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Executive Summary

Energy efficiency standards are one of the lowest-cost, highest-benefit energy policies that states and the federal government have ever adopted. Efficiency standards save consumers and businesses money and provide significant energy system and environmental benefits by prohibiting the sale or installation of products that waste energy. California first initiated energy efficiency standards in the early 1970s, followed closely by New York in 1976. During the 1980s, other states including Massachusetts and Connecticut joined the movement, prompting manufacturers to seek an alternative to the emerging patchwork of state standards. Congressional enactment of the National Appliance Energy Conservation Act of 1987 establishing the federal standards program was the result of an explicit bargain among state governments, efficiency and environmental advocates and product manufacturers. Manufacturers agreed to a national standards program while states and energy efficiency advocates agreed to federal pre-emption of state standards for covered products. Since then, technological progress and the proliferation of new energy-using products have created a wealth of new opportunities for energy savings with standards. The federal standards program has failed to keep up with these new opportunities. It addresses only products specified in federal law (last amended in 1992), and the administrative process for keeping even those standards up-to-date has proven slow and unreliable. Recognizing the enormous opportunity to save energy – and realize the related benefits of saving residents and businesses money and reducing environmental impacts – states are providing initiative on standards. California has once again led the way by adopting new state-based energy efficiency standards for a range of products. Other states are considering their own standards.

For the Northeast, a densely populated region with significant environmental challenges and a relatively aged energy infrastructure, standards are an especially powerful and sensible policy tool to support energy reliability, economic development and environmental quality. In light of these potential benefits and the recent prominence of energy policy both nationally and in the states, Northeast Energy Efficiency Partnerships (NEEP) launched the Northeast States Energy Efficiency Standards Project in June of 2001, with the following goals:

- ✍ Examine the marketplace and technical opportunities for new or updated energy efficiency standards for 15 common products (see list on following page);
- ✍ Estimate the prospective energy, economic and environmental benefits of such standards;
- ✍ Recommend strategies for Northeast states to capture those benefits.

The analysis conducted for this project showed that efficiency standards have very large and highly cost-effective economic, energy and environmental benefits for states in the Northeast. For the region as a whole, new or updated energy efficiency standards can, by 2020:

- ✍ Save business and residential energy consumers nearly \$27 billion.
- ✍ Reduce projected growth in annual electricity consumption by over 24 percent (over 42,000 gigawatt hours (GWh)) – an amount equal to 85 percent of total year electricity use in Massachusetts in 1999.
- ✍ Reduce projected growth in peak demand by over 16,500 megawatts (MW), equivalent to the output of thirty-three 500-MW power plants.

- ~~✍~~ Reduce projected growth in peak demand in the New England, New York and Mid-Atlantic (PJM) Power Pools by nearly 27 percent, 37 percent and 55 percent, respectively.
- ~~✍~~ Reduce annual carbon emissions by over six million metric tons (MMT), an amount equal to 44 percent of the non-transportation emissions reductions required to achieve the recently adopted goal of the New England Governors Conference of reducing carbon emissions to 1990 levels by 2020.
- ~~✍~~ Reduce annual nitrogen oxide (NO_x) emissions by over 6,900 metric tons, an amount equal to removing 300,000 cars from the road, or one car for every 75 households in the region.
- ~~✍~~ Reduce annual sulfur dioxide (SO₂) emissions by over 27,300 metric tons.

Product Efficiency Standards Offering Large Potential Benefits for the Northeast	
Residential Products	Commercial Building Equipment/Products
Furnace fans	Unit and duct heaters
Torchiere lamps	Packaged air conditioners and heat pumps (<20 tons)
Ceiling fans	Refrigerated beverage vending machines
Consumer electronics (standby power)	Dry-type building transformers
Central air conditioners and heat pumps	Commercial refrigerators and freezers (including reach-in beverage merchandisers)
	Traffic signals
	Exit signs
	Commercial (coin-operated) clothes washers
	Ice makers
	Large packaged air conditioners (>20 tons)

Several paths exist for achieving these savings, paths that must be pursued simultaneously in order for the states in the Northeast to realize the full measure of these economic, energy and environmental benefits. This report outlines 10 actions intended to serve as a roadmap for Northeast states to advance energy efficiency standards over the next several years. We recommend that Northeast states:

- 1. Adopt state-based energy efficiency standards for 10 products:** States should enact new product energy efficiency standards and establish administrative authority to set additional energy efficiency standards. This study identifies 10 products ready for state-based minimum efficiency standards in the near term (see Table 3.1 on page 20).
- 2. Upgrade commercial building codes to include minimum efficiency standards for four identified products:** Commercial building codes should incorporate prescriptive energy efficiency requirements (standards) for certain commercial building equipment types. Four of the products identified as near term targets for new state standards also lend themselves to incorporation into a state's commercial building code (see Table 3.1).
- 3. Establish state procurement specifications for targeted products:** States should adopt minimum efficiency specifications for state procurement purposes for each of the products targeted for state or federal standards. Procurement specifications set at the efficiency level of proposed standards help pave the way for future state and/or federal standards by establishing minimum efficiency targets and helping to build market share for energy efficient products.
- 4. Continue to expand the market for energy efficient products targeted for new standards through existing energy efficiency programs:** Ratepayer and state-funded energy efficiency market transformation programs facilitate standard setting by building product availability and consumer acceptance, lowering costs through increased product competition and capturing valuable information to inform standard setting. While programs introduce and build the market for high efficiency products, standards take the market transformation process to its conclusion.
- 5. Plan for and take credit for the benefits of new standards:** Environmental and energy policymakers should actively work at the federal and state levels to support the adoption of minimum efficiency standards that help achieve their respective goals. State and regional environmental, energy and economic planners should, likewise, recognize and incorporate the impacts and benefits of increased efficiency standards in their plans, projections and policy recommendations. As states adopt and implement standards, they should also track how their energy, environmental and economic benefits contribute to the achievement of other policy goals.
- 6. Coordinate state-level standards development, implementation and enforcement across the region:** States should work together to establish consistent standards in order to maximize their effectiveness, facilitate regional implementation and enforcement and minimize burdens on manufacturers and distributors. States should work to establish cooperative education and enforcement programs for new standards and prescriptive code requirements.
- 7. Support strong new national standards in federal legislation:** Congress is considering setting new standards or directing the U.S. Department of Energy (DOE) to set standards for

several of the products evaluated for this report. Northeast states should support inclusion of these standards in pending federal legislation as a path for achieving state-specific savings.

- 8. Engage in the federal standard-setting administrative process:** State governments and other interested parties in the Northeast should participate in federal rulemakings for national appliance standards. The priority federal rulemakings for 2002 to 2004 concerning commercial central air conditioners and heat pumps and residential furnaces and boilers are especially important for Northeast states.
- 9. Set standards stronger than the federal government when absolutely necessary:** States should pursue waivers from federal pre-emption when the federal standards process clearly fails to yield timely standards that cost-effectively save significant amounts of energy for Northeast states.
- 10. Coordinate, communicate and spread the word:** Northeast Energy Efficiency Partnerships (NEEP) and the Appliance Standards Awareness Project (ASAP) will continue to build awareness of the opportunity for new appliance and equipment efficiency standards, continue to provide technical and analytical support related to standards and create a regular forum for sharing information on progress and opportunities related to state and federal standards.

I. Introduction: Energy Policy, Energy Efficiency and Standards

Energy Policy: Prominent Once Again

For the past several years at the national and state levels, energy policy – especially power system reliability and energy security – has been prominent in a way not seen since the 1970s. California's electricity crisis, which began to unfold during the summer of 2000, demonstrated that restructured electricity markets have not absolved policymakers from responsibility for ensuring reliable electric systems and energy services at affordable prices. Volatile natural gas and oil prices seen since 1999 have further focused public and policymaker attention on energy availability and affordability. The 2000 Presidential election campaign featured calls for a new national energy policy and prompted vigorous debate over its composition – debate that reached the floor of the U.S. Senate as we finalized this paper. Finally, heightened concern over the vulnerability of the nation's electricity and natural gas supply infrastructure to terrorist attack and the prospects of oil supply disruptions resulting from geopolitical instability have reinforced this renewed attention to energy policy issues.

Energy Efficiency: An Increasingly Recognized Resource

Many policy responses to these energy problems recognize that energy efficiency is a valuable, 100 percent domestic energy resource that saves businesses and residential consumers money, helps to reduce energy price volatility, reduces peak electricity demand that can trigger reliability problems and helps states meet their environmental and air quality goals. While growth in electricity use puts pressure on the supply infrastructure to keep up, increasing energy efficiency enables growth in the economy without proportionate growth in energy use – just as increasing worker productivity fuels economic growth without requiring longer working hours. Following are some recent policy statements or initiatives that recognize the importance of energy efficiency :

- ✍* The Coalition of Northeastern Governors in July 2001 issued an Energy Policy Statement that included the declaration that “Conservation, energy efficiency, and demand management are viable and cost-effective strategies for meeting energy needs, and are necessary components of a balanced national energy strategy.”
- ✍* The New England Council, a meta-Chamber of Commerce for the region, issued a “Report and Agenda for Action” in August 2001 crediting government, business and other leaders with policies that kept growth in energy consumption to 25 percent between 1980 and 1999, even as the region's economy more than doubled, and calling for more of the same in the future.
- ✍* The state of New York in January 2001 renewed and nearly doubled funding for its very successful statewide energy efficiency program.
- ✍* The New Hampshire legislature funded the position of State Energy Manager included in Gov. Jeanne Shaheen's FY 2002 budget request. It tasked the Governor's Office of Energy and Community Services with preparing a 10-year state energy plan that includes “an analysis of the efficient use of energy resources and conservation initiatives.”
- ✍* In Vermont, Gov. Howard Dean's Energy Initiative, issued in December 2001, calls on citizens, businesses, utilities and government to work together in order to meet all growth in demand for power over the next decade through a combination of efficiency, renewable energy generation and increased use of combined heat and power applications.

~~///~~ The Northwest Power Planning Council (a four-state agency serving Oregon, Washington, Idaho and Montana) in January 2002 called for its member states to generate 300 new megawatts of conservation over the next four years – explicitly comparing the amount to the output of a new natural gas-fired power plant.

Energy Efficiency Standards: A Powerful Tool Just Right for the Times

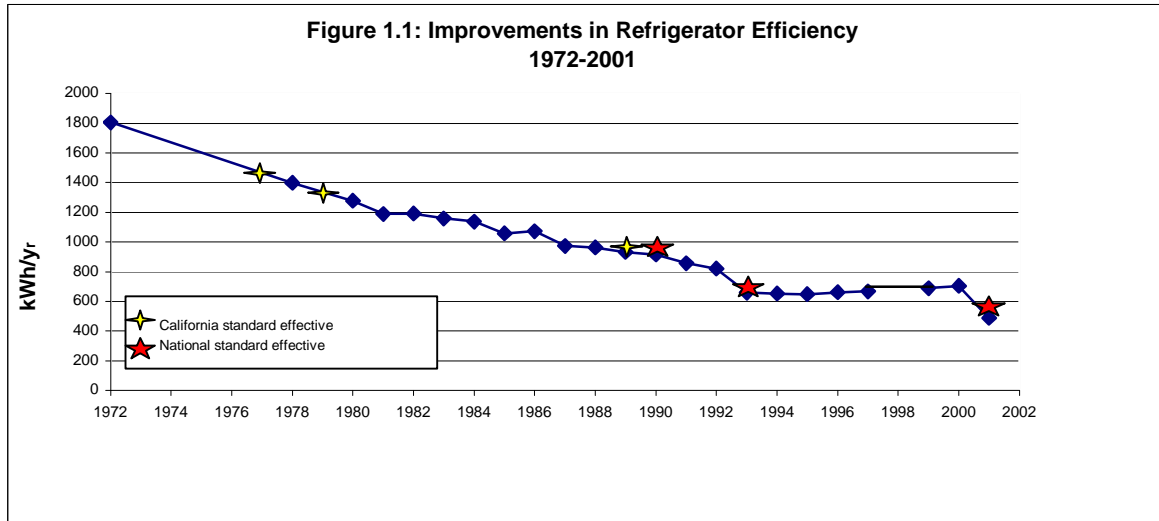
Almost 30 years have passed since efficiency standards were first conceived as an energy policy tool – predating the first national energy crisis of 1973 – and many policy responses to the recent energy-related problems have included improved standards as an important element. For example, early in that state’s electricity crisis the California legislature directed the California Energy Commission to expedite its rulemaking to set new efficiency standards. At the national level, the Bush administration’s official National Energy Policy, issued in May 2001, endorsed standards – in principle. New York Gov. George Pataki, by Executive Order, directed state agencies to achieve substantial reductions in building energy use by 2010 and comply with new state-based energy efficient procurement standards. Maryland’s recent report from the Governor’s Task Force on Energy Policy makes a clarion call for stronger efforts to improve energy efficiency in the state and endorses codes and standards as an effective activity to help achieve that goal. Bills already have been introduced in the legislatures of Maryland (SB 540), Connecticut (Raised Bill 341) and Rhode Island (H.B. 7313), each proposing adoption of efficiency standards for 10 products.

It’s not surprising that energy efficiency standards have such strong appeal – they are one of the lowest-cost, highest-benefit energy policies that states and the federal government have ever adopted. Standards save consumers and businesses money even as they deliver other valuable energy system and environmental benefits, by prohibiting the sale or installation of products that waste energy. The manifold benefits of standards include:

- ~~///~~ Increased disposable income for consumers;
- ~~///~~ Better operating margins and enhanced competitiveness for businesses;
- ~~///~~ Economic stimulus, as utility customers spend or invest bill savings more productively and locally;
- ~~///~~ Improved energy system reliability and greater energy security;
- ~~///~~ Environmental benefits (reduced power plant emissions) as “icing on the cake.”

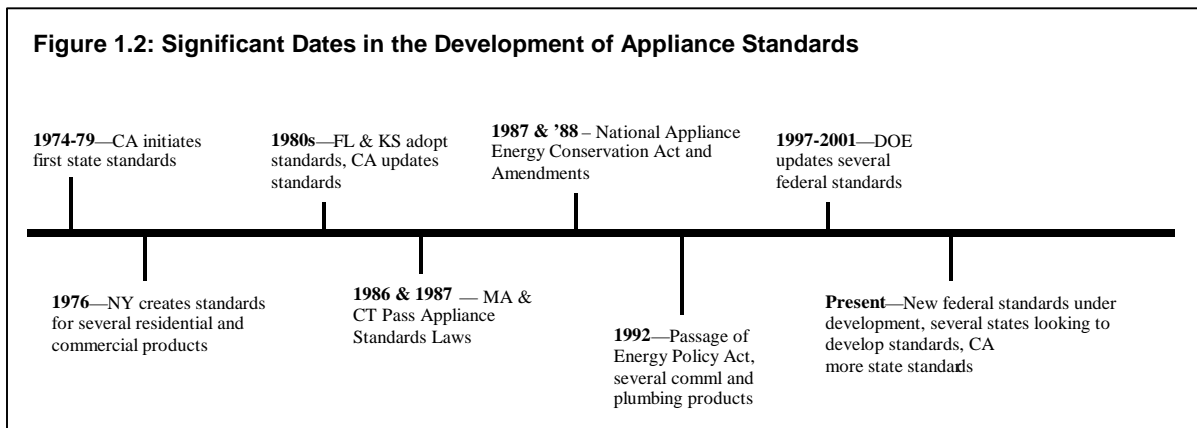
Standards remove the most inefficient products from the market while retaining a broad array of consumer choice. They can be implemented in either of two ways: as a law regulating the efficiency of products sold or offered for sale, or as a prescriptive requirement in a building code.

One of the best examples of the successful use of a standard is the household refrigerator. This appliance was one of the first products to be subject to efficiency standards (first state, then federal), which have been revised six times since 1976. As a result, a refrigerator purchased in 2001 will use about one-fourth of the energy required by a model purchased in the early 1970s (Geller and Goldstein, 1998). Figure 1.1 demonstrates the dramatic improvement in refrigerator efficiency since 1972. Standards for other products have also produced significant, if not always so dramatic, increases in efficiency, including those for residential clothes washers, water heaters and central air conditioners and heat pumps.



Source: Appliance Standards Awareness Project

Because they apply to all products sold or installed in a market, standards can have huge impacts on energy use. As of 2000, standards had already cut U.S. electricity use by 2.5 percent, reduced national peak electricity demand by 20,000 megawatts, saved U.S. energy users more than \$50 billion and cut U.S. carbon emissions from fossil fuel use by nearly 2 percent (Geller, Kubo and Nadel, 2001). Over the next 20 years, these savings will grow by a factor of roughly three as consumers and businesses replace worn-out products with products that comply with current standards and recently approved standards take effect.¹ Figure 1.2 shows the timeline of the development of state and federal energy efficiency standards over three decades.



Source: Appliance Standards Awareness Project

¹ NOTE: this a very conservative estimate since it includes only the savings from the national program, i.e. since 1987.

Efficiency Standards: Originally a State-Level Policy

Standards hold a place on the long list of policies and programs that originated in the “laboratories of democracy,” the states. California led the way, with enactment in 1974 under then Gov. Ronald Reagan, of the *State Energy Resources Conservation and Development Act* as part of its policy to “reduce wasteful, uneconomical and unnecessary uses of energy, thereby assuring statewide environmental, public safety and land use goals” (California Energy Commission, 1983). In 1976, the state of New York created standards for several residential and commercial products. During the 1980s, Massachusetts, Connecticut and Rhode Island were among those (along with Florida, Kansas and Arizona) that followed in enacting energy efficiency standards for certain products.

This proliferation of state-level standards led manufacturers to support the 1987 enactment of the National Appliance Energy Conservation Act (NAECA) and the creation of the federal energy efficiency standards program administered by the U.S. Department of Energy (DOE). Thus the federal standards program is the result of an explicit bargain among state governments, efficiency and environmental advocates and product manufacturers, in which manufacturers agreed to a national standards program while states and energy efficiency advocates agreed to federal pre-emption of state standards for covered products (Nadel and Goldstein, 1996). Table 1.1 provides an overview of the scope of the federal standards program created by NAECA in 1987 and the NAECA Amendments of 1988, and expanded by Title I of the Energy Policy Act (EPA) of 1992.²

Included in the National Appliance Energy Conservation Act of 1987 and its 1988 amendments	
Refrigerators and refrigerator-freezers	Clothes washers
Freezers	Clothes dryers
Room air conditioners	Dishwashers
Central air conditioners and heat pumps	Ranges and ovens
Residential furnaces and boilers	Pool heaters
Residential water heaters	Fluorescent lamp ballasts
Direct-fired space heaters	Televisions ³
Added in the Energy Policy Act of 1992	
Fluorescent lamps	Showerheads
Incandescent reflector lamps	Faucets and aerators
Electric motors (1-200 horsepower)	Toilets
Packaged air conditioners and heat pumps	Distribution transformers ³
Commercial furnaces and boilers	Small electric motors (<1 horsepower) ³
Commercial water heaters	High-intensity discharge lamps ³

² For an excellent detailed history of the development of state and federal standards, see Steve Nadel and David Goldstein, *Appliance and Equipment Efficiency Standards: History, Impacts, Current Status, and Future Directions*. Washington, D.C.: American Council for an Energy Efficient Economy, 1996.

³ The legislation did not set specific standards, but instructed DOE to investigate whether standards are technically feasible and economically justified and to set standards where those criteria are met. DOE has yet to set standards for any of these products.

Efficiency Standards: States Are Retaking the Initiative – With Good Reason

Several factors in addition to the national policy context encourage states to again provide the initiative on efficiency standards.

First and foremost, technological progress and the proliferation of new energy using products over the past decade have created a wealth of new opportunities for energy savings with standards. Early in 2001, the American Council for an Energy-Efficient Economy (ACEEE) announced a project to assess the potential for new appliance and equipment standards. ACEEE's September 2001 report assessed technical and market developments for more than two dozen products and identified enormous and extraordinarily cost-effective potential benefits.⁴ (See Table 1.2) The analysis commissioned for this report, based on ACEEE's national analysis, examined standards for 15 products thought to hold the greatest immediate benefit for Northeast states.

Second, but no less significant, most of the products identified as prime candidates for new standards are *not* within the scope of the federal standards program. There is no mandate for the federal government to address these opportunities – nor is there any legal barrier to states enacting standards that regulate the sale, offering for sale, or installation of most of these products within their borders. Even for products already subject to federal standards, federal law includes a provision allowing states to apply for a waiver from federal pre-emption, which California is pursuing for both residential and commercial central air conditioners.

Residential Products	Commercial Building Equipment/Products
Furnace fans	Unit and duct heaters
Torchiere light fixtures	Packaged air conditioners and heat pumps (< 20 tons)
Ceiling fans	Refrigerated beverage vending machines
Consumer electronics (standby power)	Dry-type building transformers
Central air conditioners and heat pumps	Commercial refrigerators and freezers (including reach-in beverage merchandisers)
	Traffic signals
	Exit signs
	Commercial (coin-operated) clothes washers
	Ice makers
	Large packaged air conditioners (> 20 tons)

⁴ See Steve Nadel and Toru Kubo, *Opportunities for New Appliance and Equipment Efficiency Standards: Energy and Economic Savings Beyond Current Standards Programs*, American Council for an Energy Efficient Economy, September 2001.

Third, although the federal standards program has generated substantial cost savings for the nation, the pace at which standards were adopted was far slower than expected and the number of rulemakings successfully concluded far fewer. The benefits of those standards are, correspondingly, much less than what could have been achieved had they been issued in accordance with legislative deadlines. While the DOE recently updated four standards – one for fluorescent ballasts in 2000 and three in early 2001 (for water heaters, clothes washers, and central air conditioners and heat pumps) – those standards (which will take effect between 2004 and 2007) were issued from five to eight years late. In 2002, 2003 and 2004 DOE will work on two priority rulemakings of particular interest to the Northeast states, one for residential furnaces and boilers and another addressing commercial air conditioners and heat pumps. The DOE will solicit comments on its preliminary analysis and candidate standard levels in late 2002. The schedule calls for publication of proposed new standards in 2003 and the final new standards in 2004. The commercial AC standard would go into effect in 2007 and the furnace and boiler standards in 2012⁵. (Appendix C provides further details of these rulemakings.) The furnace standard was legally due in 1994 and, if completed on time, would have been in effect this year.

Finally, the federal standards-setting process has proven vulnerable to shifts in the political landscape. Shortly after assuming office, the Bush Administration announced that one of the last standards issued by the Clinton Administration – the one that would deliver the largest savings (central air conditioners and heat pumps) – would be rescinded and revised. In federal court, Attorneys General from Maine, Vermont, New York, Connecticut, New Jersey, California and Nevada, the Natural Resources Defense Council, the Consumer Federation of America and the Public Utility Law Project are jointly contesting the administration's plan.

These factors have prompted states to seize the initiative on product efficiency standards. As mentioned, California has long led the way on efficiency standards and is setting the pace again. The expedited rulemaking mandated by California Assembly Bill 970 (California Public Resources Code section 25552) recently reached its conclusion with the California Energy Commission's unanimous adoption on Feb. 6, 2002 of a new set of efficiency standards. The effective date for revised regulations regarding enforcement, reporting of data and labeling of appliances is July 1, 2002. They include new or upgraded standards for residential central air conditioners, commercial air conditioners, refrigerated beverage vending machines, commercial refrigerators and freezers, exit signs, traffic signals, torchiere lighting fixtures, commercial clothes washers and distribution transformers. Most of these new minimum efficiency standards become effective on March 1, 2003.⁶ Oregon is contemplating state building code requirements for central air conditioners and joining California in its request for a waiver from federal pre-emption. Several states have set standards for commercial building transformers by including a minimum efficiency requirement in their commercial building codes. In 1997, Massachusetts adopted a new efficiency standard for building transformers in its electric utility restructuring legislation. In New York, pursuant to legislation and an Executive Order that Gov. George Pataki issued in 2000, the New York State Energy Research and Development Authority (NYSERDA) is establishing minimum efficiency levels that will apply to all state purchases of products in a broad range.

⁵ This is an extraordinarily long lead time for a new standard. Typically, federal standards provide a three-year period between adoption and implementation, but the national law provides a longer period for this product as a result of the negotiated agreement between manufacturers and advocates that made the first standards law possible.

⁶ Details on the CEC's recent rulemaking can found on the Commission's Web site at www.energy.ca.gov.

The Northeast States Energy Efficiency Standards Project

The opportunity to significantly increase energy efficiency and provide cost savings prompted Northeast Energy Efficiency Partnerships (NEEP) to launch the Northeast States Energy Efficiency Standards Project in June of 2001, with the following goals:

- ✍ Examine the marketplace and technical opportunities for new or updated standards in the Northeast;
- ✍ Estimate the prospective energy, economic and environmental benefits; and
- ✍ Recommend strategies for advancing the standards agenda in Northeast states.

NEEP convened an Advisory Committee comprising representatives of the region's states and stakeholder organizations, including state energy and environmental agencies, electric utilities and national and regional nonprofit groups. The Advisory Committee first met in September 2001 with participation from 15 agencies and organizations from nine states (Massachusetts, Connecticut, Rhode Island, New Hampshire, Vermont, New York, New Jersey, Pennsylvania and Maryland) and assistance from the Appliance Standards Awareness Project (ASAP). With the guidance of the Advisory Committee, NEEP commissioned ACEEE to generate a Northeast-specific analysis based on its recently completed national assessment of the costs and benefits of new minimum appliance and equipment standards. Its purpose was to generate state-level projections of these benefits, through a methodology validated by representatives from across the region and based on valid inputs and assumptions for the individual states. In addition to guiding the analysis, the Advisory Committee provided insights to assess regional and state policy contexts and other circumstances defining the prospects for Northeast state governments embracing new minimum appliance and equipment efficiency standards.

Sections II and III of this paper explain the results of the quantitative analysis and assessment of the policy environment; make the case that states must not ignore the substantial untapped benefits of energy efficiency standards; and conclude with recommendations that states reap these benefits as a means of achieving their energy policy, economic development and environmental policy goals.

II. Why Northeast States Should Act Now on Energy Efficiency Standards

Efficiency Standards: Significant Stakes for Northeast States

The Northeast is a densely populated region with significant environmental challenges and a relatively aged energy infrastructure. Here, energy efficiency standards are an especially powerful and sensible policy tool to support energy reliability, economic development and environmental quality. They cost governments very little and have high impact. Standards save consumers and businesses money and provide large energy system and environmental benefits to society as a whole by prohibiting the sale or installation of products that waste energy. This makes it all the more important that Northeast states act to ensure that this policy tool is used to its maximum effect for the region. The potential benefits of energy efficiency standards, be they federal or state standards, are so important that they must not go unrealized.

State Leadership: Crucial to Real Progress on Standards

While a comprehensive and vigorously executed federal efficiency standards program would be ideal, both the record and circumstances described in the previous section indicate it is not likely to materialize in the foreseeable future. Pressure from states is crucial to ensuring that the federal standards program achieves as much as possible, but states can and should do much on their own. The fact that, for the first time in years, both the administration and bipartisan groups in Congress are interested in extending the federal standards program to new products is partly a function of the standards-setting activity in California and the prospect of other states acting on standards. As noted, states spearheaded the challenge to the federal rollback of air conditioner standards. The House energy bill passed during the summer of 2001 (H.R. 4) would direct DOE to set standards for a few of the products analyzed for this report (consumer electronics, ceiling fans and vending machines). The energy bill crafted by Senate Majority Leader Tom Daschle and Energy Committee Chairman Jeff Bingaman (S. 517) that passed the full Senate just before this report was finalized, includes standards or requires a DOE rulemaking to set a standard for nine of the products analyzed for this report (see Table 3.1). California just issued new standards for eight of those products. Most of the standards in the Senate bill enjoy bipartisan support. However, these standards constitute just one element of a controversial comprehensive energy bill with uncertain chances of enactment. Regardless of any federal legislation, it is important that states provide leadership to ensure timely and effective minimum efficiency standards.

Efficiency Standards: Large Economic Benefits for Northeast States

Especially for Northeast states, which generally have significantly higher retail energy prices than the national average, energy efficiency standards have proven to be one of the lowest-cost, highest-benefit energy policies that states and the federal government have ever adopted. Our project's analysis of the potential benefits for Northeast states of new or updated standards shows that this holds true for the future as well (Table 2.1). The direct net economic benefits to businesses and consumers through the year 2020 (lifetime discounted energy bill savings over and above the incremental costs of efficient/proposed standard-compliant products) aggregated by state:

New York	\$9.9 Billion
Pennsylvania	\$5 Billion
New Jersey	\$3.5 Billion
Maryland	\$2.6 Billion
Massachusetts	\$2.6 Billion
Connecticut	\$1.5 Billion
New Hampshire	\$538 Million
Maine	\$517 Million
Rhode Island	\$439 Million
Vermont	\$247 Million
Total Benefits for the 10-State Region	>\$26.7 Billion

***Aggregate retail energy bill savings minus incremental cost of efficient products**

The Northeast-specific analysis that yielded these numbers was developed with regional and state-specific inputs and assumptions regarding technology and product market share, current incremental cost for efficient products, projected power pool avoided costs and emissions factors, and current state-specific average retail rates.⁷ All of the proposed standards are readily available efficiencies; most of the proposed standards are from a current standard or program, such as the state of California, the federal ENERGY STAR⁷ Program, the Federal Energy Management Program (FEMP), the National Electrical Manufacturers Association (NEMA) or the Consortium for Energy Efficiency (CEE).

The amounts in Table 2.1 represent the projected aggregate net energy bill savings of consumers and businesses in each state. They are the combined increase in disposable income of consumers and operating margins of businesses that would be experienced throughout the region if energy efficiency standards were in place for all 15 products by 2005 or 2006. However, studies have shown that the economic stimulus or “multiplier effect” of energy bill savings from energy efficiency can significantly compound those savings and provide a substantial boost to local and state economies. For example, a recent study by the Rand Corporation found that because of improvements to energy intensity (energy use per dollar of gross state product or GSP) implemented since 1977, the Massachusetts economy in 1997 grew between \$1,664 and \$2,562 per capita more than it would have without those improvements. Similarly, a February 1997 study by ACEEE concerning energy efficiency and economic development in New York, New Jersey and Pennsylvania found that the diversion of spending on energy bills away from relatively low labor-intensive energy-supply sectors (oil refining and electric and gas utilities) and toward more labor-intensive sectors such as metal durables, construction, services, finance and retail trade would

⁷ Appendix A provides documentation of the assumptions for baseline product energy use, efficient product (proposed standard-compliant) energy use, efficient product incremental cost, and a detailed explanation of the other underlying assumptions and the methodology used to calculate the regional and state-specific benefits of the proposed efficiency standards discussed in this report.

produce significant increases in states' GSPs and the region's combined GSP, employment and wage and salary compensation, and a drop in the unemployment rate. ⁸

Efficiency Standards: Large Benefits for Individual Consumers and Businesses

All the energy efficiency standards proposed and discussed in this paper are highly cost-effective for the individual purchaser, whether a residential consumer or a commercial enterprise. The benefit-cost ratios for the proposed standards range from 2.3 to over 10 to 1, while simple payback periods for most of the products are less than two years. Most of the proposed standards are from a current standard or program, such as the state of California, the federal ENERGY STAR⁷ and Federal Energy Management Program (FEMP), the National Electrical Manufacturers Association (NEMA), or the Consortium for Energy Efficiency (CEE). Tables 2.2 and 2.3 (which follow on Pages 11 and 12) provide an overview of the products, the model for the proposed standard and the figures for a single product that support the cost-effectiveness analyses.

Two additional points further strengthen the case for these standards from the perspective of the individual consumer or business:

First, the benefit-cost ratios of these efficiency standards, while impressive, are probably understated. This is because the incremental costs used in the analysis are today's higher cost of products that meet these efficiency levels – while we propose that standards go into effect several years from now. It is likely that further market development and manufacturing economies of scale will only reduce that incremental cost over the next several years.

Second, even when benefit-cost ratios are large, standards are the only way to overcome the “split incentive” market failure that permits large-scale waste of energy throughout the economy. For several of these energy-using products, the purchase decision is often made under the circumstance of the split incentive, a widespread market failure for energy efficiency in which one entity purchases the product but another entity pays the energy bill. The purchasing entity often chooses the least expensive model, without regard for its energy efficiency. Examples include cable television boxes, which cable companies purchase in bulk and install in their customers' homes, and refrigerated beverage vending machines, which beverage distributors place in institutional and commercial properties. In these and similar instances an efficiency standard for what can be sold or installed is the only way to ensure that it will be reasonably energy-efficient.

⁸ Although calculation of these indirect or multiplier benefits was beyond the scope of the analysis conducted for this report, summary discussions of several recent reports that examined this phenomenon are attached as Appendix R.

PRODUCT	Model for proposed standard	Incremental cost	Annual economic savings at 10 cents/kWh	Cost effectiveness		Average product life (years)
		\$\$		Benefit/cost ratio	Simple payback (years)	
Ceiling fans	ENERGY STAR ⁷ level	\$40	\$18	4.0	2.2	10
Residential central AC and heat pumps (cooling only)	DOE Final rule of 21 Jan. 2001	\$168	\$61	2.3	2.75	18
Residential central AC/heat pump (cooling + heating)	DOE Final rule of 21 Jan. 2001	\$166	\$143	9.2	1.2	18
Furnace fans (heating only)	Best current systems	\$100	\$65	11.7	1.5	20
Furnace fans (heating + cooling)	Best current systems	\$100	\$90	9.7	1.1	20
Set-top boxes	ENERGY STAR ⁷ level	\$5	\$7	8.0	< 1	5
Torchiere lamps	CA standard (<190 watts)	\$40	\$21	6.5	1.9	10

⁹ Provided for illustrative purposes using electric rate of \$0.10/kWh and natural gas rate of \$0.60/therm. Benefit/cost ratios shown are the overall regional figures from the Northeast analysis described in this paper and were not calculated using these illustrative rates.

PRODUCT	Model for proposed standard	Incremental cost	Annual economic savings at 10 cents/kWh	Cost effectiveness		Average product life (years)
		\$\$		Benefit/cost ratio	Simple payback (years)	
Packaged commercial AC (<20 tons)	CEE Tier II	\$612	\$368	4.0	1.7	15
Large commercial packaged AC (>20 tons)	CEE Tier II	\$1,813	\$843	3.1	2.2	15
Commercial clothes washers (electric water heating & drying)	CA standard	\$139	\$135	6.5	1.1	8
Commercial clothes washers (gas water heating & drying)	CA standard	\$139	\$59 ¹⁰	2.9	2.4	8
Dry-type commercial transformers	NEMA standard TP-1	\$9/kVa	\$1.6/kVa	2.55	5.6	30
Exit signs	ENERGY STAR ⁷	\$30	\$22	10.5	1.4	30
Food service refrigerators	CA standard	\$115	\$154	9.6	< 1	9
Ice makers	DOE Federal Energy Management Program	\$54	\$67	4.2	< 1	8.5
Traffic signals	CA standard	\$125	\$43	3.6	2.9	15
Unit and duct heaters	Power or induced draft performance	\$425	\$270 ¹⁰	6.9	1.6	18
Refrigerated beverage vending machines – lighting only	CA standard	\$25	\$33	6.4	< 1	8.5
Beverage merchandisers	CA standard	\$166	\$173	7.2	< 1	8.5

¹⁰ At 60 cents per therm.

Efficiency Standards: Cost-Effective for Businesses and Homeowners

The following list illustrates how the energy bill savings from standard-compliant products would accrue to various parties:

1) Apartment building owner with 12 commercial clothes washers in laundry room (gas water heating and drying):

Incremental cost of one energy efficient clothes washer	\$ 139
Annual economic savings of one unit @ \$0.60/therm	\$ 59.25
Cumulative energy bill savings over eight-year life of one product, discounted at five percent/year from purchase	\$ 399
Total net reduced operating costs/increased operating margin over eight years.	\$ 3,120

2) Auto repair shop with 10 unit heaters in work bays:

Incremental cost of one energy efficient unit heater	\$ 425
Annual economic savings of one unit @ \$0.60/therm	\$ 270
Cumulative energy bill savings over 18-year life of one product, discounted at five percent/year from purchase	\$ 3,255
Total net reduced operating costs/increased operating margin over the 18 years	\$ 28,300

3) Single-family home with central A/C, three ceiling fans and two torchiere lamps:

Total incremental cost of energy efficient products	\$ 368
Total annual economic savings @ \$0.10/kWh	\$ 157
Total cumulative energy bill savings over 10 years, discounted at five percent/year from purchase	\$ 1260
Total net increase in household income over the 10 years	\$ 892

4) City or town with 500 traffic signals:

Incremental cost of one energy efficient traffic signal	\$ 125
Annual economic savings of one unit @ \$0.10/kWh	\$ 43
Cumulative energy bill savings over 15-year life of one product, discounted at five percent/year from purchase	\$ 461
Total net reduced operating expenses over the 15 years	\$ 168,000

5) Commercial office building owner with 100 exit signs:

Incremental cost of one energy efficient exit sign	\$ 30
Annual economic savings of one unit @ \$0.10/kWh	\$ 22
Cumulative energy bill savings over 30-year life of one product, discounted at five percent/year from purchase	\$ 346
Total net reduced operating expenses/increased operating margin over the 30 years	\$ 31,556

Efficiency Standards: Especially Important to Low-Income Households

Some express concern that energy efficiency standards will negatively affect low-income consumers, because they may increase the purchase price of the products subject to standards. However, consumers purchase energy-using products for the services they provide – such as lighting, cooling or entertainment. Their true *cost*, then, is the cost to both purchase *and* operate them over their useful lives. The RAND Corporation study documented that low-income households derive the greatest benefit from reduced energy expenditures (Appendix R). While low-income households spend less on energy than higher income households, the burden of energy costs as a percentage of their income is much greater. Efficiency standards ensure that manufacturers incorporate technological improvements throughout their product lines, and not reserve them for only high-end models, thus benefiting all segments of society. Furthermore, in some cases low-income consumers won't face the increased purchase price of more efficient products, but will benefit from the reduced expense of operating them. This is because low-income consumers often rent their homes and find themselves on the losing end of the split incentive market failure described earlier – a landlord makes purchasing decisions about appliances, heating and air-conditioning equipment, lighting fixtures, windows, etc., while the tenant pays the monthly utility bill. The RAND study makes the point that efficiency standards thus provide two services: (1) they directly reduce monthly energy costs, thereby increasing the disposable income of the low-income population by a greater percentage than that of high-income households, and (2) they improve quality of life by improving the performance of appliances and equipment and, as a result, improve the comfort of homes.

Efficiency Standards: A Key Policy to Help Meet Climate Change and Air Quality Goals

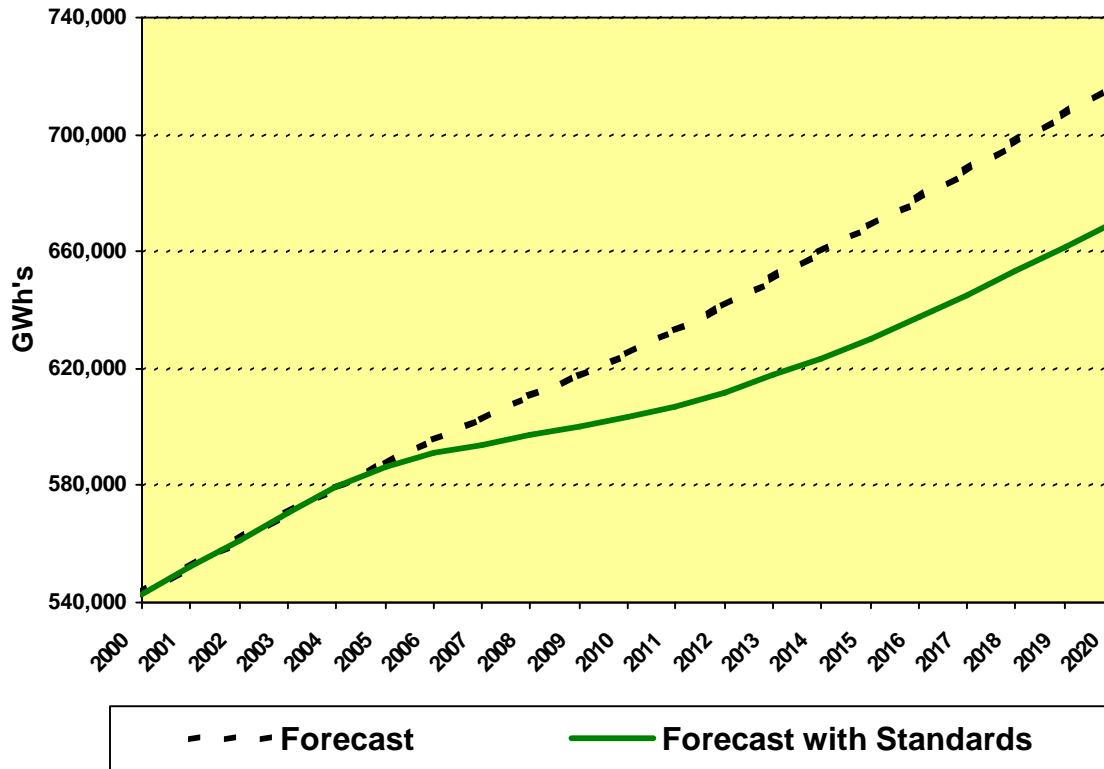
In response to growing concerns about the role of greenhouse gases in global warming and related climate change, the states of Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania and Vermont have undertaken or developed climate change action plans to identify cost-effective policies and programs to reduce carbon emissions. Minimum energy efficiency standards offer these states a ready, cost-effective policy to significantly reduce carbon emissions by using products that are available today. By 2020, the adoption of the recommended minimum energy efficiency standards could achieve a significant portion of the non-transportation greenhouse gas emission reductions needed to reduce carbon emission levels in Northeast states to 1990 levels. The analysis for this project found that new or updated efficiency standards for 15 products could reduce the projected electric energy requirement for the region in 2020 by more than 24 percent, or approximately 42 gigawatt hours (GWh), which is equal to 85 percent of the electricity consumption of the Commonwealth of Massachusetts in 1999. Further, this reduction in the electric energy requirement for the region would provide 44 percent of the non-transportation greenhouse gas emission reductions needed to achieve the recently adopted goal of the New England Governor's Conference to reduce New England carbon emissions to 1990 levels by 2020.

In addition, adoption of minimum energy efficiency standards could assist air regulators in Northeast states to reduce emissions of nitrogen oxide (NO_x) and sulfur dioxide (SO₂), which are currently regulated under a cap and trade system. Projected pollutant emission reductions from reduced electric energy requirements in 2020 (e.g., from the adoption of new or updated efficiency standards for the 15 products reviewed in this study) include:

- ?? NO_x emission reductions in 2020 of over 6,900 metric tons, an amount equal to removing 300,000 cars from the road, or one car from every 75 households in the region.

?? SO₂ emissions reductions in 2020 of over 27,300 metric tons.

Projected Regional Electricity Requirement With and Without New/Updated Efficiency Standards

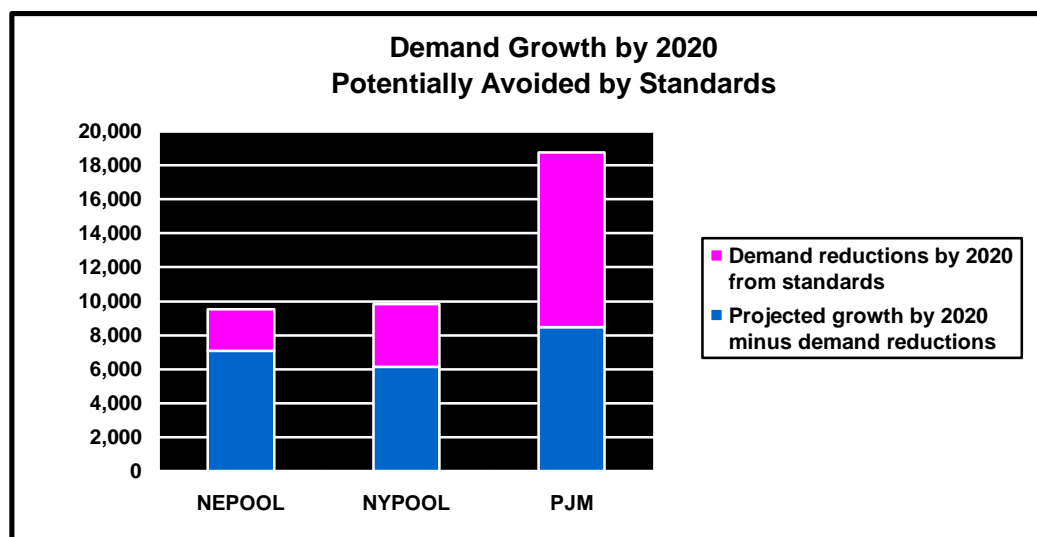


Under the current emission cap and trade program, these emission reductions in power generation could be realized by Northeast states through the adoption of minimum energy efficiency standards if air regulators lowered emission caps by these amounts.

Appendices G through Q provide region-wide and state-by-state summaries of the energy savings, demand reductions, economic savings and pollutant emissions reductions each state could achieve if each were to enact energy efficiency standards for the 15 recommended products.

Efficiency Standards: Enhancement for Energy System Reliability and Security

As in other parts of the country, the Northeast has featured much debate over the past several years about how to address brisk growth in energy consumption and summer peak demand, while ensuring a reliable electricity supply and infrastructure to support the region's economy. Much of this discussion has focused on building new or upgrading existing transmission lines, gas pipelines and fossil fuel-fired plants. The potential reduction in peak demand by 2020 from efficiency standards – over 16,500 megawatts (MW) – is equivalent to the output of 33 power plants producing 500 MW each. A supply-dominated approach to assuring reliability will be unnecessarily expensive, increase the region's vulnerability to potentially volatile fossil fuel prices and be less reliable than a more balanced approach that includes energy efficiency standards.¹¹ By reducing demand across the entire region, efficiency standards could serve as an extremely low-cost way of coping with overall demand growth as well as more acute problems such as load pockets and transmission bottlenecks. Standards could make a significant contribution to restraining projected demand growth in each of the region's three power pools, potentially allowing postponement or avoidance of a significant fraction of new investment in new generation plants as well as transmission and distribution system upgrades. As a long-term energy system planning tool, efficiency standards – which save businesses and consumers money – are preferable to the financial expense and social and political friction that often attends the siting of power plants and transmission lines. Restraining demand growth through the adoption of end-use efficiency standards would “buy time” to allow the regulator process to make the right choices about additions to the grid. It would also allow policymakers, when called upon to approve those supply-side upgrades and additions, to make a stronger case to the public that the available options for mitigating demand growth have been exploited.



¹¹ For a thorough and informative examination of this topic, see Richard Cowart, *Efficient Reliability: The Critical Role of Demand-side Resources in Power Systems and Markets*. Montpelier, VT: Regulatory Assistance Project, June 2001.

Enactment of energy efficiency standards throughout the 10-state region could reduce peak demand in the year 2020 in each of its three power pools by the following amounts:

- ✍ In the New England Power Pool (NEPOOL); by about 2,550 MW – 27 percent of projected growth.
- ✍ In the New York Power Pool (NYPOOL); nearly 3,700 MW – 37 percent of projected growth.
- ✍ In the Pennsylvania-New Jersey-Maryland Power Pool (PJM); nearly 10,300 MW – 55 percent of projected growth.

Efficiency Standards: Northeast States Are Well-Positioned to Lead

Northeast states are in a position to once again provide leadership on energy efficiency standards.

First, ratepayer-funded energy efficiency programs have successfully increased consumer demand for and the market presence of high efficiency products across the region. The success of these programs in expanding the market for higher efficiency products has raised the ceiling for efficiency in the range of products available in the marketplace. This has created the opportunity and provides support for raising the floor of minimum efficiency in products offered for sale or installed within a state. Northeast policymakers for the most part have recognized the complementary relationship between voluntary programs and standards, whereby standards can effectively lock in the marketplace response to programs, allowing program funds to address new opportunities.

In the past, ratepayer-funded programs nationwide played a major role in building market share for efficient air conditioners and refrigerators in advance of new standards. More recently, such programs in the Northeast helped increase availability and market share of energy efficient clothes washers, thus enabling adoption of the recent upgrade to the national standard.

Several of the products identified as candidates for new standards already receive market development support from programs in the region. Some states and utilities organized torchiere swaps or other programs to advance the market for energy efficient torchieres and funded programs to promote high efficiency residential central air conditioners, packaged commercial-grade HVAC equipment, exit signs and dry-type distribution transformers. The increasing availability and market share of these products supports the ability to establish new minimum energy efficiency standards.

In addition, residential and commercial building codes, respected state-level mechanisms that hold great potential for the creation of strong standards, are well established throughout the Northeast. For six years, the Northeast Regional Energy Codes Project has successfully engaged states to work cooperatively to assess and act on opportunities to improve building energy code requirements and implementation. As a result, they have adopted increasingly similar code requirements and have influenced national model energy code development.

In most states, building energy codes effectively regulate the efficiency of installed equipment during the construction process. Since energy codes have existing enforcement provisions, they can be an effective mechanism for implementing certain new equipment standards. States update building energy codes every few years through a formal process for adding new requirements deemed reasonable and cost-effective. Unlike statewide equipment standards that regulate all sales of regulated products, however, building energy codes apply to the equipment to be installed in new construction projects, additions, some renovations, and, in certain cases, building repairs. Due to this limited applicability, energy codes would not be an effective method for setting standards for torchiere lamps, consumer electronics, refrigerated vending machines or traffic signals.

Energy codes would be a good fit for products such as residential air conditioners and heat pumps, commercial HVAC equipment, exit signs and dry-type transformers. In fact, dry-type transformers are a requirement in the updated Massachusetts Energy Code that became effective in the summer of 2001. The recently adopted upgrade to the New York State Energy Code also includes a requirement for dry-type transformers.

III. Seizing the Opportunity: Recommendations for a Multi-Path Approach

Clearly, new energy efficiency standards present a significant opportunity for the region. The states must pursue several paths simultaneously to realize the full energy, environmental and economic benefits described in Section II. For most of the 15 products analyzed for this project, no national standards exist, leaving the field clear for individual states to adopt standards in legislation or building codes. For a few products, updating existing national standards provides the most promising path for success. In addition to standards, voluntary education and incentive programs and state procurement requirements can help capture a portion of the potential savings identified. Although such programs do not have the comprehensive effect of standards, they can play a crucial role in paving the way for adoption of standards in future years. Table 3.1 summarizes the most promising pathways for establishing new standards for each of the products evaluated. Often, more than one path offers potential for success.

Following the table is a set of recommendations that address the multiple paths that can lead states to the savings we've identified. Capturing the full measure of these benefits will require the support and actions of state legislatures, state agencies, utility regulators, environmental and energy efficiency advocates, and administrators of ratepayer-funded efficiency programs. Each recommendation may apply to one or more sets of actors in each state. States will have varying capacity and willingness to pursue each of the recommendations, and it is unlikely that any state can act on all the recommendations immediately. However, these recommendations serve as a roadmap for standards work in the Northeast over the next several years. Implementing these recommendations in a coordinated fashion across the region will increase the likelihood of success measured in terms of energy, economic and environmental benefits realized throughout the region.

Table 3.1: Potential Paths for New Efficiency Standards

Product	Adopt state standards in the near term	Include in state building code	Federal standard already exists; support upgrade	Support inclusion in pending federal energy legislation	Consider for future state standards
ENERGY STAR ⁷ Ceiling fans				X ¹²	X
ENERGY STAR ⁷ Commercial AC & heat pumps (<20 tons)			X		
ENERGY STAR ⁷ Commercial clothes washers	X				
Commercial unit and duct heaters	X	X		X ¹²	
ENERGY STAR ⁷ Consumer electronics (standby power)	X ¹³			X ¹²	X ¹³
ENERGY STAR ⁷ Dry-type building transformers	X	X		X ¹⁴	
ENERGY STAR ⁷ Exit signs	X	X		X ¹⁴	
Food service refrigerators				X ¹²	X
Furnace fans			X ¹⁵		
Ice makers	X				
Large packaged commercial AC (>20 tons)	X	X			
Refrigerated beverage vending machines	X ¹⁶			X ¹²	X ¹⁶
ENERGY STAR ⁷ Residential central AC and heat pumps			X ¹⁷		
ENERGY STAR ⁷ Torchiere lamps	X			X ¹⁴	
ENERGY STAR ⁷ Traffic signals	X			X ¹⁴	

¹² Pending U.S. Senate legislation calls for a DOE rulemaking to set a future standard.

¹³ ASAP's 2002 model legislation includes standards for set top boxes, a subset of the consumer electronics category. Future standards could cover other consumer electronics' standby power use.

¹⁴ Pending U.S. Senate legislation sets a specific standard.

¹⁵ Fans are a component in furnaces, which are federally regulated. The ongoing DOE furnace rulemaking, scheduled for completion in 2004, offers an opportunity to address fan energy use.

¹⁶ ASAP's 2002 model legislation includes a lighting efficiency requirement for vending machines. Future standards should be set based on overall efficiency performance pending adoption of a new test method by ASHRAE.

¹⁷ DOE set a strong new standard (SEER 13) in January 2001 but the Bush administration has proposed to roll back this standard to a weaker level. The Attorneys General of seven states and citizen groups have challenged this rollback in court and pending Congressional legislation would prevent the rollback. California has adopted the SEER 13 standard.

RECOMMENDATIONS

1. Adopt state-based energy efficiency standards for 10 products.

States should enact new product energy efficiency standards and establish administrative authority to set additional energy efficiency standards. Among the 15 products examined for this project, 10 lend themselves to near-term adoption of energy standards at the state level. These 10 products account for about one-third of the total energy savings opportunity identified. They are:

Residential products:

- ~~///~~ Set top boxes, i.e., cable TV tuners, satellite TV receivers, etc.¹⁸
- ~~///~~ Torchiere light fixtures

Commercial products:

- ~~///~~ Clothes washers
- ~~///~~ Unit and duct heaters
- ~~///~~ Dry-type building transformers
- ~~///~~ Exit signs
- ~~///~~ Ice makers
- ~~///~~ Large packaged air conditioners (>20 tons)
- ~~///~~ Refrigerated beverage vending machines
- ~~///~~ Traffic signals

For each of the above products, the key conditions for setting a standard have been met:

- ~~///~~ Large, cost-effective energy savings were identified;
- ~~///~~ A reliable method to test product energy performance exists¹⁹ and;
- ~~///~~ Products meeting the proposed standard level are ready available²⁰available.

States cannot afford to rely on Congress or the DOE to put in place appropriate energy efficiency standards. Even if Congress were to require new standards (an uncertain prospect as of this report's press time), DOE has an extremely poor track record of meeting Congressional deadlines for setting new standards. Furthermore, if Congress were to establish new standards, state standards would remain in effect until DOE actually promulgated national standards. Finally, by acting now, states not only lock in savings for their residents and businesses, but also help create momentum for eventual adoption of new federal standards.

Resources for Action:

¹⁸ Set top boxes are a subset of the consumer electronics product category.

¹⁹ Appendix E provides a reference for the energy performance testing methods for the products recommended herein for standards adoption in the near-term.

²⁰ By "readily available" we mean that products that meet the standard can be obtained from multiple manufacturers. Appendix F provides current information on compliant product availability.

- ✍✍ Model legislation included in Appendix D provides legislative language for setting new appliance and equipment standards. Updates to the model legislation can be found at <http://www.standardsasap.org/>.
- ✍✍ In early 2002, the California Energy Commission completed its new Title 20 appliance standards, as the legislature required in AB 970 passed in 2000. Visit <http://www.energy.ca.gov/appliances> for details on the standards and their benefits.
- ✍✍ Bills introduced in Maryland (SB540), Connecticut (Raised Bill No. 431) and Rhode Island (H7313) in 2002 offer useful models. See www.standardsASAP.org for the latest information on standards states have adopted.

2. Upgrade commercial building energy codes to include minimum efficiency standards for four identified products.

Building energy codes offer Northeast states another way to set and implement energy efficiency standards. Four of the products identified as near term targets for new state standards, which also provide a significant portion of the commercial energy savings identified in this report, lend themselves to incorporation into a state's commercial building code. (See Table 3.1) These include:

- ✍✍ Commercial unit and duct heaters
- ✍✍ Dry-type building transformers
- ✍✍ Exit signs
- ✍✍ Large packaged commercial A/C (>20 tons)

While new legislation is typically needed to authorize standards that govern the sale or offering for sale of appliances and equipment, most states have commercial building energy codes that already regulate minimum efficiency performance at the point of installation. In most cases, updating building energy codes does not require legislative action.

Northeast states should consider setting code requirements for each of these product types during their next commercial energy code upgrade. States that do not have regular upgrade processes should initiate a review of their codes to consider these products and set a schedule for period upgrades.

Many state codes are based on the International Energy Conservation Code (IECC), a model code that receives periodic upgrades. Northeast states should initiate and support proposals to include strong code requirements for relevant covered products in the next upgrade to the IECC.²¹

Resources for Action:

- ✍✍ Massachusetts, Minnesota and New York have adopted building code requirements for distribution transformers based on the National Electrical Manufacturers Association (NEMA) standard TP-1. NEMA's Web site is www.nema.org.

²¹ Four of the products included in this study fall within the scope of the IECC. The 2002 supplement to the IECC includes the exit sign standard recommended in this report. A proposal to set the IECC standard for dry-type distribution transformers at the level recommended by this report is under consideration in 2002. States should support this proposal. Proposals to strengthen the unit heater and commercial packaged air conditioner (over 20 tons) requirements must be submitted by April 2003 for the next IECC upgrade cycle.

- ☞☞ California also adopted building code requirements (Title 24) for many of the products for which it set standards in Title 20, thus using an existing mechanism for enforcing the state's requirements for improved efficiency: www.energy.ca.gov.
- ☞☞ The Building Codes Assistance Project provides information on state code activities: www.bcap.org. Information concerning the IECC is available at www.intlcode.org.
- ☞☞ NEEP's Northeast Regional Building Energy Codes Project assists states with energy code updates and options for improving code implementation. Information and assistance is available from NEEP Building Energy Codes Project Director Dave Abrey at dabrey@neep.org or by visiting www.neep.org.

3. Establish state procurement specifications for targeted products.

States should adopt minimum efficiency specifications for state procurement of each of the products targeted for state or federal standards. Procurement specifications set at the efficiency level of proposed standards help pave the way for future state and/or federal standards by establishing minimum efficiency targets and helping to build the market share of energy efficient products.

States should follow New York's lead in establishing procurement specifications for energy using products. Procurement specifications are a form of standards, distinct in that they apply to a narrow set of consumers: the state itself and entities that purchase off of state contracts. In many cases, they guide state agencies, universities, hospitals and public housing.

Procurement specifications provide two crucial functions. First, they help build availability and market share for energy efficient products, just like the ratepayer- or state-funded programs we discuss in recommendation #5. Second, they set an efficiency target. Often this target becomes the logical choice for future standards.

All of the products evaluated for this report are good candidates for state procurement requirements. States should first establish procurement guidelines for products most frequently purchased on their contracts.

Resources for Action:

- ☞☞ New York will begin by setting procurement specifications for 18 products, including three evaluated for this report (residential central air conditioners and heat pumps, commercial air conditioners and furnaces, including their fans). When it has completed the 18 procurement specifications, the state will consider establishing specifications for other products. To learn more about the New York procurement standards program, contact Priscilla Richards of the New York State Energy Research and Development Authority (NYSERDA) pjr@nyserda.org.
- ☞☞ The Federal Energy Management Program sets procurement guidelines for federal purchases: <http://www.eren.doe.gov/femp>.

4. Continue to expand the market for energy efficient products targeted for new standards through existing energy efficiency programs.

Ratepayer- and state-funded energy efficiency market transformation programs facilitate standard setting by building product availability and consumer acceptance, lowering costs through increased product competition and capturing valuable information to inform standard setting. While programs introduce and build the market for high efficiency products, standards take the market transformation process to its conclusion. With the adoption of new minimum efficiency standards for a product, the market is

completely transformed to the new efficiency level. Scarce energy efficiency program dollars can then be applied to the next step up in product efficiency or to address new efficiency opportunities with other products. For example, the successful introduction of high efficiency clothes washers through combined regional and national programs led to an agreement with DOE in April 2001 to establish new federal minimum efficiency standards for clothes washers beginning in 2004.

Many of the products targeted for standards in this report have already benefited from substantial investments of ratepayer and government funds. The federal ENERGY STAR® program promotes six of the 10 products recommended for state adoption of new minimum efficiency standards. In many cases, energy efficiency programs have invested in building product availability and market share by educating consumers and, sometimes, subsidizing purchases. For example, program administrators in New York, New England and New Jersey have participated in NEEP initiatives to build the market availability and awareness of energy efficient torchieres²² and residential and commercial air conditioners²³. Programs in New York, Vermont, Massachusetts, Connecticut and Rhode Island have introduced municipalities to LED traffic signals. Commercial new construction programs have promoted high efficiency exit signs and building transformers²⁴.

While the savings opportunities associated with each of the 15 products make them good candidates for program support, three products that could be candidates for a future round of standards are particularly worth supporting – furnace fans, ceiling fans and food service refrigerators. These products have not had the market development benefits of energy efficiency program support and are not ready for new energy efficiency standards²⁵. Program support now can pave the way for future product efficiency standards.

Resources for Action:

- ✍️ The ENERGY STAR® programs of EPA and DOE (www.energystar.gov), as well as initiatives of NEEP (www.neep.org) and the Consortium for Energy Efficiency (<http://www.ceel.org/>), offer templates for programs that relate to many of the products evaluated in this report.
- ✍️ Two of the most noteworthy energy efficiency success stories demonstrate the complimentary relationship between standards and voluntary programs. For both refrigerators and clothes washers, government- and utility-funded R&D helped develop breakthrough technologies, voluntary programs built market share and, eventually, standards locked in the technical advancements for the benefit of all consumers. See <http://www.ceel.org/resrc/facts/rwsh-fx.php3> for details on the clothes washer example.

²² In 2001, regional retailer training and support to stock and promote ENERGY STAR® lighting products reached over 1,045 retail locations throughout New England (excluding ME) in 2001.

²³ In 2001, high efficiency packaged HVAC units were six percent of all HVAC equipment sales in Northeast states (excluding ME, PA, MD and DE) - nearly double the national average. In NJ, a two-year statewide program raised the sale of high efficiency residential central air conditioners (SEER 13 or better) to 20 percent in 2001, nearly three times the national average.

²⁴ Incentives to promote ENERGY STAR® exit signs and building transformers in building new construction, remodeling and renovation are offered by National Grid in MA, NH and RI; by NYSERDA and LIPA in New York, by Efficiency Vermont in Vermont; by Northeast Utilities in CT, MA and NH; by the electric utilities in NJ.

²⁵ Through a coordinated regional effort, energy efficiency programs in New England and New York offer incentives and retailer recruitment for ENERGY STAR® ceiling fans.

5. Plan for and take credit for the benefits of new standards.

At the national, regional and state levels, environmental and energy policymakers should actively work to support the adoption of minimum efficiency standards that help achieve their respective goals. State and regional environmental, energy and economic planners should, likewise, recognize and incorporate the impacts and benefits of increased efficiency standards in their plans, projections and policy recommendations. As they adopt and implement standards, states should track how their energy, environmental and economic benefits contribute to the achievement of other policy goals.

For example, environmental regulators and advocates should anticipate that new standards would help states meet air quality and greenhouse gas reduction goals. Adoption of new efficiency standards can help offset the economic effects of imposing more stringent emissions standards on older, more polluting power plants that do not meet new source environmental standards.

Energy planners, including state energy offices, utility commissions and the regional power pools and transmission planners, should consider the impact of new standards on meeting (or curbing) electric demand growth in the Northeast. Adoption of minimum efficiency standards holds the potential to defer the need for new or upgraded transmission and distribution facilities.

Resources for Action:

- ☞☞ Energy planners in the Pacific Northwest recently committed to meet 300 MW of projected demand growth with new energy measures; see <http://www.nwppc.org/>. Energy planners in the Northeast could apply this model where standards could meet hundreds of megawatts of projected demand growth.
- ☞☞ The New England Governors' Conference and the State of New Jersey have committed to reduce global warming pollution (i.e., greenhouse gas emissions). A portion of these reductions could be met with energy efficiency standards.

6. Coordinate state efficiency standard development, implementation and enforcement across the region.

States should work together to establish consistent standards to maximize their effectiveness, to facilitate regional implementation and enforcement and to minimize burdens on manufacturers and distributors. States should work to establish cooperative education and enforcement programs for new standards and prescriptive code requirements. For example, manufacturer reporting of the results of energy performance testing for products subject to state efficiency standards provides the primary strategy for standards enforcement. The California Energy Commission (CEC) maintains a database of such product reporting to support its energy efficiency standards program. The CEC database is available to help other states with product reporting. A cooperative effort such as this can reduce the cost and burden to states and manufacturers.

NEEP is available to assist cooperative efforts to advance and reduce the costs of efficiency standards development and administration through its *Northeast States Energy Efficiency Standards Project*. The *Northeast Regional Building Energy Codes Project* coordinates state building energy code development and administration.

Resources for Action:

- ☞☞☞ For more information about the efficiency standards product performance database of the CEC, contact Michael Martin at <mailto:mmartin@energy.state.ca.gov>.

✂✂ For information about the NEEP *Northeast States Energy Efficiency Standards Project*, contact Jim O'Reilly at joreilly@neep.org. To learn about the NEEP Regional Building Energy Codes Project contact David Abrey at dabrey@neep.org

7. Support strong new national standards in federal legislation.

Congress is considering setting new standards or directing DOE to set standards for as many as 10 of the products evaluated for this report. Northeast states should support inclusion of these standards in pending federal legislation as a path for achieving state-specific savings.

Federal energy legislation under consideration in 2002 could provide a significant portion of the benefits identified in this report. The five specific standards, covering dry-type distribution transformers, exit signs, torchiere lighting fixtures, traffic signals and residential central air conditioners and heat pumps, already written into proposed legislation would deliver 29 percent of the identified energy savings. This legislation would also direct DOE to develop standards for another five products (consumer electronics, ceiling fans, refrigerated beverage vending machines, unit heaters and commercial refrigerators and freezers) with the potential to capture another 40 percent of the estimated energy savings. States and others in the Northeast should actively support inclusion of the standards in any final national energy bill.

Resources for Action:

✂✂ For the status of national standards legislation, contact the Appliance Standards Awareness Project at standardsASAP@msn.com or visit <http://www.standardsasap.org>

8. Engage in the federal standard-setting administrative process.

State governments and other interested parties in the Northeast should participate in federal rulemakings for national appliance standards. The priority rulemakings for 2002 to 2004 concerning commercial central air conditioners and heat pumps and residential furnaces and boilers are especially important for the Northeast states.

Northeast states have a strong interest in seeing the federal government set appropriately strong standards for each of these products. Federal standards set at the levels recommended in this report (see Appendix A) for each of these products would achieve nearly 30 percent²⁶ of the energy savings identified in this study.

States should engage in the federal standard-setting process in two ways. First, those with technical staff should participate directly by reviewing and providing input on DOE's technical analyses. In many cases, ratepayer-funded energy efficiency programs provide technical and cost information to such analyses. DOE's analyses become the basis for deciding the appropriate standard level; Northeast states must ensure that this work reflects their regional market conditions and concerns. Second, states should engage at the political level by submitting comments in support of new efficiency standards. State officials can influence decision-makers in Washington and help provide the necessary information to counterbalance criticism of new standards. See Appendix C for details on pending DOE rulemakings.

Resources For Action:

²⁶ The savings potential from these three product classes is actually larger than estimated here. We chose just to focus on the electrical component of these standards for the analysis. However, the furnace and boiler standards also address thermal efficiency and a substantial increase is probably cost effective for Northeastern states.

☞☞The next opportunity for formal comments on national standards will arrive in early 2003 when DOE publishes its Advanced Notices of Proposed Rulemakings for furnaces and boilers and commercial air conditioners and heat pumps. Visit <http://www.standardsasap.org/> for the latest on these rulemakings or contact: standardsASAP@msn.com.

☞☞The DOE's Web site, http://www.eren.doe.gov/buildings/codes_standards, provides technical documents related to each national rulemaking.

9. Set standards stronger than the federal government when absolutely necessary.

States should pursue waivers from federal pre-emption when the federal standards process clearly fails to yield timely standards that cost-effectively save significant amounts of energy for Northeast states.

Because the federal government's record for setting standards is inconsistent, states should retain the option of pursuing their own standards for federally regulated products. Northeast states will have to watch progress on federal standards under development. If DOE fails to set adequately strong standards or make adequate progress toward such standards, states should set their own standards (or building code requirements). The products for which states should consider seeking a waiver from federal pre-emption include:

- ? ? Residential central air conditioner and heat pumps;
- ? ? Commercial central air conditioners (<20 tons) and;
- ? ? Residential furnaces and boilers.

Resources for Action

☞☞California is the first state to adopt standards more stringent than the federal government. During the spring of 2002, the CEC intends to prepare its request for exemption from federal pre-emption. For more details, contact Michael Martin at the CEC at <mailto:mmartin@energy.state.ca.us>.

10. Coordinate, communicate and spread the word.

The Appliance Standards Awareness Project (ASAP) and Northeast Energy Efficiency Partnerships (NEEP) will continue to build awareness of the opportunity for new appliance and equipment efficiency standards, continue to provide technical and analytical support related to standards and create a regular forum for sharing information on progress and opportunities related to state and federal standards.

Achieving the savings identified in this report will require coordinated action over a considerable period of time. ASAP and NEEP will provide coordination, information sharing and analytic support to help states and others act on these recommendations. As needed, ASAP and NEEP also can coordinate standards work in the Northeast with that of other regions of the country

REFERENCES

Geller, H. and D. Goldstein. 1998. "Equipment Efficiency Standards: Mitigating Global Climate Change at a Profit." Washington, D.C.: ACEEE and San Francisco, CA: Natural Resources Defense Council.

Geller, H., T. Kubo, and S. Nadel. 2001. "Overall Savings from Federal Appliance and Equipment Efficiency Standards." Washington, D.C. American Council for an Energy Efficient Economy (ACEEE).

California Energy Commission. 1983. California's Appliance Standards: A Historical Review, Analysis, and Recommendations, Staff Report. Sacramento, CA: California Energy Commission.

Nadel, S. and D. Goldstein. 1996. *Appliance and Equipment Efficiency Standards: History, Impacts, Current Status, and Future Directions*. Washington, D.C.: ACEEE.