Illinois Gap Analysis

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Prepared by the Building Codes Assistance Project 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.
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Acronyms and Abbreviations

ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BCAP – Building Codes Assistance Project
BITE – Building Industry Training and Education
BPI – Building Performance Institute
CDB – Capital Development Board
CECT – Illinois Clean Energy Community Trust
CEUs – Continuing education units
CFL – Compact Fluorescent Light Bulb
DCEO – Illinois Department of Commerce and Economic Opportunity
DOE – Department of Energy
ECAP – Energy Code Ambassadors Program
EEAHCP – Energy Efficient Affordable Housing Construction Program
EEBA – Energy & Environmental Building Alliance
EECBG – Energy Efficiency and Conservation Block Grants
EEPS – Energy Efficiency Portfolio Standard
EPA – U.S. Environmental Protection Agency
EPC – Energy Performance Contracting
HBAI – Home Builders Association of Illinois
HERS – Home Energy Rating System
IBC – International Building Code
ICC – International Code Council
IECC – International Energy Conservation Code
IECC – Illinois Energy Conservation Code (spelled out in report to avoid confusion with the previous IECC)
IGEN – Illinois Green Economy Network
IHPSES – Illinois Home Performance with Energy Star
IMEA – Illinois Municipal Electric Agency
IML – Illinois Municipal League
ISBE – Illinois State Board of Education
ISTC – Illinois Sustainable Technology Center
IRC – International Residential Code
LEED – Leadership in Energy and Environmental Design
LIHEAP – The Low Income Home Energy Assistance Program
JCAR – Joint Committee on Administrative Rules
MEC – Model Energy Code
MEEA – Midwest Energy Efficiency Alliance
MMC – Metropolitan Mayors Caucus
NAAB – National Architectural Accrediting Board
NAHB – National Association of Home Builders
**Executive Summary**

The purpose of the Illinois 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 include some of the state’s current best practices and recommendations for actions that would improve energy code compliance.

The Introduction section of the report provides an overview of Illinois’ important demographic and economic indicators, including important population centers, population growth, construction activity and energy consumption. This section also describes the potential energy and financial savings available to owners and occupants of both single family residential and commercial buildings through compliance with 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.

The Adoption section examines federal, state, and local policies that influence energy codes in the state. Illinois has long been a home-rule state, and the 1,313 local jurisdictions are accustomed to setting their own building and energy codes. As a result, those jurisdictions that had adopted a code prior to the statewide adoption of the IECC 2009 are adjusting relatively easily, while others have not yet put the process in place and are not enforcing the code. Overcoming cultural unfamiliarity with energy codes in many local jurisdictions remains a significant challenge.

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. 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. Best practices and recommended actions to meet the ARRA-mandated requirement that the state measure code compliance are included.

The stakeholder section of the report identifies stakeholders currently engaged in assisting energy code efforts, such as utilities, as well as potential organizations that can work to support energy code efforts in the future, but are as of yet untapped resources.

Finally, the report’s conclusion summarizes the benefits of energy code adoption in Illinois and actions that can be taken to achieve improved 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

Buildings are a major user of energy in the United States, consuming 72 percent of electricity and 40 percent of total energy use. Buildings are responsible for 40 percent of U.S. Co₂ emissions. Illinois spends $8.96 billion annually on imported coal and natural gas alone. Some of these funds, ostensibly lost from Illinois’ economy, can be reclaimed through energy efficiency measures and remain in the state economy by virtue of lower utility bills.

As one of the principal instruments in a state’s policy toolbox, energy codes reduce our demand for energy in buildings. Energy codes, when complied with benefit society in a number of important ways - they:

- Reduce emissions of greenhouse gas emissions and air and water pollution;
- Help expand a state’s economy by keeping local dollars in Illinois as consumers and businesses save money;
- Lessen peak energy demand, delaying the need for building expensive new power plants;
- Increase the reliability of our grid, as lowered demand reduces stress on an aging energy grid system; and
- Improve indoor air quality.

Recent improvements in the stringency of the model energy codes— and the development of the first green codes—continue to raise the bar for energy-efficient design and construction to levels that were almost unimaginable a few short years ago. Retail and office buildings constructed to meet the requirements of the IECC can be over 30 percent more energy efficient than typical buildings not constructed to meet national model energy standards.

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.

The more favorable environment for more stringent codes is part of a larger transformation in the way advocates, policymakers, industry and utility representatives, and the general public view energy efficiency. Today, energy codes are increasingly perceived as a viable and cost-effective component of a comprehensive solution to our current economic, environmental, and energy concerns. The cheapest and cleanest fuel source is the one we do not burn. Moreover, the average lifespan of a building is roughly 50 years, meaning that current building energy policies will affect energy consumption through 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. 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 potential to reduce energy use and save money, states and cities must design 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 Illinois, 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 this 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

Illinois is the fifth most populated state, and home to the third largest US city, Chicago. Illinois’ population grew modestly over the last two decades. From 1990 to 2000 the state population grew by 8.6 percent, less than the national average of 13.2 percent. Likewise, the population grew 3.95 percent from 2000 to 2009 to a total of 12,910,409. The state has over 5.2 million housing units.

Figure 1. State Population Map

Construction Overview
Like most states, new construction has slowed significantly as a result of the recent real estate crisis. In 2009, there were 10,859 building permits issued, and 8,236 new single family housing units built, a third less built than the number built in 2008 (12,308).

According to the Urban Land Institute’s Emerging Trends in Real Estate 2011, recovery in Illinois, especially the key Chicago market, will be slow, as most asset classes—with the exception of downtown Class A office properties—suffer from a combination of overbuilding, tepid demand, and high vacancy rates. Vacancy rates and expected space absorption rates in the Chicago market indicate that recovery in the building sector will be slow. Currently, the vacancy rates in industrial, retail, and office space remain at or above the national average for major U.S. market areas. For these three asset classes—industrial, retail, and office space—currently vacant space and pipeline construction projects will take five years to achieve stable occupancy if current trends continue. For Chicago and its suburbs, only the apartment market provides cause for optimism, as vacancy rates are only 6.67 percent, below the national weighted average of 7.63 percent for major market areas. With only 5,980 pipeline units expected to be delivered by the end of 2013, the expected years to balance for apartment stock is only two years — significantly lower than other market segments. The multifamily sector is also most favorably regarded by real estate investors among other investment opportunities – hinting it may be among the first sector of the building industry to rebound.

Figure 2: Illinois Residential Permits by Year

According to code officials surveyed, even before the housing bubble burst nationwide, Illinois had begun to experience a sharp decline in residential building permits per year after many years of extensive building, as well as a decrease in commercial development, particularly for larger, more
expensive projects. In 2009, local jurisdictions issued far fewer permits than in 2004 and 2005, including a 52 percent drop across the state from 2008-2009 alone (see Figure 3, below). This decline greatly reduced inspection departments’ workloads and budgets, and many have been forced to reduce staff while giving remaining staff additional workload and responsibilities. When understaffed and overworked, officials admit that energy code enforcement is often the first area local inspection departments deemphasize or disregard.

Figure 3: Construction Decline 2008-2009

While a stall in construction is not good for the economy, it provides a pause in building activity to consider measures to improve energy code enforcement. The reduced demand for new buildings and homes may result in greater interest by those remaining in the construction industry to learn about ways to differentiate themselves in order to gain a competitive edge, and these builders may likewise be more interested in learning new approaches that will allow them to market their homes/buildings as having lower energy bills and lower environmental impacts. The State of Illinois and its local jurisdictions can take advantage of Recovery Act stimulus funding currently available to implement the code and conduct trainings to educate such builders. This is an advantageous time to implement building codes, as slowed construction will help ease all stakeholders into the new code, rather than trying to force it into the market when construction rates are high.

Energy Portfolio

Illinois is one of the largest energy users among U.S. states, primarily due to its large population and high demand from the industrial sector, including aluminum, chemicals, metal casting, petroleum...
Illinois is also the 11th largest producer of energy in the nation. In 2008, it produced 2,027.09 trillion Btu and consumed 4,089 trillion Btu of energy, (it imported 2,062 trillion BTUs). The cost of residential electricity in Illinois is below the national average.

 Illinois’ Sources of Energy at-a-glance:

- **Petroleum:** Prior to 1970, Illinois was among the top oil-producing states, but today Illinois imports the majority of oil consumed in the state.
- **Natural Gas:** While 81 percent of Illinois households rely on natural gas for winter heating, the state has very little local natural gas production. However, the state stores vast amounts underground— it is second only to Michigan in underground natural gas storage capacity.
- **Coal:** About 45 percent of Illinois’ electricity comes from coal, and the cost for imported coal used by Illinois utilities is about $1.36 billion annually. The state’s estimated recoverable coal reserves rank third in the U.S. behind Montana and Wyoming. However, due to the high sulfur content of its coal compared with Western coal, Illinois is a net importer of coal (primarily from Wyoming). Illinois is one of the top electricity-generating and exporting states— coal and nuclear account for over 95 percent of the electricity generated with an even split between the two sources.
- **Nuclear:** Illinois is the top producer of nuclear electricity, producing about 12 percent of all nuclear power generated in the U.S. All fuel for nuclear electric generation is imported as there is no uranium mining or processing in the state. The cost of replacing the state’s aging nuclear generation fleet is enormous and would increase utility rates significantly.
- **Biofuels:** As a corn producing state, Illinois is in the top three states for production of ethanol.

Potential Savings from Energy Codes

Prior to the weakening of the housing market, recent building trends in residential construction have indicated a movement toward larger homes across the nation, including in Illinois. As a result of large home size and the state’s lack of a statewide residential energy code in effect until 2010, the incorporation of stringent energy codes will generate tremendous energy savings and reduce energy bills for families and businesses across Illinois whose homes are built or renovated in the next market cycle.

As Table 1 shows, 100 percent compliance with the 2009 IECC would yield Illinois businesses and homeowners an estimated $154 million annually by 2020 and $307 million annually by 2030 in energy costs (assuming 2006 prices). Additionally, implementing the latest model codes will help avoid about 38.4 trillion Btu of primary annual energy use by 2030 and annual emissions of more than 2.55 million metric tons of CO2 by 2030.

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1 Includes coal, natural gas, crude oil, nuclear power, biofuels, and other renewable energy sources.
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

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**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.

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.\textsuperscript{13}

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\textsuperscript{14} and an annual measurement of the rate of compliance.

As a stipulation for receiving SEP funds, Governor Quinn wrote a letter to DOE assuring that state officials would begin actions to achieve these goals. Based on the governor’s assurance and the State Energy Plan submitted by the Illinois Department of Commerce and Economic Opportunity (DCEO), DOE awarded $101.3 million of SEP funds to Illinois for state-level energy efficiency and renewable energy programs.\textsuperscript{15} The state will spend a portion of these funds on energy code compliance and enforcement efforts. DOE also approved the EECBG program plan and awarded $112.2 million to 63 communities to develop, promote, implement and manage local energy efficiency programs. In addition, the state received $12.4 million for Energy Star equipment/appliance rebates, and $242.5 million to weatherize nearly 27,000 low-income homes and for workforce training and education as part of the state’s efforts to develop a green workforce. Further, the U.S. Department of Labor provided more than $25 million in funding for green jobs.\textsuperscript{16}

State Policy

"The public policy of the State and the duty of each person is to provide and maintain a healthful environment for the benefit of this and future generations." -Illinois Constitution, Article XI

Illinois’s proactive policies have created a strong foundation of funding for improving energy efficiency in the state. In fact, the Center for American Progress and Energy Resource Management (September 2010) rated Illinois as ninth in a list of the “Top 10 states that deserve special attention for their high market potential for future energy efficiency development.”\textsuperscript{17} Illinois is poised to lead the nation in advancing energy efficiency if the multiple funded initiatives can be coordinated and sustained. The main policies and/or funding sources for energy initiatives include:
1. **The Energy Efficiency Trust Fund: $3 million annually.** Illinois’s 1997 electric-industry restructuring legislation created a public benefits fund (PBF)\(^2\) that provides $3 million annually to be used for renewable energy and residential energy efficiency. This fund supports the Illinois Energy Efficient Affordable Housing Construction Program as well as other initiatives.

2. **The Renewable Energy Resources Trust Fund (RERTF)** is funded by a surcharge on customers’ electric and gas bills, and is required for investor-owned utilities, but voluntary for municipal utilities and electric cooperatives. Half of the money collected supports the RERTF and half supports the Coal Technology Development Assistance Fund. The fund provides about $5.5 million for renewable energy and about $5.5 million for coal technology annually. Renewable spending typically funds small scale solar and wind installations. The charges incurred by household are 0.05 cents/month per meter and 0.35 cents per commercial meter. Industrial consumers are charged a still-higher amount.

3. **The Illinois Clean Energy Community Trust (CECT)** was established in 1999, following the state’s settlement with ComEd as part of its approval to merge with PECO Energy. The $225 million settlement resulted in the establishment of the Illinois Clean Energy Community Foundation, which gives grants to support renewable energy and energy efficiency and to preserve and enhance natural areas and wildlife habitats in Illinois.

4. **The Illinois’ Energy Efficiency Portfolio Standard (EEPS) and its Renewable Energy Portfolio Standard (RPS)** The Illinois Power Agency Act, (Public Act 95-0481) requires the Commonwealth Edison Company “ComEd” and Ameren Illinois utilities to reduce electric and gas usage and increase use of renewable energy. Funding for such programs is derived from ratepayers and creates a significant opportunity for Illinois to implement energy efficiency and renewable energy initiatives and programs – in 2011 it will invest about $235 million for electricity and gas efficiency programs.\(^3\) Funds are used in the ComEd and Ameren Illinois\(^4\) territories only. In year four (this coming year) funds derived from gas IOU EEPS will be added to this portfolio.

   Programs include:

   - Public Sector Initiatives: (1) Grants and rebates to increase the energy efficiency in new and existing public sector entities (local, state, federal government buildings, schools, …

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\(^2\) The PBF and trust fund were established as a result of Illinois’s 1997 electric-industry restructuring legislation. The fund is to be used to support renewable energy and residential energy efficiency.

\(^3\) Seventy-five percent of revenues collected for the EEPS program are administered by the participating utilities; the other 25 percent of the fund is administered by DCEO. Of the DCEO portion, about 65 percent of the funding will be used for public sector programs, 25 percent on low income programs, and 10 percent on market transformation programs. The utility portion of the funding is mainly used for incentive programs that show measurable energy savings – education and training programs do not provide measurable savings are therefore not conducted by the utilities.

\(^4\) ComEd provides electricity services to 3.8 million customers across Northern Illinois, or 70 percent of the state’s population. Ameren Illinois provides electricity to 2.4 million electric customers and 900,000 natural gas customers located primarily across ¾ of the state of Illinois.
community colleges and universities); (2) Lights for Learning Fundraiser program whereby student earn money for their school or organization by selling Compact Fluorescent Light bulbs (CFLs) and schools keep 50 percent of the proceeds; (3) Energy Efficient Affordable Housing Construction Program (EEAHCP) which provides grants for non-profit and for-profit developers for inclusion of higher than standard energy efficiency features in new affordable housing construction; (4) Residential Retrofit Program provides funding for electric efficiency measures in low income households.

- **Market Transformation:** (1) Smart Energy Design Assistance – technical assistance services if provided for businesses, state and local government facilities, public schools, community colleges, universities and colleges from engineers and energy professionals from the University of Illinois, School of Architecture; (2) Large-customer Energy Analysis Program to reduce the cost of doing business in the state through energy efficiency strategies; (3) Energy Performance Contracting (EPC) – technical assistance to public entities to assist in the EPC process.

- **Building Industry Training and Education (BITE) program:** (1) Education and training programs provide training to professionals from all aspects of the building industry; (2) Extensive training (at no charge) to building and enforcement professionals on the 2009 IECC to foster greater compliance and understanding of the current Illinois code; (3) Illinois Home Performance with Energy Star (IHPsES) educates contractors on retrofitting existing homes using building science approaches to build a better trained workforce of construction personnel statewide, and includes coordination for homeowners to receive rebates for investing in energy efficiency upgrades.

5. **Renewable Energy Resources Program (RERP)** is funded by a separate line item on customer energy bills which provides about $5 million annually for the development and use of renewable energy resources in the state and to produce new sources of income for farmers, new jobs, new investment and new property tax revenues for local governments. These funds are managed by DCEO.

6. **The State Energy Program** (federally funded) receives approximately $1.4 million annually.

7. **The Low Income Home Energy Assistance Program (LIHEAP)** (federally funded) receives approximately $226 million annually –85 percent of this goes to utility companies to offset unpaid energy bills by low-income customers. Up to 15 percent (weatherization received about $34 million in 2010) can be used for weatherization of low-income homes.

8. **The low-income weatherization program** (federally funded annually, but significantly boosted with ARRA stimulus funding) was $242.5 million in 2010.

- In addition to the annual federal weatherization funding, customers pay a surcharge on energy bills for low-income weatherization of 48 cents per month per meter for households (the charge is different for commercial and industrial customers). This raises about $80 million annually to supplemental Low-Income Energy Assistance Fund, of which 90 percent goes to utility assistance and 10 percent is used for supplemental weatherization needs.
Political Environment and Energy Code Adoption

Historically, Illinois has been a home-rule state, and the promulgation of a statewide residential energy code and changes to the commercial energy code proceeded solely through the state legislature. As a home-rule state, individual municipalities were accustomed to setting their own rules – and Illinois has more municipalities than any other state in the U.S. – 1,313.

Although local governments have their own rules for code enforcement, state-owned buildings are subject to statewide oversight. The agency responsible for state facilities—which number 8,000—is the Illinois Capital Development Board (CDB), which oversees the construction and renovation of new state facilities such as prisons, college and university classroom buildings, mental health hospitals and state parks. In addition to other construction duties, the CDB also works with the State Board of Education to administer grants for school construction and renovation via the School Construction Program.

Despite these programs, many barriers exist to stakeholder buy-in and implementation of the energy code. For one, the Illinois Municipal League and the Home Builders Association of Illinois were initially opposed to increased energy codes as they are perceived as an unfunded mandate that adds cost to cities and the building industry. The HBA supported the code following the additional provision that jurisdictions may not adopt residential codes more or less stringent than the state code (however, exemptions to go above the state residential code are made for municipalities that adopted at least the 2006 IECC before May 2009 or have more than 1,000,000 residents).

Now the primary challenge to the code lies in code compliance and enforcement, and the CDB and DCEO are working hard to determine the best approaches. State officials have worked to tap into resources and best practices in other states, but limitations on these efforts remain, as travel restrictions most recently kept DCEO staff from participating in the development of the model codes and standards.

**GAP #1: State officials lack consistent funding to participate at a national level in the development of model codes and standards.**


**Recent Energy Codes-related Legislation**
In August of 2009, the legislature passed the Energy Efficient Building Act (HB 3987), which directed the CDB to officially adopt and enforce the *Illinois Energy Conservation Code*\(^5\) (in August 2009 the 2009 IECC became effective for commercial buildings, and in January, 2010 the 2009 IECC became effective for residential). The Illinois Energy Conservation Code is a mandatory statewide energy code based on the 2009 IECC, ASHRAE 90.1-2007 and all new commercial and residential construction for which a building permit application is received by a municipality or county is required by law to follow the energy conservation code.\(^6\) The Law requires design and construction professionals to follow the latest published edition of the International Energy Conservation Code.

Municipalities and counties are required to enforce the code. The CDB is responsible for assuring that local jurisdictions enforce the energy code, however the law does not establish a funding or enforcement mechanism to support and check up on local jurisdictions with this requirement.

Current statewide energy codes include:

- **For residential buildings**: The 2009 IECC.
- **For privately funded commercial construction projects**: The 2009 IECC.
  - Local governments are allowed to adopt more stringent energy codes for commercial buildings but cannot employ codes that are less stringent.

An automatic update provision directs the CDB to adopt each new version of the IECC within nine months of its publication, with an effective date three months after adoption. Administrative rules for the law are developed by CDB and approved by the General Assembly's Joint Committee on Administrative Rules (JCAR). The 2012 IECC is expected to be published in January 2011, so the next Illinois code update is expected in late 2011.

As the state transitions from a home rule system of setting energy codes to a state mandate, local governments have responded in various ways. Many have adopted and are enforcing the codes. Others jurisdictions are still working to understand the changes and have not adopted nor actively enforce the model codes.

\(^5\) The 2009 IECC means the 2009 version of the International Energy Conservation Code (IECC), not to be confused with the Illinois Energy Conservation Code, which is spelled out when used in this report to avoid confusion.

\(^6\) According to the DCEO webpage *Illinois Energy Conservation Code For Commercial And Residential Buildings* at [http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/IECC.htm](http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/IECC.htm), local governments are free to adopt stricter energy conservation Laws for commercial buildings. For residential buildings, local governments may not adopt or regulate energy conservation standards either less or more stringent than the Illinois Energy Conservation Code. Exceptions which would allow local governments to regulate energy efficient standards in a more stringent manner are municipalities or counties which meet one of the following three provisions: (1) A unit of local government that on or before May 15, 2009 adopted or incorporated by reference energy efficient building standards for residential building that are equivalent to or more stringent than the 2006 International Energy Conservation Code; (2) A unit of local government that on or before May 15, 2009 provided to the Capital Development Board identification of an energy efficient building code or amendment that is equivalent to or more stringent than the 2006 International Energy Conservation Code; (3) A municipality with a population of 1,000,000 or more.
Some builders and other opponents contend that building to an updated energy code will cost too much money up front, especially in Illinois’ vast rural areas, and that the compliance with the new code is an “unfunded mandate,” especially relevant in the current economic and construction downturn. However, according to a recent study by the Building Codes Assistance Project, the average incremental cost of constructing a new home to meet the current energy efficiency building code - the IECC 2009 - is just $818.72. A homeowner will recoup those extra dollars in less than three and a half years, thanks to the annual energy savings of $243.37. Payback occurs far more quickly if the incremental costs are amortized within a mortgage.

Achieving code compliance is the responsibility of local jurisdictions, which are free to choose from multiple compliance pathways. Minimum compliance to residential buildings may be demonstrated by submission of one of the following: (1) a REScheck certificate; (2) Other comparable compliance materials that meet or exceed the REScheck tool; or (3) The seal of the architect/engineer as required by Section 14 of the Illinois Architecture Practice Act [225 ILCS 305], Section 12 of the Structural Engineering Licensing Act [225 ILCS 340] and Section 14 of the Illinois Professional Engineering Practice Act [225 ILCS 325].

**Other Illinois Building Codes**

State codes include: the Illinois Plumbing Code (for all buildings), managed by the Division of Building Codes and Regulations; an Accessibility Code (“Illinois Accessibility Code – ADAAG”) that applies as a mandatory minimum to all buildings except residential; a Fire/Life Safety Code, managed by the Office of the State Fire Marshal, Division of Fire Prevention, which applies to all buildings except one and two family dwellings and public schools; a Boiler code (ASME Boiler & Pressure Vessel Code 2006 edition), which is managed by the Division of Boiler and Pressure Vessel Safety, a department of the State Fire Marshall. The State Board of Public Schools is responsible for the fire codes for public schools. The fire and safety codes for one and two family dwellings are managed locally. School construction is regulated by the CDB, School Construction Program.

Local jurisdictions are responsible for adopting and enforcing local building codes. For new residential construction, in areas where a home is to be built in a jurisdiction that has not adopted a residential building code, the builder must choose and specify in the contract with the buyer which building code will be used, choosing a code that is in effect in at least one jurisdiction within a 100 mile radius. If no code is agreed upon, the International Residential Code shall apply by default.

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7 BCAP based these calculations on the national average new home price of $267,451 for a 2,400 square foot home and a 4.14 percent mortgage interest rate. State-specific labor and product costs were also used so the study would mirror actual construction pricing as closely as possible.

8 For those areas of the state where a home is to be built in a jurisdiction that has not adopted a residential building code, the builder must choose and specify in the contract with the buyer which building code will be used, choosing from a code that is in effect in at least one jurisdiction within a 100 mile radius. If no code is agreed upon, the International Residential Code shall apply by default.
Energy Codes for State-Funded Facilities

The state of Illinois is leading by example by having adopted a more stringent code for state-funded buildings. While the Illinois Energy Conservation Code requires public buildings to meet the ASHRAE 90.1 2007 standard, in July of 2009, Governor Quinn signed into law the Green Buildings Act (HB 1013), which requires new public buildings and major renovations to seek LEED\textsuperscript{9} or Green Globes\textsuperscript{10} certification, or the equivalent practical for that project. If a building is over 10,000 sq feet, it must additionally attain LEED Silver certification. If under 10,000 sq feet, an attempt must be made to meet LEED certification requirements, but certification is not required. LEED and Green Globes certification costs are funded by capital bond funds.\textsuperscript{20}

All state funded educational institutions within the state of Illinois are eligible for matching grants of up to $250,000 for energy efficiency projects that reduce energy consumption.

For school projects for which a district first applied for a construction grant between July 2007 and June 2009, the projects must receive LEED or Green Globes certification; or meet the standards set forth by the CDB Green Building Advisory Committee.\textsuperscript{21} After July 1, 2009, all construction grant projects must achieve LEED Silver certification from the USGBC.

By requiring a more stringent energy code for state-funded buildings, state officials point out that not only will tax dollars be better-spent, but in addition, these state requirements will familiarize and train the construction industry and code enforcement officials, and increase demand for “greener” products from product suppliers, manufacturers and service providers. More efficient public buildings also help governments hedge against uncertain future energy costs and availability, and reduce a government’s susceptibility to fuel price volatility while creating jobs and stimulating the local economy.

**GAP #2: While the energy code requires public buildings to achieve higher energy efficiency standards, state agencies don’t have the technical expertise or time to consider improving state-owned facilities.**

Statewide Climate Change Initiatives

According to the United States Global Change Research Program, the Midwest has experienced rising average temperatures with the largest warming seen in the winter months. The growing season has been extended by one week because of earlier last spring frosts and precipitation has become more frequent including increased instances of heavy downpours. Since the 1980s, large heat waves have

\textsuperscript{9} The U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED provides a roadmap for measuring and documenting success for every building type and phase of a building lifecycle.

\textsuperscript{10} Green Globes is an online building assessment and rating tool for architects, engineers and builders for both new structures and renovations of existing structures. It provides simplified guidance for green building design and certification in a flexible and affordable way. It can be used for small to large office buildings, multi-family structures, institutional buildings such as schools and libraries, and more.
become more frequent than any time in the last century. In addition, there has been a decrease in lake ice, including on the Great Lakes. These effects of climate change are predicted to continue, threatening the region’s economy, landscape, character, and quality of life.

Illinois has taken some steps to respond to this challenge. While Illinois does not have a formal statewide climate action plan, however the Illinois Climate Change Advisory Group was created by an executive order signed by Governor Blagojevich in 2006. The Group was charged with creating a long term strategy to address the effects of climate change. The recommendations were completed and included updating the energy code beyond international standards and increased incentives for energy efficient buildings. In addition, Illinois signed on to be a member of the Midwest Greenhouse Gas Reduction Accord which was signed by nine governors and two Canadian premiers in 2007 in recognition of the impacts that the Midwest has on climate change. Unfortunately, due to uncertainty at the federal level and the change in governorship, this initiative is on hold. Both the Illinois Climate Change Advisory Group and the Midwest Greenhouse Gas Reduction Accord groups are currently inactive. Governor Quinn has not yet created any specific climate change group.

**GAP #3:** The state does not have one over-riding climate change or energy policy that could help support energy codes as one piece of a larger statewide effort.

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

Few municipalities and cities in Illinois are fully utilizing green building practices and other above-code programs such as Building America, ENERGY STAR, LEED for Homes, or the NAHB’s green rating program.

**LEED**

There are some exceptions however - Chicago has more LEED certified buildings than any other city in the U.S. (there are 288 total LEED certified buildings in Illinois). Additionally, the U.S. Green Building Council (USGBC) Illinois Chapter has 1,600 members representing real estate professionals, architects, engineers, and designers, contractors, product manufactures, state and local government officials, homebuilders and homeowners.

**Why Green and Above-Code Programs Matter**

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

As of December 2010, there were 6,307 ENERGY STAR qualified homes built to date in Illinois, with only 407 built in 2010. This equates to a 5.1 percent market share for ENERGY STAR homes. Compared to other states, Illinois is in the lowest quartile for the number of ENERGY STAR labeled homes. The state has 181 ENERGY STAR Partner builders, including nine builders who have committed to only build ENERGY STAR homes.

**Building America**

Since 1994, the U.S. Department of Energy’s (DOE) Building America program has been raising the bar of energy efficiency and quality in new and existing homes by working with national laboratories and the residential building industry to improve the quality and performance of today’s homes while continually advancing the frontier for homes of the future – homes that will ultimately produce as much energy as they use. The program’s innovative construction approaches 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*. By designing a house as a system, various energy-related components work together to maximize efficiency at the lowest cost. Building America has worked with builders to utilize innovative technologies and strategies in more than 42,000 high quality, energy-efficient homes. Through Building America’s “Builders Challenge” program, new homes today that meet the Builders Challenge qualifications can earn an “Energy Smart Home Scale” label. These homes typically sell within weeks while other new homes sit on the market for months.

The Builders Challenge is similar to the ENERGY STAR for new homes program in that both programs assist and reward builders who build homes more efficient than typical new homes. However, the energy threshold requirements for the Builders Challenge program are different than the Energy Star for new homes program. Building America represents a tremendous untapped opportunity for Illinois, as it provides a chance to improve the housing stock and helps builders embrace high-performance building technology.

**GAP #4: Third party, above-code energy efficiency programs are underutilized in Illinois.**

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11 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. For every 1 point decrease in the HERS Index it corresponds to a 1 percent reduction in energy consumption compared to the HERS reference home. For example, a home that scores 85 is 15 percent more efficient than the HERS reference home, and a home that scores zero is a home that is a net zero user of energy (see www.resnet.us for more details). Homes that meet the Builders Challenge qualifications score 70 or less on the scale (or are 30 percent more efficient than a typical new home). Homes that meet ENERGY STAR qualifications score 85 or less on the scale (or are 15 percent more efficient than a typical new home). Both programs intend to increase the stringency of their requirements in the coming months.

12 To learn about the homes built to Building America standards in Illinois, go to http://apps1.eere.energy.gov/buildings/building_america/cfm/state.cfm/state=in/full=Indiana.
Local Policy

Because Illinois has long been a home-rule state, local jurisdictions are accustomed to setting their own building and energy codes. As a result, those jurisdictions that had adopted a code prior to the statewide adoption of the IECC 2009 are adjusting relatively easily, while those who are not familiar with enforcing an energy code have not yet put the process in place and are not enforcing the code. As a result, overcoming cultural unfamiliarity with energy codes in many local jurisdictions remains a significant challenge.

As of December 2010, of the 1,313 incorporated jurisdictions and municipalities in the state, only 298 have building codes. There are 102 counties in the state, and 30 have building codes. For example, Cook County has about 190 incorporated municipalities, and almost all have adopted a building code. In unincorporated areas, the county enforces code compliance. There are 72 counties in Illinois that lack both a building department and a building code.

Local Adoption Spotlight

The cities of Oak Park, Evanston, Carol Stream and Hoffman Estates have conducted significant studies to improve their adoption and implementation of the 2009 IECC. These communities are ahead of most others in Illinois in regards to the ease and desire to adopt the energy code.

Local Climate Change Initiatives, Leadership in Energy Efficiency, and “Green” Initiatives

Local governments that demonstrate leadership in energy efficiency or “green” initiatives are described below.

Chicago has been an early leader in encouraging energy efficient and green building construction, and as a result, the city of Chicago has more LEED certified buildings than any other city in the country. Chicago’s Climate Action Plan includes retrofitting 50 percent of commercial, industrial, and residential buildings to achieve a 30 percent reduction in energy used, including water efficiency measures. Chicago’s “Green Permit Program” is part of the city’s Climate Action Plan. To encourage green building construction, the program streamlines the permit process for buildings that meet specific guidelines. In addition, projects which meet the most stringent sustainability guidelines may also qualify for a partial waiver of code review fees, up to $25,000. In addition, Chicago offers its own Green Home certification program - a checklist-based rating system developed by the Chicago Department of Environment. The program offers training and education free of charge, and as of May 2010, about 250 Green Homes were enrolled in the program.

Although Chicago has been a historical leader, the city is not yet in compliance with the state mandated 2009 IECC, and is only enforcing to the 2006 IECC with Chicago amendments.

GAP #5: The city of Chicago and other jurisdictions are not yet in compliance with the 2009 IECC.

The City of Evanston has a Climate Action Plan that sets a community-wide goal to reduce greenhouse gas emissions 13 percent by the year 2012. Faced with declining revenues and budget shortfalls in 2008-
2009, the city asked the community to develop and enact a viable plan for reducing emissions. More than 200 actions were identified, including the city’s adoption of a “Green Building Ordinance” prior to statewide adoption.

**Aurora** is the second largest city in Illinois, located about 40 miles west of Chicago. Its *Sustainability Plan* includes six “focus areas”. One focus areas is “Energy Efficiency, Conservation and Management” and includes technical assistance and incentives to encourage residential and commercial property owners to invest in energy efficiency and “green” building practices. The plan also calls for the implementation of new standards to improve the energy efficiency of new and remodeled public buildings. The city has completed a study that will determine how much energy it uses and analyze the energy mix of energy used.

**Lake County** has a “green ordinance”, which includes mention of some energy efficiency technologies such as LED traffic signals, use of efficient lighting systems, and digitally controlled heating/cooling systems. Surprisingly, their webpage that lists all applicable building codes for the county does not include mention of the energy code.13

**The Village of Algonquin** is a community of 31,000 located 70 miles Northwest of Chicago. The Village has an “Environmental Action Plan” that includes a plan to conduct a “global warming emissions inventory”, with intention to create a plan to “reduce emissions while lowering energy costs for municipal operations”. The building department also requires REScheck certification to obtain a building permit for a single family home.

**The Village of Hoffman Estates** (population 53,000) is continually encouraging the building industry to utilize third-party verification programs, and even provides free training to the construction industry (statewide) to build buildings at a higher level than code.

**The Village of Schaumburg** (population 72,000) has a “Comprehensive Green Action Plan” which includes making energy efficiency a priority through building code improvements, retrofitting municipal facilities with energy efficient lighting and encouraging employees to conserve energy. It also strives to practice and promote sustainable building practices using LEED or similar standards.

**McHenry County** has a strong focus on water conservation, and other municipalities are considering adopting their approaches in their own communities.

**Adoption Summary: Current Best Practices and Recommendations**

Illinois has demonstrated a commitment to improving the energy efficiency of its housing stock by having adopted the 2009 IECC. It is ahead of its neighbors in Indiana and Missouri in this regard. Iowa

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13 According to the Lake County Building Codes webpage, www.lakecountyil.gov/Planning/Building/BuildingCodes.htm
has had a statewide code for the past two codes cycles and is a leader nationwide, while Wisconsin has had a state code for the past 20 years and has developed a strong enforcement infrastructure.

Current Best Practices

Illinois has a number of best practices for adoption that other states can replicate:

- The requirement that the CDB adopt each new IECC within nine months of its release provides assurance to the construction industry and code personnel that energy codes are important to the state and are here to stay.
- The establishment of an 11-member Illinois Energy Code Advisory Council gives stakeholders from different building sectors (construction, building departments, and designers) the opportunity to participate and provide critical insight to the CDB prior to the adoption of a new code.
- The state is leading by example by setting a higher requirement for state-funded buildings to meet LEED certification. Leading by example in new or renovated buildings familiarizes and trains the construction industry and code enforcement officials and stimulates local economies by increasing the demand for energy efficiency products from product suppliers, manufacturers and service providers. It also demonstrates responsible government stewardship of tax dollars by reducing energy bills for the lifetime of a building.

Recommendations

GAP #1: State officials lack consistent funding to participate at a national level in the development of model codes and standards.
Recommendation: Illinois should engage in the development of the national model codes and standards and leverage the shared expertise and resources available in national code forums, via:

- Participation in IECC/IRC/IBC code development, sharing knowledge and experiences through ICC online forums.
- Participation in ASHRAE Standard 90.1 development, sharing knowledge and experiences through the ASHRAE membership.
- Sending at least one representative to the DOE codes conference.
- Utilizing www.Bcap-ocean.org website resources.
- Participating in OCEAN communities online.

GAP #2: While the energy code requires public buildings to achieve higher energy efficiency standards, state agencies don’t have the technical expertise or time to consider improving state-owned facilities.

Recommendation: Enhance the existing “Retro-commissioning” and “Municipal Energy Efficiency Aggregation” programs for public agencies to encourage and facilitate their use of ESCOs. Services could include offering pre-approved contractors, ready-made contracts (pre-negotiated with contractors as a
condition of being a pre-approved contractor); advise and assist in the review of audits; assist in paperwork; and more. The additional staff cost for this program can be recovered in the total cost to the agency—a successful model for this is the state of Kansas.\textsuperscript{14}

**GAP #3: The state does not have one over-riding climate change or energy policy that could help support energy codes as one piece of a larger statewide effort.**

**Recommendation:** Illinois should consider adopting a Climate Change Plan or Energy Plan to:

- Raise awareness statewide of the importance of energy efficiency and the benefits it can bring to Illinois.
- Link energy codes as one policy that can support related policies (e.g., energy efficiency can help make the RPS goals easier to achieve; energy efficiency can help reduce emissions in EPA non-attainment areas).

**GAP #4: Third party, above-code energy efficiency programs are underutilized in Illinois.**

**Recommendation:** For residential buildings, allow local jurisdictions to adopt stretch codes\textsuperscript{15} or codes higher than the IECC 2009 and utilize third-party certification programs such as Energy Star, LEED for homes, or Building America (EnergySmart).

**GAP #5: The city of Chicago and other jurisdictions are not yet in compliance with the 2009 IECC.**

**Recommendation:** Assist and support Chicago and other jurisdictions as they transition to code compliance and enforcement of the 2009 IECC or greater.

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\textsuperscript{14} For example, the state of Kansas has improved the energy efficiency of more than 70 percent of its public buildings and is saving more than $13 million annually on energy bills. See the Compendium of Best Practices report, page 72 available at - http://www.reeep.org/16672/compendium-of-best-practices.htm

\textsuperscript{15} For example, in the state of Massachusetts, stretch code provisions for new residential construction are specified as: “New residential buildings 3 stories or less will be required to meet an energy performance standard using the Home Energy Rating System\textsuperscript{2} (HERS). The HERS index scores a home on a scale where 0 is a zero-net-energy home, and 100 is a code compliant new home (currently based on the IECC 2006 code). The MA stretch code requires a HERS index of 65 or less for new homes of 3,000 square feet or above, and 70 or less for new homes below 3,000 square feet (this includes multi-family units in buildings of 3 stories or less). A HERS index of 65 means that the home is estimated to use 65 percent as much energy as the same home built to the 2006 energy code, or a 35 percent annual energy savings. For residential home renovations: Home additions and renovations have two options to meet the stretch code: (i) The same “performance” approach as new construction but requiring a HERS of 80 or less for significant changes to homes over 2,000 square feet, or 85 or less for homes below 2,000 square feet. (ii) A “prescriptive” approach, where specific efficiency measures are required rather than a HERS index number. This utilizes the Energy Star for Homes program prescriptive requirements, and insulation at least equal to IECC 2009.
Implementation

While energy code adoption is the necessary first step in the energy codes process, it obviously 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

Now that the state of Illinois has enacted a system for adopting and regularly updating the energy codes, the state’s focus is on compliance. To accomplish 100 percent compliance, the state needs to determine both the current overall level of compliance, and the specific areas of strength and weaknesses in construction to help tailor training and support activities. The ability to target training would maximize resources in those areas that need the most help. As well, partnering with code associations in the state, as well as home builder associations, and other groups (see recommendations sections of this report) would help to make strides in statewide compliance.

**GAP #6: The state does not have information of the level of compliance with the IECC 2009.**

To improve compliance, the state needs to understand and address issues with the enforcement process. Given the chronic shortage of resources devoted to code enforcement, helping code officials’ maximize their ability to properly enforce the code should be a priority.

**GAP #7: The state does not have an agency with the capacity to perform plan review and inspection, nor a mechanism to hire third party inspectors to perform such.**

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

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16 The state does not have an infrastructure of inspectors or plan reviewers for public or private construction, nor requirements governing third party energy code inspectors and plan reviewers. For state funded facilities, the state relies on the architect it hires to assure that it is built to state standards.
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

DCEO’s comprehensive three-year plan focuses on the public sector, low income, and market transformation. Some areas identified in the plan can directly influence greater energy code adoption, specifically:

- **Public sector**: About half of DCEO’s budget will be spent on the public sector. The state offers many grant programs to offset the cost of energy efficiency in public buildings. This funding can be used to offset the incremental cost of meeting LEED standards as required by the code.

- **Market transformation**: Within the market transformation portion of the plan, the “Building Energy Code Compliance Program” offers training on residential and commercial building codes to improve code compliance. It includes funding for an initial analysis to establish a baseline for current building code compliance, from which future compliance can be measured beginning in 2012.
  - DCEO funded the ICC to conduct multiple energy code training seminars statewide – in 2011, 47 trainings will be offered across the state. Hard copies of the energy code are provided to participants. DCEO also funds the ICC to provide “on call” support to building departments and the construction industry statewide. This has worked well, and the main ICC contact, Darren Meyers, was mentioned by name in several interviews with building commissioners as having provided strong support for local efforts.
  - In addition, the Building Industry Training and Education (BITE) program will train various professionals from all sectors of the building industry in energy efficiency approaches that will eventually meet the EEPS goals in later years. This training is a huge opportunity for builders in the state of Illinois to become world-class leaders in energy efficient new buildings and retrofits.
  - The state worked with the Midwest Energy Efficiency Alliance (MEEA) and the Retail Merchants Association to offer an appliance rebate program, which was very successful and will be replicated in the future.

Local Government’s Role in Promoting Codes

The extent to which local jurisdictions engage in outreach activities varies widely across the state. Often, the presence of a dedicated local official, typically within the building department or city council, can be the difference in achieving effective energy code enforcement or falling short of this goal.

According to interviews conducted for this report, some counties and cities adopt an energy code because they believe in the value of energy efficiency; some adopt because it is the law; and others

17 Building departments in eleven jurisdictions were interviewed for this report, as well as 30 other stakeholders involved in codes in Illinois.
adopt the code because it gives them the competitive advantage of marketing themselves as a “greener community.” In conversations with code officials across the state, all three attitudes are prevalent.

Promotion of codes varies widely between jurisdictions. Most jurisdictions either do not promote the code, or simply inform architects (or other construction professionals) of the code when they seek a building permit. Others go the extra mile by conducting training and education activities for design and construction professionals. For example, the Village of Hoffman Estates conducts outreach activities because it has publically committed to achieving compliance with the energy codes. The Village conducted an hour-long “Breakfast with Builders” last spring, and in February 2011 will host an all-day program explaining the energy code, a tutorial on how to use REScheck and COMcheck compliance software, as well as an outline of the fundamentals of conducting an inspection. The program is free to construction and code professionals statewide.

**Stakeholders’ Role in Promoting Codes**

There are many stakeholders outside and within the state of Illinois, working independently on initiatives that directly (or indirectly) influence code compliance and enforcement. Some key groups include:

1. **BCAP** has worked with organizations in the state for a number of years, such as MEEA, the Metropolitan Mayors Caucus, the Illinois Clean Energy Community Foundation, and others. BCAP staff have taken part in projects such as the Code College Network, trainings and workshops, and previous implementation and advocacy work. The state is currently participating in BCAP and the ICC’s Code Ambassadors Program.

2. **The International Code Council (ICC)** provides education and certification for construction-related professionals. Code officials, building inspectors, design professionals and others are certified and maintain certification through continuing education credits as required by the ICC. With funding from DCEO, ICC conducts training courses, and is available to the code community statewide to support energy code compliance. DCEO has chosen to work solely with ICC for training in order to maintain one consistent message regarding the code statewide.

3. **Midwest Energy Efficiency Alliance (MEEA)** is a not-for-profit organization that bridges the gap between policy adoption and program implementation by promoting market penetration of energy efficient technologies, processes and best practices within a 13-state region. In the past ten years, MEEA has provided nearly 16,000 days of training for more than 2,300 contractors. It works with all stakeholders related to energy efficiency from manufacturers, state and local governments, utilities, and academic institutions.

4. **Illinois Clean Energy Community Foundation** provides grants to support renewable energy and energy efficiency and to preserve and enhance natural areas and wildlife habitats in Illinois. Since it began making grants in 2001, the foundation has awarded more than $160 million, and over 60 percent has gone toward energy efficiency projects. For example, $2.8 billion has been awarded for “green” building design, including 32 LEED-certified buildings. Other grants have
have been to the ICC, or geographic clusters of municipalities for training or reports that support energy code compliance indirectly.

5. **Northwest Building Officials and Code Administrators (NWBOCA).** This group has about 210 members comprised of department heads and building officials and hosts monthly program meetings and a three-day “Fall School” in November each year. It could be a conduit for heightening awareness and support for energy codes.

6. **Metropolitan Mayors Caucus (MMC)** is comprised of 272 mayors. In 2009 MMC conducted a study of energy code use in ten municipalities. A second phase of the study is ongoing now.

7. **Illinois energy utilities:** Commonwealth Edison (“ComEd”) is the largest regulated electricity provider in Illinois, serving 3.8 million customers in Northern Illinois, or 70 percent of the state’s population. Ameren Illinois is the second largest regulated utility in the state, providing electricity to 2.4 million customers and 900,000 natural gas customers in central and southern Illinois. It is headquartered in Peoria, Illinois. While both ComEd and Ameren Illinois are subject to the state EEPS, and are responsible for determining how 75 percent of the funds collected are spent, both state that they only invest in measurable energy efficiency projects, and energy code training and related education activities do not contribute those measurable savings. They “leave that to DCEO to manage”, since DCEO is responsible for the remaining 25 percent of the EEPS budget.

The Illinois Municipal Electric Agency (IMEA) provides wholesale electricity to its 33 electric system customers in 14 counties across the state. It also provides engineering assistance, communications, lobbying, and other programs. Although IMEA members are not mandated to invest in energy efficiency, for FY 2011-2013, IMEA will invest $2.5 million in city agencies that will replicate the ComEd and Ameren incentive programs, working with guidance from DCEO. Generally speaking, the business culture of the municipalities represented by IMEA has a culture of avoiding state involvement of their business. They represent smaller towns with very little new construction. IMEA is a member of the University of Illinois Extension Service.

**Other stakeholders that could be further engaged:**

8. **The University of Illinois Extension Service** is the outreach arm of the University and offers educational programs to residents in all 102 counties. The Extension Service draws from several University areas to help spread knowledge throughout the state. Among its other efforts, the state may consider exploring a partnership with the Illinois Sustainable Technology Center (ISTC) - a team of engineers and scientists that help businesses and citizens implement sustainable solutions to environmental challenges. It provides services to 150-200 businesses annually regarding related topics, including energy efficiency. ISTC’s mission is to increase the State’s economic viability by conserving natural resources, improving energy use efficiency, and reducing wastefulness. The Extension Service may be a good conduit for a public education campaign to raise demand for more efficient homes.
9. **Energy Education Council** is a non-profit organization that has historically focused on electricity safety with a secondary focus of energy efficiency. Centrally located in Springfield, Illinois, it has an Energy Efficiency Task Force with representatives from investor owned utilities, electric cooperatives, municipalities, MEEA, DCEO, the Illinois Commerce Commission, Ameren, ComEd and others. They have sponsored “Energy Solutions” workshops to inform businesses about options and incentive programs. They work closely with the state extension service and are interested in partnering with the state to offer additional programs.

10. The **Illinois Association of Code Enforcement** has about 180 members that represent 70 communities in the state. While this group focuses more on property maintenance, some members are involved in code enforcement and their quarterly meetings could be one venue for heightening awareness and support for energy codes.

11. The **Illinois Home Builders Associations** has about 2,000 members, many of whom are builders, designers, lenders, attorneys. They provide continuing education credits for members and are interested in partnering to provide energy code training courses to members.

12. **Universities** throughout the state receive federal funding for educating the next generation of workers in related fields that could support energy codes. Illinois has 48 community colleges. More than 9 out of 10 community college graduates remain in the state upon graduation, contributing to the state’s economy.³³

13. The **Illinois Municipal League (IML)** has more than 1,000 members.³⁴ IML understands the value of energy codes, and may be a potential partner in the case of promoting voluntary programs or grants that may become available to assist municipalities who want to enforce the energy code.

14. **Illinois Green Economy Network (IGEN)** is an initiative begun by college Presidents working to accelerate the market competitiveness of Illinois’s emerging green economy. IGEN has engaged all 48 community colleges and works with businesses, government and the community.

**Enforcement Community**

The enforcement community is the backbone of 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 continually updated over the years, it is incumbent on states and cities to provide the enforcement community with access to sufficient energy code training.

**Overview of Enforcement Infrastructure**

As a former home rule state in regards to energy codes, the state largely allows local jurisdiction to determine its own methods for enforcement.

In regards to state-funded buildings, there is no state department or agency that conducts visual inspections of construction projects. Rather, the architect hired for each project is also responsible for enforcing the state codes, and delivering a copy of relevant documents (such as LEED certification) to
the state. The majority of new state construction happens at educational institutions as there few other state buildings currently under construction.

City and town inspection departments are responsible for energy code enforcement within their jurisdictions, while county inspection departments cover enforcement within unincorporated areas. Typically, city and county inspection departments stay within their jurisdictions and generally do not work together nor share resources. However, due to the recent economic downturn, a number of communities have combined city and county enforcement into one regional building department, and/or some have hired a subcontractor to conduct all code-related work. For example, TPI Building Code Consultants is a private company that conducts plan reviews and inspections as needed for 30 communities in DuPage County.

**GAP #8:** While the Energy Conservation Act mandates that local jurisdictions enforce energy codes, the law does not establish an institutional framework, nor funding or enforcement mechanism to support and monitor local jurisdictions.

Typically, the cities and towns enforce the energy code (very rarely counties). For those cities in Illinois that have a building department, building inspection follows a standard procedure: building professionals submit their plans to plans examiners, who return them with comments. Architects then re-submit plans with corrections, and plans examiners issue building permits once they are adequate. Code officials then conduct multiple on-site inspections at different stages in the building process (foundation, frame, electrical, plumbing, final), issuing inspection write-ups or stop-work orders for violations as needed (very rarely for energy related issues, however). After code officials have verified that construction correctly adheres to the building plans, they issue the appropriate final documentation, depending on the type of building and project. Many jurisdictions do not require the use of REScheck and COMcheck.

According to our research, building departments typically incorporate energy code enforcement into the established inspection process outlined above. In larger metro areas, energy code enforcement is generally stronger than in smaller rural communities, where it is often absent altogether. The consensus among code officials we interviewed in the state is that enforcement practices vary greatly among jurisdictions and the majority of building departments – both urban and rural – do not yet enforce the code sufficiently to achieve 100 percent compliance. According to building officials interviewed for this report, the number of visual inspections for any new structure varies widely between jurisdictions, ranging from a total of three to twenty-six inspections. Those areas with fewer inspections do not conduct insulation or other energy inspections.

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18 REScheck is a software tool developed by the U.S. Department of Energy to simplify and clarify code compliance with the 2009 IECC energy code. COMcheck is the correlating commercial code compliance tool. Both are required by the DOE for those state receiving stimulus funding for advancing energy code efforts.
GAP #9: The state does not have the specific information to understand how to best support local building departments.

A lack of resources for energy code enforcement. Local inspection departments collect building permit fees, but these fees do not entirely offset the cost of code enforcement. The majority of local building departments are understaffed and overworked, and for some the burden of supporting the energy code is not feasible. Many others understand the crucial role energy codes play in improving the life, health, and safety of buildings and occupants, but lack the resources and time required to give the energy code equal status and attention. These issues also apply to members of the building industry, who often lack the training and financial incentives that would motivate them to build to code.

GAP #10: Local building departments do not have access to assistance for plan review in complex buildings or other specific building types.

GAP #11: Building departments in many areas of the state lack the resources to enforce codes. While the state provides free training and education to local jurisdictions, it does not provide any staff or funding to conduct additional inspections or the cost of technology that could assist in code enforcement (such as handheld devices for example).

GAP #12: The state does not provide any ready-made marketing and compliance materials to local jurisdictions – all materials are locally produced.

GAP #13: According to the jurisdictions interviewed for this report, local jurisdictions do not issue a “stop order” after an inspection or plan review reveals an energy code violation.

The energy code is often viewed as a secondary concern compared to the more traditional life, health, and safety codes by policymakers and code officials. In addition, a major concern is encouraging growth in their cities, and therefore when pressured by designers, builders, or new businesses moving into their city, officials may concede energy code enforcement in order to not lose new developments or industry.

Trained to enforce traditional life, health, and safety codes, many are unfamiliar with energy issues and view them as secondary concerns. Building officials who do not value the code as integral to occupant life, health and safety are less likely to integrate the code into their established routines, particularly if their superiors take a similar view. Support—in the form of funding—for proper energy code enforcement ultimately comes from city council members, town administrators, and other local decision makers, many of whom see the energy code as a “green” initiative, adopted for political reasons, but without the conviction to support its implementation.

Certification and/or Licensing
Local building departments determine their own certification requirements for code inspectors, the process for enforcement of codes, the schedules of permit fees\textsuperscript{19}, and other details. However, most local jurisdictions require that their code inspectors and officials maintain current certification through the ICC. The state does not set requirements for certification and licensing of code personnel.

Training and CEUs

The state does not set a standard for maintaining certification through Continuing Education Units (CEUs) for building department personnel. However, inspection departments that require ICC certification also require code officials to receive the minimum number of ICC-mandated CEUs to maintain certification, though this is for all codes and does not necessarily mean that code officials have received energy efficiency training. As with other implementation issues, some departments are more proactive in encouraging code officials to earn as many certifications and CEUs as possible.

**GAP #14:** There is no requirement for Energy code training, certification, or CEU’s for any construction trades professionals.

**GAP #15:** Building departments don’t have expertise in energy, nor are they required to obtain expertise. The state does not have a certification program for energy codes for builders or code officials.

**GAP #16:** Builders are not required to be licensed in IL as residential homes are exempt from requirements of licensure under the Architectural Act\textsuperscript{20}. The state of Illinois does not require contractors to be licensed or certified in any way.

Third Party Infrastructure

As each jurisdiction is unique and sets its own requirements, some utilize third-party inspectors and some do not. This is especially true in areas of the state where construction activity is low, and building departments in multiple jurisdictions are merging staff to reduce expenses. In these situations, municipalities or counties may hire a subcontractor to perform plan reviews and inspections as needed. For example, DuPage County has contracted a private company (TPI Building Code Consultants) to perform plan reviews and visual inspections. TPI Building Code Consultants serves 30 communities in DuPage County.

Design/Construction Community

\textsuperscript{19} Typically, the cost for energy code enforcement is rolled into the regular permit fee, which is based on the cost of the project. For failed inspections, many jurisdictions charge a small fee for re-inspection, of about $50. Others do not a re-inspection fee.

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 should 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 should 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.

With the decline in the new construction market, membership in some trade association chapters have also declined, and some have had to reduce staff and services to constituents. Even in times of economic prosperity, some building professionals are wary of—or opposed to—energy codes. But when building professionals are focused on keeping their businesses afloat by cutting costs wherever possible, energy code training and compliance are often the first casualties.

**Overview of Design/Construction Community Infrastructure**

According to our research, most design and construction professionals respond to the stringency placed on codes by the local inspection departments. In jurisdictions where compliance is expected, they seek out training for their staff and work with plans examiners and building inspectors to follow the letter and intent of energy code provisions. In jurisdictions that do not place as high of a priority on energy codes, building professionals follow their lead and comply with the code only to the extent necessary, if at all. As would be expected, we found compliance with code provisions is stronger among building professionals in urban areas than rural ones.

In general, some building professionals adhere to or exceed energy code requirements for any number of reasons: desire to produce quality structures, financial incentives, environmental or indoor air quality concerns, or simply because they are the law in a given jurisdiction. Others disregard energy codes as unnecessary and/or costly regulations regardless of local or state pressure, encouragement, or incentives. Many in the middle would be more receptive to energy code compliance, but lack training on the codes or do not understand how they are integral to building and occupant life, health, and safety. Overall, however, authorities on both sides of the issue cite a strong causation between strict, consistent enforcement practices and improved compliance, as well as a willingness among most building professionals to work with code officials on energy code issues as needed.

**The most common gaps in the design/construction infrastructure are:**

**Poorly submitted plans by the design professionals.** As one official said, he is “disappointed that designers aren’t aware, concerned or supportive of energy initiatives. This puts the plan reviewers in the position of first line of defense, and the responsibility of educating designers (architects and engineers), builders, and ultimately the buyers, falls on the plan reviewer.” Plan reviewers feel that designers should be aware of the codes prior to submitting plans. Plan reviewers must battle with some design firms who “pride themselves in knowing the loopholes in the codes and how to argue their way around codes to get what they want.” Customers assume that new buildings are energy efficient and are more focused
on design aspects of buildings. In an effort to keep their customers happy, these designers interpret the code tradeoffs or exceptions to suit their needs, disregarding the intent of the tradeoffs and exceptions. For example, one building commissioner explained that design firms will “complete a COMcheck form to show that it complies, but then install many more high-wattage lights and claim the exception for retail lighting, even though the exception in the code applies only to jewelry lighting.” Once built, it is difficult to require a store to go back and make changes to comply as code inspectors and plan reviewers must also face the issue of being known as “tough to work with” or not business-friendly.

GAP #17: Once built its difficult to force contractors to go back and make changes to comply and code officials must establish and maintain good working relationships with contractors.

GAP #18: There is a lack of political support at the local government level to “champion” energy codes.

GAP #19: There is a lack of demand from consumers for energy codes.

The National Architectural Accrediting Board (NAAB) is the only agency authorized to accredit U.S. professional architecture degree programs, and most state registration boards in the US require those who apply for licensure to have graduated from a NAAB-accredited program. Thus, the NAAB is the agency determining what constitutes an appropriate education for an architect. According to an Assistant Director at the School of Architecture at the University of Illinois, energy codes are not covered in depth (if at all) in courses, and “it’s expected that students will learn the code when they’re working, not as part of the University curriculum.” She added that “Architects would say that it’s the engineer’s job to consider energy” [in design plans].

GAP #20: Architects, although ideally positioned to include energy in the design plans of a building, are not well-educated in energy codes and how to include energy efficiency in the design of buildings.

Poorly educated construction personnel. Even when energy code-compliant plans are submitted, the work being done “in the field” often does not match the plans. This is often due to a non-English speaking workforce, who cannot read and understand the plans. Buyers that are inclined to take the least cost bid for work often hire these hard-working but uneducated construction personnel. As one regulatory manager said “There are a lot of good contractors out there, and then there are many who are almost criminal – they don’t want to learn anything new.” As one building commissioner said “Anyone can hang up a shingle and call themselves a builder in this state.” As another stakeholder said “They’re [builders] a powerful lobby group and they don’t want to be licensed.”

GAP #21: Most construction personnel are poorly educated on the latest approaches to building more efficient homes.

Certification and Licensing

The Illinois Department of Financial and Professional Regulation oversees the licensing and regulation of about 200 different professions, including many in construction-related professions such as plumbers, electricians, engineers, real estate brokers, leasing agents, real estate firms, real estate appraisers,
home inspectors, real estate schools, instructors, courses and architects. Builders are not required to be licensed.

**Training and CEUs**

Licensed professionals are required to take Continuing Education Units (CEUs) to maintain their license.

Architects are required to have either a Bachelor or Master of Architecture degree from a program accredited by the National Architectural Accrediting Board (NAAB) or similar. The Illinois Department of Financial and Professional Regulation require architects to obtain 24 hours of continuing education every two years to maintain their license. Sixteen of those hours must address health, safety, and welfare – and energy efficiency is considered acceptable within that description.

The state requires professional engineers to complete 30 Professional Development Hours (PDHs) of training to renew a license. The Illinois Chapter of ASHRAE offers educational programs to help engineers fulfill this requirement.

In recent years, there have been numerous opportunities across Illinois for construction industry and code enforcement personnel to receive energy code training and fulfill CEU requirements. Training is provided by the International Code Council with funding from the DCEO. In 2011, 47 trainings will be offered statewide. Hard copies of the energy code are provided to participants.

There are numerous construction-related associations, companies, and other stakeholders that offer courses to fulfill these requirements. The main professional associations that offer courses are:

The **Home Builders Association of Illinois (HBAI)** is the state chapter of the National Association of Homebuilders (NAHB). HBAI represents the interests of contractors, developers, and other industry professionals on the state level. While the state HBAI does not offer CEU courses, the NAHB and local chapters do.

The **American Institute of Architects**, and its six regional chapters (Central, Chicago, Eastern, Northeast, Northern, and Southern) represent the interests of architects and other design professionals around the state. AIA Illinois and the regional chapters sponsor training workshops on building codes and building science issues, including energy, as well as other events for members and outreach to the public.

The **Illinois Chapter of the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE)** is the largest Chapter in ASHRAE, with over 1,200 members. ASHRAE gives student scholarships, and also participates in the Solar Decathlon competition where students build a small-scale solar home.

**Compliance Measurement and Verification**

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21 For example, there are 142 providers listed on the AIA website that conduct CEU courses for Architects.
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 has already begun efforts to determine current energy code compliance. In 2009 the Metro Mayors Caucus (MMC) analyzed the permitting process in ten suburban municipalities near Chicago and made specific recommendations for improved energy code compliance. The MMC is continuing with this project in additional municipalities in the state.

In addition, the DCEO has funded an initial analysis to establish a baseline for current building code compliance, from which future compliance can be measured beginning in 2012. 22

Further, DCEO is supporting ICC and BCAP’s Energy Codes Ambassador’s Project (ECAP) pilot program, aimed at improving energy code implementation, enforcement and compliance. Seven energy code “champions” have been selected by the project to serve as energy code mentors regionally and will provide expertise, in-field guidance, technical support and training to code enforcement professionals. These individuals will provide a distinct advantage to Illinois as it strives to meet the 90percent compliance goal.

**GAP #22: There is not a method in place to measure and evaluate compliance with the energy code.**

**Implementation Summary: Current Best Practices and Recommendations**

Since Illinois’s statewide energy code is less than a year old, there is much work yet to be done to reach 90 percent compliance. However, the state is well positioned to do so, with policies that provide needed funding for such efforts, relationships established with key stakeholders, and a relatively stable political environment within which to work (whereas other states with new Governors are in uncertain political environment). Further, DCEO has strengthened and provided support and coordination to external code-related advocates such as IGEN, MMC, BCAP, MEEA and ICC. These efforts have cultivated a statewide network that provides regular and consistent messaging targeted to building departments

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22 Within the market transformation portion of the three year EEPS plan, the “Building Energy Code Compliance Program” establishes the baseline analysis.
and construction personnel. These initiatives can be strengthened and refined as the state learns more about the status of its current code compliance and additional code enforcement officials and builders become trained and educated at the more than 40 trainings that will be available over the next year.

To improve compliance, the state needs to understand and address issues with the enforcement process. Given the chronic shortage of resources devoted to code enforcement, helping code officials’ maximize their ability to properly enforce the code should be a priority.

Current Illinois Best Practices and Recommendations

Enforcement and Infrastructure Best Practices

- Illinois’ precedent of using systems benefit charges on utility bills has created sustainable funding to support energy codes.
- The state has a certification board that oversees the credentialing and continuing education credits of architects, engineers and trades such as HVAC, plumbing and electric; and the ICC requires credentialing of code enforcement personnel.
- The state allows local enforcement jurisdictions to charge fees to cover the costs of enforcement and set the individual enforcement rules at that level.
- The state is interested in exploring new approaches to increase code enforcement. For example, the new Ambassadors program with ICC and BCAP will provide needed local “champions” to support local code enforcement. If successful, this could become a model for other states. These Ambassadors can look for opportunities to share resources between building departments regionally.

Stakeholder Best Practices:

- CDB and DCEO have established positive relationships with code associations, the Home Builders Association, universities, and other related groups to gain support for energy codes.
- The state has a central website where stakeholders can go for information on energy codes. The DCEO has contracted with to provide technical support on code interpretations.
- The state is actively developing partnerships to promote advanced programs through incentives and resources as well as informally by providing partnership opportunities.

Technical Support and Resources Best Practices

- The state provides a hard copy of the code to the code enforcement community at trainings.
- The state contracts with the ICC to provide on-call support for construction or code personnel statewide – this also reinforces one consistent message and point of contact.

23 http://www.illinoisbiz.biz/dceo/Bureaus/Energy_Recycling/IECC.htm
• The DCEO funds the Smart Energy Design Assistance Center (SEDAC) which provides no-cost technical services to help small and medium-sized for-profit and public entities reduce their energy use. SEDAC is managed by the School of Architecture at the University of Illinois at Urbana-Champaign and the 360 Energy Group – a private consulting company.

• The DCEO funds the large customer Energy Analysis Program to provide assistance with energy management practices.

• The state EEPS funding subsidizes the cost of additional insulation, air sealing, ventilation and high efficiency heating, hot water, and air conditioning for affordable housing developers.*

Training Best Practices

• The state subsidizes training for code and construction personnel so that they have the opportunity to receive free training on energy codes.

• The state contracts with ICC as the sole trainer for the state to ensure that one consistent voice and message is delivered to all construction and code personnel in every jurisdiction.

• The state supports the important work of IGEN25, an organization that could ultimately influence the training and education of the next generation of code officials and construction industry professionals trained at the state’s 48 community colleges.

Compliance Measurement and Verification Best Practices:

• Within the market transformation portion of the state’s three-year EEPS plan, the “Building Energy Code Compliance Program” includes funding for an initial analysis to establish a baseline for current building code compliance, from which future compliance can be measured beginning in 2012.

RECOMMENDATIONS

GAP #6: The state does not have information of the level of compliance with the IECC 2009.

Recommendation: Conduct an in depth study, including interviews and personal visits to several building departments throughout the state. The study should include accompanying code inspectors as they conduct energy code compliance inspections. A model study is the Fort Collins, CO study called “Is It There, Does It Work” that uncovered real and specific problems with energy code compliance in the 1990s.

GAP #7: The state does not have an agency with the capacity to perform plan review and inspection, nor a mechanism to hire third party inspectors to perform plan review and inspection.26

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24 Illinois also offers Frequently Asked Question at: www.illinoisbiz.biz/dceo/Bureaus/Energy_Recycling/IECC.htm
25 See page 32 for a description of IGEN.
**Recommendation:** Hire inspectors that travel throughout state to conduct spot checks and audits. The precedent for this has been set by the model used to conduct boiler inspectors in Illinois; these individuals could be based from their home offices and work regionally.

**GAP #8:** While the Energy Conservation Act mandates that local jurisdictions enforce energy codes, the law does not establish an institutional framework, nor funding or enforcement mechanism to support and monitor local jurisdictions.

**Recommendation A:** Investigate mechanisms to assure that local jurisdictions are enforcing the code.

**Recommendation B:** Work with forthcoming Energy Code Ambassadors to provide additional insight and what local jurisdictions need to determine how to best support them.

**GAP #9:** The state does not have the specific information to understand how to best support local building departments.

**Recommendation:** The above-referenced study should include one-on-one interviews with code inspectors, plans reviewers, building commissioners, and forthcoming “Energy Code Ambassadors” from several areas of the state, to get an in-depth understanding of how the energy code is enforced, and what support is needed to enhance energy code enforcement.

**GAP #10:** Local building departments do not have access to assistance for plan review in complex buildings or other specific building types.

**Recommendation:** Expand the ability of SEDAC to offer design assistance to plans reviewers and conduct outreach to building departments.

- SEDAC could conduct targeted outreach to make them aware of this free service.

**GAP #11:** Building departments in many areas of the state lack the resources to enforce codes. While the state provides free training and education to local jurisdictions, it does not provide any staff or funding to conduct additional inspections or the cost of technology that could assist in code enforcement (such as handheld devices for example).

**Recommendation A:** One crucial role the state plays is as an advisor and supporter for local inspection departments and policymakers. The state is limited in its ability and desire to set local policy, but it should expand the information, technical support, and incentives it already provides to influence behaviors at the local level. For example, the state should review DOE’s new guidelines on measuring energy code compliance and disseminate this information to local jurisdictions with suggestions for how to adopt DOE’s recommendations given the realities on the ground in any particular community. Another low-cost option would be to direct local jurisdictions to the recent DOE/ICC *Building Energy*

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26 The state does not have an infrastructure of inspectors or plan reviewers for public or private construction, nor requirements governing third party energy code inspectors and plan reviewers. For state funded facilities, the state relies on the architect it hires to assure that it is built to state standards.
Codes Resource Guide for code officials, which offers a multitude of useful resources. Also see Appendix A for a list of other PNNL energy code resources.

Recommendation B: Consider changing the EEPS legislation (even if for only a set number of years (e.g., five years)) to allow utilities to get energy efficiency credit for directly support energy codes.

Recommendation C: Provide a “Best Practices” outline to educate building departments on how to enforce the energy code, including code personnel attending ICC training, charging fees for energy inspections and re-inspections and repeated reviews.

Recommendation D: Subsidize the use of handheld electronics to facilitate building inspections.

Recommendation E: Subsidize the use of blower door equipment and equipment training to facilitate building inspections.

Recommendation F: Create a certified provider list for builders and code officials.

Recommendation G: Strongly encourage building departments to charge a fee to offset the cost of energy code inspections.\(^{27}\)

Recommendation H: Subsidize building departments that reduce permit fees for builders who achieve the Builders Challenge, ENERGY STAR, or LEED qualifications.

Recommendation I: Accept a HERS rating in place of traditional energy code inspection. This passes the cost and expertise of inspection from the building department to the builder.

Recommendation J: Expand the ability of SEDAC to offer design assistance to plans reviewers and conduct outreach to building departments.
  - SEDAC could conduct targeted outreach to make them aware of this free service.

Recommendation K: Subsidize the use of duct blaster equipment and equipment training to facilitate building inspections.

GAP #12: The state does not provide any ready-made marketing and compliance materials to local jurisdictions – all materials are locally produced.

Recommendation A: Create and distribute materials tailored for code officials, design professionals, and contractors on the 2009 IECC, such as compliance checklists for inspectors; or a form that clearly lists the requirements of the code and requires design professionals to check each line item and sign off that their plans will include such energy features. The form should be required to accompany the permit application.

Recommendation B: Provide compliance materials for use at the building department level.

\(^{27}\) A model and precedent for such a fee exists in the state by the boiler code inspection process and will overcome the “lack of funding for enforcement” barrier mentality of many code departments.
Recommendation C: Offer ready-made marketing materials that support building departments as they educate designers and consumers about the importance and benefits of energy codes. Informational outreach materials targeted to different audiences such as consumers, designers, and policymakers would assist code enforcement personnel who are in the position of defending and educating codes. Information should emphasize the potential money saved by lower energy bills in order to gain support for private investments in energy efficiency and boost market demand for energy efficient products and services.

Recommendation D: The state should review DOE’s new guidelines on measuring energy code compliance and disseminate this information to local jurisdictions with suggestions for how to adopt DOE’s recommendations given the realities on the ground in particular communities.

GAP #13: According to the jurisdictions interviewed for this report, local jurisdictions do not issue a “stop order” after an inspection or plan review reveals an energy code violation.

Recommendation: Require certified training in energy code plan review and inspection for all code officials in charge of energy inspections. As part of this training, they should gain and understanding of why the energy code is important; and issuing a “stop order” after a failed inspection or plan review should become routine.

GAP #14: There is no requirement for Energy code training, certification, or CEUs for any building trades professionals.

Recommendation A: Work with the Illinois Department of Financial and Professional Regulation to adopt a new requirement for energy code training for key trades (e.g., architect, engineer) as part of the CEU requirements for license renewal.

Recommendation B: Reach out to AIA to seek their support in encouraging their architect members to attend energy code or Building America training. For example, they may be willing to increase the CEU credits for attendance at an ICC energy code course, or require it as part of their CEU requirements.

GAP #15: Building departments don’t have expertise in energy, nor are they required to obtain expertise. The state does not have a certification program for energy codes for builders or code officials.

Recommendation A: Require contractors to be licensed and recertified with every three-year code update.

- Provide cash incentives to contractors that attend energy code training (especially important given the busy schedules of contractors, and the fact that contractors don’t need CEUs).

Recommendation B: Require code officials to be licensed and recertified every few years or after energy codes are altered.
● Assure that local building departments are well educated in energy codes by requiring code officials to pass the ICC Energy Inspector certification test. ²⁸

● Require code officials obtain ongoing Energy Code education (CEUs).

GAP #16: Builders are not required to be licensed in IL as residential homes are exempt from requirements of licensure under the Architectural Act ²⁹. The state of Illinois does not require contractors to be licensed or certified in any way.

Recommendation: Aside from requiring licensure, the state could work with the HBA to engage them in encouraging their members to attend energy efficiency and building courses. HBA could and help organize such classes. Provide incentives for builders to attend classes.

GAP #17: Once construction is complete, it’s difficult to force contractors to go back and make changes to comply with the energy code. Code officials are concerned about maintaining good working relationships with contractors.

Recommendation: The state or city leadership should establish protocols for all plan reviews so that contractors doing business in their jurisdiction to assist local jurisdictions in doing their job while maintaining good relationships. Help establish protocols – further details can be established in part two of this report.

GAP #18: There is a lack of political support at the local government level to “champion” energy codes.

Recommendation A: Give public acknowledgement to those local governments that are taking leadership roles in adopting more stringent codes. The Governor should reward and publicize existing champions to encourage others to do their part. Work with the Southern Illinois Mayors Associations, the Illinois Municipal League or other related groups to raise the awareness of local government leaders on what other municipalities within Illinois are doing take a leadership role in energy efficiency. Key messages should include that energy codes and related policies allow local governments to demonstrate fiscal responsibility for taxpayer dollars, stimulate jobs, and save people (and governments) money through lower bills. The 63 local governments that received federal funding should be contacted to determine what efforts they may have made to increase energy code or energy awareness in their communities. Awards, news releases and other publicity could be given to those that have recently completed an energy efficient upgrade to an existing building; completed a LEED certified new building; a zero energy home; or related efforts.

Recommendation B: Build support at the local level for improving construction practices by encouraging building departments to:

²⁸ Most local jurisdictions do this, but the state could reinforce this requirement.
²⁹ The Architectural Act can be found at this web link. See section 305/3 for the exemption.
• Expedite the permitting process for builders who build to Builders Challenge or Energy Star (or equivalent).

• Accept the Builders Challenge qualifications or ENERGY STAR certification in place of the traditional energy code compliance path. (Require that both the builder and HERS rater be registered with Building America or ENERGY STAR program to participate).

• Reduce permit fees for buildings that are LEED (or equivalent) certified, ENERGY STAR or Building America qualified. The state could reimburse local building departments to offset this cost.
  
  o If utilities (subject to EEPS goals) were able to claim credit toward their EEPS goals\textsuperscript{30}, their portion of the EEPS funding could be used for this purpose. They make look upon this favorably, as it is an “incentive” and “voluntary” program rather than an enforcement program, and they could gain positive publicity for their individual achievements -- building-by-building (for each LEED certified building), or community-by-community (for every ENERGY STAR or equivalent home /development).

**Recommendation C:** To engage municipalities across Illinois, consider working with the Illinois Municipal League to offer voluntary programs to their members. For example, municipalities could:

• Host a Building America training program in their city and encourage builders and code officials to attend (paid for by DCEO, and builders would pay a discounted fee to attend).

• Offer discounted or expedited permitting to builders who achieve Building America or ENERGY STAR qualified homes (as mentioned above).

• Other incentives as determined by collaborating with the Illinois Municipal League.

**GAP #19:** There is a lack of demand from consumers for energy codes.

• **Recommendation A:** Raise public demand for energy efficiency in housing by offering courses on energy efficiency via partnerships with groups that reach more rural areas of the state such as the State Extension Service, IMEA, the Energy Education Council, and home builder associations. The State Extension Service may be an especially good candidate for partnership since they have a history and expertise in offering courses to the public, including energy efficiency courses.

• **Recommendation B:** Seek publicity (e.g., give awards, distribute press releases) for builders who meet the Builders Challenge qualifications in order to raise public awareness and drive demand for energy efficiency and raise the bar in your state for advanced homes.

**GAP #20:** Architects, although ideally positioned to include energy in the design plans of a building, are not well-educated in energy codes and how to include energy efficiency in the design of buildings.

**Recommendation A:** Forge strategic alliances with community colleges that have recently received grants for “green jobs” training to coordinate and encourage (and perhaps provide additional funding

\textsuperscript{30} The actual amount of energy efficiency credit earned toward EEPS goals could be determined via the actual energy rating or other documentation provided for LEED certification or ENERGY STAR compliance.
for) the inclusion of energy code training (and/or RESNET training\textsuperscript{31}) for students who may become code officials or building professionals upon graduation. Structure the collaboration to assure that the community college continues to teach the energy code even when the funding is exhausted.

**Recommendation B:** Consider increasing support and set specific goals for the IGEN network. The IGEN network could engage all 48 community colleges in the state to improve training and education for the next generation of construction trades professionals so that they understand and embrace the importance of including energy efficiency in the design and construction of buildings in Illinois.

**Recommendation C:** In order to boost the experience of construction personnel, and increase demand for energy efficiency products and service in the state of Illinois, require that all EEAHCP\textsuperscript{32} grant recipients (1) attend a Building America training course; (2) all new or remodel projects funded partially or fully by EEAHCP be qualified to either Building America or ENERGY STAR qualifications.

**Recommendation D:** Work with AIA to gain their support to promote continuing education courses on energy codes in the short-term.

In the longer term, build a relationship with AIA and the NAAB to get energy code education added as a core requirement to becoming a licensed Architect.

**Recommendation E:** Add the BCAP energy code calculator on the state’s website to help educate visitors: http://bcap-ocean.org/resource/energy-code-calculator

**GAP #21:** Most construction personnel are poorly educated on the latest approaches to building more efficient homes.

**Recommendation A:** Encourage your building industry trades professionals to attend a Building America sponsored training course and by implementing the approaches to construct the best homes possible. Recommended actions include:

- Host a Building America course locally. The cost is $6,500 per one-day course, (this includes all costs, including marketing to builders in your state, and continuing education credits for builders). There are two course options available: "Houses that Work" for new homes and "Remodeling for Energy Efficiency" for existing homes. The registration fee for builders is about $125 per person. To schedule, call Nancy Bakeman at The Energy and Environmental Building Alliance at (952) 881-1098 or nancy@eeba.org.
- Encourage builders to attend a Building America sponsored training (see http://eeba.org/housesatwork/index.html for locations). Attendees receive CEU credits for

\textsuperscript{31} RESNET certified home energy raters are able to qualify homes for the Energy Star program. Some community colleges in Illinois have received grants from the U.S. Department of Labor for Building Performance Institute (BPI) training, which focuses mainly on existing homes.

\textsuperscript{32} EEAHCP is the Energy Efficiency Affordable Housing Construction Program that offers grants to for-profit and non-profit affordable housing developers for high insulation levels, air sealing, ventilation and high efficiency heating, hot water, and air-conditioning equipment. Grant amounts vary by category (substantial rehab, new multi-family, and new single family) and range from $1,800 - $4,500 per housing unit and $4.00 - $4.50/ square foot depending on the housing type.
various programs, including AIA, AIBD, BPI, RESNET, NAHB, and USGBC/LEED, plus additional benefits offered through EEBA.

- Offer a 50% subsidy to builders, architects or other building professionals to attend a training outside your state;
- Reimburse permit fees for builders who achieve the Builders Challenge qualifications.
- Accept the Builders Challenge qualifications or ENERGY STAR certification in place of the traditional energy code compliance path. (Require that both the builder and HERS rater be registered with Building America or ENERGY STAR program to participate.)

- Present awards to builders who meet the Builders Challenge qualifications in order to raise public awareness and drive demand for energy efficiency and raise the bar in your state for advanced homes.

- **Recommendation B:** Provide a calendar of educational events and market it to affected parties.

**GAP #22: There is not a method in place to measure and evaluate compliance with the energy code.**

**Recommendation:** Develop an ongoing process to measure and evaluate compliance.

- Review DOE’s guidance on measuring energy code compliance.
- Develop an evaluation methodology.
- Following the initial baseline study planned for 2011, conduct regular compliance checks and studies to determine the level of compliance.
- To demonstrate the 90 percent compliance rate, an onsite audit of buildings, based on a statistically valid sample of buildings across jurisdictions in the state, is necessary.

**Conclusion**

Illinois is poised to be a national leader in advancing energy efficiency. It has a strong funding mechanism established with the EEPS and other funding available to support energy code compliance and enforcement in the state.

Illinois can lead the world in designing the most advanced, high-quality and energy efficient buildings and homes. But builders won’t move to that next level without training and education on how to do so. The state can claim obtain that leadership role by enforcing its energy codes; educating construction professionals, trades, and code enforcement personnel; and gaining political support at the local level.

A major barrier to success is the culture of home rule by municipalities; the lack of education by design professionals and builders; and the lack of understanding and demand for energy efficiency by consumers. These barriers can be overcome by implementing the recommendations in this report; forging strong allies in areas of the state where there is interest; and offering voluntary programs and incentives for those who participate.
The ARRA-SEP conditions require the adoption of energy codes within eight years, and an annual measurement of the rate of compliance. To demonstrate the 90 percent compliance rate, the state will have to work with local jurisdictions to ensure onsite compliance audit of buildings, based on a statistically valid sample of buildings across jurisdictions in the state, will be necessary.

Illinois needs to work with local governments to establish a practical energy code enforcement infrastructure that gives local agencies the knowledge, training, and tools they need. Illinois is already providing superior training and support to the local jurisdictions. State agencies and local building departments would also provide the building industry—designers, architects, engineers, developers, builders, and contractors—with similar knowledge, training, and tools to help them understand and comply with energy code provisions at each step of the process.

By implementing the 2009 IECC and Standard 90.1-2007 statewide, Illinois businesses and homeowners will save an estimated $154 million annually by 2020 and $307 million annually by 2030. Additionally, implementing the latest model codes will help avoid about 38.4 trillion Btu of primary annual energy use by 2030 and annual emissions of more than 2.55 million metric tons of CO2 by 2030.

The majority of the recommendations made in this gap analysis are summarized in the table below, which is meant to guide state officials and other Illinois stakeholders as they work to support improved code compliance and enforcement and begin to measure code compliance achievements over the next years.

<table>
<thead>
<tr>
<th>Adoption</th>
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<tbody>
<tr>
<td>State Policy</td>
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<tr>
<td>• The state should begin a concerted strategy to address Chicago’s non-compliance issue. (p. 25)</td>
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<tr>
<td>• Illinois should engage in the development of the national model codes and standards and leverage the shared expertise and resources available in national code forums. (p. 27)</td>
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<tr>
<td>• Enhance the existing “Retro-commissioning” and “Municipal Energy Efficiency Aggregation” programs for public agencies to encourage and facilitate their use of ESCOs. (p. 27)</td>
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<tr>
<td>• Illinois should consider adopting a Climate Change Plan or Energy Plan. (p. 27)</td>
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<tr>
<td>• Allow local jurisdictions to adopt stretch codes higher than the IECC 2009 and utilize third party certification programs. (p. 27-28)</td>
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<th>Implementation</th>
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<td>Enforcement Community</td>
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<td>• Conduct an in depth study, including interviews and personal visits to several building departments throughout the state. The study should include accompanying code inspectors as they conduct energy code compliance inspections. (p. 43)</td>
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<tr>
<td>• Hire inspectors that travel throughout state to conduct spot checks and audits. (p. 43)</td>
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<tr>
<td>• Investigate mechanisms to assure that local jurisdictions are enforcing the code. (p. 43)</td>
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<tr>
<td>Outreach</td>
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<tr>
<td>• Seek publicity (e.g., give awards, distribute press releases) for builders who meet the Builders Challenge qualifications in order to raise public awareness. (p. 48)</td>
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<tr>
<th>Design/Construction Community</th>
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<tr>
<td>• Forge alliances with area colleges that received grants for “green jobs” training to encourage the inclusion</td>
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33 Assuming 2006 energy prices.
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<th>Compliance Measurement &amp; Verification</th>
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<tr>
<td>• Develop an ongoing process to measure and evaluate compliance. (p. 50)</td>
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</table>

- Encourage building industry trades professionals to attend a Building America sponsored training. (p. 49)

of energy code training for students who may become code officials or building professionals. (p. 48)
Acknowledgements

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 stakeholder’s contacts, and ongoing review of our work. In particular, we would like to acknowledge the aid of DCEO, especially Bruce Selway, David Baker, Wayne Hartel, Tammy Stone, Randy Bennet; and the Capital Development Board – especially Lisa Mattingly, Mary Hunt, and Robert Coslow; David Brimm at the Division of Professional Regulation; Ben Bailey at the Division of Boiler and Pressure Vessel; and Joe August at the State Fire Marshall. We appreciate the assistance from Isaac Elnecafe with the Midwest Energy Efficiency Alliance; the EPA’s Jonathon Passe and Jack Barnette, and Building America’s George James and Terry Logee, as well as Joe Nebbia with Newport Partners, LLC and Eric Makela with the Pacific Northwest Laboratory. We appreciate the contributions of AIA staff Joan Pomarance, Mark Wills, and Angie Taylor. Darren Meyers at the ICC was an invaluable resource to this report. We also thank Matt Davidson and Joe Scottaman at the Illinois Municipal League; Chris Davis at the Home Builders Association of Illinois; William Donovan with the Illinois Association of Code Enforcement; Brian Kumer with Thermal Imaging Services; and Celia Christensen at the Citizens Utility Board; Kate Agasie at the Metropolitan Mayors Caucus; Bob Romo with the Illinois Clean Energy Foundation; Julia Parzen, an independent sustainability consultant; Javier Ceballos of the Department of Environment for Chicago; Molly Hall with the Energy Education Council; George Melek with ComEd; Lance Escue with Ameren; and Rob Welbly with the Illinois Municipal Electric Agency. Several community colleges provided insight for the report, including Ron Sanderson at Lake Land Community College; Jesse Foote and Leith Sharp with the Illinois Green Economy Network; and Rhonda at the University of Illinois Department of Architecture. We thank Jeff Haggard of JND Properties.

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Cover page image taken in Warrenville, IL courtesy of Flickr Creative Commons, by photographer Michael Kappel. www.mikekappel.com
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

2. MEEA Testimony before Illinois Senate Energy Committee 10-28-2010.
17. For the full report, see http://bcap-ocean.org/resource/incremental-cost-analysis. This analysis is based on traditional building approaches. However, if Building America approaches are utilized, a new home can be built 40 percent more energy efficiently without any added cost.
19. For more information on the TIF, see http://www.illinois-tif.com/about_TIF.asp
20. For more information on the Green Guidelines for state construction projects, see http://www.cdb.state.il.us/green_initiatives.shtml or http://www.ilga.gov/legislation/publicacts/fulltext.asp?Name=096-0073
29. www.iccb.state.il.us/pdf/ICCBFactSheetFinalJuly.pdf
30. Interview with Matt Davidson, Legislative Director, and Joe Scottaman, Research Coordinator, with Maria Ellingson (BCAP) on December 7, 2010.

http://www.aiacolorado.org/

