



**Mercury Thermostat Recycling:
Reaching Consensus on Methods for Calculating Recycling Rates
Summary of February 3, 2009 Call – FINAL**

Scott Cassel of PSI began the call by asking if there were any corrections to the minutes from the previous call on December 9. Scott asked that people email suggested changes to PSI by February 10. [A revised summary, incorporating comments received, was subsequently prepared and distributed.]

Background

Jennifer Nash of PSI reviewed the history of the mercury thermostat recycling rate group. Two calls have been held to date, on October 30 and December 9, 2008. Thirty to forty people, including state and local officials, manufacturers, contractors, and environmental groups participated on each call. The calls highlighted a variety of approaches to calculating the performance of mercury thermostat recycling programs. PSI groups these approaches into two broad types: recycling rate and collections-based. A recycling rate approach compares the number of mercury thermostats collected to the number available for recycling. A collection-based approach assesses performance based on the percentage increase in collections relative to a base year.

The October 30 call focused mostly on Maine's approach for assessing the performance of its mercury thermostat recycling program, a recycling rate approach. The basis for Maine's estimate of the number of mercury thermostats available for recycling is the number of residential and commercial buildings in the state, taken from US census. Maine's methodology includes assumptions about (1) the number of thermostats per house and business (1.5 and 1.25, respectively), (2) the average lifespan of a thermostat (30 years), (3) the percentage coming out of service that contain mercury (83%), and (4) the amount of mercury in each thermostat (3 grams). Discussion on the call focused primarily on the second and third assumptions. Several people noted that the lifespan of a thermostat may be considerably shorter than 30 years. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) estimates the average lifespan of a gas or oil-fired furnace to be 18 years, and contractors generally replace a thermostat when they replace a furnace. People attributed the assumption that 83% of thermostats coming out of service contain mercury to the US EPA, but no one on the call could cite the study or researcher that was the source of that number.

The December 9 call focused on Pennsylvania's and King Co, Washington's approaches to assessing the performance of mercury thermostat recycling programs. Pennsylvania uses a collection-based approach, establishing annual collection goals based on previous years' program performance. King County uses a recycling rate approach, but instead of starting with the number of residential and

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commercial buildings as reported by the US Census (as does Maine), it bases its rate on the number of mercury thermostats it found in a survey it conducted of commercial buildings. Call participants offered their perspectives on the relative merits of a recycling rate approach to assessing performance versus a collections-based approach. People voiced support for both, saying that each provides useful information. A recycling rate approach has the advantage of putting the number of thermostats collected into context and helps states understand whether their collection efforts are reducing risk to acceptable levels. States wishing to use a recycling rate approach need a methodology that is reasonably accurate, based on information from reliable sources, and easy and inexpensive to use. While King Co's approach meets the first and second criteria, it would be expensive and time consuming to replicate in other areas.

Proposed Methodology for Calculating Mercury Thermostat Recycling Rates

On the February 3 call, David Lennett, PSI consultant, proposed a two-step methodology that is based on clear assumptions and defensible data, and is not resource intensive to use. It does not rely on assumptions about the number of thermostats in residential and commercial buildings or the length of thermostat life.

The first step in the methodology is to determine the number of thermostats sold for replacement. That number equals the number of thermostats being retired or "coming off the wall." David used thermostat replacement sales numbers from the 2003 report, *North American HVAC Thermostat Markets*, by Frost & Sullivan. Frost & Sullivan is the authoritative industry publication for information on market dynamics, trends, revenue forecasts, and competitive analysis.

Frost & Sullivan provides detailed information on the number of thermostat units sold in North America for residential and commercial markets. It also provides a breakdown (by sales revenue) of the percentage of units sold for new construction and replacement markets. Applying the replacement percentages to the unit sales data produces an estimate of replacement sales for thermostats for North America. The US market comprises 90% of the North American market. Using this methodology, PSI estimates that 8,260,560 thermostats were sold for residential replacement and 1,948,320 thermostats were sold for commercial replacement in 2002. State-specific replacement sales estimates can be obtained using proportionate population percentages. In 2002, about 40,000 thermostats were sold for replacement in Maine, 100,000 in Iowa, and 420,000 in Pennsylvania.

The second step in the methodology is to determine the number of thermostats coming off the wall that contain mercury. Frost & Sullivan cannot be used for that purpose because their research does not distinguish mercury thermostats from other types. PSI proposes to enlist the assistance of the Air Conditioning Contractors of America (ACCA), an association of contractors whose business includes removing and replacing thermostats. ACCA has offered to work with PSI to determine the percentage of thermostats they remove that contain mercury. Because we anticipate that that percentage will vary depending on the age of a building, date of the most recent renovation, and heating type, we will need to undertake this study in several states and regions. PSI will work with states to select a variety of locations to undertake the study, enlist ACCA members to gather information, help contractors keep records of numbers of mercury and non-mercury thermostats they remove, and gather and report results.

Response to the proposed methodology

The following states voiced support for the proposed mercury thermostat recycling rate methodology:

- California
- Illinois
- Maine
- Massachusetts
- Minnesota
- New Hampshire
- Iowa
- Wisconsin

These states and others on the call made the following points:

- A recycling rate approach puts collection numbers into context so that states can evaluate performance. It provides information that states can use to hold people accountable. EPA's National Mercury Auto Switch program used a recycling rate to establish its baseline and assess progress.
- Frost & Sullivan reports set the standard for industry market research and represent the opinion of industry experts.
- The question for states is whether the data represent the best way to estimate performance of a thermostat recycling program. Do the data provide a reasonable approximation of historical thermostat sales?
- The level of performance that states expect from mercury thermostat collection programs (e.g., 80% by 2012) should be considered separately from the methodology states use to develop a baseline rate.
- States should periodically review and revise the recycling rate methodology as better data become available.

Representatives of TRC and Pennsylvania DER made the following points in dissent:

- While Frost & Sullivan sales data may be the best available, they may not be accurate.
- Manufacturers cannot provide sales data due to anti-trust constraints.
- The methodology may be helpful in establishing a recycling rate, but performance goals based on recycling rates should not be incorporated into legislation. States and manufacturers should not be held responsible for meeting aspiration goals.
- An assumption built into the proposed methodology is that thermostats sold for replacement cost the same per unit as thermostats sold for new construction. That assumption may be erroneous because builders tend to purchase thermostats for new construction in bulk.

Scott restated the overarching goal for the group: to determine the best way to evaluate mercury thermostat recycling programs. Each state will have to decide if having exact collection data is the best way to evaluate a program's success, or if an estimation of a recycling rate is better. Pennsylvania has chosen to evaluate its program based on the number of thermostats collected. Other states prefer the recycling rate method.

Next Steps

1. PSI will talk to Frost & Sullivan about whether it will allow states to buy the report jointly, or whether each state purchase could be at a discount.
2. Theresa Stiner from IA DNR and Mark Smith from MA DEP will work with Jennifer and ACCA to determine the percentage of thermostats coming off the wall that contain mercury. TRC wants the PSI approach to be rigorous and suggested that PSI develop a list of ACCA members in key states and draw a random sample from that list, ensuring appropriate geographic representation.
3. By March 1, CA expects to receive from manufacturers a draft methodology for determining the number of mercury thermostats available for collection/recycling. When available, PSI will share that draft methodology with the group.

Participants

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James Burgess	AL Department of Environmental Management
Randy Case	WI Department of Natural Resources
Regan Clover	MA Department of Environmental Protection
Stephanie D'Agostino	NH Department of Environmental Services
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Bonnie Rouse	MT Department of Environmental Quality
Neena Sahasrabudhe	CA Department of Toxics Substances Control
Mark Smith	MA Department of Environmental Protection
Theresa Stiner	IA Department of Natural Resources
Mark Tibbetts	Thermostat Recycling Corporation

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