New Hampshire Gap Analysis

February 2011

Prepared by the Building Codes Assistance Project for the United States Department of Energy
**Building Codes Assistance Project (BCAP)**

BCAP is a non-profit advocacy organization established in 1994 as a joint initiative of the Alliance to Save Energy, the American Council for an Energy-Efficient Economy, and the Natural Resources Defense Council. BCAP focuses on providing state and local governments in the U.S., as well as stakeholder organizations, with support on code adoption and implementation through direct assistance, research, data analysis, and coordination with other activities and allies. With over sixteen years of experience supporting numerous state energy offices and city building departments, along with tracking code activities across the country, BCAP is well-positioned to assist in local and statewide activity to advance codes. As a trusted resource, BCAP is able to identify and navigate past policy and programmatic pitfalls to help states and jurisdictions put the best possible strategy in place to improve efficiency in both new and existing buildings. Our work pulls together local efforts, identifies national-scale issues, and provides a broad perspective, unbiased by corporate/material interests. BCAP also hosts OCEAN—an online international best practice network for energy codes—and is increasingly working abroad to gather and share best practices that provide value across organizations.
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Acronyms and Abbreviations

AIA – American Institute of Architects
ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BBC&S – Bureau of Building Construction and Safety
BCAP – Building Codes Assistance Project
BECI – Building Energy Conservation Initiative
BPI – Building Performance Institute
CEUs – Continuing education units
Core Programs – Core Energy Efficiency Programs
DES – Department of Environmental Services
DOE – Department of Energy
DOS – The Department of Safety
ECAP – Energy Code Ambassadors Program
EEBA – Energy & Environmental Building Alliance
EESE – Energy Efficiency and Sustainable Energy Board
EECBG – Energy Efficiency and Conservation Block Grants
EPA – U.S. Environmental Protection Agency
GDS – GDS Associates, Inc.
GHGERF – The Greenhouse Gas Emissions Reduction Fund
HBRANH – Home Builders and Remodelers Association of New Hampshire
HERS – Home Energy Rating System
IBC – International Building Code

ICCC – International Code Council
IECC – International Energy Conservation Code
IRC – International Residential Code
LECs – Local Energy Committees
LEED – Leadership in Energy and Environmental Design
NAHB – National Association of Home Builders
NEEP – Northeast Energy Efficiency Partnerships
NFPA – National Fire Protection Association
NGBS – National Green Building Standard
NHBOA – New Hampshire Building Officials Association
NHSBC – The New Hampshire State Building Code
OCEAN – Online Code Environment and Advocacy Network
OEP – The Office of Energy and Planning
PNNL – Pacific Northwest National Laboratory
PUC – The Public Utilities Commission
PSNH – Public Service of New Hampshire
RECA – Responsible Energy Codes Alliance
REF – Renewable Energy Fund
RGGI – Regional Greenhouse Gas Initiative
RESNET – Residential Energy Services Network
SEP – State Energy Program
USGBC – U.S. Green Building Council
Executive Summary

The purpose of the New Hampshire Gap Analysis Report is twofold: 1) document and analyze the strengths and weaknesses of the state’s existing energy code adoption and implementation infrastructure and policies; 2) recommend potential actions state agencies, local jurisdictions, and other stakeholders can take to achieve 100 percent compliance with the model energy code. The report is organized into four sections: Introduction, Adoption, Implementation, and Conclusion. The Adoption and Implementation sections both conclude by listing some of the state’s current best practices and making multiple recommendations for actions the state should consider to improve energy code compliance.

The Introduction section provides an overview of relevant state demographics, such as the state’s concentrated population and higher levels of construction in the southeastern counties, as well as its sharp decline in construction since 2004. It also covers some of the financial and security benefits of energy efficiency for the state’s utility sector.

Beginning on page 13, the Adoption section takes a close look at the federal, state, and local polices that influence energy codes in the state. The New Hampshire Building Code Review Board updated the New Hampshire State Building Code to meet the model energy code, and the state will enact a high-performance building policy for state-funded facilities in July 2011. This section also addresses the current politics that might alter the adoption process. Moreover, it highlights a number of green initiatives and high performance building programs on the state and local levels.

The Adoption section makes five recommendations for the General Court and state agencies, summarized below:

- The General Court should ratify the New Hampshire State Building Code and ensure that the New Hampshire Building Code Review Board retains its authority to update the State Building Code;
- The state should encourage local jurisdictions to adopt more stringent energy codes for public and private buildings.

Beginning on page 25, the Implementation section covers the many ways in which state and local agencies, the design and construction industries, utilities, and other stakeholders work to promote the adopted energy codes, establish enforcement and compliance infrastructures, and adequately prepare code officials and building professionals to carry out their responsibilities. Providing sufficient funding for energy code implementation is a necessity, and the state should explore multiple avenues for locating funding sources, given the current political climate. New Hampshire’s state enforcement infrastructure relies heavily on state agencies that do not have the resources to conduct full building code plan reviews and site inspections. There is also confusing regarding authority over building code issues, and the General Court is considering changes to the infrastructure. To ensure safe and healthy buildings, the state requires certification for a number of professions, though it does not do so for code official and contractors. The report draws attention to the outreach and training efforts of the Recovery
New Hampshire code officials and building professionals vary in their standards for energy code enforcement and compliance. A few inspection departments are well-regarded for their energy code enforcement processes, though most cite a lack of training, time, and resources as critical barriers to improved enforcement. Some code officials also do not make the energy code a priority compared to traditional building codes. Similarly, some building professionals adhere to or exceed the adopted standards. However, some do not emphasize compliance—particularly when the code official does not emphasize enforcement—and many lack training. In addition, some building professionals believe that there is not yet a market for energy-efficient construction, though the state’s rates of above-code construction and green building programs provide a compelling counter-argument. Finally, the state has conducted energy benchmarking and audits in a variety of public buildings and will begin a project for commercial and industrial buildings in 2011. These programs can provide the methodology for statewide energy code measurement and verification activities.

The Implementation section makes 23 recommendations to the General Court, state agencies, and a variety of different stakeholder groups, summarized below:

- The General Court should clarify roles and responsibilities for state energy code enforcement and require more stringent energy code compliance verification methods;
- The state should continue to support and expand energy code outreach on the state and local levels, including raising awareness among new stakeholders;
- The state should find ways to provide more resources to state agencies responsible for energy code enforcement in unincorporated areas and jurisdictions without code officials or find creative solutions, such as regional inspection departments;
- The state and local governments should provide inspection departments with funding, DOE materials, tools, and other resources to improve energy code enforcement;
- The state should set minimum certification and licensing requirements for code officials and contractors, respectively;
- The state, trade associations, and other parties should continue to provide and improve energy code training workshops and encourage code officials and building professionals to attend;
- Design and construction professionals should construct and market energy-efficient buildings to set themselves apart in a competitive marketplace;
- The state’s trade associations should set minimum CEU requirements that include energy code training;
- The state should develop a statewide measurement and verification program to determine the state’s compliance rate.

The Conclusion section provides a summary of the myriad benefits of energy code adoption and implementation in New Hampshire and concludes with Table 4, a summary list of the most important recommendations made in the report with page numbers for quick reference. Appendix A offers a list of other DOE and Pacific Northwest National Laboratory (PNNL) energy code resources.
Introduction

Energy codes have arrived. As one of the principal instruments in the energy efficiency policy toolbox, codes benefit society in a number of important ways: they reduce energy use, which decreases greenhouse gas emissions and pollution, save consumers and businesses money, lessen peak energy demand, increase utility system reliability, and improve indoor air quality.

Recent improvements in the stringency of the model energy code—not to mention the development of the first green codes—continue to raise the floor and ceiling for energy-efficient design and construction to levels that were almost unimaginable a few short years ago. Meanwhile, the Recovery Act has provided states and cities with unprecedented funding and incentives to adopt the model energy code, and more places are taking advantage of these opportunities than ever before.

Their ascent is part of a larger transformation in the way advocates, policymakers, industry and utility representatives, and the general public view energy efficiency as a viable and cost-effective component of a comprehensive solution to our current economic, environmental, and energy concerns. Energy efficiency is widely considered one of the lowest-hanging fruits since the cheapest and cleanest fuel source is the one we do not burn. Nowhere is this more apparent than in the building sector, which accounts for almost 40 percent of total energy use and 70 percent of electricity use. Moreover, the average lifespan of a building is roughly 50 years, meaning that current building energy policies will affect energy consumption until 2060 and beyond.

Yet, for all this recent progress and promise, energy codes are still falling well short of their potential. In municipalities across the country, energy code enforcement and compliance remain woefully insufficient or completely absent. While development and adoption are the necessary first steps of the energy codes process, they alone do not guarantee compliance. To ensure that energy codes accomplish their missions to reduce energy use and save money, states and cities must develop and carry out effective and realistic energy code implementation strategies.

In collaboration with the U.S. Department of Energy (DOE), BCAP has undertaken a new program to improve energy code compliance in 15 states, including New Hampshire, by analyzing the gaps in the existing energy code infrastructure and practices and providing compliance planning assistance and on-the-ground technical support to energy code stakeholders in the state. The first phase of the program is the Gap Analysis Report, which identifies barriers to successful energy code adoption and implementation, opportunities for improvement, available resources, and key stakeholders and potential partnerships.

State Overview

New Hampshire is relatively small state with a population just over 1.3 million. From 2000 to 2009, it rose steadily at 7.2 percent per year, just below the national average of 9.1 percent. Most of its residents live in the southern portion, centered around the 400,000 person Manchester-Nashua area.
The northern part of the state is rural and includes the White Mountain National Forest. Its only large population center is the Berlin area with a population of 39,000.

**Figure 1, State Population Map**

![State Population Map](image)

**Construction Overview**

As Figure 2 (below) illustrates, the net residential housing units permitted spiked from 2000 to 2001 and have steadily and rapidly declined since, from 9,263 in 2003 to 2,160 in 2009. Single-family housing made up the vast majority of new construction with almost 71 percent of all units.\(^3\) From 2006-2009, single-family construction was strongest in the four southeastern counties, Rockingham, Hillsborough, Strafford, and Merrimack. Multi-family construction was strongest in Hillsborough and Rockingham Counties. Coos, Cheshire, and Sullivan Counties had the lowest rates of single-family construction, and Coos and Carroll Counties had the lowest rates of multi-family construction.\(^4\)

Along with the housing market, commercial construction has slowed down considerably, and the majority of projects are retrofits and renovations for existing buildings. Most new commercial construction is for low-rise structures also in the southeastern counties.

For a more detailed overview of trends in state construction, please see the Market Characterization Report from GDS Associates, Inc. (GDS), a consulting firm with an office in Manchester. The report is expected to be released at the end of the NH Building (Energy) Code Compliance Project.
Even though the decline in residential and commercial construction has been detrimental to the state economy, it presents a unique opportunity for the advancement of energy codes in the state. With workloads reduced, some design and construction professionals and code officials should have more time to take advantage of available energy code training opportunities, such as the state-sponsored workshop series in progress (see Enforcement Community: Training and CEUs). Reduced construction will also help ease all stakeholders into the new code, rather than trying to adjust while construction is high. This silver lining does not make up for the stark reality of Figure 2, but it is encouraging for the future of energy efficiency in the built environment.

Figure 2 – Permits by Year

Energy Portfolio

New Hampshire is a net exporter of electricity (109.1 trillion Btu in 2008). According to the U.S. Energy Information Administration’s data from November 2010, 44 percent of the New Hampshire’s net electricity generation comes from nuclear energy, with another 38 percent coming from natural gas. Renewable sources (hydroelectric power, fuel wood, landfill gas, and municipal solid waste) account for another 12 percent. New Hampshire does not have any significant fossil fuel reserves, though its potential for wind energy production is high. The state’s net energy consumption in 2008 was 311.2 trillion Btu, making its per capita consumption 235 million Btu—much lower than the national average. Even so, reducing energy use through the adoption and implementation of the model energy code
would reduce the state’s dependence on costly imported energy and increase its revenue from exporting electric power.

More than half of the state’s households use fuel oil as their primary energy source for home heating, and liquefied petroleum gases account for an additional 11 percent. Therefore, per capita residential petroleum consumption is particularly high. Along with much of the U.S. Northeast, the state is vulnerable to oil shortages and price spikes in the winter. Reducing energy use through the adoption and implementation of the model energy code would reduce the state’s dependence on imported oil and improve its energy security. Natural gas also accounts for about one-fifth of home heating.

As of October 2010, New Hampshire’s businesses pay an average of 14.41 cents per kilowatt-hour, roughly four cents more than the national average. Residents pay 17.06 cents per kilowatt-hour, roughly five cents more—the fourth highest rate in the country. Industry pays 12.82 cents per kilowatt-hour, roughly six cents more. These average costs present a strong financial argument for reducing building energy consumption to benefit the state’s economy. Fortunately for the state, New Hampshire’s per capita energy consumption is already the seventh lowest in the country as of 2008, behind only New York, Rhode Island, Hawaii, Massachusetts, California, and Connecticut. Its mild summer climate reduces sustained air-conditioning demand, and its size and small industrial base are also factors.

**Potential Savings from Energy Codes**

Energy codes offer large-scale gains. By adopting and complying with the 2009 International Energy Conservation Code (IECC) and the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2007 statewide, New Hampshire businesses and homeowners would receive significantly more savings than the business-as-usual scenario:

- By 2030, $33 million in annual energy cost savings for households and businesses;
- By 2030, annual CO2 emissions reductions of 200,000 metric tons;
- By 2030, annual savings of 3 trillion Btu.

The following table represents a percentage of potential energy savings that can be achieved by complying with ASHRAE 90.1-2007. In the table below, Non Residential is any mid-rise commercial building, Residential represents high-rise residential buildings and Semi Heated represents commercial warehouses. 100 percent compliance with Standard 90.1-2007 would result in up to a 4.7 percent savings in commercial energy costs.
This data is from DOE and does not factor in the state amendment to reclassify the four southern counties from Climate Zone 5 to Climate Zone 6 for the 2006 IECC. The state did not reclassify the four southern counties for the most recent update to the New Hampshire State Building Code (State Building Code), as the ICC and DOE discouraged this action (see State Policy). Therefore, the potential savings in Climate Zone 5 are likely lower than the stated energy and cost savings.

Table 1. Annual Savings in Residential Energy Costs

<table>
<thead>
<tr>
<th>Construction Type</th>
<th>City (Climate Zone)</th>
<th>Energy Savings</th>
<th>Cost Savings</th>
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<tbody>
<tr>
<td>Non Residential</td>
<td>Manchester (5)</td>
<td>4.4%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Residential</td>
<td>Manchester (5)</td>
<td>5.1%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Semi Heated</td>
<td>Manchester (5)</td>
<td>0.4%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Non Residential</td>
<td>Concord (6)</td>
<td>5.8%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Residential</td>
<td>Concord (6)</td>
<td>4.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Non Residential</td>
<td>Concord (6)</td>
<td>0.3%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Source: [Impacts of Standard 90.1-2007 for Commercial Buildings at State Level](https://www.energystar.gov), U.S. DOE
Adoption

Federal Policy

Although energy code adoption occurs on the state and local levels, the federal government—through Congress and the U.S. Department of Energy (DOE)—has played a significant role in advancing energy code development, determining the relative effectiveness of national model energy codes, and supporting state- and local-level adoption and implementation.

EPAct

The Energy Policy Act (EPAct) of 1992 required DOE to determine whether the most current model energy codes would improve energy efficiency for residential and commercial buildings. It also mandated that the DOE make a new determination within twelve months for every subsequent revision of these codes. Each state would then have two years to certify that it had revised its own energy code to meet or exceed the requirements of the latest iteration of the national models. A state could decline to adopt a residential energy code by submitting a statement to the Secretary of the DOE detailing its reasons for doing so. The Energy Policy Act of 2005 specified that the most current model energy codes were the 2004 supplement to the 2003 IECC and ASHRAE Standard 90.1-2004.13

At the end of 2008, the DOE published its determination for ASHRAE Standard 90.1-2004 for commercial buildings, ruling that energy savings above the previous Standard 90.1-1999 would be 13.9 percent for national source energy and 11.9 percent for building energy consumption. DOE is currently reviewing Standard 90.1-2007, the most recent national model energy code for commercial buildings. For residential and small commercial, the last DOE determination was for the 2000 IECC. At present, DOE is reviewing the 2003, 2006, and 2009 versions of the code.

The New Hampshire State Building Code is based on the 2009 IECC and ASHRAE Standard 90.1-2007. Therefore, the state is in compliance with EPAct pending ratification from the General Court (see Energy Code Adoption Process).14

The Recovery Act

In 2009, Congress passed the American Recovery and Reinvestment Act (Recovery Act), which provided states with stimulus funds through the State Energy Program (SEP) and the Energy Efficiency and Conservation Block Grants (EECBG) to adopt the 2009 IECC or equivalent for residential construction and the ASHRAE Standard 90.1-2007 or equivalent for commercial construction, as well as achieve 90 percent compliance with the codes by 2017.15 In a letter dated March 19, 2009, Governor Lynch assured that the state would “consider actions to improve building energy codes.”16 In response, DOE awarded the state $25.8 million in SEP funding for use in energy efficiency policies and improvements. The state also received an additional $14.5 million EECBG formula grant, $9.6 million of which the Office of Energy and Planning (OEP) used primarily for building retrofits and renewable energy programs.17
Due in large part to SEP and EECBG funding from the Recovery Act, the OEP has increased its involvement in energy code support activities. In 2009, the OEP Building Code Compliance Program contracted with GDS on a $600,000 two-and-a-half-year project—The NH Building Code Compliance Project—to assist the state in reaching its goal of 90 percent compliance (see Implementation). GDS has been working for over a year on energy code compliance issues in the state. Among its projects, it has established a baseline for energy code compliance, identified barriers, launched a training workshop series, and conducted outreach to a variety of stakeholder groups.

State Policy

In the United States, building energy codes are adopted on the state and local levels. This is due, in part, to the diverse range of cultures and climates found across the fifty states, as well as a host of historical political influences that shaped federal-state and state-local relations. The process differs from state to state, but in most cases codes are adopted through a legislative process, a regulatory process, or a combination of both—like New Hampshire—although a handful of states are strongly home rule and permit local jurisdictions to adopt energy codes. Every state is unique in how it conducts business and creates policy, and each state requires its own particular strategy for achieving the best possible code for its local governments, citizens, and businesses.

Energy Code Adoption Process

The New Hampshire Building Code Review Board (the Review Board) has the authority to amend the standards within the State Building Code. It is comprised of 16 design, building, and enforcement professionals who serve three-year terms. The chairman of the Review Board is appointed by the commissioner of the New Hampshire Department of Safety (DOS). Members of the Review Board are selected to represent their constituencies by their member organizations.

The Review Board positions are:

- Board Chair
- Licensed Architect
- Licensed Structural Engineer

What’s required by the IECC?

- Depending on your location (climate zone) there are requirements for insulating ceilings, walls, and sometimes, floors, foundations, basement walls, and slab edge
- Less insulation is allowed for mass walls, and more is required for steel framing
- Also dependant on climate zone, there are requirements for windows, skylights, and doors
- The building shell, also known as the building envelope, must be caulked and sealed to limit air movement
- Duct insulation
- Pipe insulation
- Duct sealing to reduce air leakage
- Heating, ventilation, air conditioning (HVAC) and water heating equipment efficiencies and control requirements for commercial buildings
- Some residential lighting requirements
- All commercial lighting
- Heated swimming pool covers and controls
- The energy code applies to all new residential and commercial buildings, as well as additions/alterations/renovations to existing buildings
- Compliance paths include prescriptive, total building envelope UA (tradeoff method), and simulated performance
The procedure for updating the State Building Code consists of public hearings held by The Review Board followed by public adoption or rejection of proposed amendments. The Review Board does not have an automatic review and update process on a three-year cycle, though it has updated the energy code twice since 2007.20 The Review Board meets monthly to address issues of concern, amendments to codes, pertinent legislation, and code updates when they are available.

After the Review Board updates the State Building Code, the New Hampshire General Court must ratify the updated State Building Code within two years. If they do not, the code reverts to the prior version.

In 2002, the Review Board and the General Court adopted the 2000 IECC. They adopted the 2006 IECC in 2007 and amended the code to reclassify the four southern counties from Climate Zone 5 to Climate Zone 6, thus increasing the stringency of the requirements in those counties and creating Climate Zone consistency throughout the state.21

Moreover, at the ICC Final Action Hearings in 2010 for the 2012 IECC, state representatives appealed to permanently increase the stringency of NH’s climate zones to Climate Zone 6. They were unsuccessful in this effort.

Recent Energy Codes Legislation

In May 2009, the Review Board amended the State Building Code to reference the 2009 IECC. It finalized the adoption update process in December 2009, reviewing and rejecting many proposed amendments. The State Building Code includes amendments to double the insulation for circulating hot water systems to R-4, classify commercial structures less than 4,000 square feet and three stories high as subject to the residential code, and grant log homes a window and HVAC tradeoff. The state did not reclassify the four southern counties as Climate Zone 6. The new State Building Code took effect on April 1, 2010.22
As of early February 2011, the General Court has not approved the updated State Building Code, though there is pending legislation, HB 137, that would do so. However, in its current form, HB 137 would also remove the Review Board’s authority to update the State Building Code. The General Court is also considering changes to the state’s energy code implementation responsibilities (see State and Local Implementation Policies).

These potential changes are a sensitive issue among the New Hampshire Building Officials Association (NHBOA), fire officials, and other building code practitioners. At a subcommittee hearing in early February, these groups prevailed upon the General Court to postpone decision-making until the key stakeholders could meet to discuss these issues and present the General Court with their recommendations. One possibility is that the General Court will move ratification of the codes and amendments into HB 62, a less controversial bill.

**Gap:** The General Court has not approved the most recent energy code update in the State Building Code.

**Recommendation #1:** The General Court should approve the most recent energy code update in the State Building Code to ensure that new buildings meet the stringent standards of the model energy code.

**Gap:** The General Court is considering legislation that would remove the authority of the Review Board to update the State Building Code.

**Recommendation #2:**

a. The General Court should not remove the Review Board’s authority to update the State Building Code. It is comprised of knowledgeable professionals who are qualified to make decisions regarding the complexities of building codes with the best interest of the state’s citizens in mind. Additionally, their monthly meetings are dedicated to expeditiously resolving pertinent and interconnected issues related to a variety of building codes.

b. The General Court should consider granting the Review Board full authority to amend the State Building Code without legislative approval. Doing so would streamline the adoption process, increase the General Court’s ability to focus on other legislative concerns, and demonstrate fiscal responsibility and good governance.

**Other New Hampshire Building Codes**

New Hampshire adopts all building codes on the state level, and the Review Board is responsible for amending the State Building Code for all codes. As of April 1, 2010, the following codes are in effect in the state: The 2009 International Codes Council (ICC) I-codes and the National Fire Protection Association (NFPA) 2009 National Electrical Code. In addition, the New Hampshire State Fire Code is based on the NFPA codes and standards and is administered by the DOS.
Under the purview of the DOS Bureau of Building Construction and Safety (BBC&S), modular housing must meet the State Building Code, while manufactured housing must meet the Federal Housing and Urban Development Manufactured Home Construction and Safety Standards.  

**Energy Codes for State-funded Facilities**

It is important for states to demonstrate their commitment to energy codes by setting the example, and New Hampshire has done so through its efforts to improve the energy efficiency of its state-funded facilities. Executive Order 2005-04 commits the state to meeting the Energy Star Challenge by increasing energy efficiency by 20 percent in state buildings.  

Moreover, in July 2010, The General Court passed SB 409, which requires that any major state-funded project must meet a “high performance, energy efficient, sustainable design standard determined by the commissioners of the department of environmental services and the department of administrative services,” so long as it can recover its incremental costs through reduced energy costs within ten years. A number of buildings are exempt, including new construction less than 25,000 square feet, renovations worth less than $1,000,000, schools, and buildings in the University of New Hampshire system. The law will take effect on July 1, 2011.  

**Gap:** SB 409 moves the state in the right direction. However, it includes a number of exemptions that reduce the bill’s impact.  

**Recommendation #3:** The General Court should update SB 409 to eliminate the exemptions that do not reference other energy efficiency regulations or decrease the stringency of the exemption criteria.  

Attention on energy usage benchmarking and tracking within State-owned buildings has increased significantly in recent years, and feedback providing incentives for agencies to seek out ways to reduce their usage has proved overwhelmingly effective (see Compliance Measurement and Verification).  

**Statewide Climate Change Initiatives**

In March 2009, the New Hampshire Department of Environmental Services (DES) completed a Climate Action Plan. Its goal is to reduce emissions by 80 percent below 1990 levels by 2050 while creating long-term economic growth. The Plan addresses the need for greater energy efficiency of new and existing buildings by recommending that the state adopt the 2009 IECC and improve energy code compliance through an analysis of barriers, outreach to municipalities, and increased training and funding for local inspection departments.  

In addition, New Hampshire is a member of the Regional Greenhouse Gas Initiative (RGGI), a mandatory, market-based CO2 emissions reduction program in the United States between ten Northeast and Mid-Atlantic states. It is essentially a regional cap and trade system: participating states established a regional cap on CO2 emissions from the power sector and require power plants to possess a tradable
Why Climate Change Initiatives Matter

New Hampshire is concerned with the potential impacts of climate change on the environment and the economy. Since building energy use accounts for roughly 40 percent of energy use in the nation—much of it from non-renewable sources—energy codes are a vital tool for reducing energy use and, thus, greenhouse gas emissions, not to mention saving money.

Energy savings built into new construction will accrue over the life of the building. Considering that buildings typically last from 50-100 years, adopting energy codes not only impacts new building energy performance, but also the energy performance of existing buildings until 2060 and beyond. This makes energy codes an important long-term policy for mitigating climate change and supporting the New Hampshire economy.

Governor John Lynch announced the 25 x ‘25 Renewable Energy Initiative in August of 2006. The goal of 25 x ‘25 is for New Hampshire to obtain 25 percent of its energy from clean, renewable sources by the year 2025. Addressing the electricity sector, in May 2007, New Hampshire adopted a renewable portfolio standard that requires 23.8 percent of the State’s electricity to be generated from renewable sources by 2025. Funds collected through Alternate Compliance Payments to the RPS are administered by the PUC and capitalize the Renewable Energy Fund (REF), which in turn incentivizes new renewable energy projects. For a number of reasons, the REF’s capitalization has been lower than initially anticipated. By reducing energy use, energy codes will increase the percentage of renewable energy production in the state. This helps meet the state’s goals. However, reducing total energy use is the first step towards transitioning from non-renewable to renewable energy.

On-site renewable energy is another way in which the state can meet these ambitious targets, and energy codes play a crucial role in reducing the cost of renewable energy installations for homeowners and building operators. When buildings are equipped with energy efficiency measures, the overall energy demands will decrease, which lowers utility costs. This allows building owners to reduce the size of solar PV and solar hot water equipment on their rooftops, as well as other renewable energy systems. By purchasing smaller-scale equipment, building owners save additional money—potentially resulting in increased market penetration for these technologies and lower costs by way of economies of scale for manufacturers.
Overview of Green and Above-Code Programs

LEED

The most prevalent green building standard for commercial construction in the United States is the U.S. Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED). New Hampshire has 27 LEED certified and 84 registered buildings. Moreover, a small percentage of commercial construction meets above-code energy-efficient standards without receiving a high performance building certification.

Why Green and Above-Code Programs Matter

Green and advanced codes and standards help to transform the marketplace by bringing high performing buildings into the mainstream. They also raise awareness of energy- and resource-efficient design for the public, as well as design and construction professionals and code officials. Finally, they raise the ceiling for building energy performance, which, in turn, accelerates and shapes the development and adoption of future model codes.

ENERGY STAR for Homes

ENERGY STAR for Homes is a national above-code building program started by the EPA. To qualify for the ENERGY STAR for Homes label, homes must receive a score of 85 or less on the HERS index, a scoring system that provides a scale for measuring the energy efficiency of a new home compared to a reference home that was built to the 2004 IECC. Every one point decrease below 100 corresponds to a one percent reduction in energy consumption compared to the HERS reference home. Both ENERGY STAR for Homes and Building America—a more stringent DOE above-code building program—intend to increase the stringency of their requirements in the coming months to keep pace with the recent advances in the IECC.

New Hampshire has 4,870 Energy Star qualified homes, 727 of which were constructed in 2010. Additionally, 686 were constructed in 2009 for an impressive 42 percent market share.

The public and commercial building sectors in New Hampshire have also taken advantage of the ENERGY STAR Labeled Buildings and Plants program. The state has about 60 ENERGY STAR labeled public and commercial buildings, with the majority being schools, offices, retail, and dorms on the University of New Hampshire campus.

National Green Building Standard

The Home Builders and Remodelers Association of New Hampshire (HBRANH), the state’s chapter of the National Association of Home Builders (NAHB), supports construction to the National Green Building Standard (NGBS) through its Build Green New Hampshire Council. Supported by RGGI-funded incentives, in 2010, the HBRANH estimates that member builders built about 40 homes to the standard, though many are still in the process of being certified.
Building Energy Conservation Initiative

The OEP started the Building Energy Conservation Initiative (BECI) in 1997. The program contracted firms to conduct energy efficiency upgrades in 10 state-owned buildings. The state would then pay back over time through energy savings, known as performance contracting. The state is still fulfilling the last few contracts.\(^{35}\)

Local Policy

Local energy code adoption varies greatly from state-to-state. In strong home rule states, local jurisdictions have full authority to adopt energy codes that best fit the needs of their community, while others must meet a statewide minimum first. On the other end, some states mandate a minimum-maximum energy code that prohibits local jurisdictions from diverging from the state code whatsoever. Most states, like New Hampshire, fall somewhere in between, mandating a minimum code, but allowing some flexibility to go beyond it in progressive jurisdictions.

Energy Code Adoption

As covered in State Policy, the Review Board adopts the state’s energy code at the state level, though the State Building Code permits local jurisdictions to adopt local amendments, provided that they do not conflict with the State Building Code.\(^{36}\)

Due to the Review Board’s decision to not reclassify the four southern counties as Climate Zone 6, some communities in the state’s four southern counties have discussed this option. This would increase the stringency of the code’s requirements for these four counties. So far, only Durham has gone beyond the State Building Code to require all construction to comply with Climate Zone 6, which went into effect on January 24, 2011.\(^{37}\)

**Gap:** Only one jurisdiction has amended the statewide energy code to be more stringent.

**Recommendation #4:** The state should encourage jurisdictions to adopt more stringent energy codes. Options include:

a. Adopting Climate Zone 6 in the four applicable counties;
b. Adopting the 2012 IECC (once it is released next year) and ASHRAE Standard 90.1-2010 to continue to raise the bar for the minimum energy efficiency of new construction.
Energy Codes for Municipal-funded Facilities

By requiring stricter standards for public buildings, jurisdictions demonstrate their commitment to energy-efficient construction, create a more conducive environment for stricter energy code adoption for private construction, and give themselves leverage in negotiating with stakeholder groups that are hesitant to upgrade the baseline energy code. They also save taxpayer dollars with lower energy bills, further reduce their environmental impact, and improve the air quality and comfort of public buildings.

One example is the Town of Derry, which adopted a LEED Certified policy for all new municipal-funded construction or major renovations.38

Gap: Few jurisdictions in New Hampshire have adopted a more stringent green or above-code policy for municipal-funded facilities.

Recommendation #5:

a. The state should encourage jurisdictions, particularly where there is a high level of construction, to consider adopting more stringent green or advanced code policies for municipal-funded facilities.

b. The state should also encourage jurisdictions to adopt green or above-code retrofit policies for existing municipal-funded facilities.

Local Climate Change Initiatives

Nine cities in New Hampshire have signed on to the US Conference of Mayors Climate Protection Agreement: Concord, Dover, Hanover, Keene, Lebanon, Manchester, Nashua, Portsmouth, and Rochester. The Agreement commits the city to meeting or beating the Kyoto Protocol targets of 7 percent reduction in greenhouse gas emissions from 1990 levels by 2012.39

Furthermore, Keene, Nashua, Portsmouth, and Wolfeboro are members of ICLEI—Local Governments for Sustainability, an association of over 1,200 local governments around the world that have made a commitment to sustainable development. ICLEI members strive to achieve international goals regarding greenhouse gas emissions, environmental preservation, sustainability, and other socioeconomic and political issues.40

One specific objective for members is to create a local climate change action plan, which both Keene and Nashua have already done. They have also conducted a baseline greenhouse gas emissions inventory and forecast, as has Portsmouth. Keene also adopted an emissions reduction target of 10 percent for the community. Wolfeboro, a member since 2009, has not yet met any of these objectives.41

Finally, EECBG funding went to the municipalities of Lebanon, Wolfeboro, Meredith, and Lee to create energy plans. Meredith and Lee have hired contractors to help them develop their plan, and Lebanon is in the process of finding one. No information was available on Wolfeboro. The municipalities have until 2012 to develop their plans.42
Overview of Local Green and Above-Code Building Programs

It is important for cities to set the example by encouraging energy-efficient construction. One example is Nashua, which provides permit fee reductions to LEED-certified buildings on a sliding scale: 5 percent for Certified, 10 percent for Silver, 15 percent for Gold, and 20 percent for Platinum. One LEED-level building is currently under construction, though the developer might opt to not get it certified due to the additional cost.

Both Franklin and Portsmouth passed zoning ordinances to grant developments a density bonus for meeting LEED-based criteria. Franklin offers a bonus of up to 20 percent for achieving 45 points for LEED for New Construction or 55 points for LEED for Existing Buildings or the equivalent. Portsmouth offers a 4.00 floor area ratio increase for LEED certifiable projects. Franklin’s ordinance was in response to a downtown development plan that would have converted old mills into condominiums. The project fell through, and, due to its size, the town does not expect it to be used in the near future. Portsmouth’s ordinance is new, and the city is working with a proposed 100,000 square foot office building that will likely be the first project to take advantage of the program.

In 2010, the Town of Epping adopted a points system for commercial buildings. The list of points is divided into energy production (renewable energy, combined heat and power, innovative technologies) and sustainable design categories (energy efficiency, materials, innovative technologies, and operational requirements), with each policy listed receiving a set amount of points determined by its environmental impact. Projects below 5,000 square feet must achieve a minimum of five points from the list. As projects get larger, the number of points they must meet goes up. The highest level is project 50,001 square feet and up, which much achieve a minimum of 25 points. So far, two projects have been completed.

Adoption Summary

Current Best Practices

New Hampshire has adopted the 2009 IECC and ASHRAE Standard 90.1-2007, a clear best practice for the state—though it remains to be seen if the General Court will approve the update. The Review Board also adopts all building codes on the state level, an efficient process that creates uniformity for code officials and design and construction professionals. The state’s climate change action plan explicitly recommends energy code adoption, but also implementation, which many state plans do not include.

Supported by the state utilities’ Core Energy Efficiency Programs (Core Programs) (see Stakeholder Outreach), the state’s impressive construction rate for ENERGY STAR homes is commendable. With the recent advances in the IECC, ENERGY STAR for Homes is in the process of updating its standards. New Hampshire’s design and construction community should challenge themselves to increase the state’s market share of the more stringent ENERGY STAR homes in the near future.
Finally, multiple local jurisdictions have adopted strong policies that should incentivize the construction of energy-efficient buildings and reduce their communities’ overall environmental impact. It is incumbent on their political leadership and relevant departments to commit to carrying through with these initiatives through funding and outreach, and state agencies should provide guidance and support as needed.

**Gaps and Recommendations**

**State Policy**

**Gap:** The General Court has not approved the most recent energy code update in the State Building Code.

**Recommendation #1:** The General Court should approve the most recent energy code update in the State Building Code to ensure that new buildings meet the stringent standards of the model energy code.

**Gap:** The General Court is considering legislation that would remove the authority of the Review Board to update the State Building Code.

**Recommendation #2:**

a. The General Court should not remove the Review Board’s authority to update the State Building Code. It is comprised of knowledgeable professionals who are qualified to make decisions regarding the complexities of building codes with the best interest of the state’s citizens in mind. Additionally, their monthly meetings are dedicated to expeditiously resolving pertinent and interconnected issues related to a variety of building codes.

b. The General Court should consider granting the Review Board full authority to amend the State Building Code without legislative approval. Doing so would streamline the adoption process, increase the General Court’s ability to focus on other legislative concerns, and demonstrate fiscal responsibility and good governance.

**Gap:** SB 409 moves the state in the right direction. However, it includes a number of exemptions that reduce the bill’s impact.

**Recommendation #3:** The General Court should update SB 409 to eliminate the exemptions that do not reference other energy efficiency regulations or decrease the stringency of the exemption criteria.

**Local Policy**

**Gap:** Only one jurisdiction has amended the statewide energy code to be more stringent.
**Recommendation #4:** The state should encourage jurisdictions to adopt more stringent energy codes. Options include:

a. Adopting Climate Zone 6 for jurisdictions in the four applicable counties;
b. Adopting the 2012 IECC (once it is released next year) and ASHRAE Standard 90.1-2010 for all jurisdictions to continue to raise the bar for the minimum energy efficiency of new construction.

**Gap:** Few jurisdictions in New Hampshire have adopted a more stringent green or above-code policy for municipal-funded facilities.

**Recommendation #5:**

a. The state should encourage jurisdictions, particularly where there is a high level of construction, to consider adopting more stringent green or advanced code policies for municipal-funded facilities.
b. The state should also encourage jurisdictions to adopt green or above-code retrofit policies for existing municipal-funded facilities.
Implementation

While energy code adoption is the necessary first step in the energy codes process, it does not guarantee compliance. To achieve the desired energy and financial savings available through energy codes, states and municipalities must carry out energy code implementation, a term used to describe all of the activities needed to prepare state energy offices, local building departments, the building industry, and other stakeholders for compliance with the energy code. It includes outreach to stakeholder groups, on-site, classroom, and web-based training, establishing and utilizing enforcement infrastructure, tools, and systems, and other educational and organizational efforts.

Funding

Moving forward, available funding will be a constant constraint on New Hampshire’s ability to create strategies and programs to improve energy code compliance, even though these actions will save its citizens money, decrease pollution and greenhouse gas emissions, reduce peak load demand, improve electricity system reliability, and improve the comfort of buildings. The state’s minimal taxes limit government revenue and its conservative politics reduce the number and size of state- and municipal-funded programs.

Though the NH Building Code Compliance Project focuses on energy codes, the state devoted most of its Recovery Act for energy efficiency projects in the building sector to address energy use in existing buildings. Post-Recovery Act, the federal government will reduce funding significantly, and New Hampshire must be prepared to find other sources. The state currently uses GHGERF funds for energy efficiency projects in the building sector, again with an emphasis on existing buildings. If the state chooses to remain a member of RGGI, it could shift some of these funds to begin emphasizing the significant savings available for new construction.

In some states, utilities present a great opportunity to fund energy code projects, and New Hampshire’s four electric utilities are involved in energy code implementation activities (see Stakeholder Outreach). Certainly, utilities also operate on a tight budget, though they are often able to support energy code and above-code implementation in tandem with state and local programs.

Other sources of funding could come from the private sector, non-profits, or public-private partnerships. Manufacturers of energy-efficient products are a possibility, as they have a vested interest in improving energy code adoption and compliance. National trade associations and national, regional, and local non-profit organizations receiving federal or foundation funds present another opportunity for the state.

To address the state’s insufficient state-level enforcement in unincorporated areas and jurisdictions without code officials (see State Enforcement), the state could consider shifting existing funds, generating its own funds through increased permit fees, or working with decision-makers in these communities to come up with creative solutions (see Recommendation #17).
While it searches for appropriate partnerships and sources of revenue, the state can address some of its infrastructure and organizational barriers to energy code compliance, particularly at the state level (see below).

**Overview of State and Local Implementation Policies**

The State Building Code asserts that municipalities have the authority to enforce the state building code, including the energy code. Municipalities with code officials conduct plan reviews and on-site inspection, as well as issue building and occupancy permits. Municipalities may consult with the PUC and the DOS on enforcement issues as necessary. In municipalities and unincorporated area in which there is not a code official, Chapter 155-D:4 grants the PUC the authority to conduct plan reviews. The PUC also sets administrative rules for the State Building Code that corresponds with Chapter 155-D:4. Chapter 155-A:7 grants the DOS the authority to conduct on-site inspections. It is also responsible for conducting plan reviews for state and county facilities, the University of New Hampshire System, educational facilities with state funds, healthcare facilities, and jurisdictions without code officials. (see State Enforcement for the practical application of these policies).

The DOS BBC&S Manufactured Housing Board regulates manufactured and modular buildings. It is responsible for setting uniform installation standards and regularly assessing manufacturers of modular homes and third party inspection agencies for compliance with the State Building Code.

The General Court is considering legislation to change the energy code adoption and implementation infrastructure in the state (see Recent Energy Codes Legislation). The proposed legislation would remove both the DOS’s power as the ultimate authority on building code issues and its responsibility to enforce the code in incorporated areas and towns without code officials. This action would have political repercussions for the state’s building and fire code stakeholders. State energy code enforcement would likely not change substantively due to DOS’s current enforcement practices (see State Enforcement). Regardless of these proposed changes, the General Court should use its authority to clarify energy code implementation responsibilities, relying on input from all of the involved parties.

**Gap:** There is considerable confusion in the state regarding energy code enforcement authority, which hinders the effectiveness of enforcement throughout the state.

**Recommendation #6:**

a. The General Court should clarify energy code enforcement authority for all types of jurisdictions and buildings in the State Building Code and remove all existing legislation that creates ambiguity. Before passing legislation, it should weigh the opinions of the various agencies and stakeholders and then create a plan that will ultimately improve the ability of state agencies to administer and enforce the state’s adopted building codes efficiently and with no ambiguity.

b. The General Court could consider consolidating all building code enforcement into one state agency to eliminate confusion and improve the efficiency and effectiveness of the state enforcement process. This could either be one of the existing state agencies or a newly
created agency to oversee all building code enforcement, divided into separate divisions. Such options will likely be politically challenging and/or logistically infeasible.

c. The General Court could also consider clearly separating fire code enforcement from all other building code enforcement to grant the DOS, the PUC, and all code officials clearly defined areas of jurisdiction.

The State Building Code states that for all residential construction and commercial construction less than 4,000 square feet, design and construction professionals can demonstrate compliance with the PUC EC-1 form. REScheck is permissible for projects in which EC-1 cannot be used. Design and construction professionals can demonstrate compliance for commercial construction using the professional stamp of a licensed architect or engineer. COMcheck may be used to show compliance.55

Gap: State guidelines allow licensed engineers or architects to certify compliance.

**Recommendation #7:** Professional stamps alone do not ensure that the building meets energy code requirements. The Review Board and/or the General Court should consider updating the State Building Code to require more stringent compliance verification methods that mandate site-plan review by trained plan reviewers.

Article 28-A of the State Constitution prohibits the state from issuing unfunded mandates to municipalities. Thus, all of the State Building Code’s implementation policies are subject to local endorsement.56 This Article also limits the ability of the state to influence local implementation activities without providing the appropriate funding.

**Outreach**

Energy codes have come a long way, but there are still many people unaware of their benefits, including most consumers and some policymakers. Many code officials and building and design professionals are also uneducated about energy code benefits and requirements. Outreach involves all of the activities states and local jurisdictions can undertake to raise awareness of the need for energy codes, promote their adoption and implementation, and identify opportunities for training, technical assistance, and other support. Given the diversity of the energy codes community across the country, execution of strategic outreach campaigns can improve understanding of code changes, create buy-in, and can lead to greater levels of compliance.
State Outreach

Outreach to Key Stakeholders

The state plays an important role in promoting the benefits of energy code compliance and signaling its priorities to local governments and other stakeholders. The state’s primary outreach program is the NH Building Code Compliance Project run by GDS. Prior to launching its training workshop series (see Training and CEUs), GDS carried out a number of activities to market its program to key stakeholders and create buy-in. It put together a diverse Stakeholder Panel comprised of state and utility representatives, code officials, realtors, energy code advocates, and other interested parties. Meeting quarterly, its mission is to offer relevant and realistic feedback on the NH Building Code Compliance Project. It also provides GDS with an avenue to advertise its work and upcoming activities to the Panel members, who, in turn, promote GDS’s work—particularly its training workshop series—through their various channels.

For a more detailed overview of GDS outreach work, please see the NH Building Code Compliance Project overview resources.

GDS has found some success creating buy-in from the groups its stakeholder panel represents. Many professionals interviewed noted that there has been an increased awareness of the many benefits of energy-efficient construction among code officials, design and construction professionals, and other interested parties. Solid attendance at information sessions, training workshops, and other events is also a measure of GDS’s and the Panel’s outreach efforts. Still, this is not to say that all or even most of the key professionals in the state are onboard. Energy codes are still a relative unknown in many parts of the state and among some groups, and others have yet to embrace their implementation, often due to the barriers listed below (See Enforcement Community and Design/Compliance Community).

Gap: In spite of GDS’s strong outreach efforts for the NH Building Code Compliance Project, some individuals and groups still do not value the many economic, environmental, and security benefits of energy code compliance and enforcement.

Recommendation #8:

a. Once the NH Building Code Compliance Project ends, the state should continue to support outreach efforts as a crucial mechanism for saving residents and businesses money and reducing the state’s environmental impact.

b. The state should expand the scope of the Stakeholder Panel to influence changes that lead to stronger energy code implementation. Pressure—and incentives—from multiple parties, coordinated at the state level, can motivate code officials and design and construction professionals in ways that the state cannot achieve through directives, incentives, and other measures.
**Outreach to Consumers and Businesses**

GDS is also developing a public awareness campaign for homeowners. The goal is to alert the largely uninformed public that the state has an updated energy code and that they have the right to demand that new construction and renovations meet this higher standard of energy efficiency. GDS has outlined a number of different strategies for its outreach work, including press releases, speaking opportunities, marketing efforts, informational handouts, and a public service announcement that challenges consumers to demand that their new homes be built to the state code.

In addition to its consumer work, GDS is also targeting property managers, suppliers, and the real estate, appraisal, and lending communities to promote the benefits of energy code compliance. These groups have considerable influence in the success of energy code compliance, yet have traditionally been less involved and often do not have policies in place that properly value energy-efficient construction. GDS is considering special training sessions catered specifically for each of these groups. GDS expects to implement its public awareness campaign in the spring or summer 2011.

**Gap:** There has been little state outreach conducted in New Hampshire that targets consumers, businesses, suppliers, and the real estate, appraisal, and lending communities.

**Recommendation #9:** GDS is aware of this gap and is developing an outreach program targeting some or all of these groups. This program should aim to not only raise awareness of the energy code and building energy efficiency among these stakeholders and explain why it should matter to them, but also result in action items that will lead to behavior and policy changes that influence stronger energy code compliance.

**The Energy Efficiency & Sustainable Energy Board (EESE)**

Formed by the General Court in 2008, the Energy Efficiency & Sustainable Energy Board (EESE) is a group of government officials, trade association representatives, and other organizations involved in setting and carrying out energy policy in New Hampshire. Multiple agencies and groups involved in energy code implementation are represented on the EESE Board. Under the administration of the PUC, the EESE Board meets monthly to discuss energy efficiency and sustainable energy policy, funding, programs, projects, and general collaboration. Its members are strong supporters of energy codes and building energy efficiency in general, and its actions and outreach promote and raises awareness of energy efficiency and renewable energy work in the state.

The General Court is considering disbanding the EESE Board. As of mid-February 2011, no decision has been made.

We are holding our breath. As of last week, the plan was to move ratification of the codes and amendments into HB62, a much cleaner and less controversial bill which would also add the IEBC into NH’s portfolio of codes. The rest of HB137 could then be analyzed more closely, and perhaps overhauled.

**Gap:** The General Court is considering disbanding the EESE Board.
**Recommendation #10:** The General Court should not disband the EESE Board. It is comprised of knowledgeable professionals who collaborate to help move the state forward on increasing its energy efficiency and renewable energy production.

**Local Outreach**

*Outreach to Policymakers and the Design and Construction Community*

For code officials, outreach to policymakers and the design and construction community is the first step to improving energy code enforcement practices. Local decision-makers must understand the benefits of energy-efficient buildings and prioritize enforcement as a vital economic and environmental policy mechanism. The design and construction community must also understand why energy code compliance leads to better buildings so that they work with code officials to achieve energy code compliance.

Code officials interviewed said that there was little energy code outreach on the local level before the adoption of the 2006 IECC. Since then, the adoption of two iterations of the code has increased the energy code’s profile and importance, though outreach activities have not necessarily followed. In interviews, code officials disclosed that outreach to policymakers and the design and construction community is highly dependent on individual code officials. New Hampshire has energy code champions at the local level that make sure that all relevant parties understand why they need to support and comply with the State Building Code. However, many code officials only promote the energy code to the extent they feel necessary or not at all.

**Gap:** Many code officials do not conduct sufficient outreach to local policymakers and the design and construction community.

**Recommendation #11:** Through the NHBOA, the state should encourage code officials to promote the importance of energy code enforcement to local policymakers and the design and construction community, which will improve their ability to conduct proper energy code enforcement.

The lack of outreach to policymakers and the design and construction community is often due to a lack of priority for energy code enforcement among code officials. Those interviewed often indicated that many in their field view the energy code as a secondary concern compared to the more traditional life, health, and safety codes. They stress that in most jurisdictions, the focus on energy code enforcement is relatively new. Those who do not value energy code enforcement as fundamental to occupant health and safety are less apt to promote their importance to local policymakers and the design and construction community.

**Gap:** Many code officials do not make energy code enforcement a priority.

**Recommendation #12:**

a. The state and NHBOA should encourage individual energy code champions to promote the benefits of energy code enforcement to their colleagues.
b. The state should consider participating in the BCAP/ICC Energy Code Ambassadors Program to provide additional training and support to energy code champions to improve their ability to promote energy codes and train colleagues on the requirements of the energy code.

**Outreach to Other Stakeholders**

Code officials and other policymakers should also promote energy codes to businesses, consumers, building owners and operators, and other groups. It is in these groups’ best interest to support energy-efficient buildings that will save them money. When they start caring about energy issues, it increases demand for energy-efficient construction, which creates an environment in which improved construction practices and techniques required to meet the provisions of the latest energy codes become standard practice. This, in turn, allows for the adoption and implementation of even more efficient energy codes and, thus, increased energy savings for consumers.

Certainly, saving energy for consumers and businesses is an issue that inspection departments and policymakers support. However, outside of a few communities, our findings indicate that it does not appear to be a priority in most cases for a number of reasons (see Barriers to Enforcement).

**Gap:** Few jurisdictions in New Hampshire have undertaken strong outreach efforts targeted at businesses, consumers, building owners and operators, and other groups.

**Recommendation #13:**

a. The state should encourage code officials and local policymakers to conduct consumer and business outreach to create demand for strict energy code compliance from the design and construction communities.

b. The state could also encourage these groups to increase their participation in the NH Building Code Project’s ongoing outreach efforts.

c. Local Energy Committees (LECs) could adopt and champion energy code issues, creating stronger support for improved compliance.

**Stakeholder Outreach**

Stakeholders can also support energy code awareness through outreach efforts to a number of different groups, such as code officials, policymakers, building professionals, and consumers. However, many of the stakeholder groups who can raise awareness and influence behaviors—including utilities, environmental non-profits, the real estate, lending, and appraisal industries, some policymakers, property managers, manufacturers, and consumer groups—are either uninvolved in energy code implementation in New Hampshire or are already targets of state and local outreach to increase their support for energy code compliance. Therefore, the state and local jurisdictions have an opportunity to increase participation from these groups, as covered above.

Utilities are one of the most important stakeholders involved in energy code outreach, as they have a vested interested in reducing peak load demands, improving their system reliability, allowing them to
retire old production facilities, and helping them transition their production sources to meet the state’s renewable portfolio standard. All four of New Hampshire’s electric utilities are active in energy code training, promoting energy efficiency, and incentivizing above-code construction.

Since 2002, a portion of New Hampshire’s System Benefits Charge has funded the Core Programs, a set of energy efficiency programs established by the state’s four electric utilities—Public Service of New Hampshire (PSNH), National Grid, Unitil Energy Systems, and the New Hampshire Electric Cooperative—and supported by the PUC. The Core Programs address residential, commercial, and industrial buildings.58

In 2010, the Core Programs had a budget of $13.1 million, $1.4 million of which went to the ENERGY STAR Homes program. Participants receive a free HERS rating and incentives of up to $2,500 for building ENERGY STAR homes. On the commercial side, there are commercial retrofit programs for new equipment and retrofits, with incentives of up to 35 percent of the project cost. These are just two examples of Core Programs for homes and large and small businesses. Information on all Core Programs can be found at nhsaves.com, which also has information on each electric utilities’ own energy efficiency programs and outreach to customers.

The HBRANH conducts outreach to consumers through the Building New Hampshire Trade Show and Conference and the annual New Hampshire State Home Show, now in its 44th year. Both events give home builders, the public, and other interested parties the change to learn more about homebuilding and above-code construction in the state.

Finally, the Northeast Energy Efficiency Partnerships (NEEP) promotes energy efficiency in the New England and Mid-Atlantic regions. It provides policy analysis, project support, and technical assistance to states in the northeast region. One of its signature projects was to support the development and adoption of a 2009 stretch code in Massachusetts.

In New Hampshire, NEEP representatives have testified before the General Court regarding energy efficiency issues and have been in communication with GDS on how to support the NH Building Code Compliance Project. Still, the organization has not been as involved in New Hampshire as it has in neighboring states. One reason is that the state’s agencies do not have the time or resources to work with NEEP as closely as they would like to. Another might be that some involved parties believe NEEP’s progressive stance on energy efficiency policy is too aggressive, due in part to the state’s conservative culture and politics that favor cautious, incremental change. Regardless, the state knows that NEEP has regional energy code expertise and resources that could benefit the state. It considers NEEP a potential partner on future projects to advance the state towards improved energy code compliance.

Enforcement Community

The enforcement community provides the teeth behind adopted codes, as it is their responsibility to ensure that design and building professionals comply with the provisions of the energy code. While enforcement is most commonly a local issue, states play a crucial role in providing municipalities with the resources and support they need to establish effective enforcement infrastructures and practices. As
codes are a moving target, it is also incumbent on states and cities to provide the enforcement community with access to sufficient energy code training.

**Overview of Enforcement Infrastructure**

**State Enforcement**

As stated above, the PUC is responsible for conducting plan reviews for the State Building Code in unincorporated areas and jurisdictions without code officials. In practice, the PUC carries out its process for any municipalities that request it. As a one-person office, the PUC does not have the resources to conduct a full plan review. Rather, applicants must fill out an EC-1 form that documents that the plan meets all energy code requirements. If there are errors in the document, the PUC alerts the applicant and makes the corrections.

The DOS is responsible for inspections in jurisdictions without code officials, as well as inspections for modular housing installations and manufactured housing assembly. In practice, the DOS does not have the resources to conduct all such inspections. As a result, a small, but significant percentage of buildings in New Hampshire do not receive building code inspections. In these cases, the only recourse available to owners of buildings that do not meet code is civil action against the builder—far from the ideal method for ensuring compliance.

The DOS is also responsible for conducting plan reviews for state and county facilities, the University of New Hampshire System, educational facilities with state funds, healthcare facilities, and jurisdictions without code officials.

**Gap:** The PUC and the DOS do not have sufficient staff and resources to conduct adequate plan reviews and on-site inspections for all construction projects that fall under their jurisdictions.

**Recommendation #14:**

a. The PUC and the DOS could consider increasing their funding or working with state and local stakeholders to identify creative solutions to support code officials and ensure that all buildings in New Hampshire meet minimum requirements for building safety and energy efficiency.

b. Beyond clarifying state energy code implementation infrastructure (see Recommendation #6), The General Court should use its authority to strengthen the applicable state agencies’ ability to enforce the energy code in unincorporated areas and towns without code officials. Options include increasing funding or finding other creative infrastructure solutions that reduce staff workload or leverage minimal state and local resources through economies of scale (see Recommendation #17).

**State-level Implementation Support**

One important function of the state is as an advisor and supporter for local inspection departments and policymakers. The NH Building Code Compliance Project has raised the level of state involvement in
energy code implementation support over the past two years. Prior to this project, the OEP was not very involved in energy codes and the PUC and DOS implementation within their limited budgets. The state and these agencies must find ways to build off their current efforts—especially when the Recovery Act-funded NH Building Code Compliance Project ends—to guarantee that energy codes reduce energy use in the short- and long-term.

NHBOA also provides state-level support. Its mission is to encourage and educate members to achieve effective and uniform code enforcement. Led by its past and current leadership, it supports the energy code as much as it can, given available time and resources. One of its main implementation support functions is to answer code-related questions and clarify code requirements, a role its leadership fulfills on an ad hoc basis.

**Gap:** Most local jurisdictions require more resources and support for energy code implementation.

**Recommendation #15:** Through its various agencies, the state should build off the success of the NH Building Code Compliance Project by working with the NHBOA, building practitioners, and other advocates to provide additional information, technical support, and possibly incentives to influence behaviors at the local level. Some examples include:

a. Analyzing and tailoring DOE’s many resources to fit the specific needs of New Hampshire’s various jurisdictions (see Appendix A);

b. Establishing clear energy code guidelines and an official representative or body to clarify all energy code inquiries;

c. Creating easy-to-use compliance checklists;

d. Subsidizing or loaning out duct blaster, infrared camera, blower door, and other equipment for inspection departments.

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**Energy Code Enforcement in Bedford**

Bedford is widely regarded as having strong energy code enforcement practices, due in part to its available resources and to its attitude towards enforcement.

The local government supports the town’s inspection department, including providing it with sufficient funds to carry out its mission and approving permit fee increases in 2010. In turn, the inspection department is knowledgeable about energy code provisions and clearly outlines what design and construction professionals must do to meet them. Crucially, it also accepts the short-term limitations to 100 percent compliance for all involved parties.

Still, its review and inspection practices are also noteworthy. It does not allow an architect’s or engineer’s stamp to signify energy code compliance, a rare step that reduces mistakes at the design phase. It also checks for energy code compliance at all stages of the inspection process, from foundation to final.

Code officials interviewed also cited a number of the cities and larger towns that had solid energy code enforcement, due in part to their larger staffs that can devote more time to the process (see Barriers to Enforcement).
Jurisdictional Enforcement

As mentioned above, local inspection departments at the jurisdictional level are primarily responsible for energy code enforcement in New Hampshire. Some jurisdictions only conduct one of the two stages of the enforcement process and rely on the PUC and/or the DOS for assistance. A few contract one or both to third party inspection companies, and some smaller jurisdictions share a code official. Like in most states, code officials communicate regularly on local issues through the NHBOA, but generally do not work together directly.

The building inspection process in New Hampshire in jurisdictions with code officials usually follows the standard format, though each code official has his or her own process depending on their time, knowledge, and priorities. The site-plan review is straightforward and includes back-and-forth between the design and construction professionals and code officials if the plans do not meet all requirements. Code officials then conduct on-site inspections at set stages in the process, though the number and type of inspections vary by the type of construction and the code official’s available time. Ideally, they issue inspection write-ups or stop-work orders for violations, but this procedure sometimes does not extend to the energy code according to our interviews. The last step is to issue occupancy permits once the construction professional has addressed any issues raised.

Regarding the energy code specifically, code officials interviewed acknowledge that this model process is close to accurate for some jurisdictions that have already made a firm commitment to ensuring building energy efficiency, but farther from actual practice in many others that have not. Code officials that address energy efficiency requirements incorporate them into their existing review and inspection processes. Most check for sufficient insulation at a minimum, though a number of contributing factors determine whether they check for requirements at all applicable stages of the inspection process (see Barriers to Enforcement).

There is not a definitive way in which to categorize energy code enforcement practices in New Hampshire, at least among jurisdictions that have code officials. Those interviewed said that available time was the best determinant of successful enforcement. While this division often falls between rural and urban or suburban jurisdictions, multiple code officials stressed that it does not hold that most rural inspection departments were necessarily less stringent in their enforcement practices than those in the cities and larger towns.

In 2006, GDS surveyed code officials to assess the status of compliance statewide and found wide discrepancies across the state. Of the towns surveyed, 63 percent rated themselves as being actively involved in the energy code review process, with the vast majority of large towns (5,000+ citizens) in this group. Still, the other 37 percent graded themselves as having little or no involvement, and three quarters of these towns did not have at least one full- or part-time code official, as is common in rural communities.

GDS surveyed code officials again in 2010 to assess the status of compliance statewide and establish a baseline for compliance with the 2009 IECC. This survey was more thorough than its predecessor and asked code officials to comment on the following topics for residential and commercial construction:
Their energy code knowledge and experience
An estimated rate of compliance in new construction as well as renovations
Perception from their towns of their involvement in the permitting process
What practices each code official conducts to evaluate compliance, and details about the building elements checked during each
Market barriers to compliance
The effectiveness of different enforcement models

The results of the survey show slightly more promise for code compliance, but also highlight many areas where much more effort is required. Specifically, 13 percent of the interviewed code officials graded themselves as having “low” or “no” involvement in the energy code enforcement process, an improvement of 24 percent from the previous study. However, the report also suggests that many of the plan review and site inspection processes are somewhat incomplete. For example, the frequency that building envelope, lighting and electrical equipment, and mechanical systems were inspected for ranged from 36 to 86 percent for residential, and 52 to 87 percent for commercial construction. Additionally, survey responders identified many significant barriers to compliance, including public education and outreach, training, builder and contractor material availability, and insufficient manpower, resources, and time. GDS stresses that these surveys are self-reported. Hence, it is important to analyze the results with this in mind.

For a more detailed overview of the state’s enforcement infrastructure, please see the GDS NH Building Code Compliance Project survey results, which it plans to release in a modified form near the end of its project.

**Barriers to Enforcement**

In our interviews, a lack of familiarity with the energy code was the most commonly cited barrier to energy code enforcement. Despite ongoing training efforts by a number of stakeholders (see Training and CEUs), many code officials have not received adequate training on the energy code, the building science behind it, and its proper application in the field. The vast majority of code officials come from the design and building sectors. They tend to focus on the areas of construction with which they are the most familiar—and energy efficiency is rarely one of them. In addition, the model energy code is more stringent than previous energy codes and requires additional knowledge even for code officials who have attended energy efficiency trainings in the past.

See Training and CEUs for recommendations to increase training opportunities in the state.

As discussed briefly in Outreach, some code officials do not place a high priority on energy code enforcement, often because they are not familiar with the energy code. Those that feel this way are less likely to adjust their established routines to undertake more thorough energy code reviews and inspections, especially if their superiors take a similar view. Inspection department directors must champion energy code enforcement and instill this attitude in their staffs.

Time and resources are other significant barriers, particularly given New Hampshire’s energy code enforcement infrastructure in small towns and unincorporated areas. Many jurisdictions in New Hampshire
Hampshire have only one code official, and some work for multiple jurisdictions. For them, the burden of incorporating a thorough energy code plan review or site inspection into their established enforcement process is infeasible, especially if they are less familiar with the provisions of the energy code or do not view it as a priority. In our interviews, we repeatedly heard that when understaffed and overworked, energy code enforcement is often the first area local inspection departments deemphasize or have to disregard.

**Gap:** Inspection departments do not receive sufficient funding to overcome existing barriers to energy code enforcement.

**Recommendation #16:** Local governments that want to commit to saving energy for residents and businesses should make inspection department funding a higher priority. Budgeting, more than any other indicator demonstrates commitment from jurisdictional leadership to prioritize energy code implementation.

Some jurisdictions do not even have code officials. They must rely on the state for building code enforcement, which leads to a small, but significant number of construction projects that do not receive any on-site inspections (see State Enforcement). Most consumers are also rarely informed about the benefits of energy-efficient construction and do not know to check that their new home meets the state code (see Outreach). Without enforcement or consumer-driven demand for energy-efficient buildings, many industry professionals construct buildings with the lowest up-front costs, as opposed to the lowest lifecycle costs, thereby raising their profits at the expense of their clients (see Design/Construction Community).

**Gap:** Many jurisdictions do not have inspection departments or even part-time code officials.

**Recommendation #17:** All jurisdictions should ensure that buildings constructed within their jurisdictions are safe and energy-efficient.

- One possible solution to a lack of local government funding in small towns is to expand the existing arrangements in which one code official works for multiple towns.
- Another intriguing solution is to establish regional inspection departments to take advantage of combined resources for enforcement and economies of scale, a model that has worked well in other states. Relevant state agencies and the NHBOA are in the best position to work out the logistics of such an endeavor. Such a solution could improve energy code compliance in these locations and remove some of the burden of enforcement from the PUC and the DOS, thus allowing them to devote more time to their implementation responsibilities. This model could also be extended to include many other public services to further maximize the effectiveness of limited resources.

Ultimately, energy code enforcement is the result of countless on-the-ground decisions made by individuals. It is improbable that all code officials will attend energy code trainings, prioritize energy code enforcement, promote it to relevant stakeholders, and adjust their procedures to devote more
time and resources to it. Yet with training, outreach, and more support from state and local governments, those interviewed stressed that most code officials would be open to change.

See The Outreach and Enforcement sections for additional Recommendations to address these barriers.

Certification

New Hampshire does not have a formal code official certification process and does not require certifications from a qualified certification provider. The NHBOA also does not require certification as a requirement for membership. Many jurisdictions require ICC or equivalent certification for all code inspectors, either explicitly or, more often, implicitly. According to the NHBOA, New Hampshire has one of the highest percentages of ICC certified code officials. The ICC lists 172 certified code officials in the state, although there are only a handful of certified energy plans examiners and inspectors.

New Hampshire’s constitutional provision to prohibit any unfunded mandates complicates this gap and potentially shifts the responsibility for setting certification requirements from the state to the NHBOA and local jurisdictions.

Gap: The state, NHBOA, and many inspection departments do not set certification requirements for code officials that include minimum certifications from a qualified provider.

Recommendation #18:

a. To protect its citizens, the appropriate state agency should set certification requirements for code officials that include minimum certifications from a qualified provider and give every code official easy access to certification trainings from the ICC or another organization.

b. The NHBOA should make minimum certification from a qualified certification provider a requirement for membership.

c. Should the state or NHBOA be unable or unwilling to do so, both groups could use their energy codes expertise to provide guidance to local jurisdictions on how to set certification requirements for code officials.

Training and CEUs

GDS has conducted various energy code and above-code training workshops in New Hampshire over the past few years organized by PSNH and funded jointly by the four utilities in the state. It has also held energy code trainings workshops in conjunction with the PUC.

As one of its principal tasks for the NH Building Code Compliance Project, GDS undertook a more comprehensive training workshop series on the 2009 IECC in 2010. Building on its previous work, it developed a flexible training schedule to cover the State Building Code requirements for both code officials and design and construction professionals. One of GDS’s goals was to target communities that required more assistance with the transition to the updated state code, particularly those without a full-time code official. Its goal is to conduct 24 trainings across the state over a two-and-a-half year period.
In spring 2010, it conducted eight training workshops open to all code officials and design and construction professionals in six different communities across the state, in addition to an NHBOA-organized training attended by 65 code officials. In the fall and winter 2010/2011, GDS held an additional eight training workshops open to all code officials and design and construction professionals in five communities, funded by New Hampshire’s electric utilities. The average attendance for all trainings was about 40 attendees, which was about 71 percent of registered participants. Even though these are encouraging numbers, GDS estimates that—apart from the code official-only training—only 10 percent of the attendees were code officials, with builders, contractors, energy auditors, and similar professionals the majority. It is vital that the professionals who are responsible for enforcing building codes know how to enforce the state’s energy code as stringently as they enforce other building codes.

**Gap:** Code officials have not taken full advantage of free and accessible energy code training workshops to become acquainted with the new provisions of the State Building Code.

**Recommendation #19:** The state and NHBOA should continue to encourage and convince code officials to attend and appeal to local governments to apply pressure to their inspection departments.

In the spring 2011, GDS will run an additional four-to-six training workshops, and 16 overall in 2011 and 2012. It is in the planning stages of creating multiple in-the-field trainings that will bring attendees to the construction site to not only learn the code requirements, but also their practical applications and installation techniques. The most common constructive feedback from training attendees is that the classroom does not translate into the field, so these workshops would attempt to bridge that gap. Seeing first-hand how to apply the code is vital for improving both enforcement and compliance.

**Gap:** There has been little, if any, formal on-site energy code training in New Hampshire.

**Recommendation #20:** GDS is aware of this gap and is discussing how to overcome it. Working with its partners, it should ensure that it explores all avenues to working through the logistics of establishing on-site trainings.

Finally, GDS is also interested in running a training workshop for the real estate, appraisal, and lending communities and another for consumers. In each case, the training would be less technical and focus more on the benefits and importance of the energy code and building energy efficiency in general. Approaching these crucial and largely uninvolved stakeholder groups presents an excellent opportunity to increase demand and change the market for energy-efficient construction. Beyond raising awareness, it is important that this work eventually lead to action items that address the barriers.

The NHBOA is also supportive of energy code training. In recent years, it has hosted ICC classes for energy inspector certification. In 2010, it held three energy code training sessions and has been actively involved in the NH Building Code Compliance Project workshops.

**Gap:** Despite these commendable efforts, more energy code and building science training will be needed to ensure that code officials and design and building professionals have the
knowledge and skills needed to understand the provisions of the model energy codes and their application in the field, as well as green and above-code standards.

**Recommendation #21:** The state should build on its existing training infrastructure. Possibilities include:

a. Working with GDS, the PUC, utilities, and the HBRANH to create an on-site training infrastructure to educate code officials and building professionals on how to apply their knowledge of energy codes in the field;

b. Finding other funding sources to sponsor additional trainings, particularly after the conclusion of the NH Building Code Compliance Project;

c. Providing state incentives to make it easier for all code officials to attend training workshops;

d. Supporting and collaborating with community colleges, technical schools, and the state university system to increase training for design and construction professionals to gain expertise in building science and energy codes;

e. Subsidizing tuition for energy efficiency-related classes.

**Third Party Infrastructure**

New Hampshire does not have an established third party inspection process for jurisdictions, and inspection departments set their own policies. Most full-time code officials welcome third party inspectors, though most require third party inspectors to submit documentation of their work and many conduct their own energy code inspections in addition.

However, third party inspection may present a viable alternative for many code officials, particularly those with less time and staff. Since they deal only with energy, third party inspectors allow code officials to focus on their other enforcement responsibilities. While it is ideally preferable that code officials conduct their own inspections to ensure energy code compliance, even in addition to third party inspections, this might not always be the most practical option, assuming other changes have not been made that would give them more time, staff, and familiarity with energy code enforcement. Still, there is significant grey area around when this situation would be preferable, and each jurisdiction would have to determine its own comfort level with ceding all or part of its energy code enforcement process to a third party.

**Gap:** Some code officials struggle to conduct their own energy code enforcement on top of third party inspectors’ work.

**Recommendation #22:** In certain circumstances, code officials should permit third party inspectors to verify energy code compliance, leaving them to focus on the enforcement of other building codes.
There is a fairly strong infrastructure in New Hampshire for third party inspections. Multiple organizations offer trainings for Residential Energy Services Network (RESNET) Home Energy Rating System (HERS) raters and Building Performance Institute (BPI) Certified Professionals.

RESNET provides federally recognized third-party rating standards for building energy performance. Its website allows homeowners to learn about energy audits and rating processes, as well as easily locate certified energy auditors, raters, and qualified contractors and builders. According to RESNET, there are currently four organizations certified as HERS raters in New Hampshire, with an additional 16 organizations listed in neighboring areas. Providers must complete the required RESNET energy training to be included on this list. In addition, the ENERGY STAR website lists nine companies and organizations that employ qualified raters in the state and surrounding areas. Of those companies, three account for 96 percent of ENERGY STAR homes inspected: GDS, Conservation Services Group of New England, and Horizon Residential Energy Services New Hampshire.

BPI is a national non-profit organization that develops technical standards for home performance and weatherization retrofit work, training programs, and professional credentialing for individuals and companies. BPI has five Training Affiliates in the state: GDS, Energy Audits Unlimited, Keene State College, Lakes Region Community College, and Manchester Community College. There are also 56 organizations with BPI Certified Professionals on staff. There is some overlap between organizations with HERS and BPI certified professionals.

Lakes Region Community College offers an Associate’s Degree in Energy Services and Technology that includes energy code training and prepares students for careers in energy auditing, weatherization, construction, and similar fields. Moreover, in 2011, it is running a RGGI-funded training program in collaboration with the Department of Resources and Economic Development and the Plymouth Area Renewable Energy Initiative (see blue box). It will offer BPI Building Analyst and BPI Envelope Professional classes, installer training, and building energy efficiency boot camps, designed as a bridge between existing trainings and the Energy Services and Technology degree program.

This training program builds off a 2009-2010 RGGI-funded program that held twelve Building Professional trainings across the state, two of which included Envelope Professional training. There was an additional Envelope Professional-only training. 170 students attended the trainings in total and of the 70 percent that took a BPI certification test, roughly 80-85 percent passed.

These trainings are beneficial to third party inspection professionals, energy auditors, remodelers, and even code officials. Program staff noted that there has been little participation from code officials, who
could benefit from the building science and building energy efficiency training. One possible reason for the lack of participation among code officials is the cost and time commitment for trainings.

The other BPI Affiliates and other organizations, such as Lebanon College and the Northeast HERS Alliance, have also offered BPI and similar trainings in the past.71

**Design/Construction Community**

The design and construction community—made up of designers, architects, engineers, developers, builders, and subcontractors—are in charge of conceiving and constructing the built environment. It is ultimately their responsibility to comply with the requirements of the adopted energy codes. However, state and local agencies, energy code advocates, and other stakeholder groups share in this responsibility. They have the opportunity to provide the training, tools, educational materials, and support to understand and be able to comply with the code, including how to correctly install materials and use testing equipment. They can also work with the design and construction community to establish a workable compliance process that is accountable, yet flexible, and accommodates local practices and circumstances.

**Overview of Infrastructure and Barriers**

The HBRANH and the regional home builder chapters represent New Hampshire builders and remodelers through political engagement, training, and outreach services, among others. It conducts outreach to the state government. A representative sits on the Review Board, and another sits on the EESE Board. The HBRANH must promote the views of its members and, therefore, supports energy codes and energy-efficient construction through outreach and training, but has also provided opposition to energy code adoption in the past. Some builders feel that the code has moved too quickly for the market and that they cannot build to code in a cost-effective manner (see Barriers to Compliance).

The American Institute of Architects (AIA) New Hampshire and the Granite State Chapter of ASHRAE are the primary trade associations representing the state’s architects and engineers. Neither organization is as active as the HBRANH in representing its members at the state level regarding energy codes or providing them with opportunities for energy code training.

The barriers to energy code compliance in New Hampshire are all interrelated, and design and building professionals must balance multiple competing interests. As with the enforcement community, a lack of familiarity with the energy code is an important barrier according to code officials and design and construction professionals interviewed. Connected to this is a lack of priority for energy code compliance, often in response to enforcement officials’ own lack of priority for energy code enforcement or the state’s inability to enforce the State Building Code sufficiently in unincorporated areas and jurisdictions without code officials (see Barriers to Enforcement). In addition, New Hampshire’s culture of hands-off government influences many building professionals’ attitudes towards additional regulation. Finally, the state of construction in New Hampshire is such that many design and construction professionals feel that building to the energy code is not cost-effective, particularly when
consumers do not demand energy-efficient construction or show the willingness to pay more in upfront costs.

Knowledge is fundamental to improving energy code compliance. Although the hard work of a variety of involved parties has increased access to training during the last two updates to the State Building Code, it is incumbent on the state to maintain and strengthen these efforts (see Enforcement Community: Training and CEUs).

See Enforcement Community: Training and CEUs for recommendations on how to increase and improve training opportunities in the state for both the enforcement and design and construction communities.

Still, experts around the state feel that many building professionals do not understand the requirements of the energy code or their application in the field. For example, the PUC estimates that building professionals incorrectly fill out the EC-1 form 25-30 percent of the time. Moreover, some code officials say that they have to spend time teaching some building professionals how to comply, thus adding additional strain to their limited time and resources.

Conversely, some building professionals argue that some code officials do not care about or understand the code. They cite a lack of enforcement as a primary disincentive for design and building professionals to become familiar with the energy code’s provisions or follow them closely in plans and during construction. While both accounts are accurate to some extent, the larger issue is that both groups need more education and practical experience with energy code enforcement and compliance.

However, code officials’ lack of familiarity with or interest in the energy code is only one factor influencing design and construction professionals’ interest in compliance. For building projects that do not receive a full plan review or on-site inspection, it is up to the building professionals to design and build to code and the consumer to demand verification. We are unaware of any work comparing energy efficiency in buildings with and without sufficient enforcement. However, given the relative position of energy codes compared to life, health, and safety codes and the general lack of energy code knowledge among consumers, it is reasonable to infer that energy code provisions do not receive as much attention in buildings in the latter group.

Beyond these two influences, the general distrust of government regulations extends to some building practitioners who view the energy code as an unnecessary and burdensome restriction. This is particularly true for residential construction, as builders do not have to join the HBRANH or be licensed by the state to build homes.

**Gap:** For many reasons, some design and construction professionals do not make energy code compliance a priority.

**Recommendation #23:**

a. Design and construction professionals should consider the long-term economic, environmental, and energy security impacts of inefficient buildings and prioritize compliance with the provisions of the State Building Code regardless of the stringency of enforcement.
State agencies, code officials, and the building trade associations can play a large role in promoting these benefits (see Outreach).

b. To encourage compliance with the model energy code or above-code standards, jurisdictions could dissuade non-compliance by requiring change orders and re-reviews for energy code site plan violations and issue stop orders for energy code construction violations.

c. Alternatively, jurisdictions could set policies that reward design and construction professionals for a limited time for achieving compliance, such as expedited permitting, reduced permit fees, matching funds for permit rebates, or a recognition program.

**Figure 3 – Construction Decline 2008-09 in New Hampshire’s Four Most Populous Counties**

All of these issues are compounded by the state of the construction market in New Hampshire, which has been in decline since 2004 (see Figure 3). When design and construction professionals are focused on keeping their businesses afloat by cutting costs wherever possible, energy code training and compliance are often the first casualties.

However, energy-efficient and green design and construction practices and standards are growing in the state (see State Policy: Overview of Green and Above-Code Programs). Design and construction professionals who meet national above-code standards set themselves apart in the highly competitive marketplace. These practitioners must bring in third party inspectors at their own cost, but can usually earn back the additional upfront cost through a higher sale price for consumers who want better quality
homes with lower operational costs. In addition, some construction professionals, particularly on the commercial side, view third party raters as cost-effective. They do not have to delay construction while waiting for an overworked code official to conduct an inspection. Many times, the cost of delaying construction is more than that of bringing on a third party rater.

Even so, opinions vary widely within the residential construction community as to whether building above code and bringing in third party raters—or even building to the energy code at all—will ultimately help their business. One argument is that they cannot compete with the builders that cut corners on energy efficiency measures to reduce their costs. Another is that consumers do not yet value energy-efficient and above-code construction enough to pay the additional upfront cost, even when they would recoup their additional investment quickly through lower operational costs. While these are legitimate concerns, the state has already had success with above-code construction, and its outreach and training efforts should improve the ability of the industry to build on these initial successes.

Ultimately, design and construction professionals are beholden to the demands of their clients. Yet they can take the initiative to build to higher standards and influence their clients’ priorities—both good business practices. Some building professionals have already pushed the envelope towards more efficient construction and proved that this model can work in New Hampshire. They should continue to capitalize on the growing demand within the marketplace.

**Gap:** Some design and construction professionals do not support above-code construction practices

**Recommendation #24:** Design and construction professionals should take advantage of the opportunity to design, construct, and market their above-code building projects to tap into the growing market for energy-efficient and green construction among homebuyers and businesses. By establishing affordable energy-efficient and green construction practices, as many of their peers already have, they can influence their clients and set themselves apart in the marketplace.

**Licensing**

The Licensing and Certification Board oversees the licensing of architects and engineers through the Board of Architects and Board of Professional Engineers, respectively. BBC&S oversees licensing
requirements for electricians and plumbers through the New Hampshire Electrician’s Board and the State Board for the Licensing and Regulation of Plumbers.\textsuperscript{74}

Installers of manufactured homes must obtain a license from the BBC&S Manufactured Housing Board. Licensure requirements include a minimum of two years of installation experience or the equivalent, subject to Board approval, and a minimum of six hours of training.\textsuperscript{75} BBC&S also approves manufacturers of modular homes and the third party inspection agency contracted by the manufacturers.\textsuperscript{76}

The state does not set licensing requirements for commercial contractors and homebuilders. There has been legislation introduced in the past that would do so, though it did not succeed, and members of the HBRANH are divided on whether it would benefit them. In the current political climate, it is unlikely that the General Court would add additional state regulations.

**Gap:** The state does not set licensure requirements for commercial contractors and homebuilders.

**Recommendation #25:**

a. To protect its citizens, New Hampshire could set licensure requirements for commercial contractors and homebuilders, which would ensure basic competency in building construction understanding and practices, including energy efficiency. Building construction that meets the model building codes requires technical understanding of many building features and their interconnectedness, as well as their on-the-ground application.

b. In the absence of state action, local jurisdictions should set licensure requirements for commercial contractors and homebuilders.

c. Should the state or local jurisdictions not mandate licensure requirements, the HBRANH should make licensure a requirement for membership.

**Training and CEUs**

In the past few years, there has been a variety of opportunities for design and construction professionals to receive training on the energy code and building energy efficiency. Many have taken advantage of the NH Building Code Compliance Project training workshops, utility-funded workshops, BPI certification classes, and similar workshops (see Enforcement Community).

The HBRANH does not have CEU requirements for its members, though it has been involved in providing training to its members and alerting them to other opportunities. For example, in 2010 it sponsored one of the GDS training workshops, promoted others, and held several short educational courses at its monthly meetings.

HBRANH does much of its training through the Build Green New Hampshire Council and its programs, which encourage members to use the NGBS, provide them with opportunities for certification as

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**Advanced Green Building**

Build Green New Hampshire is offering a two-day course in advanced green building. It will be held on February 25-26 in Claremont. For more information, please visit the HBRANH [events calendar](https://example.com/events).

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**BCAP**

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a NAHB Certified Green Professional, and direct them to incentives and resources. It held a two-day NGBS training session at the Building NH Trade Show and Conference in November 2010 and another in February 2011. It also hosted a BPI Envelope Professional certification course, an Energy and Environmental Building Alliance Houses That Work seminar, and a course on demystifying available above-code standards. Much of this programming is a result of funding through RGGI. This funding has not been renewed for HBRANH and the heightened outreach will end in 2011, although some programs are expected to continue.

AIA New Hampshire follows the AIA National CEU requirements for its members, which do not mandate energy code or sustainability courses. Of course, architects can choose to get CEUs in these areas that would go towards their annual minimum requirements. AIA New Hampshire also promotes the GDS training workshop series, which has had strong attendance from architects.

The Granite State Chapter of ASHRAE also follows the ASHRAE National CEU requirements for its members, which do not mandate CEUs that cover Standard 90.1. It offers its members training opportunities, though to our knowledge, it has not held an energy code training since the update to the State Building Code.

**Gap:** New Hampshire trade associations do not require CEUs for energy code training.

**Recommendation #26:** New Hampshire trade associations should set CEU requirements for their members that include mandatory energy code training.

**Gap:** Many design and construction professionals require more energy code training.

**Recommendation #27:**

a. The state and New Hampshire trade associations could build on their previous and existing efforts to educate design and construction professionals on the provisions of the state's energy code, particularly while construction is low. They should also expand training on green and above-code standards, features, and practices.

b. The state should consider creating or expanding workforce and CEU training and professional degree programs that incorporate energy code requirements and practical experience into the curriculum. This would give participating building professionals an understanding of energy code issues prior to entering or re-entering the workforce and prepare them for the realities of how to achieve compliance with the adopted energy codes.

See Enforcement Community: Training and CEUs for additional training recommendations.

**Compliance Measurement and Verification**

With energy codes becoming ever more stringent, it is increasingly important for the enforcement and building communities to take extra steps beyond code to ensure that compliant buildings achieve their predicted energy savings, as many buildings fall short of their potential. The solution to underperforming buildings is measurement and verification, or the process of measuring energy
performance and verifying that it matches the expected outcome. On the micro level, this process—known as commissioning for large commercial construction and performance testing for residential construction—involves blower door tests, duct blaster tests, and other performance measurements. On the macro level, it can involve state agencies, utilities, building science professionals, advocacy organizations, and other stakeholders compiling and analyzing building performance statistics to measure compliance and gauge implementation effectiveness.

**Past and Current Activities**

According to our research, to date, there has not been a comprehensive statewide or local measurement and verification study in New Hampshire. It is critical that the state, jurisdictions, and other stakeholders, such as utilities, measure the effectiveness of energy code compliance to determine the areas in which compliance is lacking and develop enforcement and compliance strategies that address these deficiencies. It should be noted, however, that to date, relatively little work has been done with measurement and verification throughout the country. Most states and jurisdictions are in the same position.

Nevertheless, the state has begun to devote its resources to energy benchmarking activities for state-owned buildings, schools, and commercial and industrial buildings. In 2005, Governor Lynch issued Executive Order 2005-04, which requires stage agencies to reduce their energy use by 20 percent in all state buildings and benchmark and track energy use.\(^77\)

Since the Order’s inception, state agencies have tracked energy use using the Enterprise Energy Management System, based on the EPA’s Portfolio Manager. They then provide quarterly reports to the Governor’s office and the Interagency Energy Efficiency Committee. To further support this initiative, the OEP awarded $10,700,000 in Recovery Act funding to renovate 75 state-owned facilities. To date, the state has completed energy efficiency upgrade projects on more than 75 state-owned facilities and has witnessed measurable reductions in energy use upwards of its goal of 10 percent.\(^78\)

TRC Solutions, an engineering consultancy and construction management firm, is also running the RGGI-funded New Hampshire EnergySmart Schools Project in partnership with the PUC and the New Hampshire Department of Education. The Project benchmarks energy use in participating schools. TRC starts by running one to three years of utility bill data through Portfolio Manager. It then runs its own New Hampshire-specific benchmarking program using additional data points it collects for each school. After presenting each school district with a report on all of its buildings and how they compare to other schools across the state and nationally, it is up to the school to take additional steps to upgrade its energy efficiency. While it does not promote specific companies, TRC does recommend available state and utility funding sources (see Outreach).\(^79\)

The project has benchmarked 130 schools in 25 school districts to date. In addition, 11 schools have received ENERGY STAR certification, with TRC assisting in the application process. By September 2011, the project end date, TRC expects to have met its goal of 250 schools—roughly half of all schools in the state. For more information, please visit the New Hampshire EnergySmart Schools Project website.
With additional RGGI funds, TRC will be running the Pay for Performance Program, a two-year benchmarking program for commercial and industrial buildings with a peak demand of 100 kW in any of the last 12 months. TRC will benchmark energy use in participating buildings. The building operators must then set energy reduction goals of at least fifteen percent and create a plan to achieve them. Upon doing so, participants will receive tiered incentives from program funds.80

TRC is also involved in energy benchmarking and auditing work for individual jurisdictions as part of the state’s EECBG funding. It is conducting energy audits in 24 jurisdictions, mostly for public buildings, and additional building energy efficiency improvements in over 60 jurisdictions.81

All of these benchmarking projects are critical because they can inform future statewide programs to measure and verify energy code compliance in new buildings constructed to the updated State Building Code—a crucial step that will determine the state’s compliance rate through real world data and detailed analysis.

**Gap:** There has not been a statewide measurement and verification program for residential and commercial buildings constructed to the updated State Building Code.

**Recommendation #28:** The state should consider developing a statewide measurement and verification program for residential and commercial buildings constructed to the updated State Building Code. To do so, it should:

a. Review DOE’s guidance on measuring energy code compliance and research the current pilot projects underway in other states;
b. Develop an evaluation methodology and initiate a measurement and verification program based on a statistically valid sample of buildings in jurisdictions across the state;
c. Conduct regular reevaluations of targeted areas to track compliance over time;
d. Evaluate results to determine additional work needed to address common requirements and practices that do not achieve compliance.

**Implementation Summary**

**Current Best Practices**

New Hampshire has made effective use of its Recovery Act funding through the NH Building Code Compliance Project. Its outreach efforts have achieved some success raising awareness of the updated State Building Code. It should work to ensure that its upcoming activities produce measureable results while raising awareness. Meanwhile, its training workshops have educated many professionals from different industries—particularly design and construction professionals—on the requirements of the 2009 IECC. Upcoming trainings should continue to do so and ideally include on-site trainings, as well. The state has also used RGGI funds to conduct successful energy benchmarking in state-funded facilities, with additional benchmarking for commercial and industrial buildings on the horizon. These actions will lead to energy savings, as well as increase awareness among New Hampshire’s students.
Energy code enforcement is highly regarded in a number of cities and towns, including Bedford, Durham, and Keene, as well as a few other municipalities with the resources to devote sufficient time to energy code enforcement. With the support of the NHBOA and the NH Building Code Compliance Project, code officials are continuing to understand the provisions of the energy code, make them a higher priority, and devote more time to their enforcement.

Finally, the state’s utilities have been active in funding energy code trainings and promoting above-code construction through outreach and incentives for above-code construction.

Gaps and Recommendations

State Adoption Policy

**Gap:** The General Court has not approved the most recent energy code update in the State Building Code.

**Recommendation #1:** The General Court should approve the most recent energy code update in the State Building Code to ensure that new buildings meet the stringent standards of the model energy code.

**Gap:** The General Court is considering legislation that would remove the authority of the Review Board to update the State Building Code.

**Recommendation #2:**

a. The General Court should not remove the Review Board’s authority to update the State Building Code. It is comprised of knowledgeable professionals who are qualified to make decisions regarding the complexities of building codes with the best interest of the state’s citizens in mind. Additionally, their monthly meetings are dedicated to expeditiously resolving pertinent and interconnected issues related to a variety of building codes.

b. The General Court should consider granting the Review Board full authority to amend the State Building Code without legislative approval. Doing so would streamline the adoption process, increase the General Court’s ability to focus on other legislative concerns, and demonstrate fiscal responsibility and good governance.

**Gap:** SB 409 moves the state in the right direction. However, it includes a number of exemptions that reduce the bill’s impact.

**Recommendation #3:** The General Court should update SB 409 to eliminate the exemptions that do not reference other energy efficiency regulations or decrease the stringency of the exemption criteria.

Local Adoption Policy

**Gap:** Only one jurisdiction has amended the statewide energy code to be more stringent.
**Recommendation #4:** The state should encourage jurisdictions to adopt more stringent energy codes. Options include:

a. Adopting Climate Zone 6 for jurisdictions in the four applicable counties;
b. Adopting the 2012 IECC (once it is released next year) and ASHRAE Standard 90.1-2010 for all jurisdictions to continue to raise the bar for the minimum energy efficiency of new construction.

**Gap:** Few jurisdictions in New Hampshire have adopted a more stringent green or above-code policy for municipal-funded facilities.

**Recommendation #5:**

a. The state should encourage jurisdictions, particularly where there is a high level of construction, to consider adopting more stringent green or advanced code policies for municipal-funded facilities.
b. The state should also encourage jurisdictions to adopt green or above-code retrofit policies for existing municipal-funded facilities.

**State Implementation Policies**

**Gap:** There is considerable confusion in the state regarding energy code enforcement authority, which hinders the effectiveness of enforcement throughout the state.

**Recommendation #6:**

a. The General Court should clarify energy code enforcement authority for all types of jurisdictions and buildings in the State Building Code and remove all existing legislation that creates ambiguity. Before passing legislation, it should weigh the opinions of the various agencies and stakeholders and then create a plan that will ultimately improve the ability of state agencies to administer and enforce the state’s adopted building codes efficiently and with no ambiguity.
b. The General Court could consider consolidating all building code enforcement into one state agency to eliminate confusion and improve the efficiency and effectiveness of the state enforcement process. This could either be one of the existing state agencies or a newly created agency to oversee all building code enforcement, divided into separate divisions. Such options will likely be politically challenging and/or logistically infeasible.
c. The General Court could also consider clearly separating fire code enforcement from all other building code enforcement to grant the DOS, the PUC, and all code officials clearly defined areas of jurisdiction.

**Gap:** State guidelines allow licensed engineers or architects to certify compliance.

**Recommendation #7:** Professional stamps alone do not ensure that the building meets energy code requirements. The Review Board and/or the General Court should consider updating the
State Building Code to require more stringent compliance verification methods that mandate site-plan review by trained plan reviewers.

Outreach

State Outreach to Key Stakeholders

**Gap:** In spite of GDS's strong outreach efforts for the NH Building Code Compliance Project, some individuals and groups still do not value the many economic, environmental, and security benefits of energy code compliance and enforcement.

**Recommendation #8:**

a. Once the NH Building Code Compliance Project ends, the state should continue to support outreach efforts as a crucial mechanism for saving residents and businesses money and reducing the state's environmental impact.

b. The state should expand the scope of the Stakeholder Panel to influence changes that lead to stronger energy code implementation. Pressure—and incentives—from multiple parties, coordinated at the state level, can motivate code officials and design and construction professionals in ways that the state cannot achieve through directives, incentives, and other measures.

State Outreach to Consumers and Businesses

**Gap:** There has been little state outreach conducted in New Hampshire that targets consumers, businesses, suppliers, and the real estate, appraisal, and lending communities.

**Recommendation #9:** GDS is aware of this gap and is developing an outreach program targeting some or all of these groups. This program should aim to not only raise awareness of the energy code and building energy efficiency among these stakeholders and explain why it should matter to them, but also result in action items that will lead to behavior and policy changes that influence stronger energy code compliance.

The Energy Efficiency & Sustainable Energy Board

**Gap:** The General Court is considering disbanding the EESE Board.

**Recommendation #10:** The General Court should not disband the EESE Board. It is comprised of knowledgeable professionals who collaborate to help move the state forward on increasing its energy efficiency and renewable energy production.

Local Outreach to Policymakers and the Design and Construction Community

**Gap:** Many code officials do not conduct sufficient outreach to local policymakers and the design and construction community.
**Recommendation #11:** Through the NHBOA, the state should encourage code officials to promote the importance of energy code enforcement to local policymakers and the design and construction community, which will improve their ability to conduct proper energy code enforcement.

**Gap:** Many code officials do not make energy code enforcement a priority.

**Recommendation #12:**

a. The state and NHBOA should encourage individual energy code champions to promote the benefits of energy code enforcement to their colleagues.

b. The state should consider participating in the BCAP/ICC Energy Code Ambassadors Program to provide additional training and support to energy code champions to improve their ability to promote energy codes and train colleagues on the requirements of the energy code.

**Local Outreach to Other Stakeholders**

**Gap:** Few jurisdictions in New Hampshire have undertaken strong outreach efforts targeted at businesses, consumers, building owners and operators, and other groups.

**Recommendation #13:**

a. The state should encourage code officials and local policymakers to conduct consumer and business outreach to create demand for strict energy code compliance from the design and construction communities.

b. The state could also encourage these groups to increase their participation in the NH Building Code Project’s ongoing outreach efforts.

c. Local Energy Committees (LECs) could adopt and champion energy code issues, creating stronger support for improved compliance.

**Enforcement Community**

**State Enforcement**

**Gap:** The PUC and the DOS do not have sufficient staff and resources to conduct adequate plan reviews and on-site inspections for all construction projects that fall under their jurisdictions.

**Recommendation #14:**

a. The PUC and the DOS could consider increasing their funding or working with state and local stakeholders to identify creative solutions to support code officials and ensure that all buildings in New Hampshire meet minimum requirements for building safety and energy efficiency.

b. Beyond clarifying state energy code implementation infrastructure (see Recommendation #6), The General Court should use its authority to strengthen the applicable state agencies’ ability to enforce the energy code in unincorporated areas and towns without code officials.
Options include increasing funding or finding other creative infrastructure solutions that reduce staff workload or leverage minimal state and local resources through economies of scale (see Recommendation #17).

State-level Implementation Support

**Gap:** Most local jurisdictions require more resources and support for energy code implementation.

**Recommendation #15:** Through its various agencies, the state should build off the success of the NH Building Code Compliance Project by working with the NHBOA, building practitioners, and other advocates to provide additional information, technical support, and possibly incentives to influence behaviors at the local level. Some examples include:

a. Analyzing and tailoring DOE’s many resources to fit the specific needs of New Hampshire’s various jurisdictions (see Appendix A);

b. Establishing clear energy code guidelines and an official representative or body to clarify all energy code inquiries;

c. Creating easy-to-use compliance checklists;

d. Subsidizing or loaning out duct blaster, infrared camera, blower door, and other equipment for inspection departments.

**Barriers to Enforcement**

**Gap:** Inspection departments do not receive sufficient funding to overcome existing barriers to energy code enforcement.

**Recommendation #16:** Local governments that want to commit to saving energy for residents and businesses should make inspection department funding a higher priority. Budgeting, more than any other indicator, demonstrates commitment from jurisdictional leadership to prioritize energy code implementation.

**Gap:** Many jurisdictions do not have inspection departments or even part-time code officials.

**Recommendation #17:** All jurisdictions should ensure that buildings constructed within their jurisdictions are safe and energy-efficient.

a. One possible solution to a lack of local government funding in small towns is to expand the existing arrangements in which one code official works for multiple towns.

b. Another intriguing solution is to establish regional inspection departments to take advantage of combined resources for enforcement and economies of scale, a model that has worked well in other states. Relevant state agencies and the NHBOA are in the best position to work out the logistics of such an endeavor. Such a solution could improve energy code compliance in these locations and remove some of the burden of enforcement from the PUC and the DOS, thus allowing them to devote more time to their implementation.
responsibilities. This model could also be extended to include many other public services to further maximize the effectiveness of limited resources.

**Certification**

**Gap:** The state, NHBOA, and many inspection departments do not set certification requirements for code officials that include minimum certifications from a qualified provider.

**Recommendation #18:**

a. To protect its citizens, the appropriate state agency should set certification requirements for code officials that include minimum certifications from a qualified provider and give every code official easy access to certification trainings from the ICC or another organization.

b. The NHBOA should make minimum certification from a qualified certification provider a requirement for membership.

c. Should the state or NHBOA be unable or unwilling to do so, both groups could use their energy codes expertise to provide guidance to local jurisdictions on how to set certification requirements for code officials.

**Training and CEUs**

**Gap:** Code officials have not taken full advantage of free and accessible energy code training workshops to become acquainted with the new provisions of the State Building Code.

**Recommendation #19:** The state and NHBOA should continue to encourage and convince code officials to attend and appeal to local governments to apply pressure to their inspection departments.

**Gap:** There has been little, if any, formal on-site energy code training in New Hampshire.

**Recommendation #20:** GDS is aware of this gap and is discussing how to overcome it. Working with its partners, it should ensure that it explores all avenues to working through the logistics of establishing on-site trainings.

**Gap:** Despite these commendable efforts, more energy code and building science training will be needed to ensure that code officials and design and building professionals have the knowledge and skills needed to understand the provisions of the model energy codes and their application in the field, as well as green and above-code standards.

**Recommendation #21:** The state should build on its existing training infrastructure. Possibilities include:

a. Working with GDS, the PUC, utilities, and the HBRANH to create an on-site training infrastructure to educate code officials and building professionals on how to apply their knowledge of energy codes in the field;
b. Finding other funding sources to sponsor additional trainings, particularly after the conclusion of the NH Building Code Compliance Project;
c. Providing state incentives to make it easier for all code officials to attend training workshops;
d. Supporting and collaborating with community colleges, technical schools, and the state university system to increase training for design and construction professionals to gain expertise in building science and energy codes;
e. Subsidizing tuition for energy efficiency-related classes.

**Third Party Infrastructure**

**Gap:** Some code officials struggle to conduct their own energy code enforcement on top of third party inspectors’ work.

**Recommendation #22:** In certain circumstances, code officials should permit third party inspectors to verify energy code compliance, leaving them to focus on the enforcement of other building codes.

**Design/Construction Community**

**Overview of Infrastructure and Barriers**

**Gap:** For many reasons, some design and construction professionals do not make energy code compliance a priority.

**Recommendation #23:**

a. Design and construction professionals should consider the long-term economic, environmental, and energy security impacts of inefficient buildings and prioritize compliance with the provisions of the State Building Code regardless of the stringency of enforcement. State agencies, code officials, and the building trade associations can play a large role in promoting these benefits (see Outreach).

b. To encourage compliance with the model energy code or above-code standards, jurisdictions could dissuade non-compliance by requiring change orders and re-reviews for energy code site plan violations and issue stop orders for energy code construction violations.

**Gap:** Some design and construction professionals do not support above-code construction practices

**Recommendation #24:** Design and construction professionals should take advantage of the opportunity to design, construct, and market their above-code building projects to tap into the growing market for energy-efficient and green construction among homebuyers and businesses. By establishing affordable energy-efficient and green construction practices, as many of their peers already have, they can influence their clients and set themselves apart in the marketplace.
**Licensing**

**Gap:** The state does not set licensure requirements for commercial contractors and homebuilders.

**Recommendation #25:**

d. To protect its citizens, New Hampshire could set licensure requirements for commercial contractors and homebuilders, which would ensure basic competency in building construction understanding and practices, including energy efficiency. Building construction that meets the model building codes requires technical understanding of many building features and their interconnectedness, as well as their on-the-ground application.

e. In the absence of state action, local jurisdictions should set licensure requirements for commercial contractors and homebuilders.

f. Should the state or local jurisdictions not mandate licensure requirements, the HBRANH should make licensure a requirement for membership.

**Training and CEUs**

**Gap:** New Hampshire trade associations do not require CEUs for energy code training.

**Recommendation #26:** New Hampshire trade associations should set CEU requirements for their members that include mandatory energy code training.

**Gap:** Many design and construction professionals require more energy code training.

**Recommendation #27:**

c. The state and New Hampshire trade associations could build on their previous and existing efforts to educate design and construction professionals on the provisions of the state’s energy code, particularly while construction is low. They should also expand training on green and above-code standards, features, and practices.

d. The state should consider creating or expanding workforce and CEU training and professional degree programs that incorporate energy code requirements and practical experience into the curriculum. This would give participating building professionals an understanding of energy code issues prior to entering or re-entering the workforce and prepare them for the realities of how to achieve compliance with the adopted energy codes.

**Measurement and Verification**

**Gap:** There has not been a statewide measurement and verification program for residential and commercial buildings constructed to the updated State Building Code.

**Recommendation #28:** The state should consider developing a statewide measurement and verification program for residential and commercial buildings constructed to the updated State Building Code. To do so, it should:
a. Review DOE’s guidance on measuring energy code compliance and research the current pilot projects underway in other states;
b. Develop an evaluation methodology and initiate a measurement and verification program based on a statistically valid sample of buildings in jurisdictions across the state;
c. Conduct regular reevaluations of targeted areas to track compliance over time;
d. Evaluate results to determine additional work needed to address common requirements and practices that do not achieve compliance.
Conclusion

Building energy codes are one of the easiest and most cost-effective ways for New Hampshire to secure its energy future. Compliance with the code not only helps consumers and businesses save money on their energy bills, but also reduces pollution and peak loads, resulting in a cleaner environment and a more stable and diverse energy supply.

New Hampshire’s existing energy code implementation infrastructure is relatively sparse, due in part to the state’s limited government, historic attitudes towards regulation, and many rural areas. Nevertheless, some jurisdictions have established processes that achieve model energy code compliance. Moreover, involved parties in the state are aware of the need for improvement and have begun to take action. The Review Board adopted the model energy codes; state agencies have moved forward with concrete steps to improve outreach for and enforcement of the adopted code; and trade associations and other stakeholders have been involved in these processes. Potential political changes may alter the approach and timeline for achieving the goals the state has set for itself. It must also find solutions to the structural barriers that limit the state’s ability to support greater energy code compliance. Still, it is clear that New Hampshire is determined to achieve full compliance and moving in the right direction.

The recommendations made in this gap analysis, summarized below in Table 4, are meant to guide state officials and other New Hampshire stakeholders as they work to support improved implementation and continue the process of developing a careful, comprehensive compliance action plan. BCAP has developed them in conjunction with state officials and has tried to take into account state history, viewpoints, and political realities. Though some recommendations require sustained or increased funding, the financial savings gained through reduced utility bills—in addition to the other myriad financial, environmental, and security benefits for the state and its citizens—make improved energy code compliance policies and programs a responsible and practical method to improve New Hampshire now and in the future.

Figure 4. Recommendations chart

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<tr>
<th>Adoption</th>
<th>State Policy</th>
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<tr>
<td>The General Court should ratify the New Hampshire State Building Code (pg. 16)</td>
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<tr>
<td>The General Court should ensure that the New Hampshire Building Code Review Board retains its authority to update the State Building Code (pg. 16)</td>
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<tr>
<td>The General Court should update SB 409 to eliminate the exemptions that do not reference other energy efficiency regulations or decrease the stringency of the exemption criteria (pg. 17)</td>
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<th>Local Policy</th>
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<tr>
<td>The state should encourage local jurisdictions to adopt more stringent energy codes for public and private buildings (pgs. 20-21)</td>
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<tr>
<th>Implementation</th>
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<tr>
<td>Overview of State and Local Implementation Policies</td>
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<tr>
<td>The General Court should clarify roles and responsibilities for state energy code enforcement and require more stringent energy code compliance verification methods (pgs. 26-27)</td>
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<tr>
<td><strong>Outreach</strong></td>
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<td><strong>Enforcement Community</strong></td>
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<td><strong>Compliance Measurement &amp; Verification</strong></td>
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Acknowledgments

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In addition, George James and Terry Logee at the Building America program of the US Department of Energy; Joe Nebbia with Newport Partners LLC; Eric Makela at Pacific Northwest National Laboratory; Jack Barnette and Jonathon Passe at the US Environmental Protection Agency’s ENERGY STAR program, and Nancy Bakeman at the Energy & Environmental Building Alliance (EEBA) contributed information to the Green and Above-code sections.

Cover page image of New Hampshire Fall Foliage courtesy of Flickr Creative Commons, user drocpsu.
Appendix A

The Department of Energy (DOE) provides a number of useful resources that can assist states and local governments in their efforts to achieve code compliance. Many of these resources are available at Energycodes.gov. Materials include training presentations and background on DOE-sponsored software programs, Rescheck and Comcheck, which evaluate compliance for residential and commercial buildings, respectively. These software programs, which present prescriptive code requirements and calculate compliance tradeoffs, simplify the process of evaluating a building’s code compliance. By explaining requirements, these software programs can help designers, builders, and code officials streamline efforts to achieve code compliance.

Resource Guides for Code Officials

1. ICC/DOE Building Energy Codes Program Resource Guide for Code Officials: a comprehensive and easy to read collection of the best resources available from ICC and DOE.
   http://www.energycodes.gov/publications/resourceguides/

Energy Code Compliance Training Materials:

1. Commercial PowerPoint Training with links to videos

2. Residential PowerPoint Training with links to videos

3. DOE Guidance for State Compliance Measurement Efforts

Primer on Rescheck and Comcheck

1. Commercial Compliance
   http://www.energycodes.gov/comcheck/

2. Residential Compliance
   http://www.energycodes.gov/rescheck/

Available Downloads

1. Commercial Basic Requirements Download
   http://www.energycodes.gov/comcheck/download.stm

2. Residential Basic Requirements Download
   http://www.energycodes.gov/rescheck/download.stm

Users Guides

1. COMcheck Software Guide
2. **REScheck Software Guide**
   

**Plan Check and Field Inspection**

   

2. Residential Plan Review Quick Reference Guide
   

**Code Notes**

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40. http://www.icleiusa.org/about-iclei/members/member-list
41. http://www.icleiusa.org/about-iclei/members/member-list
42. Municipal websites and telephone interviews with representatives
44. Interviews with representatives

Interviews with representatives

http://www.ci.epping.nh.us/art%2022%20Energy%20Efficiency%20&%20SD%2010.pdf

Interviews with representatives

http://www.gencourt.state.nh.us/rsa/html/xii/155-a/155-a-mrg.htm

http://www.gencourt.state.nh.us/rsa/html/xii/155-a/155-a-mrg.htm
http://www.nh.gov/safety/boardsandcommissions/bldgcode/

http://www.nh.gov/constitution/billofrights.html
http://www.puc.nh.gov/Electric/coreenergyefficiencyprograms.htm
http://www.gencourt.state.nh.us/rsa/html/xii/155-a/155-a-mrg.htm

http://www.iccsafe.org/Education/Courses/Pages/bycourseid.aspx
http://deboa.org/yahoo_site_admin/assets/docs/constitution.238151817.pdf
https://av.iccsafe.org/EWEB/DynamicPage.aspx?Site=icc&WebKey=b7afd990-2e14-4013-a186-aeb405641a95&FromSearchControl=Yes

GDS training workshop statistics

http://www.resnet.us/directory/auditor/nh/89/home-energy-raters-hers-raters/1
http://www.energystar.gov/index.cf?Fuseaction=new_homes_partners.showStateResults&s_code=NH
http://www.bpi.org/tools_locator.aspx?associateTypeID=AFF
http://www.bpi.org/tools_locator.aspx?associateTypeID=CTR&accreditedSearch=N
http://www.lrcc.edu/energy/index.html
http://www.nhenergy.org/images/8/87/Local_Energy_Committee_News_April_20_2010.pdf,
http://www.energyratings.org/index.html
http://www.bcap-ocean.org/incremental-cost-analysis

http://www.nh.gov/jtboard/
http://www.nh.gov/oep/recovery/sep_programs/state_building_eerep.htm
http://www.nh.gov/oep/recovery/eecbg_award_recipients.htm

http://www.lrcc.edu/energy/index.html
http://www.nhenergy.org/images/8/87/Local_Energy_Committee_News_April_20_2010.pdf,