South Carolina Gap Analysis

November 2010

Prepared by the Building Codes Assistance Project and the South Carolina Energy Office for the United States Department of Energy
Building Codes Assistance Project (BCAP)

BCAP is a non-profit advocacy organization established in 1994 as a joint initiative of the Alliance to Save Energy, the American Council for an Energy-Efficient Economy, and the Natural Resources Defense Council. BCAP focuses on providing state and local governments in the U.S., as well as stakeholder organizations, with support on code adoption and implementation through direct assistance, research, data analysis, and coordination with other activities and allies. With over sixteen years of experience supporting numerous state energy offices and city building departments, along with tracking code activities across the country, BCAP is well-positioned to assist in local and statewide activity to advance energy 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 brings 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

ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BCAP – Building Codes Assistance Project
BCC – South Carolina Building Codes Council
BPI – Building Performance Institute
CEUs – Continuing education units
CPAC – Climate Protection Action Committee
DOE – Department of Energy
ECAP – Energy Code Ambassadors Program
EEBA – Energy & Environmental Building Alliance
EECBG – Energy Efficiency and Conservation Block Grants
EPA – U.S. Environmental Protection Agency
HVAC – Heating, Ventilation and Air Conditioning
HERS – Home Energy Rating System
IBC – International Building Code
ICC – International Code Council
IECC – International Energy Conservation Code
IRC – International Residential Code
LEED – Leadership in Energy and Environmental Design
MEC – Model Energy Code
NAHB – National Association of Home Builders
OCEAN – Online Code Environment and Advocacy Network
PNNL – Pacific Northwest National Laboratory
RECA – Responsible Energy Codes Alliance
RESNET – Residential Energy Services Network
SEEA – Southeastern Energy Efficiency Alliance
SEO – State Energy Office
SEP – State Energy Program
USGBC – U.S. Green Building Council
Executive Summary

The purpose of the South Carolina 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.

The introduction of the report provides an overview of South Carolina’s important demographic and economic indicators, including important population centers, population growth, construction activity and energy consumption. This section also introduces the possible energy and financial savings available to owners and occupants of both single family residential and commercial buildings, should the state adopt the latest model codes, the 2009 International Energy Conservation Code (IECC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2007 for residential and commercial buildings, respectively.

The Adoption section examines federal, state, and local policies that influence energy codes in the state. The section examines the purview of state agencies, including the State Energy Office and Building Code Council. As the state allows local governments considerable freedom in the enforcement of the statewide code, this section of the report also examines local efforts that address energy codes or otherwise achieve building efficiency improvements through other means, including incentives and green building initiatives launched at the local level. This section recommends that the building energy code adoption process—only recently managed by the legislature—be restored to the Building Code Council. Other recommendations include actions that state agencies can take to assist jurisdictions in their efforts to address common code-related challenges.

The implementation section of the report describes the activities taken by state and local government officials, including code inspectors, to ensure compliance with the energy code. This section of the report also explores the building inspections process at the local level, including the role of the energy code among the many building codes inspectors most enforce as well as common code-related challenges and areas for improvement. The report also examines the requirements and training responsibilities of design and construction professionals as they relate to the energy code, including the continuing education requirements for each design specialty or trade. Among other recommendations contained in this section, the report recommends requiring energy code-specific training as part of the continuing education requirements set by the state. As well, the report recommends actions that the state can begin to take to meet the ARRA-mandated requirement that the state measure code compliance.
The stakeholder section of the report identifies stakeholders currently engaged in assisting energy code efforts, such as utilities, as well as those organizations that can work to support energy code efforts in the future, but are as of yet untapped resources. The report recommends that the state reach out to these organizations and product manufacturers located in the state, as well as members of other industries, including finance, real estate, and banking, among others in order to build consensus.

Finally, the report’s conclusion summarizes the benefits of energy code adoption in South Carolina and actions that can be taken to achieve improved adoption and compliance outcomes. A recommendations table following the conclusion summarizes these opportunities for easy reference. Appendix A offers a list of other DOE and Pacific Northwest National Laboratory (PNNL) energy code resources.
Introduction

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

Recent improvements in the stringency of the model energy 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 code, and more places are taking advantage of these opportunities than ever before.

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

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

In collaboration with the U.S. Department of Energy, BCAP has undertaken a new program to improve energy code compliance in 15 states, including South Carolina, 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

South Carolina’s population has grown modestly in the last two decades. From April 1990 to April 2000, the state population grew by 15.1 percent, slightly higher than the national average of 13.2 percent. Likewise, population grew 13.7 percent from 2000 to 2009 to a total of 4,561,242. The state’s population is geographically decentralized, with many making their homes on the coast, including in the well-known Charleston metro area, as well as major cities inland, including Columbia, the state capital, and the Greenville-Spartanburg region. On the whole, the state population density is 143.4 per square mile, ranking 24th nationally among all 50 states.

Figure 1– State Population Map

Density Map and Populations courtesy of U.S. Census Bureau
Census 2000 Summary File 1 Population by Census Tract
Population Estimates as of July 1, 2007
Construction Overview

Like many other states, construction has suffered in South Carolina as a result of the recent real estate crisis, with new single family housing starts dipping significantly, from 54,157 in 2005 to 15,529 in 2009—a decline of 71 percent over the four year period. Multifamily residential construction is similarly challenged by high vacancy rates and a low rate of demand for new units reflected in low absorption rates for new construction. Vacancy rates in 2009 for multifamily units in Columbia and Greenville, two of the state’s significant metro areas, are 12.8 and 12.5 percent, respectively – well above the national average of 8.18 percent for major U.S. metro market areas. Office space and retail space construction in the major markets of Columbia and Greenville should also encounter diminished construction rates for the immediate future, as predicted absorption rates are low and vacancy rates are already above the national average.  

Figure 2– Residential Housing Permits by Year

South Carolina Single Family Permits by Year

US Census Bureau data
Energy Portfolio

The state is heavily reliant on nuclear power for electricity production, as the state’s four reactors produce more than one-half of the state’s electricity supply. Two more nuclear reactors will come online by 2016, if licensing and construction go as planned. Although the state imports more energy from outside its borders (chiefly from abroad) the state is in the middle of pack nationally in energy production, ranking 25th out of 50 states. The rest of the state’s energy comes from imports, and coal, petroleum, natural gas, hydroelectric, and other renewables produced within the state, in that order of prominence. The state ranks 19th out of 50 states in total energy consumption per capita at 369 million Btu. Residential electricity rates in the state are slightly cheaper than the national average. In June 2010 the average rate was 10.58 cents/kWh—putting South Carolina 30th out of 50 states in residential electricity costs.

Reducing overall energy use through the adoption and implementation of the model energy codes would allow South Carolina to shift energy production from imported fossil fuels in favor of local renewable energy. By reducing energy use, South Carolina will forestall the need to add additional fossil fuel-based energy production otherwise needed to meet short- and medium-term demand. In the long-term, it would also allow the state to achieve its goals for greenhouse gas emissions reduction.

Potential Savings from Energy Codes

Among other factors arguing for the adoption of improved energy codes in South Carolina are the energy savings available for homeowners if their homes are built to the latest energy code, the 2009 IECC. According to BCAP research sponsored by the environmental protection agency, if new homes in South Carolina are upgraded to the latest code, the incremental cost per home of moving to that code would only be $692.74 per home. In turn, homes built to the latest code would realize $207 in savings per year. For homeowners, these lower energy bills would repay the initial cost in less than three and a half years, given a simple payback. To present a more realistic scenario, for new homebuyers with a 20% down payment, the added costs of buying a house under the new code are an increased down payment cost would of $138.55 and $2.69 per month in mortgage payments. However, in this scenario, energy savings of $17.25 per month will result in a breakeven investment in 10 short months, after which homeowners will benefit will save $14.56 per month.4

Table 1—Annual Savings in Residential Energy Costs

<table>
<thead>
<tr>
<th>City (Climate Zone)</th>
<th>Savings Current Practice vs. 2009 IECC</th>
<th>Percent Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia (Zone 3)</td>
<td>$207</td>
<td>16%</td>
</tr>
</tbody>
</table>

The following table represents a percentage of potential energy savings that can be achieved by adopting the most up to date ASHRAE 90.1-2007 building energy standard for commercial buildings. In the table below the designation Non Residential denotes any mid rise commercial building, Residential represents high rise residential buildings, and Semi Heated represents commercial warehouses. 100 percent compliance with Standard 90.1-2007 would result in up to a 5.1 percent savings in commercial energy costs.

**Table 2—Potential Energy Savings for Commercial Buildings**

<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>Columbia</td>
<td>2.4%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Residential</td>
<td>Columbia</td>
<td>6.6%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Semi Heated</td>
<td>Columbia</td>
<td>0.7%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Source: [Impacts of Standard 90.1-2007 for Commercial Buildings at State Level](https://www.energy.gov), U.S. Department of Energy
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 90.1-2004.5

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. As South Carolina currently has a mandatory statewide energy code, it is in compliance with EPAct.

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 International Energy Conservation Code (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 2017.6 As a stipulation for receiving SEP funds, Governor Sanford wrote a letter to DOE assuring that state officials would begin actions to achieve these goals. Based on the governor’s assurance, DOE awarded $23,709,000 million of SEP funds to South Carolina for energy efficiency and renewable energy programs.7 DOE also approved the South Carolina Energy Office EECBG program plan and awarded a $31,101,478 formula grant.
**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, 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.

**Political Environment and Energy Code Adoption**

Code adoption in South Carolina—with the exception of the energy code—is governed by a regulatory process, as the South Carolina Building Codes Council (BCC) adopts and amends the statewide building code. Adoption of the latest codes is initiated by the publication of a notice of intent in the state register, followed by a comment period and at least one public hearing. As well, a study committee may be convened to collect public feedback. Once enacted, the code becomes effective on the first day of January or July, whichever date is sooner but not less than six months from the effective day of the regulation. For the energy code, however, the statutory authority to adopt the code is currently controlled by the legislature. This structure has the unfortunate effect of decoupling the development of the energy code from the traditional code development process. The currently adopted energy code, the 2006 IECC, is mandatory statewide. Because South Carolina is a Dillon’s rule state, the local jurisdictions cannot go beyond the state-mandated code. As well, the responsibility to enforce the energy code falls to local jurisdictions. Jurisdictions did have a window to opt out of the code, but this period has elapsed without any official attempts to withdraw. According to Gary Wiggins,
Administrator of the South Carolina Building Codes Council, “no one legally opted out – although some may have opted themselves out and didn’t tell anybody.”

**Gap:** The consideration and passage of the model energy code is managed by the legislature, in contrast to the conventional code review process, which is under the purview of the Building Code Council.

**Recommendation #1:** To achieve passage of the 2009 IECC and other future energy codes, the legislature should move strongly to ensure that adoption is put back in the hands of regulatory bodies in lieu of the legislature.

**Recent Energy Codes-related Legislation**

The current statewide energy code in South Carolina is the 2006 IECC, which governs all new and renovated residential and commercial buildings. Adopted with the passage of State House Bill 3550 in June 2009, the current code went into effect on January 1, 2010. As with most codes adopted in South Carolina, the state code is free of amendments. Local building officials statewide must enforce the new standards. The bill also removed an alternative compliance path with savings equivalent to the 1992 Model Energy Code (MEC) and additionally mandated that the South Carolina Building Code Council (BCC) adopt and amend the latest editions of the I-codes adopted on March 22, 2010, which will go into effect on January 1, 2010.

**Other Building Codes in South Carolina**

The state’s primary building codes are the 2006 IBC and 2006 IRC for commercial and residential buildings, respectively, both of which are managed by the State Building Code Council. The energy sections of the codes are omitted and refer to the 2006 IECC. The current fire code, which is administered by the Office of the State Fire Marshall, is the 2009 IFC.

**Energy Codes for State-funded Facilities**

State-funded buildings are subject to a higher standard than other construction in the state. As a result of state House Bill 3034, all state-owned or funded construction projects greater than 10,000 square feet (as well as major renovation projects) must be built to achieve LEED-NC Silver certification offered by the USGBC’s New Construction rating system. Green Globes or a comparable standard may be substituted, although if LEED certification is sought, the legislation specifies that a building must earn a minimum of four credits under the Energy & Atmosphere Credit 1 designated “Optimize Energy Performance.”

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South Carolina Gap Analysis
Why Climate Change Initiatives Matter

South Carolina is concerned with the potential impacts of climate change on the environment and the economy. Since building energy use accounts for roughly 40 percent of energy use in the nation—and in South Carolina, much of that energy comes from non-renewable sources—energy codes are a vital tool for reducing energy use and, thus, greenhouse gas emissions, not to mention money saved by home and business owners.

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

Statewide Climate Change Initiatives

At present the state does not have a Climate Action Plan, although it has begun to take action to save energy through other actions. House Bill 4766, passed in June 2007, requires state agencies and public school districts to create energy conservation plans targeting a 20% reduction in energy use by 2020, relative to 2000 levels. State agencies are required to make all energy savings improvements that are deemed cost-effective within five years. All buildings that were not built before the Sustainable Construction Act of 2007 went into effect—which required state facilities to be built to LEED Silver NC standard—are bound by this standard.9

Overview of Green and Above-Code Programs

Green building practices have made strides in South Carolina, both at the policy level and through the actions of local governments and building industry professionals. The state government, for its part, has introduced requirements that state-funded buildings and state owned facilities achieve a LEED silver NC rating on the USGBC’s rating system. Currently, the State Building Code Council is considering the adoption of the 2009 International Green Construction Code for the upcoming legislative session.

To date, the state boasts over 60 LEED certified buildings, and 270 LEED registered buildings. As well, 289 builders in the state are certified as Energy Star builders – meaning they are certified to build homes according the energy efficiency goals set up by the U.S. Department of Environmental Protection Agency (EPA) program. 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.

As of 2010, 2,861 homes have been built through the ENERGY STAR program, of which 1,063 were built in 2009 and another 804 have been built so far in 2010. According to EPA, the market penetration of Energy Star currently stands at 6.8% of all new homes constructed, as of 2009.10 Overall, the state’s percentage of Energy Star homes represents 0.3% of all Energy Star Homes built nationwide. In the region, South Carolina’s Energy Star certified homes are 0.7% of energy star homes built in the Southeast – although this number rises to 2.7% when excluding Energy Star certified homes in fast-growing Texas.
These efforts to promote energy efficient construction also bring down the cost of renewable energy options for homeowners and operators of commercial buildings. For residential buildings, when homes are equipped with energy-efficiency measures, the overall energy demands of the home decrease, which means homeowners can lower the size of solar PV and solar hot water equipment on their rooftops. By buying smaller-scale equipment, costs are lowered for homeowners—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. Taken as a whole, renewable energy production at the building level also compliments utilities’ efforts to meet the renewable portfolio standard goals adopted by many states.

Fortunately for South Carolina homebuilders and homeowners, there are a multitude of utility-funded incentives for energy efficiency that may help raise energy efficiency of new buildings. Progress Energy offers one such program: a discount to owners of Energy Star-certified homes of 5% of the total monthly electric bill for the life of a home. Utilities also offer rebate and loan programs. Rebates are available for existing homes to offset the cost of appliance and equipment upgrades. For new buildings, Progress Energy has made rebates available to builders who complete Energy Star-certified homes. Rebates are available for multiple building features and can help offset additional cost, including $600 for geothermal heat pumps, and HVAC equipment ($300 per unit) that has at least a 14 SEER rating. Rebates are also available for commercial buildings for owners who install energy efficient equipment or other features. Duke Energy, for one, offers rebates to commercial electricity consumers for new HVAC equipment (up to $40 per ton), occupancy sensors ($20-$40 per), window film ($1 per square foot), and lighting fixtures ($3-$75), among others. A variety of utilities also partner with local banks to offer loans to homeowners to make energy efficiency or equipment upgrades.11

Building America

Since 1994, the DOE’s Building America program has been raising the bar for energy efficiency and quality in new and existing homes. Working with national laboratories and the residential building industry, its goal is to improve the quality and performance of today’s homes while continually working towards net-zero energy homes. To qualify, homes must receive a score of 70 or less on the HERS index, though the program’s innovative house-as-a-system approach can reduce a home’s average energy consumption.
consumption by as much as 40 percent with little or no impact on the cost of new construction. Building America approaches have been used in more than 42,000 homes across the country to date. These homes typically sell within weeks while other new homes sit on the market for months.

Through its Builders Challenge program, new homes that meet stringent qualifications can earn an EnergySmart Home Scale label. Builders Challenge is similar to ENERGY STAR for Homes in that both programs assist and reward builders who build homes more efficiently than standard practice. However, the energy threshold requirements for the Builders Challenge program are different than those of ENERGY STAR.

According to Building America, 40 homes are currently under construction or planned by builders in conjunction with the Building America program.12

**Gap:** The number of advanced, voluntary above code residential construction projects is limited.

**Recommendation #2:** The state should support additional above code work, especially by promoting energy star programs at the local level.

**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. South Carolina, for its part, mandates a statewide code but currently bars jurisdictions from adopting more advanced codes.

**IECC, IBC, and IRC**

As the 2006 IECC is a mandatory statewide code, it is applicable to all jurisdictions, and thus covers all new construction statewide.

As well, all communities in South Carolina are subject to the International Building Code (IBC), which covers commercial construction. The IBC's Chapter 13 is omitted in lieu of the 2006 IECC. For single-family residential construction, likewise, the energy code section, Chapter 11, is omitted in lieu of the 2006 IECC.

**Local Adoption Challenges**

As all political jurisdictions statewide are dependent on the statewide code, no cities that have adopted their own codes, although multiple jurisdictions, including Greenville, have advocated for a permissive
green code. Such a code would provide jurisdictions who wish to adopt a more stringent code the option of doing so – thus taking the political discussion to the local level and allowing progressive cities a chance to further enhance building practice. By contrast, code officials suggest that many smaller jurisdictions lack the resources to adequately enforce the energy code.

**Gap:** The state does not allow jurisdictions to adopt a “stretch code” that goes beyond the statewide energy code.

**Recommendation #3:** The state should consider legislation that adds a “stretch code” as an appendix to the adopted state code that would allow jurisdictions to go above the state minimum in a uniform manner and allow for state support of such efforts.

**Gap:** Local governments often lack the resources to adequately enforce the energy code.

**Recommendation #4a:** For areas in the state that lack code enforcement infrastructure, the state can provide third party contactors or state hired inspectors to augment or fully cover energy code plan review and inspection.

**Recommendation #4b:** The state should develop state-level capacity for determining which jurisdictions lack sufficient infrastructure to perform inspections, and ensure that they are able to hire 3rd party inspectors.

**Energy Codes for Municipal-funded Facilities**

Cities that have adopted their own codes for city buildings— as is common across the country— have pegged building performance to the USGBC’s LEED certification system. In April 2008, Charleston mayor Joseph P. Riley signed Resolution 2008-05, which among other sustainability metrics, mandated that all new city buildings must be LEED certified, beginning in 2009.\(^{13}\)

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

**Local Climate Change Initiatives**

Climate efforts are afoot in many South Carolina cities. Five cities in the state are members of ICLEI, an international association of local governments that have committed to achieving sustainable development outcomes. Current members in South Carolina are Charleston, Columbia, Greenville, Spartanburg, and Sumter.\(^{14}\) Seven cities in the state have also signed the US Conference of Mayors’
Climate Protection Agreement; these include: Charleston, Clemson, Columbia, Greenville, Lexington, Rock Hill, and Sumter.

The City of Columbia’s efforts to tackle climate change include CPAC (the Climate Protection Action Committee) which is a volunteer group created by the city for the “purpose of identifying measures that can be taken to reduce greenhouse gases.” Begun shortly after the city signed the U.S. Conference of Mayors’ Climate Protection Resolution, the group’s purview extends broadly over many environmental issues. As of yet, however, CPAC’s efforts do not extend to the energy code or building energy efficiency. The city has also developed a set of green building incentives dubbed the Green Building Incentive Program.

South Carolina’s many universities have also created sustainability and climate action efforts. Furman University, a private college, has required new construction to meet achieve a LEED Silver rating from the USGBC, and has created an on campus Center for Sustainability. A Sustainability Planning Group was chartered in 2005, which conducted the University’s first greenhouse gas inventory in 2007.

Overview of Local Green and Above-Code Building Program

Multiple jurisdictions in the state of South Carolina have begun their own green building initiatives. In the state capital, Columbia, the city has recently introduced a Green Building Incentive Program that provides financial incentives as well as expedited plan review and permitting for LEED-Certified and other green building standards. To be eligible, projects must be within city limits, conclude by the end of 2012, and not otherwise be required to meet a green building standard. Additionally, to qualify for the program, all commercial buildings must be LEED certified, while one and two-family residential projects must be certified through one of the following programs: EarthCraft House, HealthyBuilt Homes, ICC 700 National Green Building Standard, and USGBC LEED for homes. Financial incentives, which are delivered on a sliding scale, are based on the stringency of the green building program. For residential projects, benefits include a waiver of plan and permit review fees, a 50% reduction in water and sewer connection fees, complimentary one-on-one plan review, and permitting approvals granted in less than two weeks. The total value of incentives is capped at 2% of the cost of construction.

Other jurisdictions, including Greenville, have expressed interest in an additional, permissive code to be passed at the state level which would allow local builders to build to a higher standard than is created under the 2006 IECC. In lieu of such a law, some cities have exercised their ability to regulate construction of their own buildings. For instance, the city of Charleston mandated that all new city buildings must be LEED certified, beginning in 2009.
Adoption Summary: Best Practices and Recommendations

South Carolina could take a number of actions to build on the state’s existing practices. Crucially, it has taken the step of adopting a relatively recent version of the energy code, the 2006 IECC. The state can build on this by adopting the 2009 IECC and achieve further gains in energy efficiency, and simultaneously achieve compliance with the Recovery Act.

Legislation or rulemaking that allows regulators to conduct regular review and update of the model energy code would allow the Building Code Council to become actively involved in energy code development—a crucial undertaking since the energy code is irreparably linked to the other building codes currently administered by the Council. Restoring the regulatory process would also allow the BCC to hear the vital perspectives of stakeholders (builders, contractors, inspectors) as it examines successive versions of the code – a process which the legislature may find difficult to conduct and time-consuming.

**Gap:** The consideration and passage of the model energy code is managed by the legislature, in contrast to the conventional code review process, which is under the purview of the Building Code Council.

**Recommendation #1:** To achieve passage of the 2009 IECC and other future energy codes, the legislature should move strongly to ensure that adoption is put back in the hands of regulatory bodies in lieu of the legislature.

**Gap:** The number of advanced, voluntary above code residential construction projects is low.

**Recommendation #2:** The state should support additional above code work, especially by promoting energy star programs at the local level.

The state already has a number of above code programs currently in place that lead the market forward on energy efficiency and high performance buildings. Important measures already in place include a LEED-Silver standard for state buildings and an embrace of Energy Star at the local level in some communities.

**Gap:** The state does not allow jurisdictions to adopt a “stretch code” that goes beyond the statewide energy code.

**Recommendation #3:** The state should consider legislation that adds a “stretch code” as an appendix to the adopted state code that would allow jurisdictions to go above the state minimum in a uniform manner and allow for state support of such efforts.

**Gap:** Local governments often lack the resources to adequately enforce the energy code.
Recommendation #4a: For areas in the state that lack code enforcement infrastructure, the state can provide third party contactors or state hired inspectors to augment or fully cover energy code plan review and inspection.

Recommendation #4b: The state should develop state-level capacity for determining which jurisdictions lack sufficient infrastructure to perform inspections, and ensure that they party inspectors.

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 and Local Implementation Policies

Implementation of the energy code in South Carolina is largely determined by local jurisdictions. Although enforcement standards are not codified at the state level, local governments are legally allowed to create their own enforcement practices they deem best to achieve code compliance. While this offers local governments the flexibility to tailor enforcement practices to reflect local conditions, their political isolation means best practices are more difficult to share.

Outreach

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

The state’s ability to promote codes is restricted by limited resources at the Building Code Council and State Energy Office. Fortunately, the state Building Code Council is empowered to act in a support role as an official and impartial arbiter of local energy code issues. The Council can only assist local government, however, if the Council officials are contacted by the administrator of a local building department. Unfortunately, there is currently no capacity to aggregate or share information gleaned from support efforts with other jurisdictions statewide. This gap is addressed in some fashion by Council officials, who work with third party continuing education providers to stress frequent areas of concern within their training courses.

In addition to advising and supporting local governments, the state’s other code promotion roles include providing training assistance and requiring certification and ongoing education for code officials. The Building Code Council website, which is housed within the South Carolina Department of Labor, Licensing and Regulation’s website, provides an excellent resource for all code matters in the state, including a calendar of meeting dates and live streaming video of board meetings, code information, FAQs, and information about certification and license renewal.

The South Carolina Energy Office also offers energy efficiency education materials on a long list of topics. These Energy Briefs cover energy code topics including air sealing, airtight drywall, blower door and duct blaster testing, sizing of heating and cooling equipment, appliances, insulation, and overall construction methods. Another Energy Office effort is the ConserFund Loan Program, which offers loans that fund improvements at state agencies, local governments, schools and colleges, and non-profit organizations. Funds cover 100% of eligible costs, between $25,000 and $500,000.

The state also has required builders to fill out and post an Energy Code Compliance Certificate on or near a home’s electrical panel. The form includes details about insulation R-values, window U and SHGC factors, and particulars about mechanical equipment, including efficiency rating. Each form must be signed by the builder or a registered design professional responsible for the project.

Local Government’s Role in Promoting Codes

Local inspection departments in South Carolina are more disconnected from policy makers than at any point in recent history, as recent legislation removed energy codes from the building code regulatory process. Now energy codes must be passed by the legislature, which has the effect of isolating the local building community and inspection staff from the code development process – which had been the chief feedback mechanism by which local governments and professionals accessed state policy. On the local level, by and large local governments do not engage in outright promotion of energy codes, but they do work with contractors to ensure that they are familiar with the energy code—most frequently when
inspectors find lapses. According to Lawrence Outz, administrator of the Greenwood, SC inspections department, “our inspection process has changed in response to the new code – we go in and look for those things specifically and we’ve spent a lot of time in the field during inspections explaining to contractors about why the energy code is important. We’re getting them trained up.”

**Gap:** Local governments do not always offer incentives and penalties to contractors, which might incentivize higher compliance rates.

**Recommendation #5:** The state could also offer guidance to local governments that provide incentives for contractors with a successful track record, and penalties for re-inspection.

**Stakeholders’ Role in Promoting Codes**

Local and regional stakeholders play a unique role in promoting codes to complement work done on the local level or state level. Unlike the state or local governments, these stakeholders can play a key role working across jurisdictional lines. Utilities play one significant role, by providing education, efficiency rebates, and low cost loans. Utilities actively offering programs in South Carolina are (see page x for additional details).

South Carolina also benefits from the presence of the Southeastern Energy Efficiency Alliance (SEEA) a regional energy efficiency group which plays a key role leveraging energy code work across the Southeast. Because it is familiar with the region, SEEA and other groups might also play a critical role in the future aggregating energy code compliance analysis and best practices among South Carolina’s major jurisdictions.

**Enforcement Community**

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

**Overview of Enforcement Infrastructure**

Enforcement infrastructure in most large cities and small towns is fairly consistent across the state – where inspections departments conduct plan review and follow-up with onsite inspections. As is common across the country, plan review and actual code inspection efforts are separated in all but the smallest inspection departments, with staff responsible for one or the other. For smaller towns in rural areas—such as the case of Greenwood, S.C.—the town inspection department often has a dual role of
inspecting buildings falling within both town and county boundaries alike. Likewise, some rural unincorporated areas are inspected by county officials. For state-owned buildings, local officials have no jurisdiction for inspection. Instead, state facilities are inspected by officials working for each state agency. Official state buildings are inspected by the State Engineer, schools by the Department of Education’s Office of School Facilities, and prisons by their own agency as well.

State law allows local jurisdictions to charge fees to cover the costs of enforcement as well as create their own enforcement rules. Local inspection departments in the state report a variety of mechanisms for funding code inspection; some jurisdictions charge inspection fees, while other pay code inspection costs with general funds. As the state is subject to home rule for inspections, it does not evaluate local inspection infrastructure in practice.

Local governments report that they do have sufficient resources (both personnel and time) to enforce the energy code, although they cite the need for additional training. As Steve Landrith, Building Code Administrator for Greenville, South Carolina explained, “As the code becomes more complex, it becomes more difficult to enforce. [Lack of] education can be a real barrier to understanding the code.”

**Gap:** Communities often lack the resources necessary to enforce the code.

**Recommendation #6:** The state could aid local code inspection and enforcement efforts, which are administered at the local level, by issuing enforcement standards, and by advising on the fee amount necessary to cover the cost of enforcement and re-inspection.
Building departments across the state report growing familiarly with the energy code – although they acknowledge barriers in communicating the code, and its importance, to builders. Said one code inspection official: “contractors don’t always see the value of the energy code – it’s [the code] something that slows them down.” Almost all code inspection officials report that their staff often has a background in the residential, and to a lesser extent, the commercial construction community, which helps them understand building practice. As many are less familiar with the energy code than conventional health and safety measures and conventional trades (plumbing, electrical, HVAC) many feel a lower comfort level with the enforcement of the energy code. For the most part, inspectors do not specialize in any one area of the code, including energy; code inspectors dispatched to a project site incorporate energy code inspections during the overall code inspection process.

Jurisdictions report that plan review plays a key role helping them inspect the integrity of building plans, including energy code aspects. According to one plan review official, approximately 15% of plan review time is used to scrutinize energy code aspects of the plan. Robert Harkins, head plan reviewer for Columbia, South Carolina, estimates that most plans he reviews are sent back to designers for a least one change—which may or may not an include energy code issue. During the plan review process,
common mistakes cited by inspectors relating to the energy code include furnace SEER ratings and window SHGC factors.

During the inspections process, some local inspections departments report using enforcement checklists while others do not. Similarly, only some jurisdictions elect to provide handheld devices or laptops to inspectors in the field. In Rock Hill, SC, for instance, code officials travel with a laptop complete with a digitized copy of approved construction drawings. Another code official reported that laptops were actually a hindrance for his staff and get in the way of a complete inspection. Code administrators report that almost all staff originally worked in the construction industry. “Turnover,” says one code official, “is usually minimal, but many staff lost jobs during the recession.”

**Gap:** Handheld electronics and testing equipment must be purchased at the local level, which many code departments cannot afford at present.

**Recommendation #7:** State officials could subsidize the purchase of handheld electronics for inspectors as well as other testing equipment, including duct blasters and blower door equipment.

Common energy code violations cited by inspectors in the field include improper air and duct sealing, window installation, and failure to insulate under and behind bathtubs and showers—especially in one-story homes—where bathrooms adjoin unconditioned space. Inspections officials are empowered to issue “stop orders” to halt construction in such an instance, but will usually request the change be made directly. In some cities, subsequent reinspection results in the levy of an additional inspection fee, which acts as a de facto penalty for noncompliance.

**Certification and/or Licensing**

State code officials are registered and certified by the South Carolina Building Code Council. Registrations must be renewed every two years, and during that time inspectors must complete 24 hours of state-approved training. Registration, registration of continuing education credits, and license applications can all be transacted online at the Building Code Council website.

**Training and CEUs**

The state offers considerable financial support for code training—paying for nearly all costs associated with code training. Using funding directed from the State, the South Carolina Building Code Council offers to reimburse attendees for approved training courses at a rate of up to $25 per course hour and up to 6 hours of instruction per day. Third-party trainers must work with the Building Code Council to have courses and credit hours approved. As a result of the BCC’s regulation and financial incentives, the BCC has an opportunity to influence providers to meet state-identified priorities. While the state’s funding of code training is a considerable aid to training efforts, some code inspectors cite the need to take time off from work to attend classes as a challenge.
Third Party Infrastructure

Third party plan review in the state is limited to a number of firms that provide a combination of training as well as third party plan review and inspections. All told, the state has 29 certified HERS raters, and 52 companies that currently employ energy star raters. As local governments are free to structure energy code enforcement in any way they choose, many small jurisdictions choose to have third party firms conduct plan review and/or inspect buildings for code compliance, as in Buford, SC. One of the state’s largest firms providing these services is England Enterprises, located in Charleston, SC. Additionally the firm performs school inspections for county school system construction and renovation projects. The firm also provides 3rd party code verification for Energy Performance Contractors to ensure compliance with the code and contract documents. Clients of this program often include school districts and universities.

**Gap:** The state has not issued formal guidance on the opportunities third party code inspectors offer to local jurisdictions that do not have capacity in place to conduct inspections.

**Recommendation #8:** State officials could also offer formal guidance on the use of 3rd party code inspectors – who can aid local governments in inspecting specialized buildings and support local code staff in rural areas and coastal areas in the event hurricanes damage coastal buildings en masse.

Local Variations in Energy Code Structure

Local variations in the energy code are rare, as local communities must enforce the statewide code. Most variations and innovation in code structure occur at the local level, as small jurisdictions contract for third party plan review or code inspection for complicated projects.

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

The design and construction community interacts with code officials at different points during the building process, primarily during plan review (for designers) and during inspections (for the construction community). According to building officials, energy code compliance within the design and construction community is simply another code to be considered, along with traditional building, mechanical, plumbing, and fire codes. As a group however, architects seem keen to embrace energy efficiency measures and above code building techniques. According to Columbia, South Carolina’s building plans inspector, just as builders make code mistakes, architects have their share of miscues, and plans often have to go back to the architect of record for changes. Architects, like code officials, are required to receive continuing education credits to retain certification, but they are not required to cover the energy code. Additionally, many acknowledge that energy efficiency was not a primary focus of their original training. One architect explained that as a discipline, their role in code compliance in the field is often limited, as they are often disconnected from actual job sites where compliance shortfalls occur—and thus most seem confident about performing ably with respect energy code. When they do make site inspections for larger projects, one architect explained that his colleagues would do well to make the energy code a part of their inspection process.

For construction professionals, certification is required by the state, but contractors and homebuilders are not required to take continuing education classes, which may be an oversight as it is often falls to these groups to ensure correct installation of energy code-mandated features. This may be an important area for improvement, as these groups often have the crucial job of making sure work is done correctly. Also, because they orchestrate the work of trades, contractors and homebuilders are tasked with ensuring that overlaps between trades—where one trade stops and the other picks up—do not result in mistakes that rob new homes and commercial buildings of their performance. If requiring classes for construction professionals to take continuing education courses is not feasible, the state would do well to create a compliance checklist for builders, which would help identify areas of the code where non-compliance is common.

**Gap:** Although the state has taken action to allow local code officials are able to call on experts at the state level to make code determinations on demand, the state does not currently offer outreach to the construction community in the form of guides on how to follow the code to the construction community. Doing so would forestall more code compliance shortfalls, lowering the burden on code officials.

**Recommendation #9:** The state could provide a copy of the code, code commentary, and other guides to the construction community.
Certification and Licensing

The state has licensing standards for a number of the design and construction professionals in the state. Architects, for their part, are required to be registered and licensed in the state’s Board of Architectural Examiners. Like code inspection officials, architects must take continuing education courses and activities totaling 24 hours over a two year period. The allowed range of activities is broader than that allowed to code officials, as architects can participate in a variety of activities which provide documentation of attendance/work completed. Acceptable activities include technical and college courses, seminars, and even teaching a seminar or publishing a paper, article, or book.

Building contractors are also required to be certified, in their case by the South Carolina Residential Builders Commission. Unlike other professionals licensed by the state, contractors are not required by the board to engage in continuing education activities, although they must renew their certification every two years. To become a homebuilder, the licensing process is perhaps too easy: individuals must possess an affidavit showing proof of at least one year of experience under the supervision of a licensed builder, and a total of $260 in fees. Significantly, like the boards governing code inspectors and architects, the Commission is allowed to process complaints and take disciplinary action against contractors that it has authorized. The state also recognizes nine types of specialty contractors, who are subcontracted to by licensed builders. To be licensed as a specialty contractor, individuals must provide three references from individuals familiar with their work and a surety bond if work on any project will exceed $5,000. Licensure for plumbing, electrical, and HVAC contractors differs somewhat, as they must be bonded for $10,000, have an affidavit supporting one year of work experience, and take required exams. As with homebuilders, there are no continuing education requirements. Engineers must also be certified and registered with the state’s Board of Registration for Professional Engineers and Surveyors. Continuing education requirements are higher than other professional groups, as engineers must complete 30 hours of CEU credits every two years.

**Gap:** Many building professional groups are not required to attend continuing education courses.

**Recommendation #10a:** Energy code enforcement could be improved by requiring many building professional groups to attend continuing education courses.

**Recommendation #10b:** Additionally, to achieve certification, the state could specify that a percentage of approved CEU activities be dedicated to the energy code – which is not a requirement of CEUs for any group, including code officials.

Training and CEUs

The state occasionally offers training programs for professionals, but by and large all CEUs required by architects and engineers are offered by third party firms. The state does not regulate these providers,
and also does not offer financial reimbursal to these professionals, as it does for code officials. This provides a number of barriers for continuing education, as architects and engineers must come out of pocket to pay for continuing education in almost all cases.

**Gap:** Community colleges are not actively involved in energy code training efforts.

**Recommendation #11:** The state should further encourage education by partnering with local community colleges and technical schools to shape the curriculum of continuing education

### 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

To date, South Carolina has no process in place to measure or evaluate code compliance, nor has it launched an effort to measure compliance at the statewide or local level. Likewise, local utilities and SEEA, the regional energy efficiency group, has not launched any such effort. The state’s home rule tradition has meant that compliance measurement from the state level difficult, as the state does not actively engage in code enforcement at the local level. At the local level, attempts to track or measure compliance measurement are not in evidence, although all code officials report working diligently to use their limited time completing inspections to spot common compliance shortfalls.

**Gap:** The state has thus far not undertaken statewide code compliance monitoring

**Recommendation #12a:** The state should verify energy code compliance by developing a comprehensive state effort to measure energy code compliance.

**Recommendation #12b:** The state should review of the Department of Energy’s guidance on measuring energy code compliance.
Implementation Summary: Best Practices and Recommendations

South Carolina has done a great deal to aid implementation of the energy codes within the constraints of the home rule enforcement policy that state officials must abide by. The state provides free continuing education and training for code officials, offers its services as an arbiter of code interpretations at the local level, and investigates in the event a complaint is lodged against a contractor, code official, design professional or contractor performs.

In addition to these successful programs, there are a number of activities the state could also engage in to facilitate improved energy code implementation. At present, the state requires professional trades to register with the state and – in the case of some trades—to stay up-to-date on current practice through continuing education requirements. However, some of these groups, including homebuilders, plumbers, electricians, and HVAC installers do not have to take continuing education courses apart from their normal biennial registration with the relevant state department. To this end, BCAP has identified the following gaps and recommendations:

**Gap:** Local governments do not always offer incentives and penalties to contractors, which might incentivize higher compliance rates.

**Recommendation #5:** The state could also offer guidance to local governments that provide incentives for contractors with a successful track record, and penalties for re-inspection.

**Gap:** Communities often lack the resources necessary to enforce the code.

**Recommendation #6:** The state could also aid local code inspection and enforcement efforts, which are administered at the local level, by issuing enforcement standards, and by advising on the fee amount necessary to cover the cost of enforcement and re-inspection.

**Gap:** Handheld electronics and testing equipment must be purchased at the local level, which many code departments cannot afford at present.

**Recommendation #7:** State officials could subsidize the purchase of handheld electronics for inspectors as well as other testing equipment, including duct blasters and blower door equipment.

**Gap:** The state has not issued formal guidance on the opportunities third party code inspectors offer to local jurisdictions that do not have capacity in place to conduct inspections.

**Recommendation #8:** State officials could also offer formal guidance on the use of 3rd party code inspectors – who can aid local governments in inspecting specialized buildings and support
local code staff in rural areas and coastal areas in the event hurricanes damage coastal structures en masse.

**Gap:** Although the state has taken action to allow local code officials are able to call on experts at the state level to make code determinations on demand, the state does not currently offer outreach to the construction community in the form of guides on how to follow the code to the construction community. Doing so would forestall more code compliance shortfalls, lowering the burden on code officials.

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**Stakeholders**

Saving energy through energy code compliance is the ultimate goal of the energy codes process. Yet this outcome requires buy-in, support, and input from a diverse group of energy code champions. On the frontlines are the inspection and design and construction communities, without whom energy codes cannot succeed. State legislators, city council members, mayors’ offices, and other policymakers must understand the value of energy codes and enact policies that assist enforcement and compliance.
Utilities, state and local agencies, environmental and energy efficiency organizations, consumer groups, and other interested parties each can play crucial roles in promoting codes, funding and improving the energy code infrastructure, providing technical expertise and materials, and strengthening support for building energy efficiency on the national, regional, state, and local levels.

Supporting Organizations

Aside from professionals directly involved in the building industry, the state lacks an extensive network of stakeholders invested in energy codes. The regional energy efficiency group, SEEA (the Southeast Energy Efficiency Alliance) is not active in the state, and is handicapped by the removal of the energy code from the traditional adoption process.

As described in the Green Building Overview and Incentives section on page 16, one of the largest supporters of the energy codes are local utilities, which offer electric rate discounts and incentives for meeting energy efficiency targets in new construction and renovation.

Southface

Headquartered in nearby Atlanta, GA, Southface is currently conducting energy code training in South Carolina. The organization, which developed the EarthCraft green building certification program, is well-known in the Southeast for its work to work effectively with both the private and public sector to improve building energy efficiency.

The Southeast Energy Efficiency Alliance (SEEA)

Like Southface, The Southeast Energy Efficiency Alliance (SEEA) is based in Atlanta, GA, and focuses on energy efficiency solutions, including building energy codes. Although it is currently does not have any actively funded projects in South Carolina, its expertise and resources are available for coalition building in the state.

Responsible Energy Codes Alliance (RECA)

Headquartered in Washington, D.C., RECA works on a national level as the association of product manufactures in support of codes to improve energy efficiency in buildings. Generally, RECA will work with other advocacy groups to promote the adoption and implementation of energy codes whenever a state is in the code change process. Most recently, RECA sent a letter of support backing a recent proposal to adopt the 2009 IECC statewide, and offered its assistance as necessary.

New Partnerships

In addition to those organizations working toward building energy efficiency, code efforts in South Carolina can also take advantage of other potential partners in the state. Two potential non-profit allies
are the Sierra Club, which has a state chapter, as well as the Coastal Conservation League, a local organization dedicated to protecting the environment of the South Carolina Coastal plain.

Additional contacts can be made with local homebuilders’ organizations and their constituent members, in order to reach common ground and ensure their all-important buy-in to energy code efforts. Likewise, the real estate, lending, and appraisal communities should be engaged in energy code issues.

**Gap:** There are unrealized opportunities for the state to work with regional groups and professional associations.

**Recommendation #13:** The state should work with stakeholders to increase consumer outreach efforts.

### Stakeholders Summary: Best Practices and Recommendations

The state has already engaged in the crucial work of identifying regional organizations and other key stakeholders as it proceeds through the code adoption process. These organizations and stakeholders can play an ongoing role assisting in the creation of energy code resources and building code awareness. The state also participates in national code events and local officials contribute to the development of national model code development, sharing knowledge through ICC forums.

The state has also begun efforts to tackle renewable energy and climate change at the state and local levels. Utilities, as described on page 16, have also played an exceptional role highlighting building energy issues by assigning value to efficiency upgrades.

In addition, there are a number of product manufacturers with a local presence in South Carolina that could organize to promote codes. Many of these manufactures pride themselves on producing construction materials that significantly improve energy performance in homes and buildings. More stringent energy codes and greater compliance will benefit these companies greatly, as use of the products they sell will become the standard of construction in SC.

**Gap:** Manufactures in the state could be more engaged in efforts to promote code adoption and compliance.

**Recommendation #14:** The state should engage with product manufacturers as new partners to promote adoption and compliance.

The following is an incomplete short list of product manufacturer stakeholders who have an office or plant location in South Carolina:

- BASF Chemical Company, *Plastics*
- Dupont Tyvek(R), *Air barrier*
• Grace Construction Products, *Packaging materials & plastic pipe*
• Henry Company, *Asphalt products*
• Johns Manville, *Engineered products*
• R max, *Insulation*
• Firestone Building products, *Roofing systems*
• Owens Corning, Stone *Veneer (Insulation is main product)*
• Guardian Industries, *Glass*
• Johnson Controls Inc., *Controls*
• Trane, *Ventilation Equip. AC, Heating*
• Hubbell Lighting, *Lighting*
• Nitelites, *Outdoor lighting*
• Airease, *heating and cooling systems*

While SC utility companies and the SEO have done an excellent job in consumer outreach on energy efficiency specifically, a gap still exists because of the lack of awareness among consumers of the energy code. Many consumers do not realize that there is a mandatory statewide energy code, or if their home meets the code. Still others are unaware of the amount of energy and money they would save if they lived in a home that was built to the latest model energy codes. The SEO and other stakeholder organizations should promote energy codes to the consumer audience to help transform the market to place higher demand for homes that meet the mandatory energy code. There is an opportunity for stakeholders to participate in projects that promote code compliance which will ultimately drive code awareness and compliance rates up. The state should also engage locally-based product manufacturers to support code compliance and adoption efforts.

To summarize, BCAP makes the following recommendations for the state in its efforts to improve stakeholder involvement in the energy codes:

**Gap:** There are unrealized opportunities for the state to work with regional groups and professional associations.

**Recommendation #13:** The state should work with stakeholders to increase consumer outreach efforts.

**Gap:** Manufacturers in the state could be more engaged in efforts to promote code adoption and compliance.
**Recommendation #14:** The state should engage with product manufacturers as new partners to promote adoption and compliance.

**Conclusion**

Building energy codes are one of the easiest and most cost-effective ways for South Carolina to secure its energy future. Not only will they help consumers save money on their energy bill, code compliance will reduce the load on the grid, resulting in a cleaner environment and a protected and diverse energy supply. In many parts of the state the attitude and the infrastructure is already in place, but stressing that the code is mandatory statewide, ensuring high compliance rates, and creating a demand for compliance will help South Carolina continued in the right direction toward greater energy efficiency.

Through greater communication and assumed authority as the organization responsible for the implementation of the statewide energy codes, the SEO can help pave the way toward energy efficiency through codes. Together with other state agencies and local level governments, the SEO can provide the training and resources necessary to keep the building community up-to-speed on the current energy code and its requirements. They can also shape the local building departments to take an even more active role in energy code enforcement, and the design and construction communities to encourage more awareness and familiarity of the code and the benefits of energy efficiency. By intensifying the implementation of the model energy code, South Carolina will ensure that it reaps all of the benefits they have the potential to provide.

The recommendations made as a result of this gap analysis, summarized below in figure 6, are meant to guide the stakeholders in South Carolina to meet these goals for code adoption and implementation and help in the development of a compliance action plan. Though some recommendations may require increased funding over extended periods of time, an action plan will help make sure that new construction in the South Carolina achieves 100% compliance to model energy codes now and in the future.
# Figure 4– Recommendations Table

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<td>• The state should consider legislation that adds a “stretch code” as an appendix to the adopted state code that would allow jurisdictions to go above the state minimum in a uniform manner and allow for state support of such efforts. Pg. 19</td>
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<td>• For areas in the state that lack code enforcement infrastructure, the state can provide third party contactors or state hired inspectors to augment or fully cover energy code plan review and inspection. Pg. 19</td>
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<td>• Develop state-level capacity for determining which jurisdictions lack sufficient infrastructure to perform inspections, and ensure that they are able to hire 3rd party inspectors. Pg. 19</td>
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<th>Implementation</th>
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<td><strong>Enforcement Community</strong></td>
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<tr>
<td>• The state could also offer guidance to local governments that provide incentives for contractors with a successful track record, and penalties for re-inspection. Pg. 24</td>
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<td>• The state could also aid local code inspection and enforcement efforts, which are administered at the local level, by issuing enforcement standards, and by advising on the fee amount necessary to cover the cost of enforcement and re-inspection. Pg. 25</td>
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<td>• State officials could subsidize the purchase of handheld electronics for inspectors as well as other testing equipment, including duct blasters and blower door equipment. Pg. 27</td>
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<td>• State officials could also offer formal guidance on the use of 3rd party code inspectors – who can aid local governments in inspecting specialized buildings and support local code staff in coastal areas in the event hurricanes damage coastal structures en masse. Pg. 28</td>
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<th>Outreach</th>
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<tr>
<td>• The state could provide a copy of the code, code commentary, and other guides to the construction community. Pg. 29</td>
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<th>Design/Construction Community</th>
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<tr>
<td>• Energy code enforcement could be improved by requiring many building professionals groups to attend continuing education courses. Pg. 30</td>
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<tr>
<td>• Additionally, to achieve certification, the state could specify that a percentage of approved CEU activities be dedicated to the energy code – which is not a requirement of CEUs for any group, including code officials. Pg. 30</td>
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<th>Training</th>
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<tr>
<td>• The state should further encourage education by partnering with local community colleges and technical schools to shape the curriculum of continuing education. Pg. 31</td>
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<th>Compliance Measurement &amp; Verification</th>
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<tr>
<td>• Verify energy code compliance by developing a comprehensive state effort to measure energy code compliance. Pg. 31</td>
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</table>
• Review of the Department of Energy’s guidance on measuring energy code compliance. Pg. 31

Stakeholders

• The state should work with stakeholders to increase consumer outreach efforts. Pg. 36
• Engage product manufactures as new partners to promote adoption and compliance. Pg. 37

Acknowledgments

We would like to acknowledge the financial support of the Department of Energy, which made this report possible. State officials also collaborated in the production of this report, providing comprehensive background information, local stakeholders contacts, and—perhaps most critically—ongoing review of our work. In particular, we would like to acknowledge the aid of Ralph Jenkins with the South Carolina State Energy Office as well as Gary Wiggins, Administrator of the South Carolina Building Code Council. A number of local code officials also contributed to our efforts to learn about energy code issues at the local level. Among these officials were Jerry Thompson and Robert Harkins from the Columbia, Steve Landrith in Greenville, Lawrence Outz from Greenwood, and Don Houck from Rock Hill. We also would like to acknowledge a number of code officials and building professionals who provided us with crucial insights and chose to remain anonymous.

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

4. These values are calculated assuming a nationwide average sales price of $267,561 for a new 2,400 square foot home. The mortgage is conservatively set at 30 years, with a 20% down payment and the current nationwide interest rate of 4.14%.

*Cover image courtesy of Flickr Creative Commons, author Lee Coursey