

**REPORT ON APPLIANCE EFFICIENCY:
INCENTIVES AND STANDARDS**

**Presented by the Maine Public Utilities Commission
to the Utilities and Energy Committee**

January 20, 2005

I. Executive Summary

This report responds to a legislative resolve directing the Public Utilities Commission to study alternative means to increase the efficiency of the electric appliances used by Maine residents. The report reviews the alternative methods of using voluntary incentive programs and/or establishing in law minimum energy efficiency standards. The report recommends that the Legislature implement minimum efficiency standards for nine different products. In addition, the report recommends that the Commission be directed to conduct a biennial review of the development of standards in other states and, when certain prescribed conditions exist, adopt those standards through a major substantive rule.

II. Introduction

Resolve, Chapter 119, “Resolve, To Direct the Public Utilities Commission To Examine Certain Issues Relating to Energy Efficiency” (the Standards Resolve) adopted by the 121st Maine Legislature, directs the Commission to “investigate the feasibility and design of a program that would provide incentives to residential and commercial consumers to purchase and install energy-efficient appliances or that would establish energy efficiency standards.”¹ The directive grew out of proposed legislation that would mandate minimum efficiency standards for a number of residential and commercial products.² The purpose of the original bill was to “establish minimum energy efficiency standards for certain products sold or installed in the State of Maine” in order to:

- (1) “sav[e] consumers money on utility bills,”
- (2) “save energy and thus reduce pollution,” and
- (3) “make electricity systems more reliable... and reduce or delay the need for new power plants, power transmission lines and power distribution system upgrades.”³

The resolve also directs the Commission to analyze “which energy efficient products should be included in any program; possible incentive mechanisms such as rebates, grants, low-interest loans or other financial incentives; program costs and benefits; funding sources; and the advantages and disadvantages of implementing any recommended program.”

¹ Although the Resolve specifically references a “program,” we have interpreted that broadly to include the direct enactment of standards by the Legislature, as we ultimately conclude that this is the best approach for certain appliances.

² L.D. 1187 and L.D. 1261. L.D. 1261 was initially drafted as an omnibus energy bill, one provision of which contained the language of L.D. 1187 in its entirety. The Resolve was the result of a final amendment to L.D. 1261.

³ L.D. 1261, §3211-B.

This report responds to the Resolve. Section III presents the Commission's view of the framework for reviewing programs or standards. Section IV discusses the Commission's investigation into programs and incentive mechanisms. Section V discusses appliance efficiency standards in general and describes the standards proposed in L.D. 1187/1261 and their relationship to products already covered by the Efficiency Maine programs. Section VI explores the relationship among incentive programs, market transformation activities, and standards. Section VII discusses options for achieving the legislative objectives, and Section VIII recommends a course of action. Section IX discusses implementation issues and Section X provides our conclusion.

III. Critical Components for Decision Making When Designing Efficiency Programs or Developing Standards

A. Societal Impact: Energy efficiency programs or minimum efficiency standards should only be implemented after examining whether the societal benefits resulting from the program or standard are greater than the costs imposed (i.e. that the program or standard is "cost effective" from a societal perspective). Determination of the costs and the benefits should reflect any quantifiable economic changes brought about as a result of the program or standards. Costs that are usually included in the calculation are the incremental cost of the more efficient products purchased as a result of the program or standard, increases in equipment O&M (if any), and any administrative costs incurred. Benefits include the financial value of the energy savings⁴ and any decreases in equipment O&M. Because there is little consensus on their financial value, environmental benefits are often expressed in pounds or tons of emissions avoided.⁵ Though the economic consequences of the avoided pollutants are not explicitly quantified, the societal benefits are well understood and are one of the main reasons for adopting efficiency standards (e.g. Maine Climate Action Plan, recommendation number 26).

B. Equity Issues: Energy efficiency programs can be cost effective without being fair if people who pay for the programs do not have an opportunity to benefit from them. For example, there would be equity issues if all of the money in the conservation fund were used to finance a program for just a few customers. An ideal program provides an opportunity for everyone who pays extra for conservation to participate in some feature of the program and also delivers benefits to the broader base of ratepayers regardless of whether they participate. From this perspective, building codes and appliance standards may be the fairest way to impose efficiency because the individuals who receive the

⁴ The values used for this calculation are the *avoided energy costs* – the marginal cost of the energy (electric or fossil) that is saved as a result of the intervention.

⁵ There is greater acceptance of the estimated tons of pollutant reduction from efficiency programs than there is for the estimates of financial damage resulting from the emissions.

financial benefits from reduced energy use are also the ones who pay any extra costs that may accompany the higher efficiency.

C. Effect on Consumers: Mandatory minimum efficiency standards should include consideration of the effects such standards will have on consumers. Issues to be considered include:

Whether the energy cost savings from items that meet the standard make up for any increases in the purchase cost.

Whether the standard would unduly limit customer choice among products.

Whether the standard creates scarcity conditions and higher product prices by shutting too many producers out of the market.

Whether the State's economy will suffer because neighboring states have not adopted similar measures.

D. Advantages and Disadvantages of Incentive Programs and Minimum Efficiency Standards: There are several factors to consider when deciding whether efficiency standards, voluntary programs, or some combination of each are the most appropriate method for increasing the overall efficiency with which society uses energy.

1. How the financial consequences are distributed: Products purchased by those who pay for the energy used by the more efficient device, such as lights and clothes washers, are good candidates for an incentive program. Incentive programs that reduce the incremental cost of products that lower energy costs can influence consumers to buy them.

Products such as cable boxes, for which the purchaser will consider initial price but not annual operating costs⁶ are poor candidates for incentive programs. Incentive programs will not work in this kind of a "split incentive"⁷ situation unless the incentive can make up the entire cost difference between the efficient and inefficient products.

2. The size of the savings: Consumers may be more easily convinced to take advantage of an incentive program if the product replacement will result in a large reduction in their energy costs.

3. Product availability: Efficient products with low market adoption may be candidates for voluntary incentive programs. The programs can increase

⁶ Cable boxes are usually purchased by the cable company and provided to the cable customers who must then pay their operating costs.

⁷ The split incentive applies to large packaged air conditioners in commercial properties where a developer pays the construction cost and tenants pay the energy costs.

consumer awareness of such products and help to drive up market demand. Products that have a higher market adoption should not be included in incentive programs because people who would purchase the efficient product on their own – i.e. “free riders” – can deplete the available incentive funds without creating any efficiency gains beyond what would have occurred without the program. Where market adoption is high enough, it may make sense to set a floor or minimum efficiency standard.

4. Transfer payments: While incentive programs offer many societal benefits, they also transfer money from all consumers to those who participate in the programs. Program participants benefit further from lower energy costs. Efficiency standards have no transfer payments. The cost of the higher efficiency products is paid by consumers who will benefit from lower operating costs.

IV. Incentive Program Review

During its 2002 investigation (in Docket 2002-162) in response to 35 M.R.S.A. § 3211-A, the Commission established conservation program goals and objectives and reviewed virtually every residential and commercial use of electricity to estimate the amount of cost effective energy efficiency available. Based on this review, the Commission adopted a conservation assessment that is the maximum allowed by current law - equivalent to \$.0015 per kilowatt-hour. The Commission then developed its Conservation Program Plan,⁸ which identifies the efficiency programs the Commission will implement to obtain the maximum amount of energy efficiency possible within the limits of available funding, while honoring the requirements of the Conservation Act.⁹

As a result of the program investigation and its associated Orders, the Commission developed a plan that captures the most cost effective energy efficiency available given current funding limitations. Expanding this program to include other products can only be accommodated by reducing or eliminating existing programs, or by expanding program funding.

V. Appliance Efficiency Standards

A. Background and Federal Activity: The movement to appliance efficiency standards began with the states in the 1970s. At that time, several states, including most prominently California, were adopting appliance efficiency standards. In December 1975, Congress passed the Energy Policy and

⁸ Commission Orders on each of these topics along with the final plan are available on the Efficiency Maine web site <http://www.energymaine.com/2002-162orders.htm> and in the PUC’s annual Efficiency Maine reports to the Legislature.

⁹ Programs funded at the legislative cap of \$.0015 per kWh will capture approximately 12% of the estimated economic potential achievable through such programs.

Conservation Act (EPCA), the primary purpose of which is to "conserve energy by enabling consumers purchasing appliances to compare the energy usage of competing models" (US Federal Trade Commission, The Appliance Labeling Rule, 1997). EPCA required that Energy Guide labels be placed on certain new home appliances, including refrigerators, refrigerator-freezers, freezers, water heaters, clothes washers, dishwashers, furnaces, room air conditioners, central air conditioners, and heat pumps. These appliances are "covered" under EPCA because their energy costs can vary greatly, depending on their construction and design. EPCA also required standards and labeling for humidifiers and dehumidifiers, clothes dryers, direct heating equipment, kitchen ranges and ovens, and television sets. The Federal Trade Commission (FTC), which shares responsibility with the United States Department of Energy (US DOE) for EPCA's implementation, did not include these products in the labeling program, because, in its view, there were insufficient differences in energy efficiency among different models.

By 1986, appliance manufacturers realized that uniform federal standards were better than the multiple state standards being developed because of a lack of federal leadership. The National Appliance Energy Conservation Act (NAECA) of 1987 amended EPCA by establishing minimum efficiency standards for all EPCA products. NAECA was a compromise among state governments, efficiency and environmental advocates, and product manufacturers. Manufacturers agreed to a national standards program in exchange for an agreement by states and environmental activists to accept federal pre-emption of individually set state standards on products covered by the act. NAECA established minimum efficiency standards for 13 classes of household appliances: refrigerators, refrigerator-freezers, and freezers; room air conditioners; fluorescent lamp ballasts; incandescent reflector lamps; clothes dryers; clothes washers; dishwashers; kitchen ranges and ovens; pool heaters; television sets (withdrawn in 1995); and water heaters. A 1988 NAEC amendment added fluorescent lamp ballasts. The Energy Policy Act of 1992 added general service fluorescent lamps and general service incandescent lamps, including reflector lamps. It also expanded EPCA to address water efficiency issues by specifying water flow labeling requirements for showerheads, faucets, water closets, and urinals. In 1994 the FTC extended its rule to include pool heaters and certain other water heater types.

NAECA requires the US DOE to upgrade standards on covered products to the maximum level of energy efficiency that is technically feasible and economically justified. DOE strives to establish standards that maximize consumer benefits and minimize negative impacts on manufacturers and others. Federal standards on covered products preempt state standards, unless the state standard is identical to the federal standard.

B. Standards Proposed for Maine: L.D. 1187¹⁰ (the Standards Bill) proposed that Maine adopt appliance efficiency standards for products not covered by NAECA. Sponsors furnished estimates showing that the standards would result in 206,300 MWh of annual energy savings by 2010 and 306,200 MWh by 2020.¹¹ Table I below shows the products that were included in the proposed legislation along with their per unit average cost, the incremental cost for the more efficient products, the annual unit sales in Maine, their per-unit annual energy savings, the expected pay-back period, and their benefit to cost ratio.¹²

Table I

Product	Price of Standard Product	Increase in Price of Efficient vs. Standard Product	Annual Unit Sales	Energy Savings (kWh/yr)	Simple Pay back Period	B/C Ratio
Torchiere Lamps	\$25	\$40	42,000	288 kWh	1.4 yrs.	3.7
Ceiling Fans	\$65	\$40	41,000	145 kWh	2.8 yrs.	2.9
Set-Top Boxes	\$150	\$5	98,000	175 kWh	.2 yrs.	3.2
Unit Heaters	\$815	\$277	430	268 therms	2.1 yrs.	N/A
Dry Transformers	\$375	\$45	5,000	255 kWh	2.2 yrs.	4.6
Traffic Signals ¹³	N/A	\$125	NA	431 kWh	1.4yrs.	3.7
Exit Signs	\$60	\$30	3,000	223 kWh	1.7 yrs.	6
Large Packaged Air Conditioners	\$11,330	\$1,813	50	8434 kWh	2.7 yrs.	6.7
Commercial Clothes Washers	\$400	\$139	900	985 kWh 9850 gal.	1.8 yrs	3.5
Commercial Refrigeration	\$400 - \$2,000	\$115	579	540 kWh	2.7 yrs	2.3

As shown in the last column, all of the standards proposed are cost effective when judged by the criterion used to decide whether to implement a conservation

¹⁰ L.D. 1187 was introduced in 2003 and held over until 2004. In 2004, the standards issue was addressed in L.D. 1261, which ultimately was enacted as the Standards Resolve.

¹¹ The estimates were based on a national study conducted by ACEEE "Opportunities for New Appliance and Equipment Efficiency Standards: Energy and Economic Savings Beyond Current Standards Programs." The national study was further refined to provide estimates for the northeast region and individual states in a report by the Appliance Standards Awareness Project (ASAP), "Energy Efficiency Standards: A Low-Cost, High Leverage Policy for Northeast States." Appendix A of the ASAP report documenting the sources of information and the assumptions used to generate the savings estimates is attached.

¹² A B/C ratio greater than one means the standard would pass the cost effectiveness test used to judge incentive programs.

¹³ See note 14 below.

program under the Conservation Act. The energy savings and economic and environmental benefits achievable through these standards are significant.¹⁴ Table II below provides the estimated cumulative benefits available from imposition of the proposed standards. The table shows the annual energy savings available from the standards, net present value to consumers from their adoption, and the estimated annual reduction in air pollutants expressed in millions of tons.

Table II

Product	Energy Saved in 2020 (GWh)	Present Value of Consumer Net Savings (\$Millions)	Reduced CO₂ (MT)	Reduced NO_x (MT)	Reduced SO₂ (MT)
Torchiere Lamps	121.7	88	15,500	13.3	59.6
Ceiling Fans	50.3	29	6,400	5.5	24.6
Set-Top Boxes & Digital cable converters	96.7	67.8	7,100	6.1	27.3
Unit Heaters	N/A	N/A	2,700	7.5	0
Dry Transformers	19.3	15.7	2,500	2.1	9.4
Traffic Signals ¹⁵	N/A				
Exit Signs	10.3	9.9	1,300	1.1	5.5
Large Packaged Air Conditioners	1	.5	100	.1	.5
Commercial Clothes Washers	1.8	3.1	200	.2	.8
Commercial Refrigeration	2	1.6	300	.2	1
Total	303.1	215.6	36,100	36.1	128.7

C. Technology Description: Each of the products recommended for standards in the Standards Bill is described briefly below.

- 1. Torchiere lighting fixture.** Torchieres are portable floor lamps that aim light upward, reflecting it off the ceiling to provide indirect lighting. These

¹⁴ Estimates and their basis can be found at Northeast Energy Efficiency Partnerships website <http://www.neep.org/Standards/index.html>

¹⁵ See section IV.D below. MPUC's Interim Traffic Signal Replacement program, developed and deployed in cooperation with the Maine Department of Transportation, has already converted all traffic signals in the State to this technology. A condition of the program is that communities agree not to revert back to incandescent technology after the upgrades have been accomplished. Thus, there will be no increase in energy savings if these standards are imposed on traffic signals.

fixtures have become common in homes, apartments, and dormitories due to their high light levels and low costs. Typical halogen torchiere lamps use four to five times the electricity of efficient models and have operating temperatures that are so high they are a recognized fire hazard.

2. Ceiling fan. These are the large Casablanca-style fans affixed to the ceiling to circulate air around a room and help occupants feel more comfortable.
3. Commercial clothes washer. These are family-sized clothes washers used in commercial applications such as coin laundries and apartment building laundry rooms.
4. Commercial refrigerators and freezers. These are the large, solid and glass door commercial units used in restaurants, hotels, convenience stores, and other commercial applications. Walk-in refrigerators and freezers are excluded.
5. Illuminated exit signs. These are the emergency exit signs in buildings, many of which use incandescent bulbs to operate. New designs use light emitting diodes (LEDs) and consume on the order of three watts, reducing energy use by more than 90 percent relative to an incandescent sign.
6. Large packaged air-conditioning equipment. The majority of commercial buildings are cooled by packaged air conditioning systems, so-called because they are assembled in a factory and do not need on-site fabrication. Federal efficiency standards “cover” commercial packaged air conditioners of up to 240,000 Btu/hour cooling capacity, but not larger systems. These large units cost users many thousands of dollars per year to operate.
7. Low-voltage dry-type distribution transformer. Distribution transformers are used in commercial and industrial buildings to reduce electricity voltage from levels provided by the utility company to the levels used to power office equipment and building machinery. Building developers and owners typically purchase such transformers.
8. Traffic signal modules. These are the red and green lights in traffic signals. The modules consist of a light source and lens (usually a sealed unit), and any other parts necessary for operation of the light. Newer traffic light designs include the use of LED technology and can reduce an intersection’s energy consumption by two thirds relative to incandescent signal operation.
9. Unit heater. Unit heaters are the box-type heaters fueled by natural gas that are usually positioned near a ceiling and provide heating in open

commercial and industrial spaces such as garage bays and warehouse style stores.

10. Digital cable box. These devices translate the signals from the cable company into an image on the television set. They waste energy because they use electricity even when they are not in operation.

11. Digital converter box. This device will be required once the Federal Communications Commission mandates that cable signals become digitized. Many existing televisions will not be able to read these signals and will therefore require the converter box to translate the signals back to analog mode.

D. Effect on Current Programs: Of the 11 products recommended for standards, seven are currently eligible for incentives through Efficiency Maine programs.¹⁶ ENERGY STAR rated torchiere lamps and ceiling fans are eligible for \$12 incentives to reduce the incremental purchase price through Efficiency Maine's residential products program. High efficiency exit signs, dry transformers, packaged AC, and commercial refrigeration are eligible for incentives through Efficiency Maine's business program.

Products ineligible for incentives through Efficiency Maine include set top cable or digital converter boxes, commercial washing machines, and unit heaters. Set top boxes are ineligible because they are provided by the cable or satellite TV companies, and not purchased by consumers. Incentives for commercial washing machines were eliminated after it was determined the savings were primarily in fossil fuels and not electricity.¹⁷ Unit heaters are likewise ineligible for the Efficiency Maine program because they save only fossil fuels.

E. Product Availability: The products covered by the proposed standards are widely available. The Appliance Standards Awareness Project¹⁸ reviewed the products in 2003 to ensure that there are a sufficient number of manufacturers and products available to preserve consumer choice. The list of products complying with the proposed standards is attached as Attachment A.

F. Other States: Efforts to enact standards in Maine have involved discussions about whether other states have adopted similar standards. There are reasons why Maine should not go it alone. First, standards enacted in Maine

¹⁶ To date Efficiency Maine has awarded \$42,785 in commercial incentives and \$19,705 in residential incentives for products that would be covered by the proposed standards.

¹⁷ The Conservation Act is geared toward programs that improve electric energy efficiency.

¹⁸ The Appliance Standards Awareness Project (ASAP) is dedicated to increasing awareness of and support for appliance and equipment efficiency standards. Founded in 1999 by the American Council for an Energy-Efficient Economy (ACEEE), the Alliance to Save Energy, and the Natural Resources Defense Council, ASAP is led by a steering committee that includes representatives from the environmental community, consumer groups, utilities and state government. ASAP provides advice and technical support to parties interested in advancing state standards.

alone would not change manufacturer behavior and could limit product choice and increase product price. Second, it is more difficult to enforce a standard in just one state. If a group of geographically proximate states enact matching standards, they will create a distinct market for manufacturers to target.

Legislation in other states covering these same products has been introduced across the country and throughout the northeast. In New England, standards covering the same products have become law in Connecticut and are being considered in all other states. Table III below shows where standards have been proposed (P), where they have been adopted (A), and where they have been rejected (R). The percent of the U.S. population residing in the state is also displayed to provide a sense of the number of consumers involved.

Table III: Standards Proposed (P), Adopted (A), and Rejected (R) in Other States

	ME	RI	MA	CT	VT	NH	NY	NJ	MD	PA	IL	CA
US Population (%)	0.5	0.4	2.3	1.2	0.2	0.4	6.7	3.0	1.9	4.4	4.4	12
Ceiling Fan	P	P	P	A	P	P	P	P	A	P	P	A
Clothes Washers	P	P	P	A	P	P	P	P	A	P	P	A
Refrigerators Freezers	P	P	P	A	P	P	P	P	A	P	P	A
Exit Signs	P	P	P	A	P	P	P	P	A	P	P	A
Packaged AC	P	P	P	A	P	P	P	P	A	P	P	A
Transformers	P	P	P	A	P	P	P	P	A	P	P	A
TV Set Tops	P	P	P	R	P	P	P	P	R	P	P	R
Torchieres	P	P	P	A	P	P	P	P	A	P	P	A
Traffic Lights	P	P	P	A	P	P	P	P	A	P	P	A
Unit Heaters	P	P	P	A	P	P	P	P	A	P	P	A

VI. Carrots and Sticks: The Relationship Between Incentive Programs and Minimum Efficiency Standards

A. Standards as a Baseline: Standards are often used as baselines for incentive programs. The goal of the programs is to encourage consumers to purchase products that are more energy efficient than the products they would otherwise buy without the program. When a program is designed, market surveys determine what consumers are buying without the program, what higher efficiency replacement products exist, and what kind of program could be used to encourage more efficient equipment purchases. Efficiency standards are often used as the baseline beyond which financial incentives, education, marketing, or some combination of all three will be used to influence consumer choice. For example, Efficiency Maine’s High Performance Schools Program uses Maine’s commercial building energy code (ASHRAE 90.1, 2001) as a baseline from which

to measure savings. When there are no standards, or if people are already buying equipment that is more efficient than the minimum standard, market studies are used to decide what level of efficiency should be used as the baseline.

In 2003, the Maine Legislature required all state buildings and publicly funded schools to be designed to achieve a 20% improvement in energy efficiency over the commercial building energy code. Efficiency Maine's High Performance Schools program had previously awarded incentives for construction that was more energy efficient than the commercial building energy code. In this case, legislative action shifted the baseline for one of the Efficiency Maine programs.

When there are no standards, program managers may still decided to promote more efficient products. For example, there are no minimum efficiency standards for exit signs,¹⁹ so Efficiency Maine's small business program provides financial incentives to assist with the purchase of replacement LED exit signs. Efficiency Maine's program has to date awarded over \$7,600 to help consumers purchase the more efficient LED replacement signs. If LED exit signs were mandated as the standard, there would be no need to provide incentives for their purchase.

B. Using Incentives to Achieve Market Transformation: When the Legislature directed the Public Utilities Commission to take over the planning and implementation of energy conservation programs, it provided specific guidelines for program design. One objective was to choose programs that would reshape consumer markets.

The commission shall consider, without limitation, conservation programs that...[c]reate more favorable market conditions for the increased use of efficient products and services.²⁰

The Commission included this guideline in its development of program design strategies.

The fourth program design strategy – *encourage the development of an energy efficient infrastructure in Maine* – is necessary to meet the broad principle of transforming the market, so that efficient products are sold and used in Maine without programmatic stimuli or subsidies.²¹

To this end, the Commission tries to “pull” the market with its incentive programs and through collaboration with a number of organizations.

- The Consortium for Energy Efficiency (CEE) is a nationwide partnership of efficiency program operators, manufacturers, trade associations, and

¹⁹ New commercial buildings must include LED exit signs in order to meet Maine's commercial energy codes, but there is no minimum standard for exit signs so non-LED replacement signs can be purchased for existing commercial buildings.

²⁰ 35-A M.R.S.A. §3211.A.2.A(2).

²¹ Docket 2002-162 Procedures for Conservation Program Planning.

- government agencies. CEE provides a forum in which efficiency standards and rankings are established for various products. Product ratings are continuously updated to reflect changes in available product efficiency levels and to adjust for changes in the market adoption rate for various products.
- The United States Department of Energy and the Environmental Protection Agency, which together operate the ENERGY STAR program, participate in the development of the CEE standards and rankings, and use them to inform their product qualification requirements for ENERGY STAR listing.
 - As a partner in the Northeast Energy Efficiency Partnerships (NEEP), the Commission works with other NEEP members to coordinate the promotion of ENERGY STAR qualified products.²² This process encourages manufacturers to enter and expand the market for efficient products.

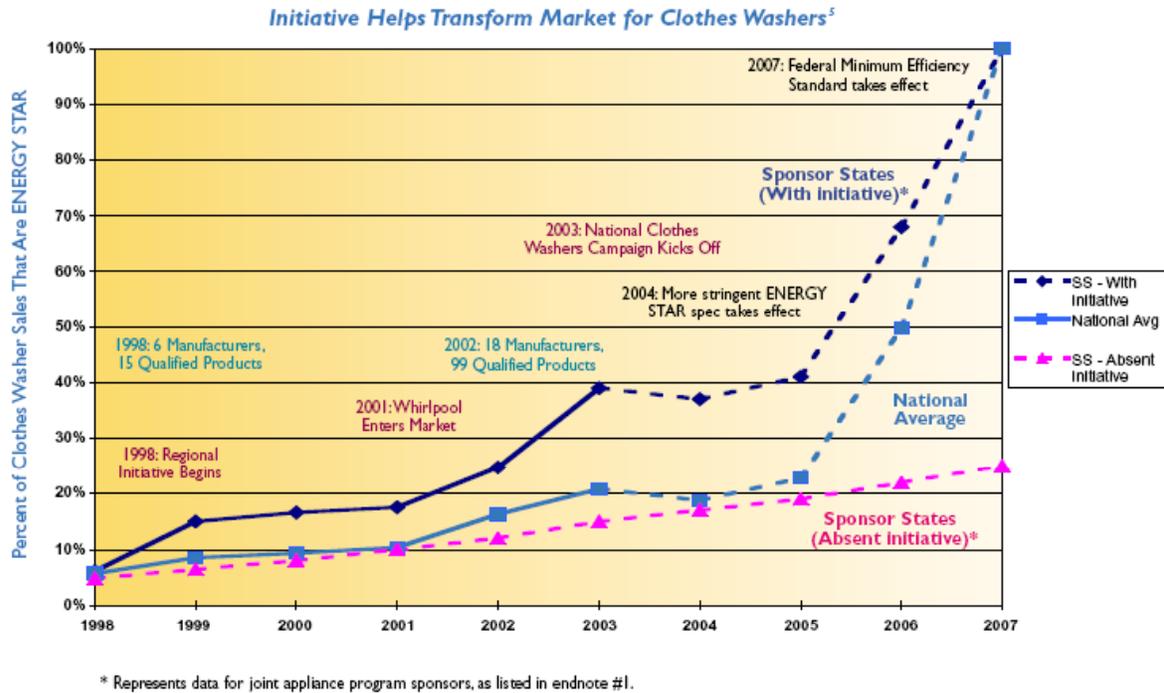
As the market moves towards a greater natural market adoption of ENERGY STAR products, the Commission and other program operators will adjust the program baselines and incentive levels to promote even more efficient products that are less available and further away from the market norm.

C. Revised Standards as Success: Market transformation is successful when the strategies used to affect consumer choice have led to a marketplace in which the inefficient products are no longer offered for sale. This can happen either when manufacturers choose voluntarily to end a product line or when they are forced to do so by the imposition of new energy efficiency standards. Efficiency program incentives can accelerate market adoption of more energy efficient products, create a demand for additional products, encourage more manufacturers to enter the market, and facilitate the adoption of standards.

An example of how the process can work is the Northeast Residential ENERGY STAR Products Initiative summarized in the graph below. This NEEP initiative began with CEE's establishment of clothes washer efficiency specifications in 1998. Washers that met CEE Tier I specifications were listed as ENERGY STAR qualified. At the time, only six manufacturers provided models that met the qualifications, and there were only 15 models offered for sale. Sales of ENERGY STAR washers made up only five percent of the market. The program began promotions of ENERGY STAR rated washers through advertising and incentives. As detailed in the graph, the promotions increased the market share of efficient washers in the region from five percent to nineteen percent in a three-year period. In 2001, attracted by increased sales of efficient washers, Whirlpool entered the efficient washer market and was joined one year later by eleven more manufacturers. Since then, over 135,000 rebates worth over \$10 million dollars have helped to sell over \$100 million worth of ENERGY STAR rated machines. The increase in demand has drawn more manufacturers to the market and increased the number of models that meet ENERGY STAR qualifications. The increase in market penetration has led the US DOE to adopt

²² Promotional efforts may include joint and cooperative advertising with manufacturers or retailers, cooperative ENERGY STAR brand promotion with US DOE or US EPA, and incentive programs.

a new minimum efficiency standard for residential clothes washers beginning in 2007. The standard is equivalent to the initial ENERGY STAR specifications.²³ Once the standard becomes effective, the market is fully transformed and there can be no slipping back in product efficiency when the incentive programs are discontinued. This example demonstrates the carrot and stick relationship that efficiency programs and standards can have.



VII. Options

A. Rely on Incentive Programs: The Legislature could continue to rely entirely on the type of programs available through Efficiency Maine. Although they have only been operational for a short time, the programs have an established administrative structure which can be used to accelerate the adoption of more energy efficient products.

Relying entirely on this approach has a number of limitations:

- The money necessary to implement incentive-type programs for all of the equipment recommended for standards would exceed the amount currently required for existing programs.

²³ Because US DOE has decided to adopt the specification for residential clothes washers, it has not been proposed as a stand-alone state standard. Standards proposed for the commercial clothes washers are identical to the CEE Tier I/ ENERGY STAR™ qualifications upon which the initiative was based.

- Developing a successful “program” to address all the market failures involved in the various appliances would almost certainly require a greater commitment of state resources (e.g. regulatory proceedings, staffing levels, contractor recruitment, product promotion etc.) than would the development of a standard.
- Certain situations, including the “split incentive,” cannot be successfully remedied with incentive programs alone.

B. Adopt a limited set of appliance efficiency standards:

The Legislature could choose to adopt minimum efficiency standards only for the products specified in L.D. 1187 during the 2004 session. These products have been screened and reviewed for over two years. They satisfy the type of social benefits test applied to other conservation programs, they have already been adopted by three states, and eight others are considering them. Adoption of the standards for the products proposed in L.D. 1187 would allow the Commission to eliminate incentives for a limited set of products covered by its Efficiency Maine program and dedicate the funds to products for which the market alone has not achieved the desired level of savings. If the standards are adopted, there will be some administrative costs to develop a compliance and enforcement program. States that have adopted appliance standards are beginning a collaborative effort to minimize these costs. If standards are adopted for Maine, the state should participate in this effort.

C. Adopt standards for the proposed appliances and allow the Commission to adopt standards for products that meet prescribed criteria:

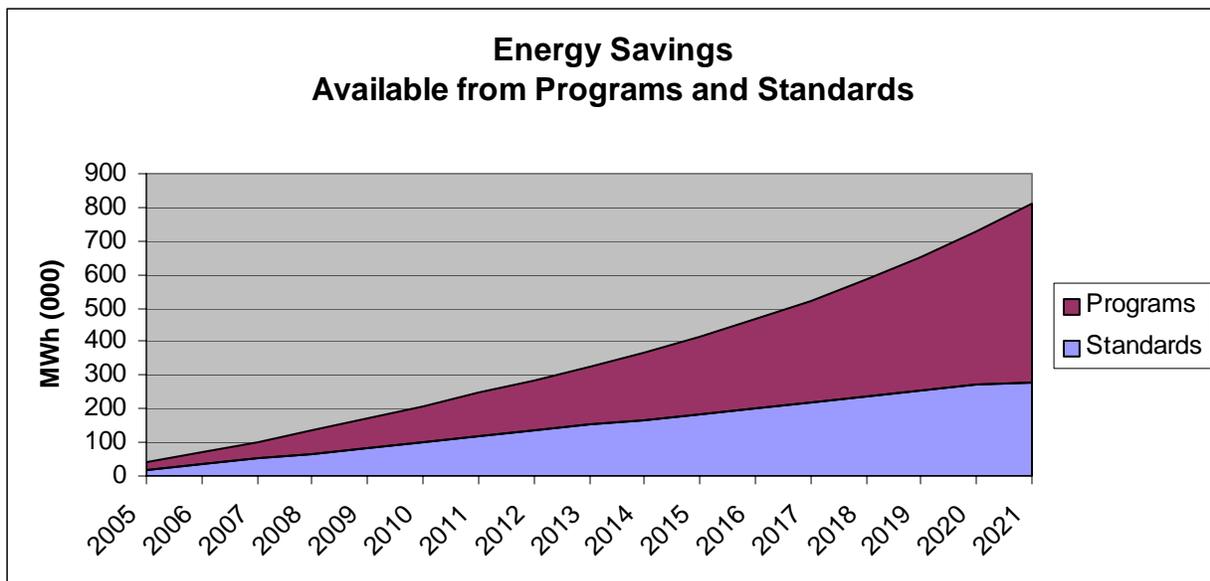
The Legislature could decide to adopt standards for the equipment proposed in L.D. 1187 and allow the Commission discretion to add standards for equipment that meets prescribed criteria. The Commission’s discretion could be limited by requiring it to conduct biennial major substantive rule makings subject to review by the Legislature prior to implementation. The Legislature could maintain ultimate control while allowing the Commission the flexibility to prescribe the specific circumstances and conditions under which standards should be imposed. The primary advantage of this approach would be to give the Legislature the benefit of full Commission review prior to implementation of any new standards.

VIII. Recommendations²⁴

²⁴ We recognize that whether standards should be adopted, either directly by the Legislature or by the Commission pursuant to authority granted by the Legislature, may raise philosophical questions about when it is appropriate for government to restrict the ability of individuals to buy certain products in Maine, even when the restriction will provide the individual with a quantifiable financial benefit and will provide society at large with certain derivative benefits. Although we are comfortable with the imposition of such restrictions when the criteria identified in this Report are met, we claim no special expertise on matters involving the relationship between government and its citizens. Indeed, we think the Legislature is best qualified to define that relationship.

Energy efficiency incentive programs of the kind that the Commission is authorized to provide through 35-A, M.R.S.A §3211-A are best used to focus attention on products that are new to the market and that have a low rate of purchase by consumers, to inform consumers of their benefits, and to improve the transfer of knowledge about the benefits of more efficient products and services to the industries that provide them. The Commission is currently striving to do this through the implementation of seven programs that were chosen after an open process and were designed to capture the greatest energy savings possible within the budget. Despite this, the amount of unrealized, cost effective efficiency potential remains high, and the programs chosen by the Commission may achieve only about one-sixth to one-eighth of the estimated energy savings available.²⁵

The standards that were proposed in L.D. 1187/1261 were for a limited set of products that already have a fairly high rate of market adoption and whose energy savings meet the Commission’s test for cost effectiveness. Most of the products are not currently (and probably should not be) included in the items covered in the Efficiency Maine Programs. Minimum energy efficiency standards for these products would therefore complement the programs offered by the Commission by adding more than sixty percent to the energy savings provided by the conservation programs alone as demonstrated in the chart below.



By eliminating the least efficient models of products for which there are more efficient alternatives that already have a natural or program induced market adoption rate, standards will help the Commission to complete the market transformation portion of its mandate. In addition, because standards are the most effective way to deal with the “split incentive” issue, they will reach a class of products that are not well suited for incentive programs. Therefore we recommend the adoption of minimum efficiency standards for the products listed below. Adoption of the

²⁵ Maine Public Utilities Commission April 4, 2003 Order on Conservation Program Funding, Docket No. 2002-162.

standards should be conditioned on a specific trigger mechanism designed to ensure that the Maine market for the products is not negatively affected.²⁶ Because the justification for standards is driven by factors that include but go beyond purely economic considerations, and because the Commission's focus and expertise lies in the economic realm, we recommend the responsibility for adding new products to the standards list remain with the State's Legislature after a biennial review and consideration by the Commission through the major substantive rule process described in section VII.C above. The products we believe should be included in a standards bill and a brief summation of the rationale for that belief are set forth below.

1. Torchiere lighting fixture. Adopt the standard proposed by L.D. 1187/1261. The standard provides energy savings that have a societal benefit to cost ratio of 3.7 to 1, and energy cost savings to the consumer result in a simple payback of 1.4 years. The availability of alternative products (130) and the number of manufacturers (12) make problems of limited choice unlikely. The halogen based lamps that would be eliminated by the standard are also a known fire hazard. The \$20,000 spent by Efficiency Maine on incentives for this technology could be directed towards other products.
2. Ceiling fan. Adopt the proposed standard. The societal benefit to cost ratio from the resulting energy savings would be 1.8 to 1, and consumers who purchase the more efficient equipment would receive a simple payback of 2.8 years. There are 16 manufacturers who make over 400 product models that would meet or exceed the standard.
3. Commercial clothes washer. Adopt the proposed standard. The societal benefit to cost ratio from the resulting energy savings would be 4.4 to 1 and consumers who purchase the more efficient equipment would receive a simple payback of 1.8 years. There are eight manufacturers who make over 160 product models that would meet or exceed the standard.
4. Commercial refrigerators and freezers. Adopt the proposed standard. The societal benefit to cost ratio from the resulting energy savings would be 2.3 to 1, and consumers who purchase the more efficient equipment would receive a simple payback of 2.7 years. There is no precise count of

²⁶ A variety of mechanisms that would trigger Maine's adoption of an appliance standard have been discussed in prior sessions. For example, adoption could be preconditioned on adoption by a contiguous state, or adoption by at least two New England states, or by some percent of the New England states population.

the number of products that qualify for this standard, but there are 12 manufacturers who make qualifying product models.

5. *Illuminated exit signs.* Adopt the proposed standard. These exit signs are already required for new buildings to comply with Maine's commercial energy code. The societal benefit to cost ratio from the resulting energy savings would be 6 to 1, and consumers who purchase the more efficient equipment would receive a simple payback of 1.7 years. There are 22 manufacturers who make over 400 product models that would meet or exceed the standard.

6. *Large packaged air-conditioning equipment.* Adopt the proposed standard. The societal benefit to cost ratio from the resulting energy savings would be 6.7 to 1, and consumers who purchase the more efficient equipment would receive a simple payback of 2.7 years. There is no precise count of the number of products that qualify for this standard, but there are four manufacturers who make qualifying product models.

7. *Low-voltage dry-type distribution transformer.* Adopt the proposed standard. The societal benefit to cost ratio from the resulting energy savings would be 4.6 to 1, and consumers who purchase the more efficient equipment would receive a simple payback of 2.2 years. There is no precise count of the number of products that qualify for this standard (there are estimated to be hundreds), but there are 23 manufacturers who make qualifying product models.

8. *Traffic signal modules.* Adopt the proposed standard. The societal benefit to cost ratio from the resulting energy savings would be 1.8 to 1, and consumers who purchase the more efficient equipment would receive a simple payback of 3.6 years. There is no precise count of the number of products that qualify for this standard, but there are five manufacturers who make qualifying product models. Adoption of the standard will have little immediate effect on consumers. The Commission's traffic signal replacement program has already upgraded all traffic signals in Maine.

9. *Unit heater.* Adopt the proposed standard. There is no societal benefit to cost ratio estimate available for this standard but consumers who purchase the more efficient equipment would receive a simple payback of 3.7 years. There is no precise count of the number of products that qualify for this standard, but there are six manufacturers who make qualifying product models.

10. *Digital cable box.* Do not adopt the proposed standard. Although proposed elsewhere, no state has adopted this standard. The standard was not adopted by California, Maryland, or Connecticut. It is unlikely that enough the remaining states where the standard has been proposed will adopt it to achieve a 20% of the population trigger.

IX. Implementation Issues

The Resolve further directs the Commission to investigate the feasibility and design of a program that would establish additional energy efficiency standards. The details of program design would best be addressed through a Commission rulemaking process similar to the way in which the design for the Conservation Programs was accomplished. The Legislature should direct the Commission to develop such rules with specific guidelines including, at a minimum:

1. That the standards include only products that are not federally pre-empted.
2. That the Commission work with other states which have adopted the standards, such as California and Connecticut, to develop the necessary labeling and certification programs and enforcement mechanisms.
3. That the Commission certify that the threshold, or trigger mechanism, has been attained before beginning standard implementation and enforcement.

The Commission would then apply those guidelines to specific products through major substantive rules, with the Legislature having the ultimate authority to approve, reject, or alter what the Commission has decided.

X. Conclusion

The products for which standards are recommended here are also the subject of pending legislation in all of the other New England states and New York, making it unlikely that Maine will need to go it alone on the imposition of the standards. Something this report does not recommend.²⁷ The tradition of ratepayer-funded efficiency programs in this region has already increased consumer demand and market acceptance for many of the products, providing the opportunity to raise the floor for their minimum efficiency. Other of these products suffer from the split incentive situation where the purchaser of the equipment considers only the purchase cost and not the lifetime energy costs. This is a situation in which neither incentive programs nor market forces can prompt more efficient behavior. The economic and environmental benefits accruing from the adoption of the standards are well documented and persuasive. For all of these reasons, we believe legislation enacting these standards and recommendations be adopted.

²⁷ It is possible that a state which chooses not to adopt minimum standards in a market region where the standards have been adopted by others, could serve as a dumping ground for inefficient products.