# Economically Achievable Energy Efficiency Potential in New England

**Prepared**

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**For**

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## Introduction

The idea of energy efficiency as a means to both secure energy resources and reduce harmful emissions from power plants is becoming more prominent in New England. All six New England states – sometimes working in a coordinated fashion with each other, sometimes focusing more within their own borders – have developed effective energy efficiency programs that have made this region a national leader in energy efficiency.

Even with this successful track record of energy efficiency implementation, however, a recent forecast by the Independent System Operator for New England (ISO-New England) indicates that annual energy demand in New England will increase annually at a rate of 1.2 percent, creating an energy requirement of 147,300 gigawatt-hours (gWh) by the year 2013.[1]

At the same time, policymakers across the region are facing several energy-related challenges:

- √ Economics – The cost of fossil fuels continues to rise, and along with it, the subsequent cost in electricity generated by oil and natural gas, as well as the primary costs of natural gas and heating oil themselves. In addition, with standard offer or rate caps expiring in several states, customers – especially the residential sector – will likely see increases in their electricity bills as default service rates take effect for all customers.
- √ Environment – New England states have committed to reducing emissions of greenhouse gases to 1990 levels by 2010 regionally, as part of the New England Governor's Conference and Eastern Canadian Premier Climate Change Action Plan, as well as through individual state efforts.
- √ Electric transmission and distribution – The most congested transmission and distribution area in the entire country exists in Southwest Connecticut, according to the Federal Energy Regulatory Commission, with Greater Boston and Northwest Vermont also facing Transmission and Distribution (T&D) congestion issues.
- √ Energy security – Global political instability and other socioeconomic have made it apparent that continuing to rely on the importation of fossil fuels for our electricity puts our nation and New England at greater and greater risk.

Given these factors, it is important to examine what economically achievable potential for energy efficiency savings exists in New England, and how this potential can address key regional and state policy goals and objectives. Northeast Energy Efficiency Partnerships (NEEP) commissioned an analysis to answer these and other key questions:

- How much energy efficiency is needed to offset forecasted load growth?

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[1] Forecasted energy requirement (energy load growth) is from ISO-NE's 2004 CELT Report. Note that NEEP subtracted out the demand-side management (DSM) impact from ISO-NE's forecast for a few reasons: the forecasts submitted by regulated utilities to ISO-NE are inconsistent (some report annual savings, some cumulative, covering different years, different assumptions about future savings levels based on funding for programs, and some don't report at all). Further, ISO-NE's forecast includes interruptible/curtailable load programs while NEEP's analysis looked only at energy efficiency savings from end-use measures. The ISO-NE forecast without DSM is only about 1 percent less than its forecast with DSM in 2013 – not a significant difference. Comparatively, NEEP's estimate of savings for continuing existing EE programs to 2013 results in a 3 percent reduction in forecasted load growth.

- What are the major “reservoirs” of energy efficiency potential?
- How can New England capture this energy efficiency potential?
- What are the costs versus benefits of this energy efficiency potential?
- How much can energy efficiency help reduce power plant emissions and help meet regional climate change goals?
- How much can energy efficiency help reduce natural gas demand for electric power generation in New England?

NEEP commissioned Optimal Energy of Bristol, Vt. to conduct an analysis of existing studies on energy efficiency potential and to extrapolate this data to determine the economically achievable energy efficiency potential of the region as a whole over a 10-year period. The results of this analysis helps to answer the questions above, as well as to give New England policymakers some options for attaining those solutions.

## What is Economically Achievable Energy Efficiency Potential in New England?

Energy efficiency potential in New England can fall into several categories. The broadest category is “**Technical Potential**,” defined for the purposes of this study as the complete penetration of all measures analyzed in applications where they are deemed technically feasible from an engineering perspective. Technical Potential does not necessarily take into account cost-effectiveness, budget constraints, or whether homeowners and businesses are willing to undertake energy saving actions and investments. Another way to categorize energy efficiency is through “**Economic (or Cost-effective) Potential**,” which represents a portion of Technical Potential based on what is cost-effective (either from customer, societal or total resource perspective). However, Economic Potential still assumes homeowners and businesses will undertake all cost-effective investments.

For the purposes of this analysis, NEEP chose to examine what is being deemed “**Economically Achievable Energy Efficiency Potential**.” This category is defined as the potential for maximum market penetration of energy efficient measures that are cost-effective according to the Total Resource Cost test[2] and that would be adopted through a concerted, sustained campaign involving proven programs and market interventions, and not bound by any budget constraints.

Our analysis concluded that total Economically Achievable Energy Efficiency Potential (“EE Potential”) in New England would result in energy savings of 17,103 gigawatt-hours (GWH) and demand savings of 4,317 megawatts (MW) by the year 2008. This is the equivalent of the annual electricity needs of 2.4 million households, and 14 electricity generating power plants

[2] The TRC test or modified version of it is used by most New England states. It measures net costs taking into perspective of utility, but includes participant and non-participant costs. Applied at program and/or measure level. Costs accounted for in the test are program costs paid by utility and participants; increase in supply costs during load increase periods; spillover and benefits are avoided supply costs; reduction in T&D, generation, and capacity costs; tax credits. (sources: Sebold, Frederick D et al., 2001. A Framework for Planning and Assessing Publicly Funded Energy Efficiency. March 1. Study PG&E-SW040. San Francisco: Pacific Gas & Electric; California State Governor's Office. 2001. Standard Practice Manual: Economic Analysis of Demand-Side Management Programs. October)

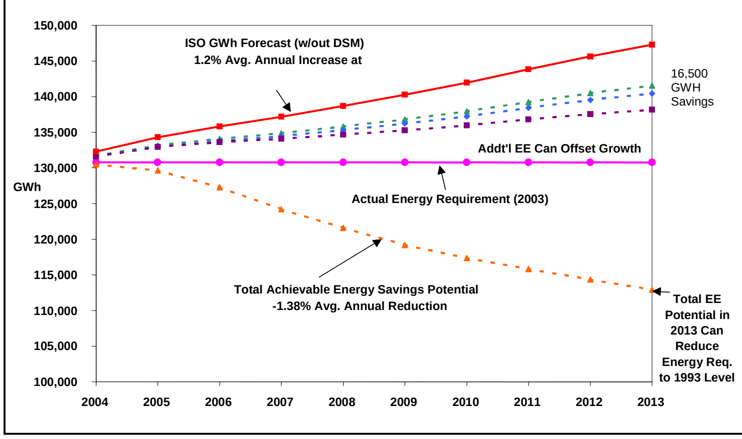
(combined cycle gas units) of 300 MW each. Even more impressive is the fact that by the year 2013 an estimated 34,375 GWH of energy savings and 8,383 MW in demand reduction could be achieved, equaling the electricity needs of all Connecticut and New Hampshire households combined, and equivalent to 28 electricity combined cycle gas units of 300 MW each.

## How much Energy Efficiency is needed to offset forecasted load growth?

While achieving full energy efficiency potential should be a goal for New England states, it is perhaps more practical to break down the analysis to examine how much energy efficiency is required to first offset ISO-NE's forecasted load growth. As previously cited, ISO-NE forecasts annual energy demand to increase to 147,300 GWH by 2013.

However, NEEP's analysis shows that if New England can capture 48 percent of the “EE Potential” in the same time frame, or 16,500 GWH, it is possible to offset projected energy growth as seen in Figure 1. This can be achieved using different strategies and by targeting different technologies, customer sectors, and markets, as discussed below.

**Figure 1: Existing and New EE Strategies Can Offset ISO Forecasted Energy Requirements (GWH) and Beyond**




## What are the major reservoirs of Energy Efficiency potential?

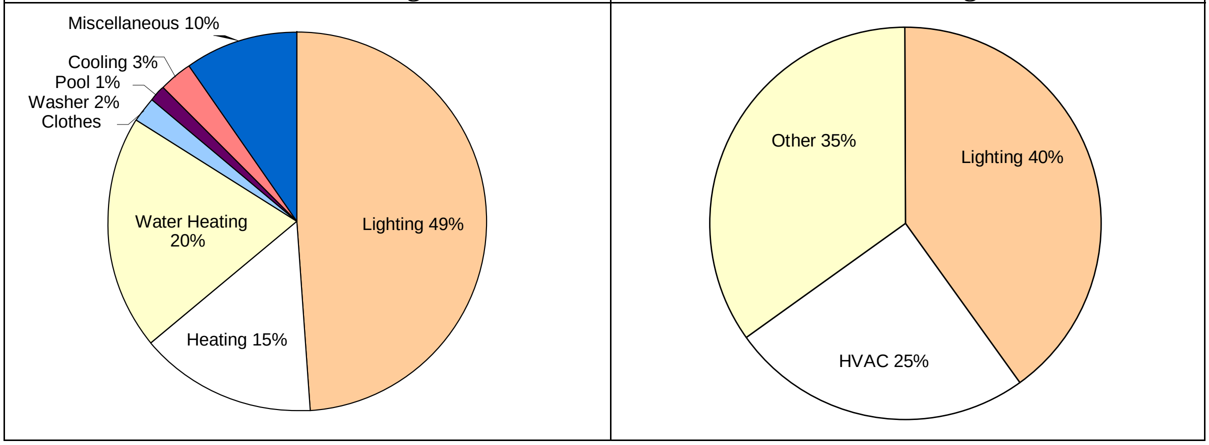
In the residential, commercial and industrial sectors there are numerous opportunities to obtain energy savings. This analysis examined these "reservoirs" to determine where the best opportunities exist. There is potential to create 12,745 GWH of savings in the residential sector and 21,630 GWH in the commercial and industrial sectors by the year 2013.

Further breakdown of savings, seen in Figure 2, shows that the largest contributor in the residential sector is improvement of lighting efficiency creating 49 percent of total savings. Water heating and heating represent the next two top contributors at 20 percent and 15 percent respectively. Lighting also ranks as the largest reservoir of potential savings in the commercial and industrial sector with 40 percent. Improving HVAC efficiency is just as important, offering 35 percent of the total potential savings.

One-third of the economically achievable energy savings in the residential sector can be achieved by 2013 through programs that capture “lost opportunity” savings when customers purchase new or replacement equipment, or homes are built, renovated or remodeled. Retrofit programs would be necessary to capture the remaining two-thirds by 2013. For the commercial and industrial sectors, lost opportunity programs can capture 25 percent of the economically achievable energy savings by 2013. Commercial and industrial retrofit programs would be needed to capture the remaining 75 percent by 2013.

**Figure 2: Major "Reservoirs" of Achievable EE Potential in 2013 by End Use**

Residential Savings | C&I Savings




## How can New England capture this Energy Efficiency potential?

The analysis examined what energy efficiency strategies are available for states to capture the EE Potential, and what their estimated cost is compared to the cost of supplying electricity. States in the region already employ – to varying degrees – a number of energy efficiency strategies, including a host of voluntary ratepayer-funded programs, upgrades to building energy codes, and minimum energy efficiency standards for commercial and residential appliances. These strategies, as well as other market-based strategies, can help the region capture the EE Potential cost-effectively.

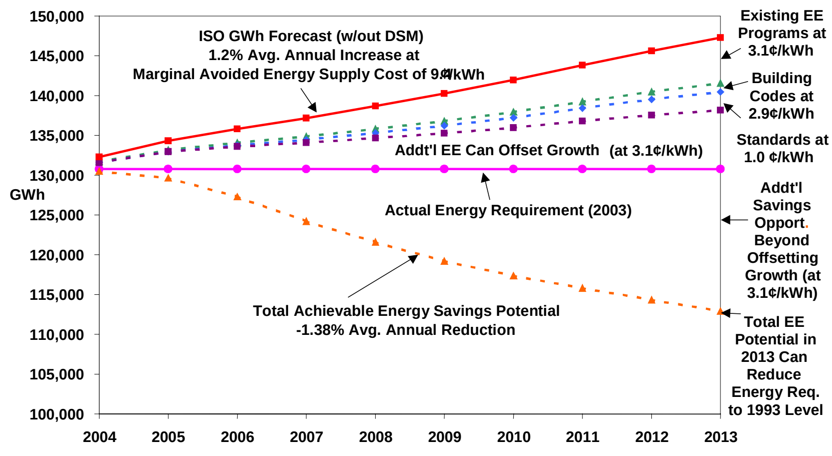
### *Energy Efficiency Strategies and Reducing Forecasted Energy Requirements:*

*Estimated Cost of Energy Efficiency Strategies and Related Electrical Savings*

Maintaining existing energy efficiency programs could provide cumulative annual electrical savings of 2,875 GWH by 2008 and 5,750 GWH by 2013 at a cost of 3.1 cents per kilowatt-hour (kWh). Investing in energy efficiency programs at current levels is 67 percent cheaper than the average cost to supply electricity over the analysis timeframe – or 9.4 cents per kWh – represented by the avoided electric supply cost for the region.[3] The implementation of building energy codes will further reduce load growth with an estimated annual electrical savings of 509 GWH by 2008 and 1,090 GWH by 2013 at a cost of 2.9 cents per kWh. The most cost-effective means of offsetting load growth is through minimum efficiency product and appliance standards, which cost only 1 cent per kWh and will save 643 GWH by 2008 and 2,284 GWH by 2013.

[3] The avoided electric supply cost includes avoided generation, T&D capacity and line losses, as used by most regulated utilities in the region to analyze the cost-effectiveness of their EE programs. For example, see "Avoided Energy Supply Costs in New England", prepared by ICF for the AESC Study Group, August 21, 2003.

Figure 3: Existing and New EE Strategies Can Offset ISO Forecasted Energy Requirements (GWH) and Beyond




To offset forecasted growth of the region's energy requirement (i.e., maintain load at 2003 levels), strategies beyond existing energy efficiency programs, building energy codes and standards would need to achieve electrical savings of 3,879 GWH by 2008 and 7,378 GWH by 2013. If the region were to commit to fully capturing the EE Potential – at an average cost of 3.1 cents per kWh[4] – it could provide energy savings of 17,103 GWH by 2008 and 34,375 GWH by 2013 – bringing energy demand back to 1993 levels. This represents a decrease in energy demand of approximately 1.38 percent a year, as opposed to ISO-New England's forecasted 1.2 percent annual increase.

*Building Energy Codes and Appliance Standards*

While this study recognizes that great progress has been made in the region in implementing cost-effective energy efficiency activities, it is also apparent that more needs to be done since continuing existing energy efficiency efforts will only account for approximately 20 percent of achievable potential energy savings by 2013. Thus, in addition to maintaining current energy efficiency programs, which at "existing" or 2003 levels save about 600 GWH per year in New England, states need to continually upgrade their building energy codes and, as importantly, ensure effective compliance. States should also adopt minimum appliance and product efficiency standards. For example, Maryland, Connecticut and New Jersey have recently adopted new energy efficiency standards for residential and commercial products, and the opportunity exists to implement similar measures in the other New England states as well as at the federal level. In the state of Connecticut alone, their newly-adopted standards on eight products – torchiere lamps; large packaged commercial HVAC units; dry-type building transformers; building exit signs; traffic signals; unit and duct heaters; commercial clothes washers; commercial refrigerators and freezers – will reduce peak demand by approximately 65 MW, equivalent to the needs of about 65,000 households by 2010.[5] If this type of legislation were implemented in the remaining five New England states, significant savings could be achieved.

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[4] While costs associated with capturing EE Potential can range above and below 3.1 cents per kWh, such measures are always cost effective. The cost remains at 3.1 cents per kWh regardless of the level of EE savings as it is the average of all cost effective EE measures over the time frame of this analysis.

[5] NEEP. "Energy Efficiency Standards: A Boon for Connecticut" available at: http://www.neep.org/Standards/FactSheets/CTfactsheet.pdf

*Energy Efficiency in State Procurement*

Further, a key strategy to help offset load growth and beyond is to increase procurement rules for state and municipal facilities. For example, New York Governor George Pataki signed Executive Order Number 111, which establishes energy efficiency requirements for state agencies and departments (http://www.nyserda.org/exorder111.html). More recently, a Maine Executive Order by Governor John Baldacci signed into law the requirement that the construction of all new state owned facilities meet the LEED standards (http://www.maine.gov/governor/baldacci/news/executive-orders/EX_ORDER_11_24_03.doc).

*Energy Efficiency Resource Acquisition*

Another important strategy is to adopt or expand upon the role of energy efficiency to meet specific local and regional electric supply needs such as transmission and distribution, power system reliability, and cost-effective default service provided by electric distribution companies to customers that do not chose an alternate electric service provider. ISO New England and most New England states do not now have processes in place that specifically consider the role of energy efficiency to address these needs as an alternative to supply-side investments, or that require cost-effective energy efficiency to meet these resource needs.

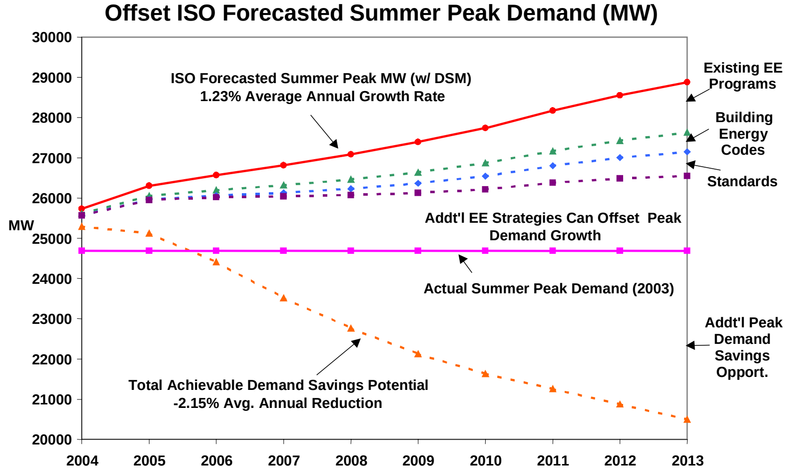
*Societal Benefit Charge*

Increasing ratepayer funding for energy efficiency programs is also vital to capture opportunities not addressed at current levels. All New England states have a "Societal Benefit Charge" or "Systems Benefit Charge" (SBC) that applies to electric customer bills to pay for energy efficiency programs. This generates about $200 million per year in New England for program development, administration, implementation, evaluation and regulatory reporting.

***Energy Efficiency Strategies and Reducing Forecasted Peak Summer Demand:***

NEEP also examined the effects of energy efficiency strategies on reducing peak summer demand as shown in Figure 4. The summer months can put the largest strain on the electrical grid, threatening energy security and stability and causing sharp spikes in wholesale electric prices, making it extremely important to highlight how energy efficiency can help offset peak demand growth. ISO-NE projects that the peak summer demand for electricity in New England will be 27,085 MW in 2008, increasing to 28,880 MW in 2013. Given 2003 actual summer peak demand was 25,170 MW, this represents a

**Figure 4: Existing and New EE Strategies Can More Than Offset ISO Forecasted Summer Peak Demand (MW)**



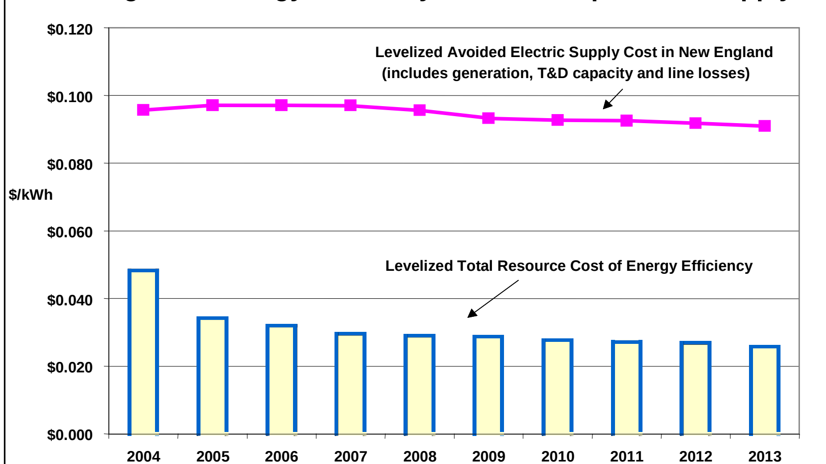
forecasted annual increase in demand of 1.23 percent.[6] Capturing the full EE potential, however, can provide the region total summer peak demand savings of 4,317 MW by 2008 and 8,383 MW by 2013, an annual decrease in peak demand of approximately 2.15 percent.

The cumulative annual electrical demand savings for the summer months if states maintain existing energy efficiency programs are 635 MW by 2008 and 1,250 MW by 2013. Enhanced implementation of building energy codes results in a peak summer demand reduction of 230 MW by 2008 and 481 MW by 2013. Minimum efficiency product standards reduce demand an additional 158 MW by 2008 and 601 MW by 2013. The region could offset its summer peak demand growth by also adopting or expanding upon other strategies (e.g., state procurement requirements, the role of energy efficiency to meet specific state and regional electric supply needs such as demand response, transmission and distribution requirements, and default service options). These energy efficiency efforts could maintain peak demand at 2003 levels by providing demand savings of 2,626 MW by 2008 and 3,108 MW by 2013.

***What are the costs vs. benefits of this Energy Efficiency Potential?***

Energy efficiency is a cost-effective means of offsetting load growth and beyond. In fact, saving electricity costs 67 percent less than supplying it as shown in Figure 5. To expand upon this finding, the benefit cost ratio (benefits divided by costs) was calculated for the above energy efficiency strategies. Any ratio over 1.0 implies that the benefits outweigh the costs. The average ratio for all the strategies was calculated to be 3.2, with a range from 2.5 to 8.7.

**Figure 5: Energy Efficiency is 67% Cheaper Than Supply**




Even though energy efficiency is cost effective, upfront capital costs can still be a deterrent for states to implement such programs. Currently, about $200 million per year is spent on ratepayer-funded voluntary energy efficiency programs in New England, which would amount to approximately $2 billion over next 10 years if current funding levels continue. State and federal building energy codes and product standards are estimated to cost another $700 million over 10 years. Thus, in order to offset forecasted load growth, an additional $2.6 billion in funding would be needed from 2004-2013 (e.g., more than double current SBC funding levels).

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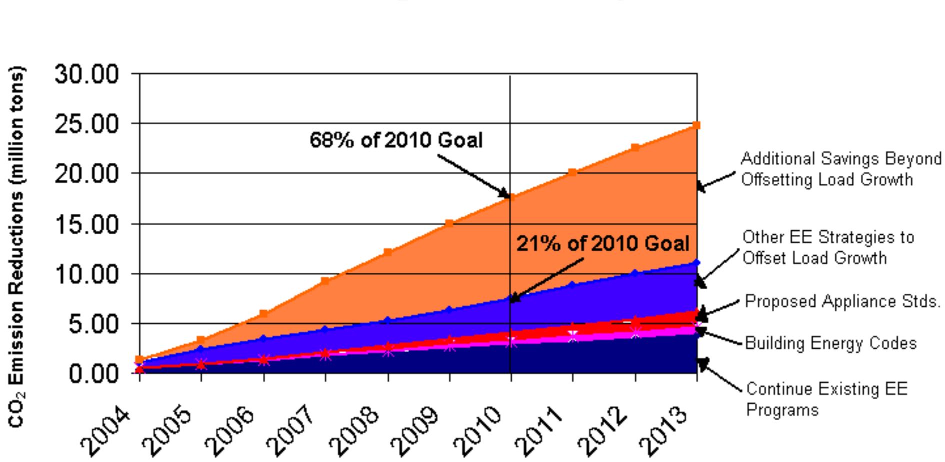
[6] The ISO-NE's forecast for peak summer demand includes significant impact of interruptible/load management programs – however it is not clear if these are all funded through voluntary ratepayer-funded energy efficiency programs.

**How much can Energy Efficiency help reduce power plant emissions and help meet regional climate change goals?**

In addition to reducing consumer costs, providing grid stability and reducing energy demand, implementing energy efficiency strategies also create a reduction in power plant emissions. NEEP's analysis concludes that obtaining full EE Potential in New England will result in reductions of 11,440,000 tons of carbon dioxide ($CO_2$); 9,834 tons of nitrogen oxides ($NO_x$); and 27, 963 tons of sulfur dioxide ($SO_2$ ) from power plant emissions by 2008. This would be the equivalent of removing 749,062 cars from the road. Further reductions of 22,994,000 tons of $CO_2$; 19,766 tons of $NO_x$; and 56,204 tons of $SO_2$ could also be obtained by 2013, equaling the removal of 1,505,588 cars.[7]

**Figure 6: Cumulative Impact of Achievable EE Savings to Reduce CO2 Emissions in New England's Stationary Combustion Sector**




Emission reductions were also analyzed in the context of the New England Governors' (NEG) and Eastern Canadian Premiers (ECP) Climate Change Action Plan goal of reducing $CO_2$ emissions to 1990 levels by 2010. In order to determine how energy efficiency strategies can aid in reducing $CO_2$ emissions, NEEP examined emissions from the Stationary Combustion Sector in New England, which includes burning fossil and biomass fuels in electric power plants, factories, and residential and commercial and institutional buildings.[8] Estimates by Northeast States for Coordinated Air Use Management (NESCAUM) indicate that $CO_2$ emissions were 116 million tons in 2000 for the Stationary Combustion Sector in New England, and will increase 19.7 percent by the year 2010.[9] Based on this, NEEP estimates that $CO_2$ emissions are projected to increase to 138 million tons by 2010, roughly 35 million tons above the targeted goal.

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[7] Conversion rates obtained from Massachusetts Division of Energy Resources 2001 Annual Energy Efficiency Report to Legislature

[8] NESCAUM, Greenhouse Gas Emissions in the New England and Eastern Canadian Region, 1990-2000 (March 2004); and NEEP calculations.

[9] NEEP used EIA 2004 Energy Outlook forecast for fuel consumption for electric generators, and residential, commercial and industrial buildings with estimated carbon coefficients to calculate an estimated 19.7 percent increase in CO2 emissions from 2001 to 2010. Carbon coefficients were obtained from: EPA Emission Inventory Improvement Program. Estimating Greenhouse Gas Emissions, Vol. VIII: Chapter 1: Methods for Estimating Carbon Dioxide Emissions From Combustion of Fossil Fuels, June 2003. Prepared for State and Local Climate Change Program, U.S. EPA & EIIP by ICF Consulting.

NEEP concluded that continuing existing energy efficiency programs can reduce emissions by 2.69 million tons or 7.6 percent of the NEG Climate Change Action Plan goal for the Stationary Combustion Sector in New England by 2010. Upgrading building energy codes on an on-going basis and achieving a 75 percent compliance rate creates a 0.47 million ton reduction or 1.3 percent of the NEG goal by 2010. Further, adopting existing and pending product and appliance standards at the state and federal level reduces $CO_2$ emissions by 0.85 million tons by 2010 or 2.4 percent of the NEG goal.

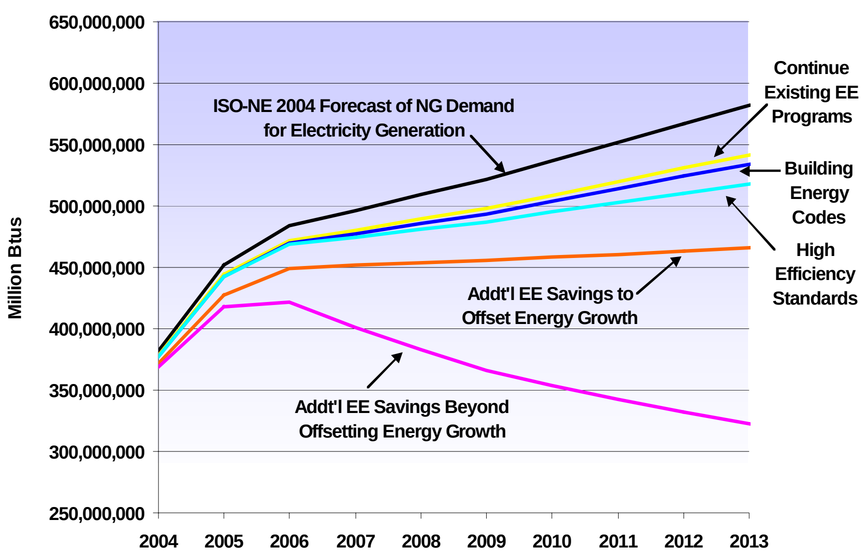
Going beyond current strategies, if states utilize other energy efficiency measures sufficient to offset projected load growth, they can create a 3.46 million ton reduction by 2010 or 9.8 percent of the NEGC goal. Implementing additional savings beyond offsetting projected load growth can create a 16.47 million ton reduction by 2010 or 46.7 percent of the total emissions reduction goal. NEEP has determined that the cumulative impact of these energy efficiency strategies is a potential reduction of 23.94 million tons of $CO_2$ by 2010, which is 68 percent of the NEG goal for the stationary combustion sector as shown in Figure 6.

In addition, once a trading system for $CO_2$ emission credits in the Northeast region is developed through the current efforts of the Regional Greenhouse Gas Initiative (RGGI), energy efficiency can help Northeast states meet mandatory carbon caps, and may mitigate or hedge against higher cost of credits caused by $CO_2$ emissions from dirtier fossil-fueled power plants.

**How much can Energy Efficiency help reduce natural gas demand for electric power generation in New England?**

Energy efficiency can also play a significant role in reducing forecasted natural gas demand in New England – the largest source of electricity generation – by between 7 percent and 45 percent by 2013, depending upon how much of the EE potential is captured. The current forecasted demand for natural gas is 509,333 billion BTUs in 2008 and 582,000 billion BTUs by 2013. As shown in Figure 7, NEEP estimates that that the cumulative impact of energy efficiency strategies for all EE potential would reduce power plant natural gas demand by 25 percent in 2008 and 45 percent in 2013.[10]

**Figure 7: Cumulative Impact of Electric EE Potential on Reducing Natural Gas Demand for New England (in Million BTUs)**




[10] Forecasted natural gas demand from ISO-NE, 2004. NEEP assumed 7 MMBTUs/MWh heat for gas combined cycle units and assumed these operate at the margin most of the time (Resource Insight), to convert EE savings to reduction in natural gas demand for electricity generation.

**Findings and Conclusions:**

1. Continuing New England's current energy efficiency policies over next 10 years would target **less than 20 percent** of economically achievable energy efficiency potential.
2. Energy efficiency is **67 percent cheaper than** the cost of electric power supply.
3. Cost-effective investments in **energy efficiency can more than offset projected system electric energy and peak demand growth**, deferring the need for 28 combined-cycle gas power plants of 300-MW in output each by 2013.
4. Economically achievable energy efficiency **is abundant in all customers sectors, end uses, and markets.**
5. Investments in energy efficiency can help New England **meet the NEGC climate change goals by 21-68 percent for the Stationary Combustion sector by 2010**.
6. Energy efficiency can help **meet mandatory carbon caps**.
7. Investments in energy efficiency can help **reduce projected natural gas demand** for electricity generation in New England by **between 4-25 percent in 2008 or as much as 7-45 percent by 2013.**
8. Improved building energy codes and appliance efficiency standards **are the cheapest way** to realize a portion of New England's energy efficiency potential.
9. Investing in energy efficiency in New England can **provide net benefits of between $13-23.7 billion** to the region's economy.

**Recommendations to New England Policymakers:**

1. Integrate energy efficiency into regional system and distribution company planning and resource procurement.
2. Link energy facility planning with environmental and economic policies.
3. Give high priority to building energy code updates and high levels of compliance (ex. 75 percent).
4. Support strong and timely adoption of federal product efficiency standards.
5. Continue to adopt state product efficiency standards.
6. Increase funding for energy efficiency investments as a clean and cheap energy supply resource.
7. Adopt or expand energy efficiency procurement rules for state and municipal buildings and equipment purchase.
8. Use increased electric energy efficiency to relieve gas supply constraints and to help mitigate energy price volatility.
9. Include increased electric energy efficiency in assessing the need for new gas supply facilities.
10. Establish common, regional methods and assumptions for measuring energy efficiency savings in New England.

**Sources:**

Optimal Energy relied on the following studies to synthesize a regional estimate of economically achievable potential for New England:

**1) Massachusetts:**
Fitchburg, Gas and Electric Light Company, Massachusetts Electric Company, NSTAR, Western Massachusetts Electric Company. The Remaining Electric Energy Efficiency Opportunities in Massachusetts. Final Report, June 7, 2001. Prepared for Program Administrators and Massachusetts Division of Energy Resources by RLW Analytics, Inc. and Shel Feldman Management Consulting. (For more information see http://www.mass.gov/doer/home.htm and scroll to bottom of page.)

**2) Connecticut:**
Independent Assessment of Conservation and Energy Efficiency Potential for Connecticut and the Southwest Connecticut Region. Final Report for the Connecticut ECMB, June 2004. Prepared for the Energy Conservation Management Board by GDS Associates, Inc. Engineers and Consultants and Quantum Consulting. (For more information, see full report on ECMB's website at http://www.dpuc.state.ct.us/Electric.nsf/ByECMB?OpenView.)

**3) Maine:**
The Technical Potential for Electric Energy Conservation in Maine (Redacted Version), September 25, 2002. Prepared for the Maine Public Advocate by Exeter Associates, Inc.

The Achievable Potential for Electric Efficiency Savings in Maine, October 22, 2002. Prepared for the Maine Public Advocate by Optimal Energy, Inc. and Vermont Energy Investment Corporation. (For more information, see full report at http://www.state.me.us/meopa/ choose *Electric* and *Conservation Reports* from pull down menu.)

**4) Vermont**
Vermont Department of Public Service. Electric and Economic Impacts Of Maximum Achievable Statewide Efficiency Savings 2003-2012: Results and Analysis Summary Public Review Draft of January 31, 2003. Prepared by: Optimal Energy, Inc.

5) **New York**
Energy Efficiency and Renewable Resource Development Potential in New York State, Final Report, August 2003. Prepared for New York State Energy Research and Development Authority by: Optimal Energy, Inc, American Council for an Energy Efficiency Economy, Vermont Energy Investment Corporation, Christine T. Donovan Associates.

**6)** 2001 NEEP Codes & Standards Analysis (NEEP/ACEEE)

**7)** 2004 ACEEE Standards Analysis

**Key Assumptions:**

- Savings based on percent savings by sector from existing energy efficiency potential studies. The following are the achievable savings potential savings in year 10 from the studies: Vermont: Res 29.9 percent, C/I 31.5 percent; Maine: Res 7 percent, C/I 17 percent; Connecticut: Res 13 percent, C/I 14 percent; Massachusetts: Economic potential in year 5 - Res 31 percent, C/I 21 percent. Achievable was assumed at 80 percent of Economic potential (consistent with assumptions in the Connecticut and Vermont studies). Year 10 savings extrapolated from the average ratio of year 10 savings to year 5 savings in the Vermont and Connecticut studies. Rhode Island: used same percent savings as Connecticut New Hampshire: used the average percent savings of Vermont, Maine and Massachusetts.

- Average costs per annual kWh hour data for Vermont and Maine were applied to the other New England states. The weighted average cost (including admin. costs) per first year annual kWh saved is as follows: Vermont: Residential * 64 cents/kWh, C/I * 62 cents/kWh; Maine: Residential * 24 cents/kWh, C/I * 12 cents/kWh

- To deal with overlap between different energy efficiency strategies, the study eliminated double counting of savings potential from existing voluntary energy efficiency programs versus building energy codes and energy efficiency product standards. It is assumed that 88 percent of the savings from Codes would overlap with the maximum achievable voluntary DSM savings. This is based on the assumptions that the voluntary DSM achieves 75 percent maximum participation and that 50 percent of the non-participants would also not fully comply with codes. It is assumed that 75 percent of the savings from Standards would overlap with the maximum achievable voluntary DSM savings. This is based on the assumption that the voluntary DSM achieves 75 percent maximum participation.

- The avoided supply costs are from the "Avoided Energy Supply Costs in New England", prepared by ICF for the AESC Study Group, August 21, 2003.

- Optimal used a 2.9 percent real discount rate. This is based on 5.2 percent nominal discount rate and 2.3 percent inflation. These were the assumptions in the Massachusetts screening tool in the fall of 2003, based on the yield on 10-year US Treasury notes.