Delaware Gap Analysis

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Prepared by the Building Codes Assistance Project and the Delaware Energy Office for the United States Department of Energy

BCAP: Dedicated to the adoption, implementation, and advancement of building energy codes
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 Resource 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

ABC – Associated Builders and Contractors
AIA – American Institute of Architects
ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BCAP – Building Codes Assistance Project
BCD – Sussex County Building Code Department
BPI – Building Performance Institute
CED – New Castle County Department of Land Use
DECC – Delaware Climate Change Consortium
DEO – Delaware Energy Office
DLC – Department of Facilities Management
ECAP – Energy Code Ambassadors Program
EEBA – Energy & Environmental Building Alliance
EECBG – Energy Efficiency and Conservation Block Grants
EERS – Energy Efficiency Resource Standard
EPA – U.S. Environmental Protection Agency
EIA – Energy Information Agency
F4G – Green For Green
GCP – NAHB Green Certified Professional
HBEA – Home Builders Association of Delaware
HERS – Home Energy Rating System
IECC – International Energy Conservation Code
LDMBOA – The Lower Delaware And Maryland Building Official Association
LEED – Leadership in Energy and Environmental Design
MEC – Model Energy Code
NAHB – National Association of Home Builders
NASEO – National Association of State Energy Officials
OCEAN – Online Code Environment and Advocacy Network
OMB – Office of Management and Budget
RECA – Responsible Energy Codes Alliance
RESNET – Residential Energy Services Network
RPS – Renewable Portfolio Standard
RGGI – Regional Greenhouse Gas Initiative
SEO – State Energy Office
SEP – State Energy Program
SEU – Sustainable Energy Utility
SFMO – State Fire Marshal’s Office
USGBC – U.S. Green Building Council
Executive Summary

The purpose of the Delaware 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 codes. 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 that would improve energy code compliance.

Beginning on page 9, the Introduction section provides an overview of relevant state demographics and the impact of the construction boom and subsequent decline. It also covers Delaware’s energy portfolio, emphasizing the state’s high electricity rates, net energy importer status, and the need for energy savings to improve the state’s economy and energy security. For instance, full compliance with the 2009 International Energy Conservation Code (IECC) would yield approximately $99 million in annual energy cost savings for households and businesses, or $783 million from 2011-30.

Beginning on page 14, the Adoption section takes a close look at the federal, state, and local polices that influence energy codes in the state. This section covers the state’s adoption of the model energy codes in 2010 by updating Chapter 76, Title 16 of the Delaware Code. It also examines state and local efforts to set policies that reduce energy use in the built environment.

The Adoption section makes nine recommendations to the state and a variety of different stakeholder groups, summarized below:

- The state should have a plan in place to be able to use available Federal funding to increase its energy code adoption and implementation activities;
- The Delaware Energy Office (DEO) and the Home Builders Association of Delaware (HBADE) should make progress on their mandate to set up programs to promote the construction of zero net energy capable buildings by 2025 for homes and 2030 for commercial properties;
- The state and local governments should adopt green or above-code policies for state- and municipal-funded facilities to set the example for the private sector;
- The state, local governments and key stakeholders should promote the construction of high performance residential and commercial building.

Beginning on page 28, 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 efficient, feasible, and cost-effective enforcement and compliance infrastructures, and adequately prepare code officials and building professionals to carry out their responsibilities. It describes state implementation guidelines for municipal inspection departments. It also covers state, local, and utility efforts to education code officials, the design and construction community, businesses, and consumers on the importance of energy-efficient construction, including Energize Delaware and the many utility programs for their customers.
The report also examines the state and local enforcement, compliance, and training infrastructure, in addition to the barriers to code enforcement and compliance in the state. For both code officials and the design and construction community, these include a lack of priority, familiarity with the energy code’s provisions, and time. The design and construction community also face increased pressure to meet their bottom lines in an unforgiving market, though a significant minority have taken advantage of the marketing potential of above-code construction.

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

- With input from all relevant parties, DEO should set uniform implementation guidelines that are clear and stringent, as is required by Chapter 76 of Title 16;
- The Department of Natural Resources and Environmental Control should provide sufficient funding, training, and additional staff to DEO to allow it to expand its existing outreach, training, and implementation efforts;
- The state and local governments should expand their outreach efforts to code officials, design and construction professionals, consumers, and businesses;
- Local decision-makers and code officials should make energy efficiency a larger priority, which would save money for their constituents and businesses and reduce the negative environmental impacts of inefficient construction;
- Code officials require additional training, guidance, and support from the state, trade associations, local policymakers, and utilities;
- The state, code official associations, and/or inspection departments should set certification or CEU requirements for code officials;
- Design and building professionals should make energy code compliance a priority to build higher quality buildings and set themselves apart in the marketplace, among other benefits;
- The state, trade associations, and/or inspection departments should set licensing requirements for commercial contractors and code homebuilders;
- The state should build off its measurement and tracking program for state buildings to include the private sector.

The Conclusion section on page 59 provides a summary of the myriad benefits of energy code adoption and implementation in Delaware and concludes with Table 2, a summary list of the most important recommendations made in the report with page numbers for quick reference.
**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 codes—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 codes, 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, BCAP has undertaken a new program to improve energy code compliance in 15 states, including Delaware, 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**

Delaware is one of the smallest states in the country. Its population of 885,122 fits into just 1,953 square miles, ranking it second last in total area (ahead of Rhode Island), but sixth most in population density. Despite its size, Delaware’s three counties are economically and culturally distinct. From north to south, New Castle County is the most populous and industrialized; Kent County is more rural and home to the
state’s capital, Dover; and Sussex County is also rural and home to many of the state’s well-known beaches.

**Figure 1. State Population Map**

Although the state does not have as much construction activity as other larger states with more area to expand, Delaware had experienced a construction boom similar to those in other states. As Figure 1 shows, northern Delaware is densely populated and southern Delaware much less so. With room to grow, it’s not surprising that Sussex County experienced the largest boom in residential construction, with a peak of 4,262 units permitted in 2005, compared with only 1,751 units permitted in New Castle County.³

As with other states, the collapse of the housing market also affected construction in the state, and the decline began even before the recession hit. As shown in Figure 2, new residential housing permits in Delaware dropped from 7,977 in 2005 to 3,140 in 2009, a 60 percent decline.⁴
Commercial construction is strongest in the Wilmington and Dover metropolitan areas, but has slowed down significantly. One measure of the commercial construction’s health is published projections of vacancy rates for office, industrial, and retail properties from commercial real estate service companies.

In the Wilmington market area, office and industrial construction are experiencing higher vacancy rates than the national average for major U.S. market areas. They also have low rates of demand for new units, reflected in low predicted absorption rates for new construction and an estimated ten years to reaching a balance. However, office space developers demonstrated caution in the lead-up to the market downturn, which should fill the vacancies more quickly, but also leaves the city without any significant development in the pipeline. Retail space has fared better—possibly due to having no state sales tax—but is also encountering diminished construction rates for the immediate future, as predicted absorption rates are low and vacancy rates are close to the national average.

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 have more time to take advantage of available energy code training, in addition to green and above-code training and/or certification. Reduced construction will also help ease all stakeholders into the new energy code, rather than trying to adjust while construction is high.
Energy Portfolio

Other than the District of Columbia, Delaware is the nation’s smallest energy producer, at just 3.77 trillion Btu as of 2008. The state relies on imports of coal, natural gas, and crude oil. This issue is compounded by the fact that Delaware also ranks last in renewable energy production. However, the state has significant potential for renewables, particularly for on- and off-shore wind power, and is exploring these options. Reducing energy use through the adoption and implementation of energy efficiency policies, such as energy codes, will benefit the state by reducing its costly reliance on energy imports.

Delaware’s energy consumption per capita is just above the national average, and its citizens pay higher rates for electricity than the national average. Therefore, the state stands to benefit from the adoption and implementation of energy efficiency policies, such as energy codes, through significant energy and financial savings. Roughly one-fifth of Delaware households rely on petroleum for home heating, which means that reducing residential energy use through energy codes also presents an opportunity to improve energy security by reducing the state’s reliance on imported oil.

Potential Savings from Energy Codes

The implementation of the recently adopted Delaware State Energy Code, which references the 2009 IECC and ASHRAE Standard 90.1-2007, will produce considerable energy savings for the state. Table 1 represents a percentage of potential energy savings that the state can achieve for commercial construction. In the table, Non Residential signifies any mid-rise commercial building, Residential signifies high-rise residential buildings and Semi Heated represents commercial warehouses, but all three building types fall within the scope of the commercial code. 100 percent compliance with Standard 90.1-2007 would result in up to a 10.3 percent savings in commercial energy costs.

Table 1. Annual Savings in Commercial Energy Costs

<table>
<thead>
<tr>
<th>Construction Type</th>
<th>City</th>
<th>Energy Savings</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Residential</td>
<td>Wilmington</td>
<td>10.1%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Residential</td>
<td>Wilmington</td>
<td>7.4%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Semi Heated</td>
<td>Wilmington</td>
<td>0.5%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Energy codes also offer large-scale gains. BCAP estimates that implementation of the model energy codes will result in substantial savings over the business-as-usual scenario:

- By 2030, $99 million in annual energy cost savings for households and businesses, or $783 million from 2011-30;
- By 2030, annual CO2 emissions reductions of 500,000 metric tons, or 4 million metric tons from 2011-30;
- By 2030, residential source energy savings of 8 percent, representing annual savings of 3 trillion Btu;
- By 2030, commercial source energy savings of 13 percent, representing annual savings of 5 trillion Btu.
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.\textsuperscript{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 Delaware State Energy Code is based on the 2009 IECC and ASHRAE Standard 90.1-2007. Therefore, the state is in compliance with EPAct.\textsuperscript{14}

The Recovery Act

In 2009, Congress passed the 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.\textsuperscript{15} In a letter dated February 27, 2009, Delaware Governor Jack A. Markell assured that applicable state officials in Delaware would begin actions to 1) update the code to the 2009 IECC or an equivalent code and 2) achieve 90 percent compliance with these codes in all new construction by 2017.\textsuperscript{16} In response, DOE awarded $24.2 million in SEP funding for use in energy efficiency policies and improvements. The state also received an additional $15.9 million EECBG formula grant, $9.5 million of which went to the Delaware Energy Office (DEO)—a division of the Department of Natural Resources and Environmental Control (DNREC)—also for energy efficiency projects. However, the state did not allocate SEP or EECBG

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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

Gap: Like many states with a lack of staff and resources available to respond to federal solicitations, Delaware did not allocate Recovery Act funding for energy code activities.

Recommendation #1: In the future, the state should have a plan in place to be able to use available Federal funding to increase its energy code outreach and support activities (see Implementation).

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 Delaware—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

Delaware adopts a mandatory energy code through a regulatory process that updates Chapter 76, Title 16 of the Delaware Code, which covers the “Code for Energy Conservation.” Chapter 76 grants the DEO the responsibility of determining the “highest available energy conservation code of the [International Code Council (ICC)]...and the latest available standard of [ASHRAE],” adopting these updates, and promoting their compliance on the local level.

Delaware first established a minimum energy code in 1979, based on ASHRAE/IES 90-1975. In 1995, the General Assembly adopted the 1993 Model Energy Code (MEC), a precursor to the International Energy

**Recent Energy Codes-related Legislation**

In response to funding from the American Recovery and Reinvestment Act of 2009 (Recovery Act), on April 7, 2009, the General Assembly passed Senate Bill 59, updating Chapter 76 to require that DEO adopt the 2009 IECC and ASHRAE Standard 90.1-2007. From January 1 to July 1, 2010, design and construction professionals had to offer buyers the choice of whether to build their project to the 2009 IECC. As of July 1, 2010, the 2009 Delaware State Energy Code became mandatory statewide for all new buildings except agricultural structures. Chapter 76 also mandated that the state review the State Energy Code on a three-year cycle to consider possible updates.\(^\text{19}\)

Given its mandate to determine the highest available energy code, DEO worked with the General Assembly to pass Senate Bill 59. In general, DEO interacts with the General Assembly through DNREC's Office of the Secretary. Its role is to draft or comment on relevant energy legislation and go to the Legislative Hall to represent the department when there are energy meetings or hearings.

**Other Delaware Building Codes**

The only other building code Delaware adopts at the state level is the Delaware State Fire Prevention Regulations, adopted by the State Fire Prevention Commission and based on the most recent editions of the National Fire Protection Association fire codes.\(^\text{20}\)

For all other non-energy building codes, Chapter 76 of Title 16 permits the adoption of “building codes, plumbing codes, electrical codes or other similar codes” on the county level.\(^\text{21}\) For the plumbing, mechanical, and fuel gas codes, the counties must submit amendments to the Board of Plumbing, Heating, Ventilation, Air Conditioning and Refrigeration Examiners (Plumbing & HVACR Board).\(^\text{22}\)

In New Castle County, the County Council is responsible for adopting building codes. The Department of Land Use (DLU) currently administers the 2006 I-codes, and the County is in the process of updating to the 2009 I-codes. In Kent County, the Levy Court is responsible for adopting building codes. The Inspections and Enforcement Department (I&E) currently administers the 2006 I-codes. In Sussex County, the County Council is responsible for adopting building codes. The Building Code Department (BCD) currently administers the 2003 I-codes.

To increase uniformity from jurisdiction-to-jurisdiction, it is possible that in the near future, the state will move towards a uniform statewide building code package. As of this writing, no official information was available.

**Energy Codes for State-funded Facilities**

It is important for states to demonstrate their commitment to energy codes by setting the example, and Delaware has done so through its efforts to improve the energy efficiency of its state-funded facilities. In
February 2010, Governor Jack Markell issued Executive Order No. 18, which requires the construction, renovation, and operation of all state facilities to consider green building features based on the U.S. Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED) standards.\textsuperscript{23} The Order does not require that these projects meet LEED standards or achieve certification.\textsuperscript{24}

**Gap:** The state does not have a mandatory green or advanced code policy for state-funded facilities.

**Recommendation #2:**

a. Delaware should pass legislation that mandates that all state-funded facilities meet the requirements of a recognized national green building or high performance standard or code.

b. If legislation is not possible, the governor should update the language of Executive Order No. 18 to mandate that all state-funded facilities meet these requirements.

The Order also requires state agencies and state-owned or -leased properties to reduce energy consumption by 30 percent below 2008 levels by the end of 2015. DNREC, the Cabinet Committee on Energy, and the Agency Sustainability Managers—designated representatives from each state agency—are responsible for different aspects of oversight on the state’s progress towards achieving the goals set out in Executive Order No. 18 and making recommendations for setting new goals in the future.

Furthermore, the Office of Management and Budget (OMB) is tasked with measuring and tracking energy use and CO\textsubscript{2} emissions in state buildings, which it can then use to prioritize projects based on their potential energy savings. Compared to fiscal year 2008, this program has already achieved significant energy reductions in state-owned facilities (see Compliance Measurement and Verification). Additional sections of the order address recycling, clean transportation, and environmentally sensitive procurement practices for state government.\textsuperscript{25}

Since 2004, the state established an official partnership with ENERGY STAR. State agencies must purchase ENERGY STAR qualified products whenever practical, in accordance with House Bill 435 of 2004.\textsuperscript{26} The state also helps utilities, schools, and state agencies with purchasing options and has set up an automatic EPA energy performance ratings using EPA Portfolio Manager tracking software.\textsuperscript{27}

**Statewide Climate Change Initiatives**

In 2000, the University of Delaware’s Center for Energy and Environmental Policy (CEEP) prepared a Climate Change Action Plan with support from the Delaware Climate Change Consortium (DCCC), a
group of industry leaders, government representatives, environmental organizations, and other stakeholders. DEO and the U.S. Environmental Protection Agency (EPA) sponsored the report, designed to raise awareness of climate change and to address the problems caused by it.\textsuperscript{28}

**Gap:** The state’s Climate Change Action Plan from 2000 is outdated. It does not explicitly require the adoption of the latest model energy codes, nor does it address implementation, which is critical for realizing potential energy savings and greenhouse gas emissions reductions.

**Recommendation #3:** The state should form a stakeholder group to update its Climate Change Action Plan to:

a. Include the mandatory adoption of the latest model energy codes, which would lock in future energy savings and greenhouse gas emissions reductions;

b. List energy code implementation as a priority for Delaware jurisdictions;

c. Account for scientific advances related to the potential impacts of climate change, improved technologies and policy tools, and increased awareness of this issue;

d. Create a feasible framework for implementation.

More recently, the state has passed legislation that indicates that it is aware of the threat of climate change and the many benefits of energy efficiency and renewables. On July 29, 2009, Governor Markell signed SB 106, establishing an energy efficiency resource standard (EERS) of 15 percent electricity consumption and peak demand savings and 10 percent natural gas consumption savings by 2015. SB 106 also requires utilities to first consider electricity demand response and management strategies for meeting base load and growth needs. The bill established a workgroup “to determine the feasibility and impact” of the EERS goals for affected utilities.\textsuperscript{29} The workgroup met throughout 2010 to prepare a report it plans to submit to DNREC in late January 2011.

Along these lines, Senate Bill 74 of 2005 set a renewable energy portfolio standard (RPS) of 10 percent by 2019. The General Assembly has since updated the standard twice, most recently in 2010, and it is now at 25 percent by 2025.\textsuperscript{30}

The adoption of energy codes would reduce total energy use in Delaware, which would increase the percentage of renewable energy production in the state. This alone will not meet the state’s goals, and the state should continue to increase renewable energy production. 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 will 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 homes are equipped with energy efficiency measures, the overall energy demands of the home decrease. This allows homeowners to reduce the size of solar PV and solar hot water equipment on their rooftops. By purchasing smaller-scale equipment, homeowners save money—potentially resulting in increased market penetration for these technologies and lower cost by way of economies of scale for manufacturers. The same principle applies to the provision of on-site energy for commercial buildings.
In addition, Delaware 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 CO₂ allowance for each ton of CO₂ they emit. The states auction nearly all of the CO₂ emissions and take that money to fund programs supporting end-use energy efficiency and renewable energy technologies. The state uses some of the RGGI funds to support energy efficiency improvements for low-income consumers, climate change projects selected through a competitive process, and climate change programs within DNREC.

Over half of its share of the RGGI auction proceeds go towards funding the Sustainable Energy Utility (SEU), an innovative non-profit managed by leading government, energy, and industry professionals that works closely with the DEO to improve the end-user markets for energy efficiency and renewable energy, as well as improve consumer access to these technologies (see Outreach: State’s Role). The SEU’s goal is to reduce Delaware’s greenhouse gas emissions 33 percent by 2020.

Overview of Green and Above-Code Programs

**LEED**

The most prevalent green building standard for commercial construction in the United States is LEED. Compared to its neighbors in the Northeast, Delaware has the lowest number of LEED certified (10) and registered (49) buildings. However, the state’s totals are not far behind similarly sized and populated states such as Rhode Island and Vermont. It’s also important to keep in mind that the rate of commercial construction is relatively small compared to larger states with more room to grow and larger urban centers.

Furthermore, multiple design and construction professionals interviewed cite the high cost of LEED certification as a significant barrier to certification. They indicate that a higher percentage of commercial buildings are following green and advanced energy efficiency provisions without going through the certification process, though they estimate that number to be only 10-15 percent.

**ENERGY STAR**

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 DOE above-code building program—intend to increase the stringency of their requirements in the coming months to go beyond the recent advances in the IECC.

Since 2004, Delaware has had an official partnership with ENERGY STAR. As of November 2010, Delaware has 6,456 ENERGY STAR qualified homes. These totals make up 0.56 percent of the nation’s ENERGY STAR homes for a state with just 0.28 percent of the population—double the proportional amount. Furthermore, the state’s 558 ENERGY STAR qualified homes in 2009 accounted for a 21 percent market share. While this percentage was slightly lower than in Rhode Island and Vermont, the state’s rate of construction exceeds these two states.

The public and commercial building sectors in Delaware have also taken advantage of the ENERGY STAR Labeled Buildings and Plants program. The state has over 60 ENERGY STAR labeled public and commercial buildings, with the majority being supermarkets and schools. Food Lion Corp. owns and manages 15 grocery stores, and the Red Clay Consolidated School District (northwest Wilmington and its suburbs) has led the way with 23 schools, and the Seaford and Smyrna School Districts account for 11 more ENERGY STAR schools.

**Gap:** High performance residential and commercial building requirements are not encouraged sufficiently for new construction in Delaware.

**Recommendation #4:**

a. DNREC and DEO should work to increase the market penetration of high performance residential and commercial buildings. One crucial step is to raise awareness and knowledge of the available high performance standards and work with progressive jurisdictions to adopt green or above-code voluntary or mandatory standards, even if they do not include certification.

b. Companies within the design and construction industry should make the economic and environmental decision to adopt high performance construction as official policy and then market their properties to clients as cheaper to operate, more energy-efficient, and less harmful to the environment.

**Net Zero Energy Legislation**

Senate Bill 59 also amended Chapter 76, Title 16 of the Delaware Code to require DEO to work with the Home Builders Association of Delaware’s (HBADE) Green Building Council to set up programs to promote the construction of zero net energy homes. Chapter 76 defines a “zero net energy home” or “zero net energy building” as “a residence or commercial building that, through the use of energy-efficient construction, lighting, appliances and on-site renewable energy generation, results in zero net energy consumption from the utility provider.” It adds that “a net zero energy capable home must be energy efficient enough that if the home or building owner chooses to add on-site generation, net zero energy consumption could be achieved.” All new construction in the state must be zero net energy capable by December 31, 2025 for residential projects and by December 31, 2030 for commercial
properties. To date, DEO and HBADE are still in the early planning stages of this process. One option would be to form a workgroup that would put together practical, specific guidelines for achieving zero net energy capable construction.

**Gap:** DEO and HBADE have yet to set up programs to promote the construction of zero net energy capable buildings by 2025 for homes and 2030 for commercial properties.

**Recommendation #5:** To the extent possible, DEO and HBADE should create programs that promote the construction of zero net energy capable buildings and, thus, satisfy the state mandate. This requirement presents an excellent opportunity for a collaborative partnership that raises the standard of design and construction practices through a realistic, incremental approach with clear, manageable target dates.

*Green for Green*

Another example of an SEU program is the New Construction Green Home Rebate Program, known as Green for Green (G4G). A collaboration of SEU, DNREC, and HBADE, G4G offers $3,000 to $6,000 rebates to homebuyers who buy new homes certified through the NAHB National Green Building Standard (Silver, Gold, Emerald) or LEED for Homes (Silver or higher). With some exceptions, homes built in rural or undeveloped areas—labeled Level 4 by the Office of State Planning Coordination—do not qualify for the rebate. Of the $300,000 of available funds, the program has given out $33,000 in rebates for 11 homes so far. It has also approved $95,000 in rebates for 21 other homes and received applications for another $33,000 in rebates for nine more homes, for a total potential payout of $161,000 for 41 homes. Given the decline in residential housing across the state, the program has shown promise.

Including construction finished prior to G4G, Delaware has the highest per capita construction rate for homes built to the National Green Building Standard—123 certified homes in all.

*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 fall somewhere in between, mandating a minimum code, but allowing some flexibility to go beyond it in progressive jurisdictions.

*Energy Code Adoption*

In Delaware, local jurisdictions must operate under the mandatory, statewide energy code. Since July 1, 2010, the 2009 Delaware State Energy Code has been the adopted energy code for the state’s three
counties and fifty-eight municipalities. A number of jurisdictions with home rule charters are in the process of adopting the state energy code through their legislative process or have already done so.

In years past, there has been some ambiguity regarding statewide adoption, and some jurisdictions have lagged behind in administering the statewide code. For the most recent state adoption, DEO was proactive in contacting all local jurisdictions to create buy-in for the new statewide code.

**Gap:** Some local jurisdictions have lagged behind the state in administering the mandatory statewide energy code.

**Recommendation #6:**

a. The state should increase its adoption outreach to ensure the adoption of the statewide code in jurisdictions with home rule charters.

b. The state should also launch a consumer campaign to create demand for local adoption of the state energy code. BCAP is currently working on a project with the Consumers Union that will create resources to empower consumers to demand model energy codes.

Even with the mandatory statewide energy code, local jurisdictions are permitted to adopt more stringent energy codes than the statewide code. Prior to the most recent adoption, the Delaware State Energy Code—in effect since July 1, 2004—was based on the 2000 IECC for residential and ASHRAE Standard 90-1-1999 for commercial buildings. Therefore, from 2004 to 2009, the state’s code was less stringent than the national model energy codes.

A number of communities decided to save their residents and businesses money and improve the quality of construction in their jurisdictions by adopting an energy code more stringent than the state. Both New Castle and Kent Counties adopted the 2006 IECC, as did the cities of Camden and Newark. The city of Harrington adopted the 2003 IECC.

**Gap:** Prior to the adoption of the 2009 Delaware State Energy Code, many jurisdictions had not adopted an energy code more stringent than the statewide code.

**Recommendation #7:** Jurisdictions should consider adopting an energy code more stringent than the statewide code, such as 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**

As with the state, it is important for cities to set the example for energy code adoption. The City of Newark leads the way with the only municipal energy code more stringent than the adopted state code.

In November 2010, Newark’s mayor and city council approved amendments to the city’s building code to establish mandatory energy efficiency requirements based on LEED standards for all new major developments, both residential and commercial. Major developments are defined as residential
subdivisions with six units or more and commercial projects with buildings 20,000 square feet or greater. This policy applies not only to municipal-funded facilities that meet the major development guidelines, but also to all private developments that meet the criteria. 41

Technically, municipal-funded buildings that do not qualify as major developments would not be subject to the new mandates. However, the city plans to apply the above-code to all of them.

**Gap:** Only one jurisdiction in Delaware has adopted a more stringent green or above-code policy for municipal-funded facilities.

**Recommendation #8:**

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**

One way in which jurisdictions can reduce their carbon footprints and save on their energy bills is by joining national and international organizations dedicated to promoting sustainability. Such organizations give support to local jurisdictions, particularly those that may not be big enough to have professionals on staff who have experience with climate change mitigation strategies and energy efficiency and renewable energy policies.

With support from Cool Cities Delaware, the cities of Wilmington, Dover, Newark, and Lewes have signed on to the US Conference of Mayors Climate Protection Agreement. 42 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. Dover released a progress report in 2008 on the policies and improvements it has undertake, and Wilmington has also pledged to encourage state and federal policies and legislation to reduce greenhouse gasses. 43

Furthermore, New Castle County is a member 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. One specific objective for members is to create a local climate change action plan, which the county has not done as of this writing.\textsuperscript{44}

**Gap:** Few local governments have taken actions that publicly demonstrate their commitment to mitigating the potential effects of climate change.

**Recommendation #9:** All local governments should consider adopting climate change or sustainability action plans and working with national organizations, DNREC, and other jurisdictions that have experience with these issues.

**Overview of Local Green and Above-Code Building Programs**

Dover, Newark, and Wilmington each have green building programs in place or in development. This should come as no surprise, as these three cities have 76 percent of all LEED APs in the state and the vast majority of ENERGY STAR for Homes Partners. These programs are intended to encourage design and construction professionals to consider green and above-code standards for new construction projects.

Dover has a voluntary green building zoning policy that allows LEED certification to satisfy the requirements for corridor overlay zones to improve urban development and increase the quality of construction.\textsuperscript{45} In addition to Newark’s more stringent energy code (see Energy Codes for Municipal-funded Facilities), it also has a program for residential and commercial projects in high-density areas to use LEED certification for site plan approval.\textsuperscript{46}

As part of Green City Wilmington (see sidebar), the city is developing a voluntary green building program that will provide incentives for building owners, builders, and architects to use green techniques in their building and renovation efforts. However, the city has made slow progress advancing this initiative to date.\textsuperscript{47}

**Adoption Summary**

**Current Best Practices**

Delaware has made great strides in energy code adoption policy over the past few years. The adoption of the model energy codes on a three-year review and update cycle is a best practice that indicates the state’s desire to help its citizens and reduce its environmental impact. The state’s goal of having all new construction be zero net energy capable by 2025 for residential and 2030 for commercial is also commendable, as is its participation in RGGI and its EERS and RPS goals. The state will have to continue to make meaningful progress to take advantage of these policies’ potential.

Moreover, the G4G Program is a good example of a collaborative statewide voluntary green building program that has achieved measurable results. The state should review the program’s success
alongside other state and SEU programs and consider expanding its funding, particularly as Recovery Act funding runs out.

On the local level, Wilmington has led by example through its building energy efficiency retrofit and upgrade work. It should continue that momentum by finalizing and implementing its proposed voluntary green building program. Likewise, Newark’s adoption of mandatory green building requirements for major subdivisions is a good example of a policy that should raise the standards of energy-efficient building practice, though the program has not existed long enough to determine measurable results.

**Gaps and Recommendations**

As mentioned above, addressing the following gaps in energy code adoption will improve the ability of Delaware and its local governments to promote safety and health in the built environment, help their businesses and residents save money, set the example and raise the bar for energy-efficient construction, and solidify their commitment to reducing the environmental impact of its building stock.

**Federal Policy**

**The Recovery Act**

**Gap:** Like many states with a lack of staff and resources available to respond to federal solicitations, Delaware did not allocate Recovery Act funding for energy code activities.

**Recommendation #1:** In the future, the state should have a plan in place to be able to use available Federal funding to increase its energy code outreach and support activities (see Implementation).

**Energy Codes for State-funded Facilities**

**Gap:** The state does not have a mandatory green or advanced code policy for state-funded facilities.

**Recommendation #2:**

a. Delaware should pass legislation that mandates that all state-funded facilities meet the requirements of a recognized national green building or high performance standard or code.

b. If legislation is not possible, the governor should update the language of Executive Order No. 18 to mandate that all state-funded facilities meet these requirements.

**Statewide Climate Change Initiatives**

**Gap:** The state’s Climate Change Action Plan from 2000 is outdated. It does not explicitly require the adoption of the latest model energy codes, nor does it address implementation, which is critical for realizing potential energy savings and greenhouse gas emissions reductions.
**Recommendation #3:** The state should form a stakeholder group to update its Climate Change Action Plan to:

a. Include the mandatory adoption of the latest model energy codes, which would lock in future energy savings and greenhouse gas emissions reductions;
b. List energy code implementation as a priority for Delaware jurisdictions;
c. Account for scientific advances related to the potential impacts of climate change, improved technologies and policy tools, and increased awareness of this issue;
d. Create a feasible framework for implementation.

**Overview of Green and Above-Code Programs**

**Gap:** High performance residential and commercial building requirements are not encouraged sufficiently for new construction in Delaware.

**Recommendation #4:**

a. DNREC and DEO should work to increase the market penetration of high performance residential and commercial buildings. One crucial step is to raise awareness and knowledge of the available high performance standards and work with progressive jurisdictions to adopt green or above-code voluntary or mandatory standards, even if they do not include certification.
b. Companies within the design and construction industry should make the economic and environmental decision to adopt high performance construction as official policy and then market their properties to clients as cheaper to operate, more energy-efficient, and less harmful to the environment.

**Gap:** DEO and HBADE have yet to set up programs to promote the construction of zero net energy capable buildings by 2025 for homes and 2030 for commercial properties.

**Recommendation #5:** To the extent possible, DEO and HBADE should create programs that promote the construction of zero net energy capable buildings and, thus, satisfy the state mandate. This requirement presents an excellent opportunity for a collaborative partnership that raises the standard of design and construction practices through a realistic, incremental approach with clear, manageable target dates.

**Local Policy**

**Energy Code Adoption**

**Gap:** Some local jurisdictions have lagged behind the state in administering the mandatory statewide energy code.

**Recommendation #6:**
a. The state should increase its adoption outreach to ensure the adoption of the statewide code in jurisdictions with home rule charters.
b. The state should also launch a consumer campaign to create demand for local adoption of the state energy code. BCAP is currently working on a project with the Consumers Union that will create resources to empower consumers to demand model energy codes.

**Gap:** Prior to the adoption of the 2009 Delaware State Energy Code, many jurisdictions had not adopted an energy code more stringent than the statewide code.

**Recommendation #7:** Jurisdictions should consider adopting an energy code more stringent than the statewide code, such as 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**

**Gap:** Only one jurisdiction in Delaware has adopted a more stringent green or above-code policy for municipal-funded facilities.

**Recommendation #8:**

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**

**Gap:** Few local governments have taken actions that publicly demonstrate their commitment to mitigating the potential effects of climate change.

**Recommendation #9:** All local governments should consider adopting climate change or sustainability action plans and working with national organizations, DNREC, and other jurisdictions that have experience with these issues.
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 cities 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.

Overview of State Implementation Policies

The state does not have a comprehensive implementation policy in place. Developing one will be a focus of the next stage of its collaboration with BCAP.

The state has outlined some enforcement guidelines for local jurisdictions for all building codes. Chapter 76 of Title 16 states that Delaware’s three counties may “enforce building codes...[and] charge reasonable fees for the enforcement of said codes.”

Moreover, for the energy code, Chapter 76 states that jurisdictions must require licensed engineers or architects to certify compliance for commercial buildings over 5,000 square feet. For residential construction and commercial construction smaller than 5,000 square feet, design and construction professionals can demonstrate compliance using REScheck and COMcheck software. ENERGY STAR software is an acceptable alternative for residential construction. For buildings that exceed the stringency of the state’s energy code, jurisdictions “shall allow submission of documents that demonstrate energy efficiency that exceeds the requirements of the code” for recognized national, state, or local green or above-code building programs.

Gap: State guidelines allow licensed engineers or architects to certify compliance for commercial buildings over 5,000 square feet.

Recommendation #10: Professional stamps do not ensure that the building meets energy code requirements. The state should consider updating the Delaware Energy Code to require more stringent compliance verification methods that include site-plan review by trained plan reviewers. Seattle provides an excellent example of a thorough energy code enforcement process that Delaware could emulate.

Chapter 76 of Title 16 also states that “the Delaware Energy Office, or its successor, shall promulgate procedures for certification of compliance with these codes and standards to be utilized by respective local governments.” Due to staff and resource limits, as well as the need to proceed with due caution and work collaboratively with local governments, DNREC and DEO have not yet promulgated procedures beyond what already exists in Chapter 76 of Title 16.
Gap: The state has not yet established additional procedures for certification of compliance for local jurisdictions beyond those listed in Chapter 76 of Title 16.

Recommendation #11:

a. Building off the strategic compliance plan with BCAP, DEO should promulgate uniform statewide procedures for compliance certification through a collaborative process with local jurisdictions that seeks to build consensus wherever possible.

b. DEO, inspection departments, and design and construction stakeholders should create energy code compliance checklists that follow uniform state requirements.

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 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 lead to greater levels of compliance.

State’s Role in Promoting Codes

Outreach to the Enforcement Community

DEO conducts limited outreach efforts to building inspection departments, given its budget and staff. However, DEO is eager to improve its services, and it is proactive about contacting code officials to disseminate national and state information on energy code adoption and implementation issues. Moreover, in 2010, it distributed a preliminary survey to code officials to identify key energy code enforcement and compliance concerns. As part of the research for this project, DEO also distributed a BCAP survey of almost 50 questions covering local inspection policy and inter-agency cooperation, education and training, and general enforcement and compliance issues. These forthright assessments of the on-the-ground realities of code enforcement in the state—returned by the vast majority of inspection departments—should give DEO an excellent starting point for launching statewide support and outreach activities.

Gap: DEO does not have sufficient resources to provide additional and much-needed outreach to local jurisdictions regarding the implementation of the adopted energy codes.

Recommendation #12: DNREC should provide additional funding to DEO to continue to promote energy code implementation through outreach activities, such as:
a. The dissemination of relevant national and state energy code information, such as DOE compliance guidelines and other resources (see Appendix A for a list of other DOE and PNNL resources); 

b. Data collection to better understand the realities of energy code adoption and implementation, as well as and code official and policymaker concerns;

c. Technical support on code interpretation and infrastructure issues;

d. Materials tailored to code officials and policymakers, such as fact sheets, code guides and compliance checklists;

e. Other outreach activities and resources.

**Outreach to Consumers and Businesses**

The state conducts its outreach efforts to consumers and businesses primarily through the Delaware Sustainable Energy Utility (SEU), mentioned above. SEU is a first-of-its-kind non-profit organization formed by the General Assembly in 2007 to promote energy efficiency and renewable energy through a variety of funding mechanisms. The SEU receives funding from RGGI, the Recovery Act and tax-exempt bonds. Its major outreach and incentive initiative is Energize Delaware, a one-stop-shop that provides educational resources and financial incentives to individuals and businesses for energy efficiency upgrades and renewable installations. Its overarching goal is to raise awareness, demystify the energy efficiency upgrade process, and provide consumers with financing options.

Prior to launching, Energize Delaware conducted market research on consumer and business energy efficiency practices, options, and priorities and established its programs based on this information. Its findings confirmed that Delawareans were eager to do more energy efficiency upgrades, but lacked knowledge and cited funding as the biggest barrier. For example, “two-thirds of homeowners identified a need to make one or more energy efficiency improvements, but only 42 percent plan to take action.” The research also indicated which energy efficiency features would have the most impact. For existing homes, Energize Delaware offers residents a wide range of home energy efficiency options, from discounts on CFLs to rebates on ENERGY STAR for Homes energy audits, HVAC equipment, and appliances. The G4G program (see Overview of Green and Above Code Programs) offers rebates to home buyers for building new homes to green standards.

The Efficiency Plus Business Program is available to all businesses, non-profit organizations, institutions, and governments in the state. The Program offers incentives of up to $20,000 for energy audits, lighting, HVAC, water heating, appliances, motors, and other equipment and up to $250,000 for loans. Applicants can also submit custom measures. More information can be found on the Energize Delaware site, including a list of Program Allies that offer energy efficiency services.

Finally, Energize Delaware held several community events in 2010 to raise consumer awareness of energy efficiency features and educate adults and children about their benefits. It hosted a booth at the Great Green Expo in Wilmington and the Delaware State Fair in Harrington, as well as a solar car race for...
middle school teams and a CFL giveaway at a Home Depot in Newark. There are also scavenger hunt and word search games for children on the website. 58

**Gap:** In spite of commendable efforts by Energize Delaware, many consumers and businesses still lack knowledge regarding energy efficiency upgrades and believe that the upfront costs would be prohibitive.

**Recommendation #13:** Delaware should continue to support the SEU and Energize Delaware as a crucial mechanism for saving residents and businesses money and reducing the state’s environmental impact.

**Gap:** Most consumers are largely unaware that most buildings fall short of adopted energy code requirements—or even that there are adopted requirements in most jurisdictions.

**Recommendation #14:**

a. DEO should engage real estate representatives, appraisers, and lenders to create a strategy for properly valuing energy-efficient construction and operating costs in the market. Creating consumer demand and proper valuation will give the design and construction communities a much more powerful incentive to comply with the adopted codes than any incentive or mandate the state could issue.

b. Similar to Recommendation #6, DEO should conduct consumer and business outreach to heighten awareness of the importance of energy code implementation and create demand for strict energy code enforcement policies. BCAP’s consumer campaign could inform and support this effort.

**Local Government’s Role in Promoting Codes**

**Outreach to the Design and Construction Industry**

Prior to the most recent adjustment to a more stringent energy code, most jurisdictions in Delaware have not had to promote a new energy code since 2004, and interest in the code was generally lower at that time. There has been much greater interest in the most recent energy code update, though outreach activities have not necessarily followed. Our interviews indicated that the effort put forth to educate the design and construction communities—as well as homeowners—varies widely by jurisdiction. As in many states, larger inspection departments with more buildings to inspect tend to emphasize the energy code more than their smaller counterparts, though this pattern does not hold across the board. Some jurisdictions do not conduct outreach for energy code compliance awareness, and many work with these groups to the
extent they feel necessary. A few jurisdictions take a proactive approach to announcing code updates and issues and working with them to prepare for the change.

Outreach to Consumers and Businesses

Another role local decision-makers should take is to reach out to consumers and businesses. Energy code outreach to these groups is critical for advancing the market for energy-efficient construction and existing building upgrades, while helping both save money is smart economic policy—and smart politics. While Wilmington (see below) and Dover (see sidebar) have both made efforts to engage these important stakeholders, we have not found significant outreach efforts in many other communities. Certainly, saving energy for consumers and businesses is an issue that inspection departments and policymakers support, though it does not appear to be a priority in some cases.

**Gap:** Few jurisdictions in Delaware have undertaken strong outreach efforts targeted at the design and construction communities, businesses, and consumers.

**Recommendation #15:**

a. Inspection departments should find ways to emphasize to design and construction professionals the importance of constructing better quality homes and commercial properties that save occupants money. They should also work with these groups to ensure a smooth transition to the State Energy Code while building rates are low.

b. Similar to Recommendation #14, local decision-makers should conduct consumer and business outreach to create demand for strict energy code compliance from the design and construction communities.

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**Dover Outreach to Consumers**

Dover offers a number of outreach resources to its residents. It has **Consumer Energy Tips** with links to other resource sites (although the page is not easily accessible on the city’s website). It has also created a **consumer handout** with energy saving tips.

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Green City Wilmington offers a great example of consumer and business outreach (see Local Climate Change Initiatives). The Wilmington Green Environmental Stewardship Program challenges city residents to measure their household’s environmental sustainability based on a number of sustainable criterion, such as food, energy, water conservation, cleaning, outdoor yard work, transportation, and waste management. Following the city’s guidebook, residents add up their environmental sustainability points to achieve either the green or gold classification. The city plans to release other guidebooks for schools, churches, and other organizations. The program is based on similar work conducted by Annapolis, Maryland’s Sustainable Annapolis Program.

Green City Wilmington also offers a climate pledge for citizens that include home energy efficiency measures, among other sustainability topics. A youth climate pledge is also available, as are links to government and non-profit environmental information sites and an Energy Information Agency (EIA) climate change games and activities site. While these two programs do not ensure behavioral changes, they do raise awareness of these critical issues.
Stakeholders’ Role in Promoting Codes

The primary function of stakeholder outreach is to raise awareness of energy efficiency issues, often directly to energy consumers. When consumers 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.

Cool Cities Delaware (CCD), a project of the Sierra Club Delaware Chapter, is part of a national initiative to encourage cities and counties to endorse and meet the goals of the U.S. Mayors Climate Protection Agreement (see Local Climate Change Initiatives). The [CCD website](#) features success stories from cities and towns in the state, including Newark and Dover’s building energy efficiency work covered above. It also has a list of government and non-profit links for energy saving programs and tips.62

The Delaware Municipal Electric Corporation (DEMEC) is a wholesale electric utility that includes nine municipalities, including all of the largest population centers save Wilmington. DEMEC launched the [Energy Depot](#), an online resource for utility customers to learn about their home’s energy use and how to save on utility bills through efficiency upgrades and measures.63

The Energy Depot allows users to select their jurisdiction and then create a customized energy profile by filling in basic information about home size, efficiency measures, appliances, and energy use behaviors. The profile then breaks down energy use into easy to understand charts and graphs, as well as energy savings tips for each category of energy use taken from the library section. It is also possible to enter billing information to track utility bills over time. The energy calculator and comparison sections allow users to estimate energy use for individual categories in terms of kWh and dollars per year. Lastly, users can contact an energy advisor with further questions.

Another interesting outreach program is the Delaware Electric Cooperative’s (DEC) Beat the Peak. Its goal is to help members save money by reducing energy use during peak hours—when energy prices are at their highest. Those who sign up get an indicator light with green, yellow, and red lights that signal non-peak, peak warning, and peak hours. Members can also sign up for email or text alerts. While this program delays some energy use until off-peak hours, it also raises awareness of energy reductions.64 Moreover, the DEC is a member of Touchstone Energy Cooperatives, an alliance of consumer-owned electric co-ops.65 DEC points its members to Touchstone’s excellent interactive home energy awareness tool, [TogetherWeSave](#).

Delmarva Power Outreach

Delmarva Power also offers its customers online resources for making energy efficiency upgrades and behavioral changes. It has put together multiple brochures, including 85 Ways to Save Money and Energy, Energy Vampires, and Winter Heat Pump Tips. Moreover, its monthly newsletters regularly suggest many other actions customers can take to reduce their energy use. Yet the most helpful resources on the site might be the energy saving videos for winter and summer, which cover common areas for improvement and demonstrate how to make simple changes.
HBAD is also active in promoting energy-efficient construction to builders and consumers. One of its signature events is the second annual Delaware Green Fest, Sunday, May 1 on the Dover Legislative Mall. It will include live music and entertainment, green product vendors, and other events to educate consumers and get them excited about energy efficiency and other green behaviors.

While it is ultimately incumbent on consumers to take action to improve the energy efficiency of their homes and businesses, these types of programs can serve as the impetus for educating them in an accessible way and turning knowledge into action.

Still, Delaware utilities can build off these outreach efforts. One obvious area that they have yet to explore is energy code outreach. Such activities could give customers—particularly those looking to build a new home or move into a recently constructed home—the knowledge they need to ask the right questions to design, building, and real estate professionals regarding compliance with the adopted energy code. Utility programs could also include local government advocacy initiatives to empower customers to demand stronger government support of energy code training and enforcement.

**Gap:** Delaware utilities do not include energy code outreach and local government advocacy as part of their outreach programs.

**Recommendation #16:** Delaware utilities should consider energy code outreach and local government advocacy initiatives that would empower customers to demand energy code compliance and implementation support from local policymakers and design, building, and real estate professionals.

Certainly, funding for increased outreach efforts is a consideration. Compared to the cost of constructing new energy production facilities and peak load demands, however, Delaware’s utilities can make an economic argument for promoting energy reduction through efficiency outreach, coupled with incentives to encourage customer action. This is particularly true for Delmarva Power, which reached an agreement in April 2010 with the Delaware Public Service Commission, DNREC, and other stakeholders to decouple the company’s distribution rate revenue from sales volume. This enables the utility to benefit even more from reduced energy use.66

**Enforcement Community**

The enforcement community provides the teeth behind adopted codes, as it is their responsibility to ensure that design and construction 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

No state agency enforces the statewide energy code. Inspection departments at the county and jurisdictional level are responsible for energy code enforcement.

The State Fire Marshal’s Office (SFMO) enforces the 2009 Delaware State Fire Prevention Regulations, based on the most recent editions of the National Fire Protection Association fire codes.67

Enforcement of State-funded Facilities

The Division of Facilities Management (DFM) within OMB is responsible for planning, designing and managing all state-funded construction projects not administered by the Departments of Transportation or Education. DFM’s work includes new construction and renovations. It sets design and construction quality standards and building specifications. It also contracts with design and construction firms and ensures that their work meets those standards and specifications. However, it’s role in state-funded construction and renovation does not include enforcement of any building codes, including energy. SFMO conducts building code enforcement for life safety and fire codes for state-funded construction projects. Local inspection departments are responsible for energy code enforcement.68

State Implementation Support

Although the state does not conduct energy code enforcement, DEO supports local efforts to the extent possible, given its limited budget and resources dedicated to energy code implementation support. Currently, DEO supports local jurisdictions mainly through outreach (see State’s Role in Promoting Codes) and training (see Training and CEUs).

Gap: DEO does not have sufficient resources to increase its local implementation efforts.

Recommendation #17: DNREC should provide DEO with sufficient funding, training, and additional staff to allow it to build upon its existing implementation efforts. Beyond performing the

Municipal Enforcement Jurisdictions

The following municipalities conduct their own enforcement services:

**New Castle County:** New Castle County DLU, Bellefonte, Newark, New Castle City, Newport, Odessa, Townsend, and Wilmington

**Kent County:** Kent County I&E, Camden, Cheswold, Clayton, Dover, Harrington, Milford (also in Sussex County), Smyrna, and Wyoming

**Sussex County:** Sussex County BCD, Bethany, Laurel, Lewes, Rehoboth, Seaford, and Selbyville

The following jurisdictions contract with third party companies or the county for plan review, on-site inspections, or both:

Bridgeville, Delmar, Elsmere, Middleton, Millsboro

The remaining jurisdictions cede building code enforcement to the counties.
proposed outreach efforts (see Recommendation #12), it can provide higher-level implementation support that would provide code officials with the training, materials, and tools they need to enforce state law.

For specific recommendations that address gaps in local energy code implementation for which the state can provide guidance and assistance, see the following Gaps.

**Local Energy Code Enforcement**

As mentioned above, local inspection departments at the county and jurisdictional level are responsible for energy code enforcement. Counties are responsible for unincorporated areas, as well as jurisdictions that cede enforcement duties to the county (see sidebar above for a list of jurisdictions that conduct their own energy code enforcement). Some jurisdictions only conduct one of the two stages of the enforcement process and rely on the county inspection departments for the other, and a few contract one or both to third party inspection companies, such as RVE Inc. and URS Corporation.

Outside of these arrangements, city and county inspection departments stay within their jurisdictions and generally do not collaborate or share resources. Still, county and city code officials communicate on local issues as needed, usually through the Delaware Building Officials Association (DBOA) or the Lower Delaware and Maryland Building Official Association (LDMBOA), both of which meet regularly.

The building inspection process in Delaware usually follows established procedures. The site-plan review includes back-and-forth between design and construction professionals until the plans meet all requirements. Code officials then conduct multiple on-site inspections at different stages in the process (foundation, frame, and final at a minimum), issuing inspection write-ups or stop-work orders for violations as needed. The final step is for code officials to issue an occupancy permit. Beyond this standard outline, however, each jurisdiction adopts its own methods for conducting plan reviews and inspections, many of which differ greatly in the state.

In general, plan reviewers that check for energy incorporate the energy code into their work. Code officials interviewed and surveyed responded that site plan reviews for residential projects typically last anywhere from ten minutes to two hours. For commercial projects, estimates ranged from ten minutes to four hours. Even for smaller construction projects, ten minutes is not sufficient to inspect all building code requirements, including the energy code.

**Gap:** Some jurisdictions in Delaware do not spend sufficient time conducting plan reviews.

**Recommendation #18:**
a. Inspection departments should include all energy code provisions in their standard plan review process and spend more time ensuring that building projects meet all building code requirements.

b. The state should create a set of minimum site plan review requirements that code officials must follow to ensure that all buildings meet the adopted building code provisions.

For on-site inspections, two important indicators for the success of energy code enforcement are the number of on-site inspections and the incorporation of the energy code into each applicable inspection. In most cases, the provisions of the state’s adopted energy codes require inspection at every major step of the enforcement process. In Delaware, the typical range of inspections is 4-6—fairly standard for residential and low-rise commercial projects. Some code officials interviewed and surveyed responded that they check energy code requirements for each inspection where applicable. However, the range for inspections that include energy code requirements was only 1-4, meaning that some jurisdictions do not check for energy code requirements at all applicable stages of the on-site inspection process. Rather, these jurisdictions check for insulation only, which is an important component of energy efficiency requirements, but hardly sufficient to ensure compliance with every provision of the code.

Some code officials surveyed also identified two other troubling indicators of insufficient on-site enforcement. Fewer than half of inspection departments use energy code inspection checklists for on-site inspections. A handful of inspection departments even said that they do not issue stop work orders for energy code violations, nor do they withhold occupancy permits until energy code provisions are met.

**Gap:** Some inspection departments do not check for all requirements of the energy code during on-site inspections, nor do they use energy code inspection checklists to make certain that they have inspected for all energy code provisions.

**Recommendation #19:**

a. Inspection department should inspect for energy code compliance at all applicable stages of the inspection process and use checklists to double-check their work. Insulation inspection is not sufficient to ensure energy code compliance.

b. Inspection departments could look to the state and the code official associations for training on the energy code and inspection practices, as well as resources such as checklists.

c. The state should create a set of minimum on-site inspection requirements that code officials must follow to ensure that they inspect for provisions of the energy code at all applicable stages of the inspection process.

**Gap:** Some inspection departments do not issue stop work orders or without occupancy permits for projects that do not meet the requirements of the energy code.

**Recommendation #20:** Inspection departments must enforce the energy code to the same stringency as other building codes, which includes issuing stop work orders and withholding occupancy permits for building projects that do not meet the requirements of the energy code.
While the on-the-ground realities of building inspection sometimes benefit from some give-and-take, this practice is incompatible with the state’s goals for reducing energy use and with Chapter 76 Title 16.

There is a wide range of energy code enforcement practices and infrastructure in the state. A few jurisdictions have already made a firm commitment to ensuring building energy efficiency. Energy efficiency experts in the state acknowledge that enforcement is stronger in the north than the south, although practices vary in both regions, yet neither region matches standards sufficient for the state to achieve 90 percent compliance with the model energy codes.

Most inspection departments do insufficient energy code review and inspection work. These communities tend to be smaller and process fewer building projects per year, particularly in recent years. However, this is not to say that larger jurisdictions all conduct flawless energy code enforcement. The consensus among enforcement professionals, design and construction professionals, and other involved stakeholders interviewed and surveyed is that the majority of building departments do not yet enforce the code sufficiently to achieve compliance with the statewide energy code, and multiple barriers exist.

**Barriers to Energy Code Enforcement**

One overarching barrier to successful energy code enforcement is a lack of priority for the energy code. Our findings indicate that many code officials in Delaware view the energy code as a secondary concern compared to the more traditional life, health, and safety codes. Code officials stress that in most jurisdictions, the focus on energy code enforcement is relatively new. Other code officials, particularly in Southern Delaware, also view the energy code with apprehension. Some see it as nothing more than additional government regulation.

Nonetheless, code officials who do not value the code as integral to occupant health and safety are less likely to integrate the code into their established routines, particularly if their superiors take a similar view. Inspection department directors must be energy code champions who prioritize energy code enforcement for their staffs. Support for proper energy code enforcement also comes from local decision-makers, who must also prioritize it as a crucial economic and environmental mechanism rather than a politically convenient, but underfunded, “green” initiative.

**Gap:** Many local jurisdictions do not make energy codes a priority.

**Recommendation #21:** Code officials and local decision-makers alike should consider the long-term economic and environmental impacts of inefficient buildings and prioritize their enforcement alongside more traditional building codes.

In our interviews and survey, by far the largest barrier cited was a lack of familiarity with and understanding of the energy code. Despite some recent 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. Few, if any, come from an energy efficiency background. In addition, the adopted model energy codes are more stringent than previous energy codes and require additional knowledge, even for code officials who have attended energy efficiency trainings in the past.

Unlike other states that struggle to reach code officials in rural areas, Delaware is sufficiently small that all code officials have reasonable access to training workshops.

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

The other major barrier to energy code compliance cited was sufficient time and staff to conduct the additional inspections needed for the energy code. Adding energy code enforcement duties to the workloads of code officials who had not previously enforced all provisions of the energy code necessarily adds time to the process, even when incorporated into the existing plan review and inspection process.

**Figure 3.**

![Delaware Residential Construction 2005-2009](image)

In Delaware, inspection departments are funded by the permit fees they collect. Most also receive jurisdictional funds allocated to them by the county or local government. Our findings indicate that funding is generally sufficient for proper enforcement of building codes, not including energy. However, to account for the increased training, time, and staff needed to enforce the energy code to the same standard as the life, health, and safety codes, jurisdictions should provide additional funding to inspection departments. Of course, determining the appropriate percentage of funds for inspection departments’ budgets depends on a host of variables and must be examined on a case-by-case basis.

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

**Recommendation #22:** County and 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. Proper enforcement of the energy code simply does not happen with local government support and resources.
The variable nature of the economy and construction market compounds this concern. Delaware has experienced a sharp decline in residential building permits per year (see Figure 3), as well as a decrease in commercial development, particularly for larger, more expensive projects. This decline greatly reduced inspection departments’ workloads and budgets, and many have had to give staff additional responsibilities and enact hiring freezes. 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.

For each of these barriers, the state can play a much greater role in supporting local energy code implementation, as many state energy offices do. As covered above, DEO has been limited in its ability to support and encourage local jurisdictions due to funding and staffing concerns. With greater support, DEO can expand its services.

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

**Recommendation #23:**

a. DEO should act as an advisor and supporter for local inspection departments and policymakers by providing additional resources and assistance as needed, including the outreach activities listed in Recommendation #12.

b. DEO should create and distribute materials tailored for code officials and design and construction professionals on the 2009 IECC, such as code guides and compliance checklists. These documents should summarize key provisions of the energy code, identify changes from the previous code, discuss the intent of major requirements, highlight proper installation techniques, and generally clarify and expand upon the code itself. The state can also work with local jurisdictions and especially trade associations to adapt materials to fit each audience.

c. The state could subsidize the purchase of handheld tools for building departments to streamline inspections, help facilitate the integration of energy code inspections into the building code enforcement process, and, thus, reduce inefficiencies.

d. It could also subsidize duct blaster and blower door equipment and training for communities that request these services. Given the size of the state, another option would be to loan out this equipment upon request.

e. The state should consider advising and working with jurisdictions to strengthen county inspection departments where feasible to allow jurisdictions—particularly with small or understaffed departments and little construction—to take advantage of combining resources for enforcement and economies of scale. The county/regional model has worked well in regions of Colorado, many of which are the size of Delaware.

**Certification**

Delaware does not have an official code official certification process. Moreover, it does not recognize
certifications from a qualified certification provider. DBOA and LDMBOA also do not require certification as a requirement for membership.

Delmar, Elsmere, Milford, Newark, Newport, Smyrna, South Bethany, and both New Castle and Kent Counties require code officials to have certification from a qualified certification provider, most often from the ICC, or achieve their certification within 18 months. Sussex County and the remaining jurisdictions with inspection departments do not require certification as an official policy, although many indicated that they expect it.

Our research did not identify any inspection department in Delaware that requires previous knowledge of energy efficiency for applicants. Such an action would ensure basic competency in building enforcement skills and practices, including energy efficiency, and demonstrate these groups’ commitment to building code enforcement. Enforcing building codes for current buildings requires technical understanding of many building features and their interconnectedness, as well as their on-the-ground application.

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

**Recommendation #24:**

a. To protect its citizens, DEO or the appropriate state agency should set certification requirements for code officials that include minimum certifications from a qualified provider.

b. DBOA and LDMBOA should make minimum certification from a qualified certification provider a requirement for membership.

c. In the absence of state action, local jurisdictions should set certification requirements for code officials.

**Training and CEUs**

As with certification, the state does not set or recognize training and CEU requirements from the ICC and other qualified training providers.

**Gap:** Delaware does not set or recognize training and CEU requirements from qualified training providers.

**Recommendation #25:** DEO should recognize training and CEU requirements from the ICC and other qualified certification providers. A number of state agencies involved in energy code adoption and implementation, including Pennsylvania’s Department of Labor and Industry, accept all ICC certification and training or a specific list of certifications and trainings.

In addition, DBOA and LDMBOA do not set CEUs requirements to maintain membership.
Jurisdictions that require ICC certification also require code officials to receive the minimum number of ICC-mandated CEUs to maintain certification, though this is for all codes and does not necessarily include energy efficiency training. Many jurisdictions in Delaware do not require CEUs of any kind, though most encourage staff to earn them whenever possible. As with other implementation issues, some departments are more proactive in encouraging code officials to earn as many certifications and CEUs as possible. Our research did not identify any inspection department in Delaware that requires energy efficiency CEUs, though recent energy code training workshops have allowed a number of code officials to receive training on the adopted model energy codes.

**Gap:** DBOA, LDMBOA, and many jurisdictions do not set minimum CEU requirements for code officials.

**Recommendation #26:** DBOA, LDMBOA and all jurisdictions should set minimum CEU requirements for code officials for all building codes, including energy.

In 2010, DNREC and DEO undertook a statewide training effort to prepare code officials and design and construction professionals for the adoption of the 2009 IECC and ASHRAE Standard 90.1-2007. The state contracted the workshops to BCAP and Newport Ventures, a research and consulting firm with expertise in the housing industry. These organizations held a stakeholder’s meeting to better understand specific training needs across the state and the most effective training formats. Based on these results, they then developed a tailored training curriculum.

In May and June of 2010, BCAP and Newport Ventures staff conducted two half-day residential and half-day commercial trainings in Newark, Dover, and Georgetown, 12 in all. One of the residential trainings was online. In total, 270 code officials and design professionals attended the sessions.

DBOA, LDMBOA, and ICC have also offered energy code training sessions in previous years.

Despite these efforts, less than half of the jurisdictions interviewed and surveyed have attended classroom trainings. A few have participated in National Association of State Energy Officials (NASEO) webinars on energy codes. However, the most recent covered the next iteration of the model energy codes—the 2012 IECC and ASHRAE Standard 90.1-2010.72

**Gap:** Many code officials in Delaware lack sufficient familiarity with and understanding of the adopted energy codes.

**Recommendation #27:**

a. The state should build on its previous energy code training workshops (see Training and CEUs) to offer additional classroom and on-site training to code officials and design and construction professionals (see Design/Construction Community). They should also strongly encourage all code officials to attend, even if they have participated in previous energy code training sessions.

b. State agencies should also provide opportunities for training and certification for green and above-code standards, features, and practices.
c. Inspection departments should mandate that code officials attend available training sessions so that they are equipped to enforce the code for site-plan reviews and on-site inspections. They should also provide time and funding to do so. DBOA and LDMBOA can play a crucial role in providing and/or coordinating training workshops that are accessible for all code officials in the state.

d. The state should consider forming a stakeholder group of energy efficiency experts and practitioners, educational institutes, trade associations, and other interested parties to strengthen workforce training programs that develop highly skilled plan review and inspection professionals. The state’s role could be to connect and facilitate collaboration between all relevant groups, help develop curriculum and identify qualified professionals to teach, and provide financial incentives for institutions and tuition assistance for students. Beyond saving money and reducing energy use, energy and above-code inspections represent an opportunity to create good “green” jobs.

Third Party Infrastructure

The enforcement guidelines in Chapter 76 of Title 16 authorize third party documentation to meet energy code requirements if they exceed state law for recognized national, state, or local green or above-code building programs. From our surveys, the consensus among inspection departments is that they conduct their standard energy code enforcement procedures for all buildings in their jurisdiction, but also accept and welcome third party inspections and documentation.

The Residential Energy Services Network (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 five organizations certified as HERS raters in Delaware, with an additional eight organizations listed in neighboring areas of Pennsylvania, Maryland, and New Jersey. Raters must complete the required RESNET energy training to be included on this list. In addition, the ENERGY STAR website lists 27 companies and organizations that employ qualified raters in the state and surrounding areas. However, of those companies, only five have inspected at least 40 or more ENERGY STAR homes. One organization—The Energy Services Group—has conducted over 60 percent of all ENERGY STAR homes inspections in the state.

The Building Performance Institute (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 two Training Affiliates in the state: EnergyScore, Inc. and the Delaware Technical and Community College. Although the state does not have any Accredited
Contractors, it does list 25 organizations with BPI Certified Professionals on staff. There is some overlap between organizations with certified third party rating professionals.

**Gap:** Neither the state nor jurisdictions have established standards and mechanisms for third party inspection services.

**Recommendation #28:**

a. DEO and/or jurisdictions should establish standards and mechanisms for third party inspection services. Given the expected growth of above-code and green construction in the future, it is imperative that inspection departments be able to work efficiently in conjunction with third party testers and raters.

b. Similar to Recommendation #27, DEO should consider forming a stakeholder group of accreditation and standards organizations, third party rating firms, and educational institutions to strengthen workforce training programs that develop third party rating professionals.

**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 Design/Construction Community Infrastructure**

*Trade Associations*

Delaware’s trade associations for the design and construction communities are making an effort to support energy code compliance and energy efficiency in general.

HBADE represents the interests of homebuilders in Delaware and offers them various services in addition to its collaborations with the state mentioned above. Building Blocks Breakfats provide educational opportunities on topics of interest. The Delaware Home Show also provides an avenue for homebuilders, the public, and interested parties to learn more about homebuilding in the state. In 2011, the Home Show will be in Wilmington on March 5-6 and Dover on March 26-27 and will feature multiple energy efficiency organizations as exhibitors. Moreover, HBADE supported the update to Chapter 76 of Title 16. Finally, HBADE also represents the state at national conferences and hearings.
The American Institute of Architects Delaware Chapter (AIA Del.), Delaware ASHRAE (Del. ASHRAE), and the Associated Builders and Contractors of Delaware (ABC Del.) represent the interests of the architecture and engineering communities. Activities include government advocacy, CEUs opportunities, and meetings to discuss issues and share ideas (see Training and CEUs).

In addition, each hosts state or regional conferences. AIA hosts the annual AIA Del. Sustainability Conference. In 2011, ABC Del. will host the Power of Green Conference: the Future of Green Building and Economic Development in Delaware on March 21-22 in the University of Delaware’s Clayton Hall in Newark. In 2010, Del. ASHRAE hosted the Mid-Atlantic Chapters Regional Conference, which featured sessions on LEED construction and the state’s green initiatives.

See Training and CEUs for more information on trade association training sessions.

### Certified Green/Above-code Professionals

One measure of interest in and knowledge of green and above-code building is the number of certified professionals in the state:

- **LEED Accredited Professionals (APs):** 176
- **ENERGY STAR Builder Partners:** 154
  - Half have signed up since 2009
  - Eight build exclusively ENERGY STAR qualified homes
- **Green Advantage Certified Building Practitioners:**
  - 69 Commercial
  - 35 Residential
  - Some overlap between the two groups
- **NAHB Certified Green Building Professionals:** 11

### Construction Industry State of Affairs

As covered above, residential and commercial construction in Delaware have declined steadily since 2005, and the design and construction industries have felt the effects. Some businesses have gone bankrupt, many firms have had to lay off staff, and a number of residential and commercial developments have been put on hold. HBADE lost 47 builders and only added 11. In additional, banks are lending less money for large residential developments and commercial projects. An increase in renovation projects for existing buildings has helped buttress the industry against further decline.

### Barriers to Energy Code Compliance

The design and construction sectors face many of the same barriers as the enforcement community. The most important barrier is a lack of priority among some professionals, particularly given the difficult economics of the industry.

Even in times of economic prosperity, some design and construction professionals are wary of the state-mandated energy code, which they see as additional regulation. 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, even though BCAP’s Incremental Cost Analysis study found that building to the model energy codes is affordable.

However, a significant minority of homebuilders has embraced energy-efficient and green design and construction practices and standards, with HBADE supporting this effort (see State Policy: Overview of Green and Above-Code Programs). In doing so, they have set themselves apart in the highly competitive...
marketplace. These builders must bring in third party inspectors at their own cost, but are often able to recoup the additional investment through a higher sale price for consumers who want better quality homes with lower operational costs. Commercial design and construction firms have found similar success, even if they choose not to attain official certification.

Although design and construction professionals are beholden to the demands of their clients, they can take the initiative to build to higher standards and influence their clients’ priorities. These practitioners should encourage their peers to value energy-efficient design and construction, while pushing the envelope towards net zero energy construction to continue to advance and capitalize on the growing demand within the marketplace.

**Gap:** Many design and construction professionals do not make energy code compliance a priority or understand the benefits of above-code construction practices.

**Recommendation #29:**

a. Design and construction professionals should consider the long-term economic and environmental impacts of inefficient buildings and prioritize compliance with the provisions of the State Energy Code.

b. Design and construction professionals should also 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, they can influence their clients and set themselves apart in the marketplace.

c. To encourage compliance with the model energy codes or above-code standards, 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.

d. Alternatively, local jurisdictions could also 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.

In much the same way as for code officials, training is also a concern within the design and construction community (see Barriers to Energy Code Enforcement). There are a number of training options available (see Training and CEUs), but the state, trade associations, and firms must all play a greater role in ensuring that every building is in compliance with the mandatory, statewide energy code.

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

A final barrier to compliance is the lack of uniformity in enforcement practices across the state (See Overview of State and Local Implementation Policies). There is a wide range of energy code enforcement practices from one inspection department to the next. Both code officials and design and construction professionals interviewed agree that compliance is better in jurisdictions that set clear expectations for the design and construction community and work with practitioners to achieve code
requirements. As might be expected, in jurisdictions that do not place as high of a priority on energy codes, design and construction professionals sometimes follow their lead and comply with the code only to the extent necessary, if at all. Certainly, some design and construction professionals put up resistance to energy code requirements in jurisdictions with active inspection departments, and others comply with the energy code provisions even when code officials do not prioritize compliance. The overarching message from professionals on both sides of the process is that strict, consistent enforcement practices lead to improved compliance.

Licensing

The Delaware Association of Professional Engineers sets licensing requirements for professional engineers. The Plumbing & HVACR Board sets licensing requirements for plumbers and HVACR contractors, while the Delaware Board of Architects (Architect Board) sets licensing requirements for architects. The Delaware Department of Finance’s Division of Revenue requires commercial contractors and homebuilders to obtain business licenses, but it does not require them to be certified.

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

**Recommendation #30:**

a. To protect its citizens, Delaware should 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, trade associations in the state should make licensure a requirement for membership.

Training and CEUs

Knowledge is crucial to code officials’ and design and construction professionals’ desire and ability to enforce, comply with, and stay up-to-date on the requirements of adopted energy codes. Delaware’s trade associations have provided a solid foundation for energy efficiency training from which they can continue to expand.

HBADE does not require CEUs for applicants or membership renewal.

In preparation for the 2009 IECC, HBADE held a number of trainings for residential builders and code officials in all three counties. It also offered a number of Building Block Breakfasts that focused on energy
code compliance and green building issues. Courses included 2009 IECC Codes & SB 59, How to Sell Green, and NAHB Certified Green Professional (CGP) program overview. According to the NAHB website, there are not currently any CGP trainings scheduled in Delaware.

AIA Delaware requires 18 CEUs annually for membership renewal and offers courses taught by energy efficiency experts from a number of disciplines. A minimum of eight must be for health, safety, and welfare, and four must be for sustainable design. Moreover, 2011 will mark the sixth year of AIA Delaware’s Sustainable Delaware conference, hosted in conjunction with the University of Delaware’s Center for Energy and Environmental Policy (CEEP) and other environmental organizations. The conference has a broad design focus that includes green and above-code issues.

The Architect Board also requires 24 CEUs over a two-year period, although none must be for energy efficiency and sustainable design. Assuming that all practicing architects in the state are members of AIA Delaware, this omission is probably not detrimental to the architecture community. Still, the Architect Board should require CEUs for energy efficiency and sustainable design as a way of supporting these important building features. AIA provides regular training for members to achieve their required CEUs.

Neither ABC Del. nor Del. ASHRAE requires CEUs for applicants or membership renewal.

ABC Del. has multiple courses scheduled for Spring 2011. It is offering one LEED Green Associate training program on January 19 and February 1 and another on February 15 and March 1, both at its New Castle office. The trainings will provide an overview of the LEED Green Associate credentialing process and offer resources for passing the exam. It is also offering a seminar on LEED v.3 requirements, policies, and procedures. Furthermore, from February to April, it is offering two Green Advantage preparatory courses and exams. Finally, it is presenting a class on green roofs on March 17.

In 2010, Del. ASHRAE hosted a training workshop on ASHRAE 90.1-2007. The organization recognizes that energy efficiency is an important policy stance of the governor and expects to continue energy code training, though it does not currently have any workshops scheduled.

Though the state has made important inroads for energy code education, additional and ongoing training is critical for all code officials and design and construction professionals, as many building projects are not yet in compliance with the energy code. Moreover, training will become even more important as the model energy codes increase in stringency and the use of even more stringent codes and standards becomes more prevalent.

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

**Recommendation #31:**

- DEO and Delaware’s trade associations should build on their previous and existing efforts to educate design and construction professionals on the provisions of the state’s energy code, as well as green and above-code standards, features, and practices.
- The state should consider including design and construction practitioners into the energy code education stakeholder group from Recommendation #27. For these groups, the goal
would be to create or expand workforce and CEU training and professional degree programs that incorporate energy code requirements and practical experience into the curriculum. This would give these 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.

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, neither the state, local jurisdictions, nor other stakeholders have conducted a statewide or local measurement and verification study to document and evaluate the on-the-ground realities of energy code compliance in Delaware. It is critical that these groups 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 as Delaware.

The state has begun to conduct measurement and verification activities for state-owned buildings, an excellent way to lead by example. Executive Order No. 18 mandates that the OMB measure and track energy use and CO$_2$ emissions in state buildings (see Energy Codes for State-funded Facilities). Though the project measures energy use in buildings constructed prior to the adoption of the current model energy codes—and even prior to the previous energy code—it nonetheless presents the state with an excellent pilot opportunity to learn how to develop and implement this work and follow it up with appropriate retrofit and upgrade measures.

To date, state agencies are on track to compile and enter energy usage and utility data from fiscal year 2008 for all state-owned buildings into the EPA’s Portfolio Manager. OMB oversees the state facilities through the database to ensure that each agency is updating their building utility information.

As of the end of September 2010, 184 state-owned buildings have been entered into the database. For the first 50 DFM-managed facilities entered into the database, the state has already achieved a 13
percent reduction in energy use from the fiscal year 2008 baseline. A number of variables could account for part of this total, so it is incumbent on OMB to analyze its results and put in place energy efficiency and energy conservation measures to ensure a steady and lasting decline in energy use.

**Gap:** Neither the state, local jurisdictions, nor other stakeholder groups have conducted measurement and verification studies in Delaware.

**Recommendation #32:**

a. The state should ensure that the actual energy performance of buildings constructed to the 2009 IECC meets the expected performance. With the recent adoption of the model energy codes, now is an excellent time to undertake such a study, even with the drop in residential and commercial construction. Given Delaware’s size, DEO and other state agencies might be in the best position to conduct such a study with support from utilities and inspection departments, particularly in the larger jurisdictions.

b. Given the early success of OMB’s measurement and tracking program for state-owned facilities, the appropriate state agencies should consider expanding this effort to include representative new private and local construction projects across the state.

**Implementation Summary**

**Current Best Practices**

While Delaware still has some significant challenges ahead to achieve its energy code implementation goals, it has a number of solid foundations from which to build.

In connection with this project, DEO has done an admirable job creating a database of information on infrastructure, training, enforcement, and other relevant topics from almost all of the inspection departments in the state. Expanding the role of DEO to coordinate and support inspection departments, provide training, and set uniform standards is crucial to achieving the state’s goals.

Energize Delaware and the state’s utilities have conducted commendable outreach campaigns that clearly explain energy use to consumers, analyze individual home energy use and costs, and offer reasonable tips for home energy efficiency improvement efforts. Green City Wilmington is also leading by example through the initial success of its programs, and Kent County offers a solid model for reaching out to the design and construction community.

The recent training sessions in the state are an encouraging sign and should be followed up with additional training that reaches more code officials and design and construction professionals. Ideally, training workshops should get professionals on construction sites to learn about the practices and techniques for enforcement and compliance first-hand. AIA Del.’s requirements for CEUs in sustainability are commendable, as well.
OMB’s program to measure and track energy use in state-owned buildings is an exciting initiative that has already demonstrated quantifiable results. With code compliance issues central to actual energy reduction, the state has begun an important effort that gets to the heart of how and why buildings often underperform. As a state initiative, it also sets an example for jurisdictions and other states to follow.

Gaps and Recommendations

Addressing the following gaps in energy code implementation will improve the ability of Delaware and its local governments to significantly reduce energy use in the built environment, which will save consumers and businesses money and reduce pollution and greenhouse gas emissions.

State Implementation Policies

**Gap:** State guidelines allow licensed engineers or architects to certify compliance for commercial buildings over 5,000 square feet.

**Recommendation #10:** Professional stamps do not ensure that the building meets energy code requirements. The state should consider updating the Delaware Energy Code to require more stringent compliance verification methods that include site-plan review by trained plan reviewers. Seattle provides an excellent example of a thorough energy code enforcement process that Delaware could emulate. 

**Gap:** The state has not yet established additional procedures for certification of compliance for local jurisdictions beyond those listed in Chapter 76 of Title 16.

**Recommendation #11:**

a. Building off the strategic compliance plan with BCAP, DEO should promulgate uniform statewide procedures for compliance certification through a collaborative process with local jurisdictions that seeks to build consensus wherever possible.

b. DEO, inspection departments, and design and construction stakeholders should create energy code compliance checklists that follow uniform state requirements.

Outreach

**State Outreach to Enforcement Community**

**Gap:** DEO does not have sufficient resources to provide additional and much-needed outreach to local jurisdictions regarding the implementation of the adopted energy codes.

**Recommendation #12:** DNREC should provide additional funding to DEO to continue to promote energy code implementation through outreach activities, such as:

a. The dissemination of relevant national and state energy code information, such as DOE compliance guidelines and other resources (see Appendix A for a list of other DOE and PNNL resources).
b. Data collection to better understand the realities of energy code adoption and implementation, as well as and code official and policymaker concerns;
c. Technical support on code interpretation and infrastructure issues;
d. Materials tailored to code officials and policymakers, such as fact sheets, code guides and compliance checklists;
e. Other outreach activities and resources.

State Outreach to Consumers and Businesses

**Gap:** In spite of commendable efforts by Energize Delaware, many consumers and businesses still lack knowledge regarding energy efficiency upgrades and believe that the upfront costs would be prohibitive.

**Recommendation #13:** Delaware should continue to support the SEU and Energize Delaware as a crucial mechanism for saving residents and businesses money and reducing the state’s environmental impact.

**Gap:** Most consumers are largely unaware that most buildings fall short of adopted energy code requirements—or even that there are adopted requirements in most jurisdictions.

**Recommendation #14:**

a. DEO should engage real estate representatives, appraisers, and lenders to create a strategy for properly valuing energy-efficient construction and operating costs in the market. Creating consumer demand and proper valuation will give the design and construction communities a much more powerful incentive to comply with the adopted codes than any incentive or mandate the state could issue.

b. Similar to Recommendation #6, DEO should conduct consumer and business outreach to heighten awareness of the importance of energy code implementation and create demand for strict energy code enforcement policies. BCAP’s consumer campaign could inform and support this effort.

Local Outreach to the Design and Construction Community, Businesses, and Consumers

**Gap:** Few jurisdictions in Delaware have undertaken strong outreach efforts targeted at the design and construction communities, businesses, and consumers.

**Recommendation #15:**

a. Inspection departments should find ways to emphasize to design and construction professionals the importance of constructing better quality homes and commercial properties that save occupants money. They should also work with these groups to ensure a smooth transition to the State Energy Code while building rates are low.
b. Similar to Recommendation #14, local decision-makers should conduct consumer and business outreach to create demand for strict energy code compliance from the design and construction communities.

**Stakeholder Outreach Efforts**

**Gap:** Delaware utilities do not include energy code outreach and local government advocacy as part of their outreach programs.

**Recommendation #16:** Delaware utilities should consider energy code outreach and local government advocacy initiatives that would empower customers to demand energy code compliance and implementation support from local policymakers and design, building, and real estate professionals.

**Enforcement Community**

**State Implementation Support**

**Gap:** DEO does not have sufficient resources to increase its local implementation efforts.

**Recommendation #17:** DNREC should provide DEO with sufficient funding, training, and additional staff to allow it to build upon its existing implementation efforts. Beyond performing the proposed outreach efforts (see Recommendation #11), it can provide higher-level implementation support. The state must provide code officials with the training, materials, and tools they need to enforce state law.

For specific recommendations that address gaps in local energy code implementation for which the state can provide guidance and assistance, see the following Gaps.

**Local Energy Code Enforcement**

**Gap:** Some jurisdictions in Delaware do not spend sufficient time conducting plan reviews.

**Recommendation #18:**

a. Inspection departments should include all energy code provisions in their standard plan review process and spend more time ensuring that building projects meet all building code requirements.

b. The state should create a set of minimum site plan review requirements that code officials must follow to ensure that all buildings meet the adopted building code provisions.

**Gap:** Some inspection departments do not check for all requirements of the energy code during on-site inspections, nor do they use energy code inspection checklists to make certain that they have inspected for all energy code provisions.

**Recommendation #19:**
a. Inspection department should inspect for energy code compliance at all applicable stages of the inspection process and use checklists to double-check their work. Insulation inspection is not sufficient to ensure energy code compliance.

b. Inspection departments could look to the state and the code official associations for training on the energy code and inspection practices, as well as resources such as checklists.

c. The state should create a set of minimum on-site inspection requirements that code officials must follow to ensure that they inspect for provisions of the energy code at all applicable stages of the inspection process.

**Gap:** Some inspection departments do not issue stop work orders or without occupancy permits for projects that do not meet the requirements of the energy code.

**Recommendation #20:** Inspection departments must enforce the energy code to the same stringency as other building codes, which includes issuing stop work orders and withholding occupancy permits for building projects that do not meet the requirements of the energy code. While the on-the-ground realities of building inspection sometimes benefit from some give-and-take, this practice is incompatible with the state’s goals for reducing energy use and with Chapter 76 Title 16.

**Barriers to Energy Code Enforcement**

**Gap:** Many local jurisdictions do not make energy codes a priority.

**Recommendation #21:** Code officials and local decision-makers alike should consider the long-term economic and environmental impacts of inefficient buildings and prioritize their enforcement alongside more traditional building codes.

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

**Recommendation #22:** County and 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. Proper enforcement of the energy code simply does not happen with local government support and resources.

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

**Recommendation #23:**

a. DEO should act as an advisor and supporter for local inspection departments and policymakers by providing additional resources and assistance as needed, including the outreach activities listed in Recommendation #11.
b. DEO should create and distribute materials tailored for code officials and design and construction professionals on the 2009 IECC, such as code guides and compliance checklists. These documents should summarize key provisions of the energy code, identify changes from the previous code, discuss the intent of major requirements, highlight proper installation techniques, and generally clarify and expand upon the code itself. The state can also work with local jurisdictions and especially trade associations to adapt materials to fit each audience.

c. The state could subsidize the purchase of handheld tools for building departments to streamline inspections, help facilitate the integration of energy code inspections into the building code enforcement process, and, thus, reduce inefficiencies.

d. It could also subsidize duct blaster and blower door equipment and training for communities that request these services. Given the size of the state, another option would be to loan out this equipment upon request.

e. The state should consider advising and working with jurisdictions to strengthen county inspection departments where feasible to allow jurisdictions—particularly with small or understaffed departments and little construction—to take advantage of combining resources for enforcement and economies of scale. The county/regional model has worked well in regions of Colorado, many of which are the size of Delaware.

Certification

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

**Recommendation #24:**

a. To protect its citizens, DEO or the appropriate state agency should set certification requirements for code officials that include minimum certifications from a qualified provider.

b. DBOA and LDMBOA should make minimum certification from a qualified certification provider a requirement for membership.

c. In the absence of state action, local jurisdictions should set certification requirements for code officials.

Training and CEUs

**Gap:** Delaware does not set or recognize training and CEU requirements from qualified training providers.

**Recommendation #25:** DEO should recognize training and CEU requirements from the ICC and other qualified certification providers. A number of state agencies involved in energy code adoption and implementation, including Pennsylvania’s Department of Labor and Industry, accept all ICC certification and training or a specific list of certifications and trainings.
**Gap:** DBOA, LDMBOA, and many jurisdictions do not set minimum CEU requirements for code officials.

**Recommendation #26:** DBOA, LDMBOA and all jurisdictions should set minimum CEU requirements for code officials for all building codes, including energy.

**Gap:** Many code officials in Delaware lack sufficient familiarity with and understanding of the adopted energy codes.

**Recommendation #27:**

a. The state should build on its previous energy code training workshops (see Training and CEUs) to offer additional classroom and on-site training to code officials and design and construction professionals (see Design/Construction Community). They should also strongly encourage all code officials to attend, even if they have participated in previous energy code training sessions.

b. State agencies should also provide opportunities for training and certification for green and above-code standards, features, and practices.

c. Inspection departments should mandate that code officials attend available training sessions so that they are equipped to enforce the code for site-plan reviews and on-site inspections. They should also provide time and funding to do so. DBOA and LDMBOA can play a crucial role in providing and/or coordinating training workshops that are accessible for all code officials in the state.

d. The state should consider forming a stakeholder group of energy efficiency experts and practitioners, educational institutes, trade associations, and other interested parties to strengthen workforce training programs that develop highly skilled plan review and inspection professionals. The state’s role could be to connect and facilitate collaboration between all relevant groups, help develop curriculum and identify qualified professionals to teach, and provide financial incentives for institutions and tuition assistance for students. Beyond saving money and reducing energy use, energy and above-code inspections represent an opportunity to create good “green” jobs.

**Third Party Infrastructure**

**Gap:** Neither the state nor jurisdictions have established standards and mechanisms for third party inspection services.

**Recommendation #28:**

a. DEO and/or jurisdictions should establish standards and mechanisms for third party inspection services. Given the expected growth of above-code and green construction in the future, it is imperative that inspection departments be able to work efficiently in conjunction with third party testers and raters.
b. Similar to Recommendation #27, DEO should consider forming a stakeholder group of accreditation and standards organizations, third party rating firms, and educational institutions to strengthen workforce training programs that develop third party rating professionals.

**Design/Construction Community**

**Barriers to Energy Code Compliance**

**Gap:** Many design and construction professionals do not make energy code compliance a priority or understand the benefits of above-code construction practices.

**Recommendation #29:**

a. Design and construction professionals should consider the long-term economic and environmental impacts of inefficient buildings and prioritize compliance with the provisions of the State Energy Code.

b. Design and construction professionals should also take advantage of the opportunity to market their above-code building projects and tap into the growing demand for energy-efficient and green construction among homebuyers and businesses. By establishing affordable energy-efficient and green construction practices, they can influence their clients and set themselves apart in the marketplace.

c. To encourage compliance with the model energy codes or above-code standards, 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.

**Licensing**

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

**Recommendation #30:**

a. To protect its citizens, Delaware should 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 mandate licensure requirements, HBADE should make licensure a requirement for membership.

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

Recommendation #31:

a. DEO and Delaware’s trade associations should build on their previous and existing efforts to educate design and construction professionals on the provisions of the state’s energy code, as well as green and above-code standards, features, and practices.

b. The state should consider including design and construction practitioners into the energy code education stakeholder group from Recommendation #27. For these groups, the goal would be to create or expand workforce and CEU training and professional degree programs that incorporate energy code requirements and practical experience into the curriculum. This would give these 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: Neither the state, local jurisdictions, nor other stakeholder groups have conducted measurement and verification studies in Delaware.

Recommendation #32:

a. The state should ensure that the actual energy performance of buildings constructed to the 2009 IECC meets the expected performance. With the recent adoption of the model energy codes, now is an excellent time to undertake such a study, even with the drop in residential and commercial construction. Given Delaware’s size, DEO and other state agencies might be in the best position to conduct such a study with support from utilities and inspection departments, particularly in the larger jurisdictions.

b. Given the early success of OMB’s measurement and tracking program for state-owned facilities, the appropriate state agencies should consider expanding this effort to include representative new private and local construction projects across the state.
Conclusion

Building energy codes are one of the easiest and most cost-effective ways for Delaware to secure its energy future. Compliance with the code not only helps consumers and businesses save money on their energy bills, it also reduces pollution and peak loads, resulting in a cleaner environment and a more stable and diverse energy supply. Given the state’s adoption of the model energy codes in 2010, it has already begun to embrace them as a successful policy tool. It must build off this success by: strengthening the state’s adoption process; promoting above-code adoption for public buildings and at the municipal level; supporting successful enforcement of and compliance with the code through training, resources, and clear state-level guidance; and increasing demand for code compliance. These actions will result in greater energy efficiency for new construction and renovations, as well as save Delaware’s citizens and businesses money and strengthen the state economy.

The recommendations made in this gap analysis, summarized below in Table 2, are meant to guide state officials and other Delaware stakeholders as they work to support improved code adoption and implementation and begin the process of developing a compliance action plan. Though some recommendations may require increased funding over an extended period, a careful, comprehensive action plan that leverages existing infrastructure and provides the state with realistic funding mechanisms will help ensure that new construction in the state achieves 100 percent compliance with the model energy codes now and in the future.
Table 2. Recommendations chart

<table>
<thead>
<tr>
<th>Adoption</th>
<th>State Policy</th>
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<tbody>
<tr>
<td></td>
<td>The state should have a plan in place to be able to use available Federal funding to increase its energy code adoption and implementation activities (pg. 15)</td>
</tr>
<tr>
<td></td>
<td>The Delaware Energy Office (DEO) and the Home Builders Association of Delaware (HBADe) should make progress on their mandate to set up programs to promote the construction of zero net energy capable buildings by 2025 for homes and 2030 for commercial properties (pg. 21)</td>
</tr>
<tr>
<td>State and Local Policy</td>
<td>The state and local governments should adopt green or above-code policies for state- and municipal-funded facilities to set the example for the private sector (pgs. 17, 23)</td>
</tr>
<tr>
<td></td>
<td>The state, local governments, and key stakeholders should promote the construction of high performance residential and commercial building (pg. 20)</td>
</tr>
<tr>
<td>Implementation</td>
<td>State Implementation Policy</td>
</tr>
<tr>
<td></td>
<td>With input from all relevant parties, DEO should set uniform implementation guidelines that are clear and stringent, as is required by Chapter 76 of Title 16 (pg. 29)</td>
</tr>
<tr>
<td></td>
<td>The Department of Natural Resources and Environmental Control should provide sufficient funding, training, and additional staff to DEO to allow it to expand its existing outreach, training, and implementation efforts (pg. 29-30, 35)</td>
</tr>
<tr>
<td>Outreach</td>
<td>The state and local governments should expand their outreach efforts to code officials, design and construction professionals, consumers, and businesses (pgs. 29-32)</td>
</tr>
<tr>
<td>Enforcement Community</td>
<td>Local decision-makers and code officials should make energy efficiency a larger priority, which would save money for their constituents and businesses and reduce the negative environmental impacts of inefficient construction (pgs. 38-39)</td>
</tr>
<tr>
<td></td>
<td>Code officials require additional training, guidance, and support from the state, trade associations, local policymakers, and utilities (pg. 40)</td>
</tr>
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<td></td>
<td>The state, code official associations, and/or inspection departments should set certification or CEU requirements for code officials (pgs. 41-42)</td>
</tr>
<tr>
<td>Design/Construction Community</td>
<td>Design and building professionals should make energy code compliance a priority to build higher quality buildings and set themselves apart in the marketplace, among other benefits (pg. 46)</td>
</tr>
<tr>
<td></td>
<td>The state, trade associations, and/or inspection departments should set licensing requirements for commercial contractors and code homebuilders (pg. 47)</td>
</tr>
<tr>
<td>Compliance Measurement &amp; Verification</td>
<td>The state should build off its measurement and tracking program for state buildings to include the private sector (pg. 50)</td>
</tr>
</tbody>
</table>
Acknowledgments

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Cover page image of the Delaware State House courtesy of Flickr Creative Commons, user jimbowen0306.
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 BECP 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
   http://www.energycodes.gov/training/pdfs/comm_review_guide1.pdf
2. Residential Plan Review Quick Reference Guide

Code Notes
http://www.energycodes.gov/help/notes.stm
References

3. http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl
5. IRR-Viewpoint 2010. Integra Realty Resources.
10. http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl
11. This value was calculated by multiplying the average annual number of new single-family residential permits from 2005-2009 by the median energy savings if the home is built to the 2009 IECC. These savings assume 100 percent code compliance: http://www.energycodes.gov/publications/techassist.stm
12. BCAP Code Estimator tool
17. http://recovery.delaware.gov/grant-applications-energy.shtml
34. http://www.energystar.gov/index.cfm?fuseaction=new_homes_partners.showStateResults&s_code=DE