be sent to a collection and storage facility, to ensure that the mercury is safely and responsibly recovered from the old thermostats.

Congratulations! You can rest easy, knowing that you have helped keep mercury out of the environment and at no cost to you! You will be featured by the Clean Air Foundation as a responsible leader in your industry.

Mercury Background Information

As you know, in spite of the energy-saving benefits of programmable thermostats, many homes still have old mercury thermostats. These contain between one and four switches which contain approximately 2.5 grams of mercury each. The mercury is contained in a glass bulb, which tilts back and forth as the temperature changes and activates an on-off switch.

Mercury is a potent neurotoxin and is extremely harmful to the health of humans and wildlife. Mercury is especially toxic to young children and women of child-bearing age because it can inhibit the development of the brain and nervous system. **Mercury-containing thermostats pose a threat to human health and the environment when they are improperly disposed of.**

Because mercury is dangerous to human and environmental health, it must be disposed of safely and responsibly. By participating in this program, you help ensure that mercury-containing thermostats are prevented from entering landfill, and that the mercury is safely and responsibly recovered and stored.

Switch the 'Stat combines the benefits of improved residential energy efficiency through the installation and use of programmable thermostats with a collection program for old mercury-containing thermostats.

Contact Us!

Janet Taylor
Clean Air Foundation
Phone: 416-922-9038 x241
Fax: 416-922-1028
E-mail: jtaylor@cleanairfoundation.org
Website: www.switchthestat.ca

Switch the 'Stat Program Partners



uniongas
A Spectra Energy Company



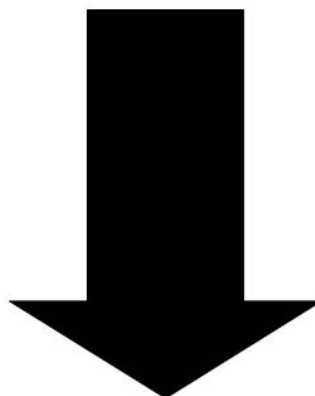
Imperial Oil
Foundation

LAMINATED INSTRUCTION POSTER FOR PARTICIPATING CONTRACTORS AND
WHOLESALEERS

Attention Heating and Cooling Contractors!

Did you know that disposing of older mercury-containing thermostats with regular waste can result in toxic mercury being released into the environment?

Do the right thing! Please dispose of **fully intact** mercury-containing thermostats in this collection bin and prevent mercury from contaminating the air, soil and water!





Contact:
Erica Pinto, Clean Air Foundation
E-mail: epinto@cleanairfoundation.org
Phone: (416) 922-9038 x286

Participating in Switch the 'Stat is mandatory for Cool Savings Rebate participants.




PRINTED BROCHURE FOR HOMEOWNERS AND BUSINESS OWNERS (English version)

Make the right switch!

This is a mercury switch – something that still exists in millions of older mechanical thermostats. Mercury is highly toxic and dangerous to the health of people and wildlife.

Switching to newer and more energy-efficient programmable thermostats and responsibly disposing of older mercury-containing thermostats reduces energy consumption and prevents mercury from contaminating our air, soil and water.




Another successful Clean Air Foundation program with over 10,600 mercury-containing thermostat switches collected to date.


(front)

Now the choice is yours!

If you dispose of your old thermostat with your household waste, you are sending mercury to landfill.





Old mechanical thermostats have one to four switches, each containing approximately 2.5 grams of mercury.




Mercury is a potent neurotoxin and it only takes one gram to contaminate an eight-hectare lake to the point where the fish are not edible for a full year.

If you participate in **Switch the 'Stat**, you will conserve energy, save money, and prevent mercury releases to the environment.

Step 1: With the help of your participating **Switch the 'Stat** contractor, switch to a newer, more energy-efficient programmable thermostat.









Step 2: Responsibly dispose of your old mercury-containing thermostat through your local **Switch the 'Stat** contractor.

A recycling facility will dismantle the thermostat, recycle the parts, and prevent the mercury from contaminating air, soil and water.

For more information, go to www.switchthestat.ca or call 416-922-9038 x286.

Switch the 'Stat' program partners:

™ Official mark of the Ontario Power Authority
THIS FLYER WAS PRINTED USING A WATERLESS PROCESS ON 100% RECYCLED, ENVIRONMENTAL CHOICE CERTIFIED, PROCESSED-CHLORINE FREE, FSC-APPROVED PAPER.

(back)

PRINTED BROCHURE FOR HOMEOWNERS AND BUSINESS OWNERS (French version)

Faites le bon choix!




Voici un interrupteur au mercure – un dispositif qui existe encore dans des millions d'anciens modèles de thermostats mécaniques. Le mercure est hautement toxique et dangereux pour la santé des humains et de la faune.

En passant à des thermostats programmables plus modernes et plus écoénergétiques et en éliminant de manière responsable les vieux thermostats contenant du mercure, on réduit la consommation d'énergie et on prévient la contamination au mercure de l'air, de sol et de l'eau.

FONDATION airpur

Un autre programme réussi de la Fondation Air pur qui a permis de récupérer jusqu'à présent plus de 10 600 interrupteurs au mercure.

(front)

À vous de faire votre choix!

Si vous jetez aux ordures votre vieux thermostat, vous envoyez du mercure aux décharges.

En participant à Troque ton Stat, vous économisez de l'énergie, de l'argent et évitez le rejet de mercure dans l'environnement.



Les vieux thermostats mécaniques comportent de un à quatre interrupteurs, contenant chacun environ 2,5 g de mercure.



Étape 1 : grâce à l'aide de votre entrepreneur participant à Troque ton Stat, optez pour un thermostat programmable plus moderne et plus écoénergétique.

Étape 2 : éliminez de manière responsable votre thermostat contenant du mercure en faisant appel à l'entrepreneur participant à Troque ton Stat de votre région.

Le thermostat sera démonté dans une installation de recyclage, les pièces seront recyclées et le mercure sera récupéré soigneusement afin qu'il ne contamine l'air, le sol et l'eau.

Pour de plus amples renseignements, allez à www.troquetonstat.ca ou appelez 416-922-9038, poste 286.

Partenaires du programme Troque ton Stat :



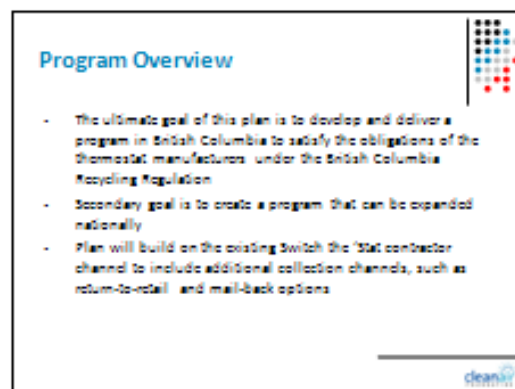
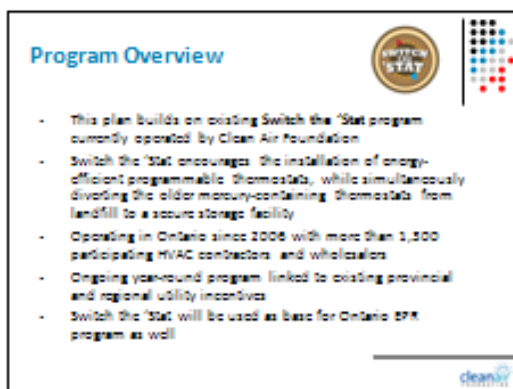
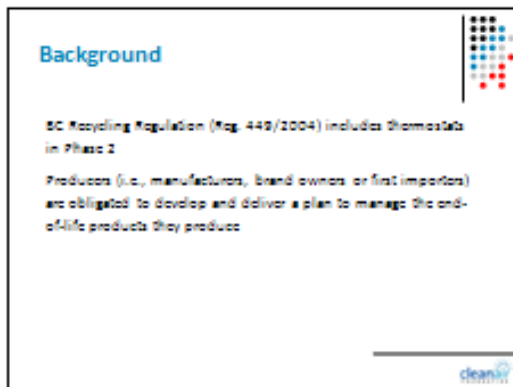
SM Marque officielle de l'Office de l'électricité de l'Ontario
CETTE BROCHURE A ÉTÉ IMPRIMÉE À SEC ET SANS CHLORE SUR DU PAPIER
RECYCLÉ À 100%, CERTIFIÉ PAR LE PROGRAMME CHOIX ENVIRONNEMENTAL ET LE PSC.

(back)

PROGRAM COLLECTION CONTAINER (5.5 gallon with UN-approved sealed lid for safe storage and shipping)



Appendix D — PowerPoint Presentation from the Public Consultations/Webinars



Current Program Results

- Since April 2008, Switch the 'Stat in Ontario has collected more than 21,875 mercury-containing switches from thermostats
- This is equivalent to the recovery of more than 78 kilograms of mercury, given that each thermostat switch contains approximately 2.5 grams of mercury
- To date, there are more than 1,200 heating and cooling contractors and wholesalers registered for Switch the 'Stat in Ontario



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Program Partners

HRAI – Heating, Refrigeration and Air Conditioning Institute of Canada



CIPH – Canadian Institute of Plumbing and Heating



Manufacturers signed on:
Emerson Electric Corporation/White-Rodgers
Honeywell Corporation
York/Johnson Controls

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Program Partners

In addition to HRAI, CIPH and thermostat manufacturers, the following participants will be involved in program delivery:

- Clean Air Foundation for overall program management and delivery
- HRAI contractors and wholesalers and CIPH wholesalers for primary collection
- Other non-member contractors/wholesalers for primary collection
- Retailers for secondary collection through return-to-retail pilot

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Product Stewardship Plan: Program Products

This plan covers all "thermostats" defined as a product that senses and controls room temperature through communication with heating, ventilation and air conditioning equipment

- Electromechanical thermostats – contain internal mercury or snap switches
- Electronic thermostats – use sensors instead of switches
- Lifespan – thermostats are designed to last 20-30 years; however, the majority are replaced more frequently (i.e., every 7-10 years) as a result of renovations, HVAC equipment upgrades, etc.



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Product Stewardship Plan: Collection Infrastructure

The Plan will use the following four channels to collect end-of-life thermostats in British Columbia:

- Contractors/wholesalers
- Return-to-retail pilots
- Mail-back pilot
- Regional district/municipal collection

Overall goal is to provide convenient, accessible disposal options at no cost to consumers.

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Product Stewardship Plan: Collection Infrastructure

1. Contractors/wholesalers:

- Contractors and wholesalers can register for Switch the 'Stat either via the program website (www.switchthestat.ca) or by calling CAF directly.
- CAF sends registered contractors and wholesalers the following material – a collection container (United Nations approved for shipping), an introductory letter, program instructions, information brochures to leave behind with their customers and a pre-paid courier waybill.
- Contractors remove old thermostats from homes or businesses and replace them with new thermostats.

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Product Stewardship Plan: Collection Infrastructure

1. Contractor/wholesaler:

- Contractors place old thermostats intact in the provided collection containers.
- Contractors continue to collect thermostats until their containers are full, or until they are requested to return their container during a collection "sweep".
- The full containers are shipped using the provided pre-paid courier waybill.
- The courier picks the containers up from the contractor or wholesaler and ships them directly to the recycling facility.



Product Stewardship Plan: Collection Infrastructure

1. Contractor/wholesaler:

- The Plan will use the existing industry contractor/wholesaler memberships (HRA, CPH, TCCA, etc.) to engage members to participate in the program.
- We will also identify and engage additional contractors and wholesalers who are not association members to participate through advertising in industry publications, and participation in industry meetings (via presentations and trade show).
- Our aim is to have 200 contractors/wholesalers registered for the program in Year 1 and then increase registration by at least 20 per cent each year.



Product Stewardship Plan: Collection Infrastructure

1. Contractor/wholesaler:

- There are many small one-person contractor businesses, so this Plan will work to engage wholesaler branches as drop-off and promotion points for thermostats, as all small businesses will visit at least one wholesaler on a regular basis to get supplies.
- We will still send individual collection containers and free shipping to business that request to have their own collection point.
- Finally, participating contractors/wholesalers will be asked to act as drop-off points for the general public.



Product Stewardship Plan: Collection Infrastructure

2. Return-to-retail pilots:

- In Year 1, we will run return-to-retail pilot events at 10 retail locations.
- These will be timed, staffed campaigns.
- Program will distribute an RFP to retailers in early 2010.
- Participation by retailers is completely voluntary.
- We are starting with a limited number of events now because the proportion of thermostats sold to the DIY market is relatively small (less than 15%).



Product Stewardship Plan: Collection Infrastructure

2. Return-to-retail pilots:

- Collection results from return-to-retail events will be reviewed after Year 1.
- Plan right now is to increase the number of locations by at least five locations per year in Years 2-5.
- May increase number of events per year by more than five if the results show value.



Product Stewardship Plan: Collection Infrastructure

3. Mail-back pilots:

- A mail-back pilot project for remote areas of the province will be initiated in Year 1 of the program.
- Program will have a toll-free number to request shipping, and will send shipping supplies with pre-paid shipping direct to the recycler.
- We will look at the results from Year 1 in BC (as well as lessons learned from a similar program that ran in the state of Maine, which saw a collection rate of approximately 7%) to determine the amount of promotion for this channel in Years 2-5.



Product Stewardship Plan: Collection Infrastructure

4. Regional district/municipal collection:

- Preliminary data show that four regional districts currently accept thermostats
- Along with the other collection methods, we will collect and process any thermostats returned to municipal depots – supply collection containers and shipping. In Year 1 to any regional district or municipality that requests
- However, the intent of this Plan will be to educate British Columbians that the correct channel to dispose of thermostats is through the contractor/wholesaler, return-to-retail or mail-back



Product Stewardship Plan: Pollution Prevention Hierarchy

- Reduce/Redesign – already see reduced mercury use in thermostats
- Reuse – this program will not encourage the reuse of old thermostats collected because (1) with mercury-containing thermostats we want to ensure that the mercury is properly managed and retired, and (2) with non-mercury thermostats there is a risk that they will not meet the technical/safety specifications of new HVAC systems
- Recycle – all materials (i.e., plastics, metals, glass, mercury) recovered through this program will be recycled responsibly
- Plan will implement vendor standards that meet provincial/federal regulations for all transportation, storage and processing facilities



Program Performance: Consumer Awareness

- The Plan will expand on existing Switch the 'Stat program resources, such as the website, and the communications pieces for the contractors (program instructions) and the general public (information brochure), as well as develop new resources as necessary
- The main message – why old thermostats need to be recycled, who funds the program, disposal options and program contact information

Overall goal is to make all consumers and contractors/wholesalers aware of the program and the need to properly dispose of thermostats



Program Performance: Consumer Awareness

The types of program resources for the general public/consumers:

- Program website will provide a comprehensive overview of program, with periodic updates and an up-to-date list of disposal locations (with search function by postal code/municipality)
- Printed brochures to be distributed by contractors/wholesalers, at retail locations and at public events
- Printed posters to be displayed at retail locations and public events
- Advertising for the general public via RSC hotline and website, regional district/municipal community calendars
- Information linked to website/phone number provided on packaging of new thermostats (link from US program to BC program)
- Program launch – media/PR strategy



Program Performance: Consumer Awareness

The types of program resources for and via the industry participants:

- Wholesalers, distributors and manufacturers will promote the program to contractors and the general public via their websites, newsletters, signage, etc.
- Wholesalers to provide on-site promotion and education for the mail, one-person contractors via signage and printed information, and allow contractors to use their collection containers
- WRA/CRA/industry communications channels – website, newsletters, meetings, email updates, etc.
- General outreach to industry via newsletters, industry publications, trade shows, etc.



Program Performance: Collection Targets

From very preliminary data, the number of all types of replacement thermostats available for collection in British Columbia on an annual basis is estimated at 13,000 units. We are working with the manufacturers to further refine and verify this number.

Year	Percent Capture
Year 1 (July 2010-June 2011)	25%
Year 2 (July 2011-June 2012)	40%
Year 3 (July 2012-June 2013)	55%
Year 4 (July 2013-June 2014)	65%
Year 5 (July 2014-June 2015)	75%



Program Performance: Accessibility Targets

The table below provides estimates for the number of collection points in British Columbia over the five year period this plan covers:

Year	Generalist collection points	Household collection points	Comments
Year 1 (July 2010-June 2011)	220	12	Number TBC by update
Year 2 (July 2011-June 2012)	210	18	Number TBC by update
Year 3 (July 2012-June 2013)	200	22	Number TBC by update
Year 4 (July 2013-June 2014)	190	28	Number TBC by update
Year 5 (July 2014-June 2015)	180	32	Number TBC by update



Program Administration: Program Financing

The Plan will be managed and funded by the manufacturers and distributors that sell and/or import thermostats into British Columbia.

Manufacturers and distributors will pay a flat fee toward the administrative costs associated with the program and then will pay per unit fee based on return share of the thermostats collected through the program.



Program Administration: Steward Compliance

CAF, WRA and OPA will actively identify and recruit manufacturers and distributors that sell and/or import thermostats into British Columbia who are not participating in the program.

Once a company is identified, CAF will issue communications to advise the steward of their regulatory obligation to participate in a stewardship program.

If the company does not comply, CAF will issue a letter to the Ministry of the Environment advising of the circumstances and requesting investigation and appropriate enforcement.



Program Administration: Annual Reporting

CAF will prepare annual reports based on the program results and will make them publicly available via the program website. Information to be included:

1. Collection Results – number of units collected, by channel, by region
2. Awareness – summary of promotion/outreach activities, website visits, calls to program toll-free number; feedback from surveys administered at return-to-retail events and with contractors and wholesalers
3. Accessibility – number of participating contractors/wholesalers, number of retail events, number of mail-back requests, population within a certain proximity of collection channels
4. Other – amount of each type of material collected, post-collection destination of materials



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Appendix E — Summary of Feedback from the Public Consultations/Webinars with Associated Responses

Participant Question, Comment or Feedback	ISP Response or Action
<i>RETURN-TO-RETAIL PILOTS</i>	
How will the 10 return-to-retail pilot sites be chosen and what will be the criteria?	An RFP will be issued to retailers after July 1, 2010 to determine interest in participating in the timed take-back events. The criteria for the RFP, which have not been established at this point, will be determined by the program advisory committee.
Will the costs for retail events be reimbursed to retailers?	We don't anticipate that the retailers who participate in the return-to-retail events will incur costs, as the program will hire and train the representatives and pay for all costs associated with shipping and processing the collected thermostats.
How do you know there will be 10 return-to-retail events?	This is the number of events that we have decided to run in Year 1.
<i>REGIONAL DISTRICTS/MUNICIPALITIES</i>	
It is important to keep municipal depots as a collection option, as many are set up as one-stop shops.	The program will supply collection and processing of any thermostats returned to municipal depots, via collection containers and pre-paid shipping. We will document and track the number of thermostats that come back through this channel in Year 1 to judge the relative proportion of collection results, and determine the effectiveness of keeping municipal depots as collection options in Years 2–5.
The program may need to provide financial compensation to municipalities to cover the costs for overhead, storage and staff time to manage returned thermostats.	The Year 1 budget for the program does not include financial compensation for municipalities. We anticipate that very few thermostats will be collected at municipal depots, and therefore will accumulate very little in terms of overhead costs. However, the program will provide collection containers, shipping and processing at no cost to the municipal depot.
Program should consider using	Similar to municipal depots, the program

ecocentres for collection - they provide a "one-stop drop".	will provide collection containers, shipping and processing for ecocentres in Year 1, and will track the number of thermostats returned to determine the effectiveness of continuing to use them in Years 2-5.
Will there be funding available to regional districts to do a waste composition study once the program is in operation?	The Year 1 budget for the program does not include funding for this activity.
Will the collection reports be by regional district?	Yes, each pail that is returned will have an individual sender label which will allow us to track the geographic location the pail came from. This collection results for both the whole province and by each regional district will be reported as part of the annual report.
It is important to support the existing infrastructure established by municipal recycling depots and programs for not only public relations but also to provide a convenient option for our residents. Phasing out the existing infrastructure would be working against the principles of EPR policies in British Columbia.	As stated in the plan, the majority of thermostats are sold (and installed) by HVAC contractors, which means that this channel is the most convenient option in terms of collection. The program will provide collection pails to municipalities that collect thermostats, and will review the collection results from all channels after Year 1. In an effort to streamline our program and make it as effective as possible, we may discontinue certain collection channels in the future, if the results are sufficiently low.
OTHER COLLECTION CHANNELS	
Why does the program exclude collection at non-profit recycling centres? These centres may be useful collection points in remote areas where there aren't contractors or wholesalers.	The program will provide collection containers and shipping and processing to interested recycling centres in Year 1, and will review the collection results to determine the effectiveness for future years of the program.
Are there any concerns with mailing mercury?	Since the consultations, CAF has learned that Canada Post will not transport mercury-containing thermostats, and as such, we have contact Purolator as a transport option for the remote send-back channel. CAF will source smaller, individual collection containers that are sealable to

	be used during transport by Purolator. Similar to the larger containers used for the contractors, a sealable shipping container will ensure that there is no risk associated with transportation via this channel.
Program should look into ways to engage demolition contractors to participate. You could look into municipal bylaws and making it a requirement for getting demolition permits, at minimum promote program to the demolition sector and provide them with collection pails.	We agree that this is a good audience to target. We will start with outreach and engagement, and will look into the regulatory measures, if needed.
COMMUNICATIONS/EDUCATION AND OUTREACH	
We would like to see it mandatory for retailers to post the appropriate signage and information at the point of sale to increase public awareness.	Information is already provided on the packaging of most thermostats. We will approach retailers about providing signage, but the program can't make it mandatory for them to post signage.
RCBC would be pleased to partner with Switch the 'Stat to provide information to the public on the program.	We will definitely partner with RCBC, as well as look for opportunities with additional partners.
You may want to hold a focus group to test reactions to the existing program resources; current brochure may send the wrong message because of the hand holding the mercury-containing switch.	The program may consider this after Year 1. The existing program resources that we use currently get good responses from the program participants in Ontario.
Is the Switch the 'Stat program interested in advertising in regional district community calendars?	Yes, the program will be looking for public-facing opportunities to advertise and promote all of the program collection channels.
It would be good to have joint brochures or messaging at retail locations that include information about all of the products that fall under the Recycling Regulation, rather than having individual brochures for each product category.	The program will consult with other stewardship programs to determine the opportunities for joint messaging. We will also work with RCBC as a one-stop message centre for recycling options in British Columbia.
There is a need to engage ethnic media in the province to promote the program.	The program will be looking for a variety of public-facing opportunities to advertise and promote the collection options.

RECYCLING/END-USE OF MATERIALS	
The reuse of distilled mercury in other products or industries should be exhausted before the disposal options are considered.	See section 2.3 of the plan.
Need more information concerning the recycling of the materials collected through the program — mercury, metal, plastic and glass. The current economic climate has created challenges for mixed plastic and glass commodity markets.	See section 2.3 of the plan.
The language needs to be stronger to ensure that no product will be shipped off-shore to non-OECD countries where they have the potential to be reprocessed irresponsibly and without any regard for the people or the environment.	Before July 1, 2010, HRAI and CAF will formalize vendor standards and selection process, and will include language to ensure the processors for the program deal with the materials responsibly.
What will be the end use of the mercury collected in this program?	The mercury is quadruple distilled and then reused in products and processes. Our preference is to reuse the mercury in products where there are no mercury-free alternatives (i.e., fluorescent lighting).
Why does the program discourage the re-use of non-mercury thermostats?	See section 2.3 of the plan.
Is there any chance of the mercury collected through this program being exported overseas, especially to third-world countries?	The final step in the mercury distillation process takes place at a company in the US because there isn't a Canadian company that has the necessary equipment. In other programs run by CAF, we have requested that the mercury we send be kept in North America and only used in products where there isn't a mercury-free alternative (i.e., fluorescent lighting). We will request the same limits on the mercury from the thermostat program.
FUNDING	
Will this plan be funded by manufacturers?	Yes.
What is the estimated cost per thermostat?	The material costs to manage the thermostats include the costs of the collection containers, the shipping of the containers and the collected thermostats

	and the dismantling/processing of the thermostats. This material cost is estimated at \$5.70 per unit collected. The program also includes fixed costs, such as promotion and education, data tracking and reporting, management fees and third-party audits.
Can you explain how you will determine the fees charges to each manufacturer? Will each unit be counted at the recycler?	The fees will be charged to each manufacturer based on return share. The recycler will count and document the returned thermostats based on the brand.
Will there be visible eco-fees on the sale of new thermostats?	No.
OTHER QUESTIONS	
Have you worked with Thermostat Recycling Corporation (TRC) in the United States?	Yes, the same manufacturers (Honeywell, Emerson and Johnson Controls) who have been involved in the development of this plan, also participate in the TRC program.
Is it mandatory for contractors to participate in this program? What is the appeal for them to participate?	No, it is not mandatory for contractors to participate in this program. However, participants in Ontario like the program because it is easy, free and allows them to offer an additional service to their customers. We expect the same reaction from contractors in British Columbia.
Who will enforce manufacturer and brand owner compliance with the program?	See section 4.2 of the plan. HRAI will inform the manufacturer of the program and invite them to participate. If needed, BCMOE will provide enforcement.
Will the program provide a financial incentive for collectors?	No.
Will storage at the wholesalers create a program in terms of the hazardous waste regulations? Is there a limit to the amount of mercury that can be stored in one location without having a hazardous waste permit?	Through discussions with the Hazardous Waste department of BCMOE, it has been determined that interim storage sites (such as wholesalers) would not need to have a hazardous waste permit. The point of processing is where the permit will be needed. Additionally, the collection containers used for all channels in this program are 5.5 gallon which limits the number of thermostats, and therefore the amount of mercury, that can be collected

	in each container.
Is it even possible to calculate an accurate recovery rate given the long lag time between when/where the thermostats are purchased and when/where they are recovered?	The lifespan of the product does make it difficult to establish an exact number for the thermostats that are available for collection. We have used the best available data from a number of sources to determine the baseline. See Appendix F for the specifics.

Appendix F — Section on Mercury-containing Thermostats in the “Final Consolidated MHSW Program Plan V. II — July 30, 2009” from the Ontario Municipal Hazardous or Special Waste Program

Available at

http://stewardshipontario.ca/mhsw/pdf/plan/mhsw_plan_jul30_09_vol2.pdf

22.0 Mercury Devices — Thermostats

22.1 Definition

Mercury Thermostats means a product that uses a mercury switch to sense and control room temperature through communication with heating, ventilation and air conditioning equipment

22.2 Market and Product Information

Mercury is widely used in a variety of products utilized in residential, commercial and industrial environments. Mercury is a heavy liquid at room temperature and tends to be popular on account of its ability to conduct electricity and its standard responsiveness to changes in temperature and level. Typically, measuring devices contain the largest amount of mercury on a unit basis.

Mercury containing switches and relays, however, account for a far greater share of the total mercury in the marketplace, due to the very high number of products that contain switches and relays.

Figure 22.1 below provides a breakdown of mercury use by product category in the United States for 2004. According to this, thermostats represented 13% of the total use of mercury in products in the United States that year. It is reasonable to assume that the situation in Canada is comparable.

In late 2006, Environment Canada published a Risk Management Strategy for Mercury-containing products. The strategy outlines options available to Environment Canada to prohibit or limit the use of mercury in products. This prohibition is expected to include all products containing mercury, with the exception of fluorescent lights and dental amalgams, and is expected to come into force in 2012. Notwithstanding this, due to legislation restricting the use of mercury passed in the United States, and overall health concerns associated with this substance, the vast majority of manufacturers have discontinued the use of mercury in their products. For this reason, all the products designated under this category are obsolete in nature, that is to say, the material no longer supplied or sold for consumer use in Ontario.

22.3 Small Quantity IC&I Generators

The Minister's Program Request Letter designates waste thermostat that contain mercury from residential and IC&I small quantity generators. In the case of mercury, the quantities permitted from IC&I businesses is defined by the small quantity exclusion or Regulation 347 and is set at 5 kg of mercury containing waste per month.

22.4 Quantities Available for Collection

According to a report by Environment Canada, Honeywell, General Electric and White Rodgers are the main suppliers of thermostats into the Ontario market. Honeywell discontinued the sale of mercury thermostats in 2006. White Rodgers ceased importation of mercury thermostats into Canada as of December 31, 2008.

There is no source of information available to estimate the quantities of mercury thermostats sold into Ontario up until 2008. An Environment Canada report estimates that the national domestic demand for mercury-containing thermostats in 2003 was approximately 195,000 units. In 2002, Union Gas and Enbridge estimated there were approximately 1.25 million mercury thermostats in use by natural gas consumers in the province of Ontario that year.

In addition to the lack of thermostat sales information, the challenge in attempting to determine the quantity of thermostats that become available for collection each year is that while the design lifespan of a mercury thermostat is considered to be 20–30 years, in practical use it is replaced more frequently, generally in 7–10 years. This is related to homeowner's upgrading their thermostat for energy efficiency, remodelling their home, and replacing or repairing HVAC systems. It also coincides with the average re-sale period of a home — a likely time for homeowner's to renovate and upgrade their systems.

Notwithstanding these limitations, an attempt has been made to estimate the quantity of thermostats available for collection for the baseline year of the Consolidated MHSW Program Plan, using information on the number of Central Air Conditioning (CAC) and Furnace Shipments into Ontario for 2008. Using data on the number of new home constructs for that time period, the number of CAC and furnace replacements attributable to the retro fit market has been estimated, as presented in Table 22.1

Table 22.1: Number of Central Air Conditioning (CAC) and Furnace Shipments into Ontario for 2008

Description	2008
Ontario CAC Shipment	124,683
New home construct	76,025
New homes with AC (65%)	49,416
Retro Fit Market	75,267
Ontario Furnace Shipments	161,203
Fixed	102,712
ECM	58,491
New Homes	76,025
Retro Fit Market	85,178

Source: New Home Construction Data from CMHC
Shipment data from HRAI

According to industry sources, a reasonable assumption regarding the incidence of thermostat replacement is that half of the replacements occur when both the CAC and furnace are replaced, and the other half occurs when only one of the two (either the CAC or the furnace) are replaced. Using this assumption and using CAC shipment numbers as the most conservative of the two types of replacements, an estimated 117,500 thermostats were replaced in 2008.

The next step is to estimate the fraction of these that would be likely to contain mercury. A survey conducted by the Heating, Refrigeration, and Air Conditioning Institute (HRAI) asked contractors what percentage of the programmable thermostats they installed were replacing mercury thermostats. Respondents were asked to specify a percentage range (i.e. less than 10%; 10-25%; 25-50%, etc). The average value for the 145 respondents who answered this question was 57%. An alternate and perhaps more statistically significant source of information is Statistics Canada's Households and the Environment Survey (2007)⁵⁴, which reported that 53% of households in Ontario had a programmable thermostat as their main thermostat — meaning that 47% had a non programmable thermostat as their main thermostat.

The non-programmable thermostat segment is made up of electronic and mechanical categories. While mercury thermostats are part of the mechanical category, not all mechanical thermostats do contain mercury. Because of this, it is difficult to estimate the fraction of non-programmable thermostats that are likely to contain mercury. This is compounded by the fact that manufacturers' transition to all non-mercury thermostats took place over a long period of time, and mercury thermostat sales decreased significantly as more accurate, more efficient all-electronic models became available.

Notwithstanding these challenges, and recognizing that the numbers presented here are meant to be used for baseline establishment purposes only, one option is to use Frost and Sullivan data on the split of mechanical vs. electronic thermostat sales in 2003. Table 22.2 provides the number of mechanical and electronic thermostats sold in North America for residential markets.

Table 22.2: North American sales of thermostats to the residential market (2003)

Type of Thermostat	Units Sold	Percent of Total Sales
Mechanical	5,180,000	36%
Electronic	9,100,000	74%
Total	14,280,000	

Source: Information provided by Product Stewardship Institute, using Frost & Sullivan 2003 data.

Assuming that 36% of the 47% of non-programmable thermostats replaced in 2008 contained mercury, an estimated 19,881 mercury thermostats were available for collection that year.