South Dakota Gap Analysis

December 2010

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

Acronyms and Abbreviations ........................................................................................................................ 5

Executive Summary ....................................................................................................................................... 6

Introduction .................................................................................................................................................. 8

- State Demographic Overview ................................................................................................................... 8
  - Construction Overview ........................................................................................................................ 9
  - Energy Portfolio .................................................................................................................................. 10
  - Potential Savings from Energy Codes: Residential .............................................................................. 11
  - Potential Savings from Energy Codes: Commercial ............................................................................ 12

Adoption ..................................................................................................................................................... 13

  - Federal Policy .......................................................................................................................................... 13
    - EPAct ................................................................................................................................................... 13
    - The Recovery Act ................................................................................................................................ 13
  
  - State Policy .............................................................................................................................................. 14
    - Political Environment and Energy Code Adoption ................................................................................ 14
    - Other South Dakota Building Codes ..................................................................................................... 16
    - Energy Codes for State-funded Facilities ............................................................................................ 16
    - Statewide Climate Change Initiatives .................................................................................................... 16
    - Overview of Green and Above-Code Programs .................................................................................... 17

Local Policy .............................................................................................................................................. 20

  - IECC and Standard 90.1 ........................................................................................................................ 20
  - IBC or IRC ............................................................................................................................................. 20
  - Local Adoption Challenges ..................................................................................................................... 21
  - Energy Codes for Municipal-funded Facilities ....................................................................................... 22
  - Local Climate Change Initiatives ............................................................................................................ 23
  - Overview of Local Green and Above-Code Building Programs ........................................................... 23

Adoption Summary ..................................................................................................................................... 23

Implementation .......................................................................................................................................... 25

  - Overview of State and Local Implementation Policies ........................................................................... 25
  - Outreach .................................................................................................................................................. 25
    - State’s Role in Promoting Codes .......................................................................................................... 25
    - Local Government’s Role in Promoting Codes .................................................................................... 26
Acronyms and Abbreviations

AIA – American Institute of Architects
ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BCAP – Building Codes Assistance Project
BPI – Building Performance Institute
CEUs – Continuing education units
CLARB – Council of Landscape Architectural Registration Board
DOE – Department of Energy
ECAP – Energy Code Ambassadors Program
EEBA – Energy & Environmental Building Alliance
EECBG – Energy Efficiency and Conservation Block Grants
EIA – Energy Information Agency
EPA – U.S. Environmental Protection Agency
HERS – Home Energy Rating System
IBC – International Building Code
ICC – International Code Council
IECC – International Energy Conservation Code
IFC – International Fire Code
IMC – International Mechanical Code
IRC – International Residential Code
LEED – Leadership in Energy and Environmental Design
MEC – Model Energy Code
MEEA – Midwest Energy Efficiency Alliance
NAHB – National Association of Home Builders
NCARB – National Council of Architectural Registration Boards
NCEES – National Council of Examiners for Engineering & Surveying
NEC – National Electric Code
OCEAN – Online Code Environment and Advocacy Network
OVE – Optimum Value Engineering
PNNL – Pacific Northwest National Laboratory
RECA – Responsible Energy Codes Alliance
RESNET – Residential Energy Services Network
SEO – State Energy Office
SEP – State Energy Program
UPC – Uniform Plumbing Code
USGBC – U.S. Green Building Council
Executive Summary

The purpose of the South Dakota 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 Dakota’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. As the state allows local governments latitude in the adoption of the statewide code, this section of the report also examines local energy code adoption. This section recommends that the state take actions to adopt the latest model codes and achieve 90% compliance. 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 also explores building inspection work at the local level as it relates to the energy code. The report also examines the requirements and training responsibilities of design and construction professionals as they relate to state and local requirements. 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 Dakota 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 Dakota, 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 Demographic Overview

South Dakota’s population has grown slightly in the last two decades. From April 1990 to April 2000, the state population grew by 8.5 percent, lower than the national average of 13.2 percent. In the last decade, population grew 7.9 percent from 2000 to 2010 to an estimated total of 814,180. The state has a relatively low population density of ten people per square mile, ranking 48th nationally among 50
states. While low in population, many of the state’s residents live and work in one of the state’s medium sized cities, including Sioux Falls, Rapid City, Pierre, Brookings, Watertown, Aberdeen, and others.

**Figure 1: State Population Map**

**Construction Overview**

Although construction starts of new single family homes have declined nationwide in the face of the real estate crisis, housing starts in South Dakota have slumped less than in many states, both as a percentage and in actual numbers. As illustrated in figure 1, from 2008 to 2009, when many states suffered a marked decrease in new home starts, South Dakota’s builders constructed 193 fewer units—a decrease of only 5%.

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, building professionals and code officials may have more time to take advantage of available energy code training, such as the upcoming workshop series offered by the state building code officials association through Recovery Act funding (see Enforcement Community: Training and CEUs).
Reduced construction will also help ease all stakeholders into the new code, rather than trying to adjust while construction activity is high.

**Figure 2 – South Dakota Residential Permits by Year**

**Energy Portfolio**

South Dakota is a minor energy producer (ranked 43rd in the nation) and an energy importer. Residential electricity costs are the 7th lowest in the nation, likely contributing to South Dakota’s relatively high per capita energy consumption (14th nationally among 50 states). The state is also among the nation’s top producers of corn-based ethanol. Statewide, hydroelectric power supplies half of the electricity consumed within the state’s borders, while coal-fired electricity generation is the second-largest source. Despite the state’s high per capita consumption of energy, as a low-population state, South Dakota’s energy demand is significantly lower than many other states, and it consumes only 0.4% of all energy used in the U.S. Within the state, the industrial and transportation sectors lead in statewide energy consumption.

Reducing overall energy use through the adoption and implementation of the model energy codes would allow the state to forestall the need to generate additional energy with fossil fuels, as would be required to meet short and medium-term demand. In the long-term, it will assist the state’s efforts to becoming a net-exporter of renewable energy, as it is currently for ethanol.

Fortunately for South Dakota, the state has been rated by the U.S. Energy Information Administration (EIA) as having significant (and untapped) renewable power resources. The most significant untapped energy source is wind power, which has high potential statewide. As well, EIA has identified the south-
central part of the state, stretching from the Nebraska border to Pierre, as prime for geothermal energy development.³

**Potential Savings from Energy Codes: Residential**

Among other factors arguing for the adoption of improved energy codes in South Dakota 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 US Environmental Protection Agency), if new homes in South Dakota are built to the latest model code, those homeowners will enjoy an average annual energy savings of $405 per year. In contrast, the cost per home of meeting those code requirements is a one-time cost of $1293.59 per home.

<table>
<thead>
<tr>
<th>Climate Zone/City</th>
<th>Savings ($/year)</th>
<th>Percent Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omaha, NE (Zone 5A)</td>
<td>$427</td>
<td>21%</td>
</tr>
<tr>
<td>Pierre (Zone 6A)</td>
<td>$383</td>
<td>18%</td>
</tr>
</tbody>
</table>

Source: [2009 IECC Residential Nationwide Analysis](#), U.S. Department of Energy

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 of $258.72 and $5.03 per month in mortgage payments. Given energy savings of $33.75 per month, homeowners will reach a breakeven point in 9 months, and achieve $90.95 in savings by the end of the first year. For each month after the breakeven point (month 9) homeowners will save $28.70 per month through lower utility bills, for a total of $344 per year.⁴

<table>
<thead>
<tr>
<th>Weighted Average Incremental Cost</th>
<th>Median Energy Savings</th>
<th>Simple Payback</th>
<th>Amortized Payback, 20% down payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,293.59 per home</td>
<td>$405 per year</td>
<td>3.2 years</td>
<td>9 months</td>
</tr>
</tbody>
</table>

Source: [Estimated Energy Savings](#), Building Codes Assistance Project

Viewed in total, potential annual energy savings for all owners of new homes in South Dakota have a value of $1,483,839 per year. This is money that could be used by South Dakota residents at their discretion, whether as savings, investment or disposable income. This estimate is based on 100 percent code compliance with the 2009 IECC and only represents one year of savings per household. In reality, these homes will deliver utility savings to their owners for the life of the home. Note: The statewide estimate is based on the average number of new single-family residential permits issued in South Dakota over the past five years. According to BCAP estimates, if South Dakota updated to the 2009 IECC, the energy savings that would accrue to home and business owners would total $26 million annually by 2020 and $50 million annually by 2030 (assuming 2006 energy prices).
Potential Savings from Energy Codes: Commercial

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 *Non Residential* is defined as 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 10.8 percent 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>Climate Zone 5 (Yankton)</td>
<td>10.7%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Residential</td>
<td>Climate Zone 5 (Yankton)</td>
<td>4.1%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Semi Heated</td>
<td>Climate Zone 5 (Yankton)</td>
<td>0.3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Non Residential</td>
<td>Climate Zone 6 (Pierre)</td>
<td>10.9%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Residential</td>
<td>Climate Zone 6 (Pierre)</td>
<td>4.2%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Semi Heated</td>
<td>Climate Zone 6 (Pierre)</td>
<td>0.3%</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Source: [Impacts of Standard 90.1-2007 for Commercial Buildings at State Level](https://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 a home rule state (see State Policy: Political Environment), South Dakota does not adopt a mandatory, statewide energy code and is, therefore, not in compliance with EPAct. 6

The Recovery Act

In 2009, Congress passed the American Recovery and Reinvestment Act (Recovery Act), which provided states with stimulus funds through the State Energy Program (SEP) and the Energy Efficiency and Conservation Block Grants (EECBG) to adopt the 2009 IECC or equivalent for residential construction and the ASHRAE Standard 90.1-2007 or equivalent for commercial construction, as well as achieve 90 percent compliance with the codes by 2017.7 In a letter dated February 24, 2009, Governor Michael Rounds assured that he requested that the legislature “consider actions to improve building energy codes, consistent with state law and state Constitutional requirements, and to consider the statutory language contained in ARRA.”8 In response, DOE awarded the state $23.7 million in SEP funding for use in energy efficiency policies and improvements and an additional $15 million EECBG formula grant, a portion of which the South Dakota State Energy Office will use for commercial energy efficiency projects.
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 either a legislative process—as in South Dakota—through a regulatory process, or a combination of both. A handful of states are strongly home ruled 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. From the federal level, the US Department of Energy works in the states to ensure that every new homebuyer has access to homes that meet national minimum standards for comfort, quality and performance.

Political Environment and Energy Code Adoption

South Dakota’s first building code was enacted in 1978 as part of Chapter 53 of the state building code. It was not mandatory, and allowed jurisdictions to adopt the code voluntarily. As described in the Final Report of the South Dakota Energy Code Workgroup, submitted to the Governor on November 24th, 2010, the 1978 law, SDCL 11-1-1—specifically Chapter 11-10—has been amended to update the energy code to reflect more recent codes. According to the report, while the state lacks a statewide mandatory minimum energy code, state laws referencing the code do exist.

Currently, for those jurisdictions that choose to adopt any standards for new construction, state law requires that these jurisdictions comply with the 2009 International Building Code (IBC), which references IECC compliance. And while local jurisdictions are given the authority to amend, modify, or delete the model code language referenced in the IBC, the Working Group’s report points out that “most local jurisdictions in South Dakota have not done so.” According to the Midwest Energy Efficiency Alliance (MEEA), a regional advocacy group, discussions on the Workgroup center on the possibility of achieving 90% code compliance requirement without a statewide code—a belief held by many.

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
stakeholders who feel that compliance goals can be met because most construction occurs in South Dakota’s largest jurisdictions, many of which have recently adopted versions of the energy code.\textsuperscript{10}

For residential buildings, the state has adopted a voluntary statewide code based on the 2006 IECC. Passed by the legislature on March 30, 2009 the code became effective on July 1, 2009. While this code is not mandatory, a baseline of construction information is available to buyers (and the state) as sellers of all new residential buildings are required to complete a Builder’s Energy Efficiency Disclosure Statement—which rates the value of insulation r values, window u-values, and other technical specifications of a home—as compared to the requirements of the 2006 IECC. The form must be provided to prospective buyers at their request.

For commercial buildings, the state requires that buildings built in jurisdictions where no local code has been adopted meet the requirements of the 2009 IBC. While local governments have the right to enforce the code, stakeholders speculate that enforcement is not widespread. Likewise, at present the state does not have the resources to enforce the IBC requirement for commercial buildings. The 2009 IBC is mandatory, however, for schools, day-care centers and state-owned buildings.

Further changes to the state’s energy code would have to be made by the South Dakota legislature, which is responsible for adopting and amending energy codes. The viability of passing a mandatory statewide energy code is challenged, however by the low construction rates outside the state’s major cities. For these rural areas, construction rates are too low to support full time code staff—and both lawmakers and code officials are hesitant to create such a mandate for rural governments. According to Brad Solon, President of the South Dakota Building Officials Association, “we’ve got counties with about a thousand people that are twice the size of Rhode Island. High schools are so small that they play 9 man football, with 16 players on the entire team. We need creative solutions to get the energy code out there.”

**Gap:** The state lacks a mandatory statewide energy code for residential and commercial construction and is currently not in compliance with EPAct.

**Recommendation #1:** BCAP recommends that the state adopt the 2009 IECC and ASHRAE Standard 90.1-2010 as the mandatory, statewide energy codes without weakening amendments. Although it may be theoretically possible to meet the 90% compliance target by relying on compliance inspections in major cities, exempting rural construction from the energy code may mean that homeowners and businesses in low-density areas of the state forfeit significant energy and financial savings.

**Gap:** The state’s minimum voluntary energy code does not prohibit local governments from removing energy code requirements from the building code.

**Recommendation #2:** The state should consider prohibiting weakening amendments or encouraging local jurisdictions to do so. Significantly, the state’s Energy Codes Workgroup has taken the step of recommending this action for commercial buildings, writing that “energy
codes should be exempted from local jurisdiction authority to modify, amend, or delete from building codes adopted by local units of government.”

**Gap:** The state does not have an automatic review and update process on a three-year cycle for future iterations of the minimum energy code.

**Recommendation #3:** The state could adopt a mandatory review and update cycle for future iterations of the minimum energy code to lock in future energy savings.

**Other South Dakota Building Codes**

Other state codes in South Dakota include the 2003 Uniform Plumbing Code (UPC) and the National Electrical Code (NEC) 2008 which are both a mandatory minimum for all buildings. The 2003 International Fire Code (IFC) and the 2003 International Mechanical Code (IMC) are required for schools, day-care centers and state-owned buildings. While these codes are mandatory, there is no state oversight or provision for their enforcement at the local level. Additionally, the South Dakota State Fire Marshal’s office inspects new boilers and issues operating certificates statewide.

**Energy Codes for State-funded Facilities**

State buildings requirements are among the most advanced in the state, as all state buildings must meet the LEED Silver New Construction certification offered by the U.S. Green Building Council (USGBC). State buildings fall outside the purview of local building inspectors and are the responsibility of the state. As well, the Office of the State Engineer maintains an internal policy—included in all contracts—that all state buildings meet the most current IBC and ASHRAE 90.1 standards.

**Statewide Climate Change Initiatives**

At present the state does not have a Climate Action Plan, although some measures have been taken to save energy from the building sector, including the mandated LEED-silver certification for state buildings. If the state chooses to charter its own effort, it may look to neighboring Iowa’s State Climate Action plan (published in 1996) or the state of Michigan’s Climate Action Council, which was formed in 2007 by Governor Granholm. Charged with producing an inventory and forecast of greenhouse gas emissions as well as a climate action plan for mitigating effects of climate change, the Council completed its initial report in March 2009.
South Dakota is also a participant in the Midwest Greenhouse Gas Reduction Accord. The group has
seven members: Iowa, Illinois, Kansas, Manitoba, Michigan, Minnesota, and Wisconsin. Four additional
states are observers including South Dakota, Indiana, Ohio, and Ontario. Through the Accord, state
governors agreed to establish a Midwestern greenhouse gas reduction program to reduce greenhouse
gas emissions in their states, as well as a working group to provide recommendations regarding the
implementation of the Accord.\textsuperscript{14} South Dakota’s continuing (or increased) participation in this group
offers a significant opportunity to leverage the region’s collective political clout and renewable energy
resources. The Accord may serve as the basis for coordinating regional infrastructure investments—such
as power transmission lines—which when coupled with wind turbine development could create self-
sustaining local jobs and lower energy imports for South Dakota residents.

As well, as of November 15\textsuperscript{th}, 2007, the State joined many of its neighbors in signing the Midwestern
Energy Security and Climate Stewardship Platform, which laid out many climate related goals including
transmission improvements to support wind energy development and CO\textsubscript{2} management.\textsuperscript{15}

\textbf{Overview of Green and Above-Code Programs}

Green building practices have made inroads in South Dakota, largely on the strength of efforts to achieve
LEED- and Energy Star-certification. The state
government, for its part, has introduced requirements
that state funding buildings achieve a LEED Silver New
Construction rating on the USGBC’s rating system.
Actions taken by consumers and the private sector
have also played a role, as the state now boasts 58
LEED registered buildings—7 of which have been
certified.\textsuperscript{16} Additionally, the state now has 464 Energy
Star certified homes and 27 builders who have been 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. The 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, which is a measure of the home’s energy efficiency.
Although the percentage of new homes built through the Energy Star program is low (less than 3%), the
growth of the program in the state provides hope that the market for these homes will continue to expand.\textsuperscript{17}
The HERS Index Explained

The HERS Index is 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, which is assigned the score of 100 points. The lower a home’s HERS Index, the more energy efficient it is. Every one point decrease in the HERS Index corresponds to a one percent reduction in energy consumption compared to the HERS reference home. For example, a home that scores an 85 is 15 percent more efficient than the HERS reference home, and a home that scores zero is a net zero building (see [www.resnet.us](http://www.resnet.us) for more details). Both ENERGY STAR for Homes and Building America intend to increase the stringency of their requirements in the coming months.

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 Dakota homebuilders and homeowners, there are a multitude of utility-funded incentives for energy efficiency that may help raise energy efficiency of new buildings. For residential buildings, there are a number of utility rebates, which provide rebates for energy-efficient products. MidAmerican Energy, one of the state’s utilities providing gas and electricity, offers rebates on building components, including those that improve energy efficiency. Incentives relating to efficiency include a 70% rebate on insulation (up to $750), geothermal heat pumps ($1,000-$2,000), and free energy audit that includes an inspection of water heater and pipe insulation. Montana-Dakota Utilities (a gas company) provides rebates for efficiency upgrades in renovated homes, including furnace replacement rebates ($150 for AFUE 92% and $300 for AFUE 94%) $20 for a programmable thermostat, and between $0.06-0.41 cents for attic insulation, depending on insulation grade and whether the product is installed by homeowner or a contractor. For new homes, the company offers $100 rebates for R-21 wall insulation and R-49 – both on par with the insulation requirements in the 2009 IECC. Otter Tail Power company also offers rebates, including for thermal storage technologies and residential demand control units, which assist the company’s efforts to lower peak power use.

Incentives for commercial buildings and businesses are also significant. Otter Tail and Black Hills Power offer rebates on geothermal heat pumps. Black Hills Power’s incentive is up to $10,000, which includes $7,500 for the loop field installation and $2,500 for the heat pump. MidAmerican Energy offers rebates for programmable thermostats ($25) and lighting occupancy sensors ($20). As with residential properties, Montana-Dakota utilities also offer rebates on energy efficient natural gas furnaces of $150 or $300, depending on efficiency rating.
In addition to federal tax incentives aimed at driving wind energy production in the state, South Dakota has created additional incentives aimed at utilities. To encourage new projects, the state offers a refund on the utilities’ excise taxes on wind energy production and transmission project costs, which can be up to 55% of their normal tax obligation to the state for projects exceeding $40 million dollars.¹⁸

**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 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 their website, builders are currently not undertaking any Building America projects in South Dakota, but the program may offer an opportunity for innovative builders in the future.¹⁹

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

**Recommendation #4:** The state should support additional above code work, such as Energy Star and Building America. The spread of advanced building practice, such as the use of Optimum Value Engineering (OVE) framing (which spaces the 2 inch x 6 inch studs that are necessary to accommodate added insulation further apart than 2 x 4s) can save money for builders and
The 2009 International Residential Code (IRC) is not equivalent to the 2009 IECC. South Dakota must add a number of amendments to bring the 2009 IRC up to 2009 IECC standards. These include:

- Strengthening fenestration and insulation requirements
- Eliminating trade-off allowances
- Adding new air barrier and insulation checklists
- Redefining “conditioned space”
- Adding “mandatory,” “prescriptive,” and “performance” labels in the code
- Exempting only “building thermal envelope provisions that do not contain conditioned space”

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.

IECC and Standard 90.1

Statewide, the IECC has officially been adopted in four jurisdictions statewide. Huron and Lead have adopted the 2003 edition of the IECC, Meade County the 2006 IECC, and Sioux Falls the 2009 IECC. Sioux Falls’ adoption of the 2009 IECC is significant however, because it is also the state’s largest city and was home to 31% of all residential construction starts statewide in 2009 and 37% of housing starts in 2008.

IBC or IRC

Several communities in South Dakota choose to adopt the International Building Code (IBC), which covers commercial construction. The IBC’s Chapter 13 references the IECC—which, in turn, references ASHRAE Standard 90.1-2007 as an alternative compliance path—but does not include all of same energy efficiency attributes. In theory, then, the IBC is equivalent to the IECC and Standard 90.1, but only if the jurisdiction also adopts the IECC. The municipalities in South Dakota that adopt the IBC eliminate Chapter 13 altogether or choose not to also adopt the IECC, as well. Therefore, in practice, adopting the IBC is not equivalent to adopting the IECC.

For single-family residential construction, the situation regarding energy code adoption looks a little more promising when you include the IRC. Chapter 11, the energy efficiency chapter, references the IECC as an alternative compliance path, yet it also includes prescriptive energy efficiency requirements that are slightly less stringent than the IECC. This gives the building and design industries the option of taking an easier compliance path, which reduces these codes’ impact on energy savings as compared to the IECC.
Local Adoption Challenges

Sioux Falls is a leader among cities that have adopted the latest version of the energy code, the 2009 IECC. Local code officials report that it is a challenge to adopt newer version of the code even in larger cities because of the perceived inspection challenge and in the words of another chief building official, “because of resistance from local builders, who don’t like the idea of additional requirements.” Other jurisdictions in rural parts of the state lack the population to support any code inspection departments at the local level, let alone energy code provisions.

Figure 4 – South Dakota Building Codes by Jurisdiction

<table>
<thead>
<tr>
<th>Local Jurisdiction</th>
<th>IBC</th>
<th>IRC</th>
<th>IECC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belle Fourche</td>
<td>2006 ed.</td>
<td>2006 ed.</td>
<td></td>
</tr>
<tr>
<td>Box Elder</td>
<td>2006 ed.</td>
<td>2006 ed.</td>
<td></td>
</tr>
<tr>
<td>Brookings</td>
<td>2006 ed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Gap: Local governments often lack the resources to adequately enforce the energy code.

Recommendation #5a: 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.

Recommendation #5b: For areas in the state that lack code enforcement infrastructure, the state can provide third party contractors or state hired inspectors to augment or fully cover energy code plan review and inspection. The state might find an excellent precedent for state inspectors from the South Dakota Plumbing Commission, which is charged with inspecting plumbing in new construction statewide. Currently, the state employs five inspectors, two serving western South Dakota, and three in eastern part of the state. Likewise, the South Dakota Electrical Commission performs inspections on electrical work, including a rough-in and final inspection. The potential exists to realize increased inspection efficiency by leveraging the combined assets of these departments alongside energy codes.

Energy Codes for Municipal-funded Facilities

As of December 2010, no local jurisdiction in South Dakota had adopted a building standard for local government buildings that is more advanced than the local code. By requiring stricter standards for public buildings, South Dakota jurisdictions might further 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

Nascent climate action efforts are active in many South Dakota cities. At present, two jurisdictions are members of ICLEI, an international association of local governments that have committed to achieving sustainable development outcomes. Current members in South Dakota are Sioux Falls and Oglala. As well, two cities have also signed the US Conference of Mayors’ Climate Protection Agreement; these include Huron and Spearfish City. At the local level, no cities have adopted a climate action plan. However, one precedent-setting plan was recently developed by the South Dakota School of Mines and Technology. The school’s Climate Action Plan 2010 represents a meaningful start for CO₂ reduction efforts at the campus level.

Overview of Local Green and Above-Code Building Programs

Perhaps because many of South Dakota’s local governments have not yet adopted the energy code, the number of above code building programs charted at the local level is presently limited. Interestingly, as a result of environmental conditions, many jurisdictions add additional requirements that may inadvertently create a higher level of energy efficiency. For instance, the city of Box Elder, located near Ellsworth Air force base, has a noise ordinance that requires insulation standards that approximate the 2009 IECC. As well, some code officials report builders building above code, although such reports are mixed. Although many code officials suggest that builders fall short in the energy efficiency aspects of new construction and build only to minimum requirements, others officials suggest 2 inch x 6 inch framed, highly insulated building envelopes are common in their areas of review, even when the code does not specify them.

Adoption Summary

South Dakota could take a number of actions to build on the state’s existing practices. The state has taken the steps to adopt relatively recent version of the energy code, the 2006 IECC for residential new construction, and the 2009 IBC for commercial buildings, but these codes are conditional and not mandatory statewide. The state can build on these efforts by adopting the 2009 IECC as a mandatory code statewide, allowing it to realize 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 also take the guesswork out of the code adoption process and allow legislators and stakeholders a shortcut to evaluating the energy code.

The state already has created programs that will 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 local climate action efforts that might be tied to codes. Additionally, local utilities offer generous incentives for the installation of energy efficient features.
Gap: The state lacks a mandatory statewide energy code for residential and commercial construction.

Recommendation #1: BCAP recommends that the state adopt the 2009 IECC and ASHRAE Standard 90.1-2010 as the mandatory, statewide energy codes without weakening amendments. Although it may be theoretically possible to meet the 90% compliance target by relying on compliance inspections in major cities, exempting rural construction from the energy code may mean that homeowners and businesses in low-density areas of the state forfeit significant energy and financial savings.

Gap: The state’s minimum energy code does not prohibit local governments from removing energy code requirements from the building code.

Recommendation #2: The state should consider prohibiting weakening amendments or encouraging local jurisdictions to do so. Significantly, the state’s Energy Codes Workgroup has taken the step of recommending this action for commercial buildings, writing that “energy codes should be exempted from local jurisdiction authority to modify, amend, or delete from building codes adopted by local units of government.”

Gap: The state does not have an automatic review and update process on a three-year cycle for future iterations of the minimum energy code.

Recommendation #3: The state could adopt a mandatory review and update cycle for future iterations of the minimum energy code to lock in future energy savings.

Gap: The amount of advanced, voluntary above-code residential construction projects is limited

Recommendation #4: The state should support additional above code work, especially by promoting energy star programs at the local level. The spread of advanced building practice, such as the use of Optimum Value Engineering (OVE) framing (which spaces the 2 inch x 6 inch studs that are necessary to accommodate added insulation further apart than in 2 x4 walls) can save money for builders and in part negate the added lumber cost. Code officials in South Dakota report that the OVE framing practice is uncommon.

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

Recommendation #5a: 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. The state might find an excellent precedent for state inspectors from the South Dakota Plumbing Commission, which is charged with inspecting plumbing in new construction statewide. Currently, the state employs five inspectors, two serving western South Dakota, and three in eastern part of the state. Likewise, the South Dakota electrical commission performs inspections on electrical work, including a rough-in and
final inspection. The potential exists to realize increased inspection efficiency by leveraging the combined assets of these departments alongside energy codes.

**Recommendation #5b:** 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.

### 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

Currently, the state government does not suggest or mandate enforcement standards. Instead, enforcement standards for the energy code are created and managed at the local level. Local governments vary widely with regard to energy code implementation. Some, such as Sioux Falls, are hailed as an example of thorough enforcement, while many smaller towns make enforcement a lower priority.

### 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

As in many states, South Dakota’s ability to promote the energy code is challenged by limited resources and the state’s vast geography, although recent funding provides an opportunity to do added training and outreach. The state also might tap into stakeholders to provide additional resources to local jurisdictions.
Local Government’s Role in Promoting Codes

Due to limited resources in local building departments, local governments in South Dakota currently engage in limited efforts to promote the energy code. In Sioux Falls, the code inspection department took the unusual and innovative step of creating a seminar to educate local contractors about the newly-passed 2009 IECC. According to Ron Bell, the Chief Building Official of Sioux Falls, South Dakota, educating contractors can be challenging: “the IECC can be difficult to understand—it’s a very technical code.”

While South Dakota jurisdictions do not make a habit of using incentives and penalties to change contractor behaviors, they do have a tradition of strongly protecting consumers from substandard work. For instance, in Sioux Falls, local builders are required to post compliance bonds on an annual basis, which the city can tap if contractors leave work uncompleted.

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

**Recommendation #6:** 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 can 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 Dakota are numerous (see page 18 for additional details).

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

Taken as a whole, these groups can 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.

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, MEEA (the Midwest
Energy Efficiency Alliance) is not active in the state, but is one potential ally for the state’s efforts to work with local governments.

As described in the Green Building Overview and Incentives section on page 17, 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.

*The Midwest Energy Efficiency Alliance (MEEA)*

The Midwest Energy Efficiency Alliance (MEEA) is based in Chicago, Illinois, and focuses on energy efficiency solutions, including building energy codes. Although it is currently does not have any actively funded projects in South Dakota, 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.

**New Partnerships**

In addition to those organizations working toward building energy efficiency, code efforts in South Dakota can also take advantage of other potential partners in the state. Potential allies include state and local homebuilders’ organizations and their constituent members. A partnership with this group might provide a chance to reach common ground on energy codes 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. One code official suggested that banks could be an important partner, as they could alter their underwriting formulas to reflect the added value of these homes: “the homebuilders say the cost is going to go up x. In response banks should change their tune, and help people with loans [requirements] to compensate.”

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

**Recommendation #7:** The state should work with stakeholders to increase consumer outreach efforts. The state’s recent Energy Codes Workgroup, which convened these stakeholders, represents an excellent beginning and opened an important dialog.

**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

Structurally, enforcement infrastructure in most large cities is consistent across the state – where inspections departments conduct plan review and follow-up with onsite inspections. In smaller jurisdictions, third party firms conduct inspections or, if they lack an energy code, no inspections occur. For state-owned buildings, local officials have no jurisdiction for inspection. Instead, state facilities are inspected by third party officials.

State law allows local jurisdictions considerable freedom to local governments’ code inspection efforts. Local governments are empowered, for instance, to charge fees to cover costs of enforcement, and must fund their activities with proceeds from inspection fees that are paid by builders. Statewide, funding is typically sourced from general funds, but spending on enforcement activity is correlated with inspection fees. The state does not take an active role in local code enforcement efforts, and has not as of yet evaluated local inspection infrastructure in practice.

Local governments with existing code inspection efforts, for their part, maintain that they could enforce the energy code in their jurisdiction it was enacted statewide. “We have the ability to do energy code inspections,” said one code official, who also suggested that doing so would require additional inspections and permit fees to cover staff time. Almost to a fault, these officials suggest that enforcing the code in rural areas will be significantly more challenging and that additional education would have to accompany an energy code mandate.

Across the state, the makeup of building departments has not changed dramatically in light of the slow-down in the housing market; unlike other states in the U.S., the decline in South Dakota has not been as precipitous. Most code officials, according to inspection departments, have backgrounds in the construction industry—usually as contractors—and turnover is slight. According to one code official, “we’re mostly long term, and in our 50s.” Paralleling the patchwork of energy code adoptions statewide, knowledge of the energy code varies by jurisdiction, although officials report that in general they are much less familiar with energy provisions than traditional life-health-safety codes that govern structural, fire, and building systems such as plumbing and electrical. While all code officials are not certified, many have achieved certification through the International Code Council (ICC).

As in most states, local code inspectors traditionally are cross-certified or familiar with multiple areas of the code inspection process, allowing them to inspect multiple building systems and handle all facets of the in-field inspection process. The flexibility of code officials also extends to plan review and inspections, as many inspectors are trained to conduct plan reviews and inspections. The number of building inspections per site varies by product type, but ranges widely based on department preferences. Among code officials interviewed, single family residential properties are inspected—
depending on the city—as few as 4 times or as many as 12. Commercial properties usually are inspected on more occasions. Jurisdictions report that they are empowered to enact stop orders as a result of code problems, but rarely do so for energy code shortfalls. In the field, few departments rely on handhelds or electronic devices to consult plans, although some do.

Significantly, while code efforts in South Dakota are geographically distant, many code officials report that they have formed both formal and informal networks that assist their individual efforts. Formal ties are maintained by the South Dakota Building Officials Association, an affiliate of the South Dakota Municipal League which is also a chapter member of the International Code Council (ICC). This membership allows code officials access to ICC’s wealth of resources, education, and expertise. The Association organizes training events, convenes meetings, and represents the Code Officials’ perspective in meetings with the legislature and state government. The group’s website also posts a list of members, which is a resource to members of the group. In addition to the Association’s formal activities, its members and other code officials report that they routinely contact one another by phone and email to consult on building code challenges and to discuss specific compliance interpretations.

**Gap:** While communities have developed innovative methods for conducting code inspections, they sometimes lack the resources necessary to enforce the code.

**Recommendation #8:** 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.
Certification and/or Licensing

On the state level, there are no requirements for code official certification or licensing. Instead, licensing decisions are handled by local jurisdictions, which vary in the requirements required to work as a code official. According to Brad Solon, the President of the South Dakota Building Officials Association, requirements for code officials vary by jurisdiction. Rapid City illustrates a common approach among the state’s larger cities, as it requires trade experience as well as International Code Council (ICC) certification and CEUs for code inspectors in their area(s) of expertise.

Gap: The state does not require licensure or continuing education credits from code officials.

Recommendation #9: South Dakota could consider offering a certification program and CEU requirements for code officials including training on the energy code.
Training and CEUs

In addition to training opportunities offered through conventional providers, such as the ICC, the state Building Officials Association sponsors twice annual training events on topics as needed, including energy codes. Events are held in major cities on either side of the state—often in Sioux Falls and Rapid City, respectively, to minimize travel distances for officials. Often, financing for these events comes from the state. In addition, training events are sometimes held by product manufacturers but these events are irregular. Despite the availability of CEUs online, local code officials cite a need for additional training events, especially in person classroom training opportunities.

**Gap:** Training opportunities are often far away from code officials’ area of responsibility.

**Recommendation #10:** The state should consider sponsoring additional code training events in areas that are accessible to code professionals, which might be achieved in partnership with local and regional partners, such as the Midwest Energy Efficiency Alliance (MEEA)

Third Party Infrastructure

Third party code inspection is allowed in the state, and local governments encourage its use to meet challenges posed by the state’s low population density. 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. Dave St. Pierre, a third party inspector who works primarily in areas around Rapid City, SD (the state’s second largest metro area) illustrates the typical purview of a third party official, as he conducts plan reviews and code inspections for small jurisdictions. For third party inspectors across the state, fees are typically collected by towns, which in turn pay third party officials. All told, the state has three firms certified to conduct HERS ratings, and an additional three located in neighboring Iowa, Minnesota, and Nebraska which also work in South Dakota.28

**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 #11:** 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 in rural areas that in aggregate can support a third party code inspector that functions as a de-facto “circuit rider” inspector.

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

Architects and engineers may be among the most well-trained professionals with respect to the energy code in South Dakota. Architects and engineers, for their part, must pass state licensing standards (see following section). Architects, which generally must be members of the American Institute of Architects (AIA) in order to secure commissions, are required to pursue continuing education to maintain certification, but they are not required to take courses that explicitly cover the energy code. Nevertheless, the group (along with engineers) is well-regarded as knowledgeable on the subject of the energy code. Put succinctly by one code inspector, “architects know the code.”

Gap: Many building professional groups are not required to be certified or attend continuing education courses.

Recommendation #12a: Energy code enforcement could be improved by requiring many building professional groups to attend continuing education courses.

Recommendation #12b: Additionally, to achieve certification, the state could specify that a percentage of approved CEU activities be dedicated to the energy code.

Certification and Licensing

The state requires certification and licensing standards for many building professionals. Requirements are most stringent for architects, landscape architects, and engineers, who must be licensed by the state and complete continuing education requirements. To achieve certification, these groups must offer proof of employment under a certified professional, and are then allowed to take the licensing examination. All three groups are required to have a total of 8 years of education and experience and must receive 30 hours of continuing education units (CEUs) every two years to renew their license with the state. Unlike some other states, the South Dakota Board of Technical Professions does not pre-approve CEU providers. Instead, they honor credit hours approved by the National Council of Architectural Registration Boards (NCARB) the Council of Landscape Architectural Registration Board (CLARB) and the National Council of Examiners for Engineering & Surveying (NCEES). Of the 30 required credit hours, the board allows freedom for up to 10 Professional Development Hours (PDH) to occur outside of a traditional training or classroom setting. Eligible activities include: seminar presentations, conferences, writing papers, articles or books, participation in professional or technical societies, and securing a patent. At present, certified professionals are not required to receive training in specific areas, including the energy code.29

Some construction professionals, including plumbers and electricians, are also subject to state requirements. To apply for a license, plumbing contractors must show evidence of at least six years of
experience, with at least 1900 hours per year. Each must pass an exam. Electricians, likewise, must likewise hold a State of South Dakota Electrical Contractor’s License. Neither group is required to take continuing education courses.

Other construction and development professionals, including contractors, homebuilders, and developers, are subject to less strict regulation, as the state currently does not require certification or training. This gap is sometimes addressed on the local level, as in Sioux Falls, where HVAC installers and building contractors must pass additional, local certification requirements.

Training and CEUs

The state does not currently offer training courses, and gives design professionals the freedom to choose courses from many accredited bodies. A list of continuing education providers is posted on the website of the South Dakota Board of Technical Professions, which is the state body that regulates the certification and CEU process. Fortunately, the distance between design professionals and training events—which are held in the larger cities or out-of-state—is a less acute problem than for code officials, as designers are often headquartered in larger cities.

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

The state currently has not taken efforts to measure and evaluate compliance, but it has taken the important step of identifying the need to collect more data on baseline construction practices. In addition, the state’s Energy Codes Workgroup has recommended that the state collect information on baseline building practice and cost impacts of the latest codes. The report also highlights the need to collect builders’ energy efficiency disclosure statements in a central location. Aggregating data from these residential disclosure statements (and possibly doing the same with commercial properties) looms as a valuable source of information for the state. While compliance shortfalls will likely mean that all
data will not be entirely accurate, builders’ self-reported data on energy code compliance would nonetheless be a useful starting place in the state’s effort to measure code compliance.

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

**Recommendation #13a:** The state should verify energy code compliance by developing a comprehensive state effort to measure energy code compliance, beginning with data from energy efficiency disclosure statements.

**Recommendation #13b:** The state should review of the Department of Energy’s guidance on measuring energy code compliance.

**Implementation Summary**

South Dakota’s state and local governments have taken steps to encourage energy code implementation. Significantly, the state’s charter of the South Dakota Energy Codes Workgroup is a critical step to addressing energy codes in the state. The report, the result of a unique and important collaboration of stakeholders, lays out challenges, opportunities, and next steps that are appropriate for the state.

In addition to this effort, the state requires many professional trades to register with the state. However, many groups do not have to be certified at the state or local level, and most do not have to take continuing education courses apart from those required by professional associations. 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 #6:** 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:** There are unrealized opportunities for the state to work with regional groups and professional associations.

**Recommendation #7:** The state should work with stakeholders to increase consumer outreach efforts. The state’s recent Energy Codes Workgroup, which convened these stakeholders, represents an excellent beginning and opened an important dialog.

**Gap:** While communities have developed innovative methods for conducting code inspections, they sometimes lack the resources necessary to enforce the code.

**Recommendation #8:** 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.

**Gap:** The state does not require licensure or continuing education credits from code officials.
Recommendation #9: South Dakota could consider offering a certification program and CEU requirements for code officials including training on the energy code.

Gap: Training opportunities are often far away from code officials’ area of responsibility.

Recommendation #10: The state should consider sponsoring additional code training events in areas that are accessible to code professionals, which might be achieved in partnership with local and regional partners, such as the Midwest Energy Efficiency Alliance (MEEA).

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 #11: 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 in rural areas that in aggregate can support a third party code inspector that functions as a de-facto “circuit rider” inspector.

Gap: Many building professional groups are not required to be certified or attend continuing education courses.

Recommendation #12a: Energy code enforcement could be improved by requiring many building professional groups to attend continuing education courses.

Recommendation #12b: Additionally, to achieve certification, the state could specify that a percentage of approved CEU activities be dedicated to the energy code.

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

Recommendation #13a: The state should verify energy code compliance by developing a comprehensive state effort to measure energy code compliance.

Recommendation #13b: The state should review of the Department of Energy’s guidance on measuring energy code compliance.

Conclusion

Building energy codes are one of the easiest and most cost-effective ways for South Dakota to secure its energy future. Not only will they help consumers save money on their energy bills, code compliance will reduce the load on the energy 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 Dakota continue in the right direction toward greater energy efficiency.

Through additional steps 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 help provide the training and resources necessary to keep the building community up-to-speed on the current energy code and its requirements. State agencies can also influence local building departments to take an even more active role in energy code enforcement, and encourage the design and construction communities to build awareness and familiarity of the code and the benefits of energy efficiency. By intensifying the implementation of the model energy code, South Dakota will ensure that it reaps all of the benefits codes 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 Dakota 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 Dakota achieves 100% compliance to model energy codes now and in the future.
**Adoption**

**State Policy**
- BCAP recommends that the state adopt the 2009 IECC and ASHRAE Standard 90.1-2010 as the mandatory, statewide energy codes. Pg 15
- The state should consider prohibiting weakening amendments or encouraging local jurisdictions to do so. Pg 15-16
- The state could adopt a mandatory review and update cycle for future iterations of the minimum energy code. Pg 16
- The state should support additional above code work, especially by promoting energy star programs at the local level. Pg 19-20

**Local Policy**
- The state should develop state-level capacity for determining which jurisdictions lack sufficient infrastructure to perform inspections. Pg 22
- For areas in the state that lack code enforcement infrastructure, the state can provide third party contractors or state hired inspectors to augment or fully cover energy code plan review and inspection. Pg 22

**Implementation**

**Outreach**
- 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 26
- The state should work with stakeholders to increase consumer outreach efforts. Pg 27

**Enforcement Community**
- 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. Pg 29
- South Dakota could consider offering a certification program and CEU requirements for code officials including training on the energy code. Pg 30

**Training**
- The state should consider sponsoring additional code training events. Pg 31
- State officials could also offer formal guidance on the use of 3rd party code inspectors Pg 31

**Design/Construction Community**
- Energy code enforcement could be improved by requiring many building professional groups to attend continuing education courses. Pg 32
- Additionally, to achieve certification, the state could specify that a percentage of approved CEU activities be dedicated to the energy code. Pg 32

**Compliance Measurement & Verification**
- The state should verify energy code compliance by developing a comprehensive state effort to measure energy code compliance. Pg 34
- The state should review of the Department of Energy’s guidance on measuring energy code compliance. Pg 34
Acknowledgments

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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%.
17. http://www.census.gov/popest/states/NST-ann-est.html
18. http://www.dsireusa.org/incentives/index.cfm?re=1&ee=1&spv=0&st=0&srp=1&state=SD
29. http://www.state.sd.us/dol/boards/engineer/
30. http://www.state.sd.us/dol/boards/plumbing/licensing.htm#Top
32. http://www.state.sd.us/dol/boards/engineer/

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