

Economic and Fiscal Impact Analysis:
Mercury Thermostat Collection and Performance Requirements
Department of Toxic Substances Control Reference Number R-2010-03

INTRODUCTION

Economic analyses of new regulations related to hazardous wastes generally examine the impacts of a rulemaking by comparing the difference between how wastes are managed before the proposed rule and how they are to be managed after the proposed regulations are adopted. In the case of mercury-added thermostat collection, this analysis is somewhat complicated because the management of mercury-added thermostat waste is currently addressed under existing universal waste regulations (California Code of Regulations title 22, chapter 23). In addition, the Mercury Thermostat Collection Act of 2008 (HSC section 25214.8.10 et seq) requires manufacturers, who sold mercury-added thermostats in California prior to January 1, 2006, to establish a thermostat collection program, pay the costs of transporting and recycling mercury thermostats, and conduct education and outreach on the law's requirements. The law also imposed new requirements on contractors and wholesalers. It required heating, ventilation and air conditioning (HVAC) and demolition contractors to transport thermostats to a collection site and required HVAC wholesalers to act as a collection site and to pay up to \$25 each for thermostat collection bins. None of these costs result from the current rulemaking.

Health and Safety Code section 25214.8.17 directs the Department of Toxic Substances Control (DTSC) to adopt regulations that develop performance requirements to specify collection rates for out-of-service mercury-added thermostats and establish a methodology for calculating the number of out-of-service mercury-added thermostats becoming waste annually. Hence, the proposed regulations focus on the method for determining the number of out-of-service mercury-added thermostats that become waste annually and the annual performance requirement for the collection of mercury-added thermostats by manufacturers. To provide an accurate estimate of the economic and fiscal impacts over the long-term, this analysis assumes the baseline to be the current legislative and regulatory framework that exists if these proposed regulations are not adopted. To be clear,

- 1) The proposed regulations will not require anyone to handle an out-of-service mercury-added thermostat that is not already required to do so by statute. Nor do they change the requirements for universal waste handlers, transporters or destination facilities.
- 2) None of the 30 former manufacturers of mercury-added thermostats manufactures its products in California

The proposed regulations only establish performance requirements for activities in which these persons are already engaged.

This document presents estimates of the cost to comply with the proposed rules, including an estimate of the potential costs that manufacturers may incur to meet the performance requirements in these regulations for collecting out-of-service mercury-added thermostats. This document also includes an analysis of impacts on small businesses as required pursuant to Government Code 11346.5.

MERCURY THERMOSTAT COLLECTION RATE AND PERFORMANCE REQUIREMENTS

The regulations establish performance requirements that specify annual collection rates for manufacturers to meet or exceed. DTSC elected to establish a methodology for determining the number of out-of-service mercury-added thermostats becoming waste each year based on a report submitted to DTSC by the Thermostat Recycling Corporation (TRC). The report, *Study to Meet Requirements for State of California Thermostat Recycling Legislation. Mercury-Containing Thermostats: Estimating Inventory and Flow from Existing Residential & Commercial Buildings* (SERA Report), summarizes the results of a statistically-valid survey of households and businesses across California, and was prepared by Skumatz Economic Research Associates (SERA) on behalf of the manufacturers of mercury-added thermostats, as required by section 25214.8.18 of the Health and Safety Code.

ENTITIES SUBJECT TO MERCURY THERMOSTAT COLLECTION RATE AND PERFORMANCE REQUIREMENTS

Approximately 30 manufacturers produced mercury-added thermostats and sold them in California prior to January 1, 2006. Nearly all of these manufacturers are represented by the Thermostat Recycling Corporation (TRC), a non-profit organization voluntarily founded by thermostat manufacturers in 1985 for the purpose of collecting and properly disposing of mercury-containing thermostats.

There are approximately 11,000 licensed C-20 heating, ventilation, and air conditioning (HVAC) contractors in California, as defined in section 832.20 of title 16 of the California Code of Regulations, and approximately 1,600 licensed C-21 demolition contractors in California, as defined in section 832.21 of title 16 of the California Code of Regulations. All of these businesses are potential handlers of out-of-service mercury-added thermostats and could be subject to these regulations. These contractors must already manage waste thermostats in accordance with the universal waste regulations adopted by DTSC pursuant to Chapter 6.5 of the California Health and Safety Code, which require delivery of waste mercury-containing thermostats to proper collection locations. Because the Health and Safety Code already requires contractors who remove out-of-service mercury-added thermostats to bring them to a collection location operating in compliance with DTSC's (existing) regulations the requirements on these contractors will not materially change as a result of the adoption of these proposed regulations. Because they do not impose new requirements on C-20 and C-21 contractors, these proposed regulations will have no economic impact on these businesses.

METHODOLOGY FOR ECONOMIC AND FISCAL IMPACT ANALYSIS

A) Estimating the Quantity of Mercury-Added Thermostats and Out-of-Service Mercury-Added Thermostats

Prior to 2008 neither the quantity of mercury-added thermostats in use, nor the number being replaced in California annually was well-characterized. As described earlier, section 25214.8.18 of

the Health and Safety Code required manufacturers to present to DTSC a survey plan and methodology for a survey to provide statistically valid data on the number of mercury-added thermostats that become waste annually in California. In 2009, the SERA report was completed and estimated the anticipated flow of mercury-containing thermostats each year for 25 years, starting with 2010. The "high" estimates assume that 100 percent of analog thermostats contain mercury (i.e., that all thermostats except digital models contain mercury). The "low" estimates are based on a small validation study, in which SERA visited 30 locations that had responded to the survey in order to validate their responses. Based on the survey and subsequent validation study, the SERA report estimated between 22 and 46 percent of thermostats currently installed in commercial buildings and between 27 and 47 percent of thermostats in residences contain mercury. There are about 1.4 million mercury-containing thermostats in the commercial sector (taking the midpoint of the high and low ranges) and about 5.8 million mercury-containing thermostats in California households, for a total of about 7.2 million (estimated range 5.1 - 9.3 million) statewide.

DTSC is adopting the "low" estimates of the SERA report as its methodology for calculating the number of mercury-added thermostats becoming waste each calendar year in the proposed regulations.

B) Estimating the Annual Collection Rate

The SERA report estimates that within twenty-five years of 2010, 82% of the estimated 5 to 9 million mercury-added thermostats will reach their expected useful service life, estimated at 27.5 years. Performance requirements in the proposed regulations are specified, incrementally, for the first five years: 2013 through 2017. The performance requirements for subsequent years through 2022 are set at a rate of 75 percent. Performance requirements beyond 2022 will be established in a future rulemaking and will be determined based on the manufacturers' success in meeting the first seven years' requirements.

The first five years' requirements are based on historical collections by the Thermostat Recycling Corporation (TRC) in a number of other states. In 2010, TRC programs in several small states collected more than 500 mercury thermostats per 100,000 population ($500/100,000 = 0.005$). If the manufacturers were able to achieve a comparable per capita collection rate in California in a given year, it would correspond to $0.005 \times 37,000,000 = 185,000$ thermostats (in 2010 the population in the state was 37 million). The performance requirements specified in proposed regulations are considerably more modest. The table below shows the absolute number of thermostats that the manufacturers would be required to collect in 2013 through 2022 and the number of thermostats per 100,000 population.

Performance Requirement for
Number of Thermostats Per 100,000

Year	Percent goal	Number of thermostats	Thermostats per 100,000 population
2013	30%	65,100	173
2014	45%	95,400	253
2015	55%	113,850	302
2016	65%	131,300	348
2017	75%	147,750	392
2018	75%	144,750	384
2019	75%	140,250	370
2020	75%	135,750	360
2021	75%	130,500	346
2022	75%	126,000	334

C) Assessing the Cost of Compliance with the Proposed Regulation

As described in the introduction, it is difficult to separate the cost of compliance only with the regulation from the costs associated with existing requirements for the management, collection and disposal of mercury-added thermostats. The number of thermostats that would become a waste in any given year is estimated, as seen in the SERA Report. The performance goals included in the proposed regulations are based on these estimates beginning with a small percentage of the estimate and growing to a larger percentage as the collection programs' effectiveness improves gradually over time.

DTSC recognizes that manufacturers may incur some increased costs associated with meeting the specified performance requirements. A conservative estimate of the cost of compliance with the proposed regulation assumes that 100% of the mercury-added thermostats reflected in the performance goals result from the regulation and would not otherwise become wastes in the absence of regulation. DTSC can estimate the cost per thermostat of operating the collection program to derive this conservative calculation.

The cost for the California program has been estimated from the known costs of the national program activities after removing those costs not applicable to California activities. The TRC reports annual national program costs and three years of costs are depicted in the following table. As shown, although the costs of operating the program has increased over time, the number of thermostats collected has also increased, resulting in a lower cost per thermostat.

TRC 3-YR NATIONAL PROGRAM COST

	Activities	2009	2010	2011
Direct Costs	TRC - Staff and Administration	\$248,066.00	\$231,757.00	\$255,617.00
	Recycling Costs	\$222,755.00	\$300,096.00	\$299,877.00
	Insurance	\$18,706.00	\$17,771.00	\$13,945.00
	New Collection Containers	\$18,130.00	\$18,219.00	\$18,859.00
	Marketing & Outreach	\$96,867.00	\$76,696.00	\$123,221.00
	Other	Travel	\$16,105.00	\$28,809.00
Legal		No-Report Cost	No-Report Cost	\$93,272.00
Statutory Incentive Payments (not in CA)		\$27,496.00	\$40,380.00	\$37,860.00
Number of Thermostat Collected		155,733	200,064	300,000
Totals		\$648,125.00	\$713,728.00	\$870,759.00

Staff and administration are personnel requirements to run the national program. Recycling costs are those costs associated with disposal of the collected thermostats. Insurance is identified as pollution insurance for incidents. New collection containers are for replacement of damaged bins and to fill any additional requests for collection bins. The statutory incentive payment does not apply in California. DTSC assumes direct costs are those activities necessary to operate a program in California, namely, staff and administration, recycling costs, insurance, new collection containers, and marketing and outreach. All other costs are not included in the calculation of costs in California.

ESTIMATES OF DIRECT COST PER THERMOSTAT

	2009	2010	2011
Direct Costs (staff & administration, recycling costs, insurance, new collection containers, and marketing & outreach)	\$604,524.00	\$644,539.00	\$711,519.00
TRC Annual Thermostat Collection	155,733	200,064	300,000
Direct Cost per Thermostat	\$3.88	\$3.22	\$2.37

The following table provides an estimated range of cost for manufacturers to operate a California only mercury-added thermostat collection program for the next ten years, applying an estimated cost per thermostat to the annual performance requirements identified in these regulations. The actual costs will be determined by TRC as they implement their program to meet the annual performance requirements. It is important to note that these costs are likely to be an overstatement of the actual cost of the proposed regulation since they assume that 100% of the thermostat collection activity is attributable to the regulation.

**ESTIMATES OF MERCURY-ADDED THERMOSTAT
WASTE COLLECTION QUANTITIES AND COST**

Year	Annual Performance Goals: "T"= Number of Thermostats Collected	Estimated Annual Costs per "T" Recycled	Estimated Annual California Collection Program Costs
2013 (1)	65,100	\$2.37	\$154,287
2014 (2)	95,400	\$2.37	\$226,098
2015 (3)	113,850	\$2.37	\$269,824
2016 (4)	131,300	\$2.37	\$311,181
2017 (5)	147,750	\$2.37	\$350,167
2018 (6)	144,750	\$2.37	\$343,057
2019 (7)	140,250	\$2.37	\$332,392
2020 (8)	135,750	\$2.37	\$321,727
2021 (9)	130,500	\$2.37	\$309,285
2022 (10)	126,000	\$2.37	\$298,620
Totals	1,230,650		\$2,916,638

ESTIMATES FOR THE 399 FORM

A. Economic Impact: Statewide Cost Impacts On Businesses

As described earlier, existing statute already requires the manufacturers to operate a collection program and existing universal waste requirements already establish handling requirements for mercury-added thermostats. Because the performance requirements specified in the proposed regulation are based on estimates from the manufacturers of the amounts of mercury-added thermostats likely to become waste, the impact of the regulation on businesses in the state is likely to be small or negligible. DTSC estimates that the number of businesses affected will be approximately 30 manufacturers that have identified themselves as manufacturers that sold mercury-added thermostats in California prior to January 1, 2006. DTSC does not anticipate the creation of new businesses or jobs or the elimination of business or jobs. These regulations will not affect the ability of California businesses to compete with other states.

B. Economic Impact: Estimated Costs

These regulations establish a performance requirement that the manufacturers must meet, so manufacturers will need to work with handlers of waste mercury-added thermostats to achieve these goals. However, these performance requirements are based on proven performance by the manufacturers in other states, so DTSC anticipates the goal are reasonable. These regulations do not impose any additional governmental fees, charges or assessments on mercury-added thermostat manufacturers. Existing law requires the manufacturer to establish a collection program and these regulations establish the performance requirement for that program. There are no required

specifications for how the manufacturers will accomplish the performance requirements, so there are no mandated additional requirements for new equipment, additional staff, consultants, testing laboratory costs, or other professional services. These regulations require no additional costs associated with maintaining shipping, receiving and recordkeeping costs for the mercury-added thermostat manufacturers existing requirements of the Mercury Thermostat Collection Act of 2008.

These regulations do not generally affect the activities of heating, ventilation, and air-conditioning (HVAC) contractors or demolition contractors. The activities of these contractors are subject to existing laws and regulations.

C. Economic Impact: Estimated Benefits

As seen in the TRC national program cost data for 2009 through 2011, the cost per thermostat may decline as the number of thermostats collected increases. Some of this per unit cost decrease may be attributed to economies of scale and may apply to program costs in California as the annual percentage performance requirements increase over time. In addition, as the TRC implements the thermostat program in California, it may identify opportunities to reduce indirect and other costs associated with the national program, resulting in greater national efficiency and reduced national costs.

D. Economic Impact: Alternatives to These Regulations

DTSC has identified the following alternatives. DTSC has chosen the first of the three alternatives presented below

1. Manufacturer sponsored survey study and performance requirements: DTSC used the results of a manufacturer-sponsored study as the basis for its methodology for estimating the number of thermostats becoming waste annually. The study determined the anticipated flow rate of mercury-containing thermostats by year for 25 years starting in year 2010. The study used random and stratified samples; and indicated that there are approximately 1.4 million mercury-containing thermostats in the commercial sector and approximately 5.8 million mercury-containing thermostats in California households, for a total of approximately 7.2 million mercury-containing thermostats statewide (taking the mid-point of low and high estimates). The contractor performed a small-scale validation study consisting of 30 site visits to validate the accuracy of the survey responses. To develop the estimated numbers of thermostats becoming waste in each calendar year, SERA used a statistical "cumulative distribution and expected lifetime model, along with survey data on the distribution of ages of installed thermostats. SERA develop the estimate of the total market that would flow out in a given year. These results are tabulated in Table 1.5 of the SERA provides three sets of estimates of the number of thermostats becoming waste each year:

- A low estimate, which is based on data from a small-scale validation study by SERA
- A middle estimate, which that does not take the results of the validation study into account ;
and

- A high estimate, which applies a 13.5 percent factor (“validation premium”) to the middle estimate values, to account for the undercounting of thermostats by survey respondents seen in the validation study mentioned previously.

DTSC has determined that SERA’s study was well-conducted and provided statistically valid data on the number of thermostats becoming waste annually. Therefore, DTSC is adopting the results of the study, as summarized in Table 1.5 of the SERA, as the methodology for these regulations. Due to the relatively small sample size in SERA’s validation study and its geographical limitations (all site visits were in the San Francisco Bay area), DTSC has chosen to use SERA’s low estimate, described above, in its methodology. While this conservative approach may underestimate the true number of out-of-service mercury-added thermostats becoming waste annually, DTSC has concluded that this approach is rigorous and defensible. The annual collection rates for the manufacturers to collect mercury-added thermostats are expressed as percentages of thermostats collected based on these annual flow rate numbers. Performance requirements set in these regulations are based on proven performance in other states. After starting with very modest rates, subsequent years’ performance requirements rise to eventually approximate performance rates in top performing states.

2. **Do Nothing:** DTSC rejected this option because HSC section 25214.8.17 requires DTSC to adopt regulations to establish collection rates and a methodology for determining the number of out-of-service mercury-added thermostats becoming waste annually. Mercury-added thermostats are a universal waste and doing nothing would limit DTSC’s ability to achieve compliance with the universal waste requirements. To do nothing could potentially place Californians in jeopardy of increased exposure to mercury.
3. **Contractor Reporting Requirements:** This alternative was rejected because it placed the primary burden of the regulation on thousands of individual contractors, imposing a new contractor reporting requirement that would have represented a potentially sizeable financial burden on small businesses in California. Compliance rates would likely have been low, error rates would likely have been high, and the resources required of DTSC to effectively enforce a new administrative requirement on such a large number of individual businesses would have been considerable. Furthermore, this alternative contradicts the intent of the legislature in adopting an extended producer responsibility (EPR) law: that the responsibility and costs for collecting and properly managing out-of-service mercury-added thermostats should fall primarily to the manufacturers.

E. Economic Impact: Major Regulations

The proposed regulation is not considered to be a major regulation because it will not have an economic impact of more than \$10,000,000 on California businesses.

Fiscal Effect on Local Governments

These regulations do not require local entities to undertake a new program or to provide an increased level of service in an existing program and therefore not state reimbursable.

Fiscal Impact on State Government

These regulations do not require state agencies to undertake a new program or to provide an increased level of service in an existing program. The cost to DTSC attributed to monitoring extended producer responsibility is absorbed as part of the current costs under the universal waste management program.

Fiscal Impact on Federal Funding of State Programs

These regulations do not implement federal mandates. Federal funding of state programs will not increase or decrease as the result of these regulations.

Conclusion

DTSC anticipates the proposed regulations will have an economic impact on a limited number of businesses—the manufacturers. While the manufacturers already fund TRC's efforts to collect out-of-service mercury-added thermostats in California and a number of other states, DTSC believes that TRC will be required to invest some additional resources in order to meet the collection rate goals established in these regulations. The proposed regulations will have a modest economic impact on approximately 30 manufacturers whose mercury thermostats were formerly sold in California. Nevertheless, DTSC has determined that the proposed regulation will not have a significant statewide adverse economic impact directly affecting businesses, including the ability to compete with businesses in other states, many of which have mercury thermostat collection requirements similar to California's.