Role for Utilities in Enhancing Building Energy Code Compliance

Sarah Stellberg, Institute for Market Transformation
Adam Cooper, Institute for Electric Efficiency
Carolyn Sarno and David Lis, Northeast Energy Efficiency Partnerships

ABSTRACT

Utilities are uniquely positioned to play a key role in developing programs that would support and enhance compliance with building energy codes. With increasing regulatory requirements and energy savings goals for efficiency programs, utilities are exploring new ways to generate additional savings. The opportunities from energy codes are significant and cost-effective, yet few states have legislative or regulatory approval to count rate-payer funded energy code compliance enhancement programs towards energy efficiency resource standards or utility-filed energy efficiency programs. Utilities leading the charge are in the midst of developing attribution frameworks for these activities. This paper will provide guidance on the roles, barriers, and regional considerations for energy efficiency program administrators and regulators considering code compliance programs as part of utility energy efficiency portfolios. Key case studies from Arizona, California, Massachusetts, New York, Rhode Island, Texas, Vermont, and Washington are included to highlight past and current efforts by utilities to support and enhance code compliance efforts.

Introduction

For decades, building energy codes have served as one of the most effective policy tools for advancing the energy efficiency of our nation's building stock. Progress has been made on the development of the latest commercial and residential codes, which have increased energy savings potential by nearly 30% from 2006 to 2012, and now states and cities representing nearly three-quarters of the nation's building stock have adopted or will soon adopt model codes that meet or exceed the requirements of the 2009 International Energy Conservation Code (IECC).[1]

Despite such advances, shortfalls in compliance enforcement have led to the underperformance of many new buildings and renovation projects. Compliance varies by region and sector, but survey and other data point to average rates within the 40–60% range nationally (Yang 2005).[2] A number of factors have contributed to this outcome, including (1) capacity and resource constraints within building departments (2) a knowledge gap among key stakeholders about energy efficiency issues and energy code requirements and (3) a general lack of training around, or prioritization of, energy codes by enforcement officials among their broad range of

[1] Figure based on state and local code adoption status and construction volume data from the U.S. Census Bureau. 30 states have adopted a commercial code that meets or exceeds ASHRAE Standard 90.1-2007 or equivalent, and 22 states have adopted a residential code that meets or exceeds IECC 2009. Many municipalities in home rule states have joined in adopting these model energy codes (*see* http://energycodesocean.org/sites/default/files/Code%20Status%20Maps.pdf)

[2] The majority of compliance studies define the rate of non-compliance as the number of homes out of compliance by any margin, not the overall degree of failure.

responsibilities, including fire, plumbing, and life safety codes.

A heightened awareness of the gaps in energy code compliance and enforcement, driven in part by state commitments under the American Recovery and Reinvestment Act of 2009 (ARRA), has motivated efficiency advocates nationwide to focus on achieving the full potential of existing energy codes.[3] The U.S. Department of Energy's Building Energy Codes Program has published field checklists and abbreviated code guides to help streamline the compliance process (DOE 2012) and has also developed and piloted a compliance evaluation methodology intended to streamline the compliance measurement process (PNNL 2010).[4] The Building Codes Assistance Project (BCAP) has been working with states on a series of compliance gap studies to assess deficiencies in state energy code infrastructure and recommend pathways to improved compliance.[5] Several states, such as Minnesota and Vermont, are taking individual action to develop action plans for meeting the 90% compliance requirement under ARRA.

Savings opportunities abound for utilities willing to partner in these structured efforts to enhance compliance with existing codes. Given their knowledge of building energy efficiency programs, experience with managing other market transformation programs, and access to capital, utilities serve as natural contributors for developing, administering, and delivering energy code compliance support programs across service territories. This paper will identify the appropriate roles, tools and regional considerations for energy efficiency program administrators and regulators to allow for the integration of code compliance support efforts into utility energy efficiency portfolio goals, while highlighting several successful case studies of utility-supported code compliance enhancement programs.

Strategic Importance of Utility Partnerships in Energy Code Compliance

Energy code compliance programs offer a tremendous opportunity to achieve market-wide energy savings at a relatively low cost, especially for utilities looking to meet increasing Energy Efficiency Resource Standards (EERS), state or regional environmental or greenhouse gas goals, or other efficiency targets. As federal legislation on the efficacy of lamps reduces the energy savings from utility lighting programs and increases program costs, savvy utilities will seek to establish new programs that deliver energy savings to help meet the standards and/or their goals. Lighting programs have traditionally provided 40-60% of total energy efficiency portfolio savings, and as this fraction declines, building energy codes programs are increasingly viewed as another viable option for delivering additional energy savings to meet increasing standards while saving customers energy and money.

As with any energy efficiency program, the key factors to consider when evaluating a building energy codes initiative are cost-effectiveness, scalability, measurability, and the magnitude of energy savings. At a national level, focusing on electric savings alone, a long-term look at the potential energy savings from building energy codes is captured in an April 2011

[3] In order to receive State Energy Program funds under ARRA, all 50 states committed to meet or exceed the minimum code stringency requirements of the 2009 IECC for residential buildings and ASHRAE Standard 90.1-2007 for commercial buildings, and to achieve and measure 90% compliance with these codes by 2017.

[4] DOE funded eight energy code compliance evaluation pilot studies based on this methodology in 2010. Preliminary results from most studies

[5] See http://energycodesocean.org/compliance-planning-assistance-program for a list of CPA program states, Gap Analysis Reports, and Strategic Compliance Plans.

whitepaper by the Institute for Electric Efficiency. Their analysis finds that U.S. electricity consumption could be reduced by 123 MMWh, equivalent to 30% of the projected growth in electricity consumption over a 15-year period (2011-2025) if new codes were readily adopted and fully complied with in all states. While there are several challenges to realizing this scenario, it does frame the policy discussion at the national and state level as to the potential savings from a utility supported building energy codes program (Cooper and Wood 2011).

A 2010 study by the Institute for Market Transformation (IMT) found that simply achieving 90% nationwide compliance with codes on the books could yield average annual energy savings ramping up to 50 MMWh, or $2.7 billion annually by 2020. Even when factoring the incremental costs to the private sector of constructing to the code, every additional $1 spent on code compliance efforts would yield an average of $6 in energy savings (IMT 2010). From a program administrator's standpoint, one might expect even greater paybacks as the incremental costs of the efficient construction features are borne principally by the builder or owner.

California utilities have demonstrated that building energy codes programs can deliver substantial energy savings. For instance, between 2006 and 2009 the energy savings from California IOU codes and standards programs totaled 676 million kWh, equivalent to 9% of total portfolio savings (CPUC 2011). Given the success of the programs, California IOUs budgeted over $30 million to continue codes and standards program activities in the 2010-2012 program years. Total energy savings from 2010-2012 program activities are estimated to be 837 million kWh (CPUC 2010).

Program Options and Case Studies of Utility Involvement

Over the last two decades, a growing number of utilities have engaged in activities to support the energy code in their territories, and several have sought regulatory or legislative approval to count a share of energy savings towards their savings requirements under energy efficiency resource standards, demand-side management programs, or air quality regulations. The following section identifies key engagement opportunities and select case studies that highlight code support activities for program administrators.

Resources & Funding for local building departments

Maintaining a fully staffed, trained, and funded building department remains a fundamental challenge for states and municipalities tasked with administering and enforcing energy codes. Utilities have demonstrated that they can support the local code enforcement structure by providing:

- On-line or classroom trainings for code officials
- Funding for code books, diagnostic equipment (e.g., blower doors, duct blasters, infra-red cameras), or other enforcement tools
- Development of technical resources to streamline enforcement, including abbreviated code guidelines or energy code field guides for field inspectors
- Direct financial support for additional full- or part-time staff to review plans and supporting calculations, perform site inspections, provide technical assistance with code questions, or follow up with projects that do not report or are out of compliance

Case study: Arizona utilities. In August 2010, the Arizona Corporation Commission (ACC) adopted rules requiring regulated electric utilities in the state to achieve a schedule of savings relative to their previous year's sales, starting at 1.25% in 2011 and ramping up to 22% by 2020. A component of the rules permits utilities to count up to one-third of the energy savings associated with energy codes towards the targets, provided the affected utility demonstrates and documents its supporting role and undertakes a measurement and evaluation study to quantify the savings (ACC 2010). Arizona Public Services Company (APS) and Tucson Electric Power (TEP), the state's largest IOUs, are now aggressively pursuing energy codes programs as a means for achieving these savings mandates, and the Salt River Project (SRP), a public power utility, has implemented an energy codes program to help achieve a self-mandated target.

In early 2012, regulators approved APS's Energy Efficiency Implementation Plan, including a component for energy codes and standards. In this first year, work will include code trainings and the purchase of code books for local enforcement officials, as well as efforts to lay the groundwork for future programs, including outreach to code departments or code development committees and market research efforts to identify potential areas of targeted intervention or training. APS has also commissioned a study to develop an evaluation, measurement, and verification (EM&V) protocol for their work, though they do not intend to claim savings for this year's activities. The program has been budgeted at $100,000 for 2012, a small fraction of the utility's total $77 million energy efficiency program budget (Baggett 2012).

TEP has implemented an Energy Codes Enhancement Program ("ECEP") as part of its 2011-2012 Energy Efficiency Implementation Plan, with program activities including training and support for code officials and building professionals, documentation of the local benefits of code enforcement, advocacy for and research to inform code updates, and collaboration with other stakeholders across the TEP service territory. For the 2011-2012 program year, TEP has allocated one-half of a full-time-equivalent staff person to administer the program and a budget of $124,825 (TEP 2011).

Stakeholder Outreach and Education

An effective code implementation strategy involves stakeholder outreach and education to prepare the construction industry and community to comply with the energy code, especially during the transition to a more stringent code. Utilities can participate in this process by providing free energy code trainings and technical assistance for builders, architects, engineers, HVAC contractors, remodelers, and others in the building industry.[6] Workshops should be tailored to the needs of specific professions or to measures that have a large influence on the building's energy consumption and are known to be routinely installed at below code levels. Utilities can also offer technical assistance (e.g., help hotline, modeling consultation, free plan review) or reference materials to provide technical interpretation of code provisions.

[6] Utility-funded code training programs have been implemented across a handful of states, including California (PG&E, SCE, SDG&E, SoCal Gas), Illinois (ComEd, Ameren Illinois, Ameren Gas, NICOR, North Shore Gas, and Peoples Gas), Maine (Efficiency Maine), Massachusetts (National Grid), Nevada (Nevada Power and Sierra Pacific), New York (NYSERDA), Ohio (Duke Energy), Rhode Island (National Grid), Vermont (Efficiency Vermont), Washington (PacifiCorp, Puget Sound Energy), and others.

Utilities are well suited to establish or participate in a coalition of code advocates, industry representatives, and other stakeholders of the code implementation process. A building energy code compliance working group or coalition can:

- Coordinate outreach/communications among various stakeholders including state energy offices, regulatory bodies, building professionals, and local code officials
- Monitor code changes and provide up-to-date information to stakeholders
- Create a model action plan for broad-based compliance enhancement programs to guide local building departments or state agencies
- Commission a study of the savings potential of new energy codes in the jurisdiction
- Develop or oversee a media outreach initiative to raise community awareness or emphasize the value of energy codes

Case study: Efficiency Vermont's energy code assistance center. Efficiency Vermont, a ratepayer-funded energy efficiency utility, was established in 2000 by the Vermont Public Service Board to administer the state's energy-efficiency programs and services. Efficiency Vermont's Energy Code Assistance Center provides technical assistance, forms and certificates, free compliance software, code training materials, and assistance with form completion. The Center also operates the E-Call Energy Code Hotline, a toll-free telephone hotline which builders and tradespeople can call with codes-related questions.

Case study: California's energy training centers. California's 2008 Long-Term Energy Efficiency Strategic Plan included a budget of $3.82 million for a comprehensive framework of goals and strategies targeted at improving compliance with existing codes (CPUC 2010). The proposed strategies included the development of a statewide compliance plan, the support of local enforcement, and the development of models that require proof of code compliance as a condition of receiving rebates or financing (CPUC 2008).

California's investor owned utilities (IOUs) have also long supported energy code education through their training centers, including PG&E's Stockton Energy Training Center and Pacific Energy Center and the SoCalGas Energy Resource Center. The centers offer workshops and other educational programs free of charge to the public, including courses on California's Title 24 Energy Code. The state's IOUs also provide development and training support for the California Certified Energy Plans Examiner (CEPE) program, a statewide certification program for plan checkers, field inspectors, and energy consultants.

In return for their efforts, California utilities may claim credit for 50% of the verified savings of their energy codes programs toward their savings goals. However, the utilities have not yet attached savings to compliance enhancement programs due to the difficulty of attribution.

Incentives Beyond Code Performance

State, federal, private, and utility beyond-code programs, including Building America, ENERGY STAR®, LEED® for Homes and others are on the rise. "Stretch," "reach," or other beyond-code programs incentivize energy efficiency performance beyond minimum code requirements through tax credits, utility rebates, or other incentives. These programs help achieve greater levels of code compliance both by motivating greater levels of energy

performance and by preparing the private sector for advanced building techniques in advance of code change cycles. Utilities can incentivize beyond-code programs through rebates or other incentive mechanisms, or work with local governments to adopt voluntary or mandatory beyond-code ordinances. Statute will determine if a jurisdiction can adopt a beyond-code ordinance.

Case study: Massachusetts stretch code. The Massachusetts stretch code is a standardized appendix to the state building code that individual municipalities can choose to adopt. Once adopted by a local government, it becomes mandatory for all buildings in the jurisdiction. The state's stretch code requires buildings to meet an energy performance target approximately 20% lower than the base code. Municipalities that adopt the stretch code are eligible to receive state funds through the "Green Communities" grant program; the incentive funds have no doubt played a significant role in spurring adoption. The Massachusetts utility program administrators took an active role in developing the current version of the stretch code by assisting with the development of cost effectiveness analysis and case studies to support adoption in local communities. To date, more than 100 cities and towns have adopted the stretch code, covering roughly half of the state's population.

Compliance Evaluation

A comprehensive assessment of energy code compliance and enforcement provides insights regarding existing barriers and solutions to performance gaps in local codes. The key elements of compliance evaluations include:

- Onsite building inspections, leakage tests, and software analyses to determine rates of code compliance by sector and code measure
- An analysis of key areas of non-compliance and reasons for non-compliance
- Interviews to determine perceptions of baseline performance, performance gaps, needs and successes of the agencies responsible for enforcement
- Recommendations for code officials, design and construction professionals to enhance training programs or create opportunities to streamline enforcement practices.

While compliance evaluations support the development of targeted training and compliance programs, they also serve as a keystone in the evaluation, measurement, and verification (EM&V) process for estimating the potential and realized energy savings from compliance enhancement. All efforts to credit energy savings from utility compliance programs, or to estimate the energy savings potential from such activities, may require an assessment of the baseline conditions against which the effects of utility intervention may be measured.

Case study: New York compliance evaluation. The New York State Energy Research and Development Authority (NYSERDA) serves as the primary, rate-payer funded administrator for the state's energy efficiency programs. As part of New York's commitment to meet 90% compliance with the state energy code under the ARRA legislation, NYSERDA funded a baseline compliance assessment for both the residential and commercial energy codes. The study included detailed plan reviews and field inspections on 26 new commercial buildings and 44 new residential as well as telephone interviews and surveys with policy makers, contractors,

engineers, architects, and code officials. The study findings, including areas of non-compliance, the lost-savings from non-compliance, and a roadmap to 90% compliance, will be integrated into NYSERDA's existing Energy Codes Training and Support Initiative. This program offers plan review and energy modeling support for architects, engineers, and builders, as well as trainings for code officials, home builders, designers and energy modelers (VEIC, 2012).[7]

Case study: Rhode Island compliance evaluation. As a first step towards understanding the actions needed to improve code compliance and energy efficiency in buildings, the state of Rhode Island intends to measure the state's rate of compliance with the 2006 IECC code. The study, funded by National Grid, will help the state gain a better sense of how to measure compliance; which aspects of the code are the primary causes for non-compliance; and how close or far the state is from meeting the 90% requirement. The findings will be used to assess existing commercial and residential efficiency programs. National Grid also intends to assist the state with code trainings, the development of a voluntary stretch code, planning and advocacy of future codes, examination of building energy rating as a vehicle for code compliance, and the development of a third-party enforcement strategy.

Assessment of Opportunities for Compliance Process Improvements

Utilities can help improve the enforceability of the code—and the ease of compliance for builders and design professionals—by conducting research into the gaps in compliance or enforcement mechanisms. This can entail a market research study (e.g., interviews with builders, design professionals, code officials) or the piloting of innovative compliance strategies, such as third-party compliance.

Third-party verification can help improve compliance in areas with a weak or non-existent enforcement infrastructure. The process entails outsourcing some elements of the building code enforcement process—including plan review, on-site inspection, and performance testing—to specialized and independent (i.e. third-party) private-sector actors. Third-verification can be a cost-effective means of enhancing the uniform application of building energy codes across a jurisdiction as it allows building department staff to sidestep the burden of developing in-house capacity or technical expertise around energy efficiency. Employing third-party agents may also become necessary to fulfill the performance testing requirements found in the IECC 2012. Utilities can provide rebates to offset the cost of third-party inspections, or support the administration and oversight of such programs.

Given their placement across regions and building departments, utilities are also well-suited to help standardize minimum code requirements or compliance protocols across jurisdictional boundaries, making it easier to enforce and comply with the code. Utilities can also help code departments identify and eliminate burdensome administrative procedures common in enforcement procedures, such as excessive plan review time or a complicated permitting process, or in the development of code language that can be easily and uniformly enforced.

Case study: Special plans examiner/inspector (SPE/I) program in Washington State. Upon adoption of an updated commercial energy code in 1994, Washington State utilities came

[7] See https://nyserdacodetraining.com for more information on NYSERDA's Energy Codes Training and Support Initiative.

together to design and fund a new certification system to develop a cadre of trained plan checkers and inspectors. The purpose was to implement the new requirement in Section 1704 of the International Building Code (IBC) which mandated use of special inspectors, hired directly by the permit applicant, to review the energy code components of the plans and inspect the construction for compliance with the building plans and code requirements. This enforcement mechanism was used by a little over 10% of the local building departments.

The state implemented the SPE/I Certification Program, which consisted of an eight-hour training session on the energy code and a certification exam. The Washington Association of Building Officials (WABO) handled scheduling, registration, and administration of the exams; proctoring and grading was left to the International Council of Building Officials (ICBO). The cost of the training program was heavily subsidized by the Utility Code Group (UCG), a non-profit corporation formed by the state's utilities. UCG also provided support for code trainings, publications/forms, and a help-hotline. Each utility's contribution was based on its state retail sales. Expenditures totaled $5 million over the three and a half year program life, of which education and training accounted for a two-thirds share (Kunkle 1997).

Case study: Austin energy's residential third-party testing program. More recently, the City of Austin, Texas implemented a third-party testing program to verify compliance with energy codes in new residential buildings. The program is administered by Austin Energy, the local municipal utility, who bears responsibility for registering and overseeing all certified third-party testing companies. Austin Energy provides an operating budget of $131,200 and a part-time staff member to assist with the program's operations.

A comprehensive program evaluation has not been performed to date, but initial field audits have indicated significant improvement in compliance rates among new residential buildings as a result of the program. As a municipal utility, Austin Energy is not subject to the state energy efficiency savings goals mandated for IOUs. Support for the performance testing is part of its broader energy efficiency initiatives aimed at reducing peak load demand; these programs cost Austin Energy an average of $23.50 per MWh in 2008 while renewable energy and coal generation cost $33 and $41 per MWh, respectively (IMT 2012).[8]

Barriers and Solutions to More Meaningful Program Involvement

Energy Codes: A Whole New Ball Game

Energy code compliance enhancement programs are within the capabilities of utility program administrators, but they differ from traditional install-and-measure energy efficiency programs in their complexity, legal framework, lexicon, and a host of other unique program development hurdles. First is the nature of codes themselves. As an existing legal statute, home builders are required to comply with the building energy code by law, whereas traditional program measures engage only a portion of the market with voluntary promotions. Unlike incentive programs, energy codes and code enforcement can also be a source of contention with builders, making utilities wary of becoming the enforcement arm of the code. To address this issue, utilities in Massachusetts, Arizona, and elsewhere have created a clear mission of

[8] Weighted utility life cycle cost of all programs (residential, commercial, and Green Buildings) reported in DSM Performance Measures Report. In 2010, incentivized energy efficiency cost decreased to $21/MWh. See IMT 2012.

providing support to designers, builders, community members, local officials, and others to facilitate an easy transition to a more energy efficient built environment.

Utilities have an advantage in participating in code compliance programs, given their existing relationships with the most advanced practitioners in the new construction industry and experience coordinating programs across jurisdictional boundaries. However, code programs require involvement with new partners—architects, engineers, contractors, developers, code officials, local governments, and consumers—a challenge for program planning and for the attribution process. While most voluntary efficiency programs are managed in-house, and in collaboration with only one or two key partners, enforcement of the building code is most often the responsibility of local/state government agencies and can be a multi-party/multi-step process, involving plan reviews and site visits at various stages of the construction process, as well as training and education in advance of energy code changes. The diversity of actors involved places a high premium on the need to clearly communicate the role and responsibility of each stakeholder.

Negative Impact on Claimed Savings from Other Programs

Savings from energy codes represent a potential problem to conventional energy-efficiency programs because improved codes shift the baseline of minimum building efficiency upward, making it more difficult and more expensive to achieve savings above and beyond "business as usual." Fortunately, code compliance, unlike code adoption or development efforts, likely will not negatively affect current new construction programs that are commonly offered by efficiency programs as new construction programs generally assume energy efficiency performance levels in line with the minimum existing building energy code. However, in the case that program administrators can demonstrate the participant would have been non-compliant without the program, there may be justification for claiming some marginal code compliance as an element of the program. Thus, getting program administrator buy-in and regulatory support for codes and standards (C&S) programs necessitates that they have a clearly defined path for claiming some of the savings achieved in raising the baselines.

Statutory and Regulatory Barriers

Utilities operate in a highly regulated environment that can provide unintended but critical disincentives toward investing in energy efficiency. Efforts to credit energy savings from code compliance programs require approval from state regulators or governing boards, depending on the type of utility. What's more, building code enforcement is the jurisdiction of local and/or state agencies wherever provided by law. In almost all cases, efficiency programs do not have legal authority to ensure code compliance (nor would programs want to wield this power) but use advanced construction programs (e.g., ENERGY STAR) to incent buildings to be constructed to higher standards. Local governments and states have a variety of enforcement schemes where different agencies or offices may have jurisdiction over different building types or compliance responsibilities. In general, developing high compliance rates in rural areas and in states with multiple climate zones has been a challenge to local and state government training and enforcement efforts.

In order to receive the necessary approval from regulators, utilities should clearly communicate how their code related programs will enhance code compliance while addressing the statutory and geographic challenges as expressed above. Only after a clear case is made that program intervention will affect improved compliance will regulators be comfortable directing program resources to this effort.

Attribution of Energy Savings

The complex nature of building codes presents unique challenges in the evaluation, measurement, and verification of savings attributable to code compliance efforts. Utilities must grapple with the ongoing challenge of accurately measuring building code compliance before and after any interventions. Use of standardized tools/methods of measuring compliance, such as the PNNL checklist approach, will ensure that programs start from an established baseline of compliance and are able to demonstrate improvement from that baseline based on their engagement.

To make the measured compliance rate from a checklist approach meaningful from a program evaluation perspective, a bridge step is needed to unbundle the raw compliance score to actual energy effects. For instance, knowing whether wall and ceiling insulation is either at code or marginally/substantially below or above code provides greater transparency and conveys more information about the actual energy use of the building relative to code than an aggregate compliance score provides. Frequent surveying of code compliance to assess progress in aggregate (i.e., overall compliance rates) and to identify explicit trends in underperformance at the micro level will help in the development of training programs and in the measurement and verification of realized energy effects for utilities that support building energy codes programs.

Efficiency programs administered by regulated utilities are carefully scrutinized to demonstrate that energy savings were directly attributable to program activities. Demonstrating a clear cause and effect relationship proves especially difficult in the case of code training programs and other programs aimed at achieving market transformation, especially when compared to simple, transaction-based efficiency measures, such as equipment rebates. Unlike other energy-efficiency and demand-side management (DSM) programs, utility code compliance programs depend on many actors and a long chain of efforts and therefore entail energy savings that are complex to measure and may take years to occur.

The variety of stakeholders/parties involved with building code compliance—including state energy offices, local building departments, regional energy efficiency coalitions, and the building industry itself—further complicates the attribution problem, as it can prove challenging to assign exact amounts of credit to each of these parties for gains in code compliance. Unless programs and their evaluators can reasonably prove that certain results would not have generally occurred in the absence of their activity, assigning energy savings becomes difficult. If this general concept is accepted by regulators, it will be up to them to decide exactly how much of the savings can be credited to the involved program.

A handful of states—California, Arizona, Massachusetts, Minnesota, and others—have established or are in the process of developing mechanisms whereby energy savings can be quantified and attributed to program administrator efforts. Additionally, the Northeast Energy Efficiency Partnerships (NEEP) EM&V forum has a project underway to develop a

recommended EM&V approach for attributing energy savings to ratepayer funded energy codes programs, and to build an understanding of the energy savings potential associated with improved compliance levels.

Conclusions and Recommendations

State and regional policy goals are influencing utilities to consider the formal development of a building energy codes program that would supplement code development, adoption, and enforcement activities already occurring at the state and municipal level. The case studies show the experiences developed by utilities running these sorts of assistance programs to date, yet there remains a vast untapped potential for broader, multi-year, multiple action approaches to acquiring savings from improved compliance. The path ahead depends on dialogue on the key questions regarding regulatory and attribution uncertainties, as well as options for integration of building energy codes and noncompliance into long-term resource planning. We recommend the following priority actions:

- Recommendation #1 – Advance measurement and translation of baseline compliance levels such that utility programs can target education and training efforts to problematic areas of the design, permit, and build process
- Recommendation #2 – Develop a mechanism for evaluating and attributing the energy savings impacts appropriate to the type of program administrator (e.g., IOU, municipal utility, efficiency utility) and magnitude of investment.
- Recommendation #4 – Secure regulator approval for expenditures on code activities, including a mechanism for cost recovery and claiming credit towards savings goals.
- Recommendation #3 – Promote the inclusion of energy codes into integrated resource planning.
- Recommendation #5 – Advance knowledge on the interaction of codes with existing energy efficiency programs.

References

Baggett, C. (Arizona Public Service). 2012. Personal Communication. May 1.

[ACC] Arizona Corporation Commission. 2010. Arizona Administrative Code Title 14, Ch. 2. Corporation Commission – Fixed Utilities. http://images.edocket.azcc.gov/docketpdf/0000116125.pdf.

[CPUC] California Public Utilities Commission. 2008. *California Long-Term Energy Efficiency Strategic Plan.* http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/eesp/eesp.htm.

[CPUC] California Public Utilities Commission. 2010. "Fact Sheet: Energy Efficiency Statewide Codes and Standards Program (2010-2012)." http://www.cpuc.ca.gov/NR/rdonlyres/FAA129C6-55D8-42CC-8B1C-3F4FBAD8FE5B/0/EE14CodesandStandardsPrograms0710.pdf.

[CPUC] California Public Utilities Commission, Energy Division. 2011. *Energy Efficiency Evaluation Report for the 2009 Bridge Funding Period.*

Cooper, A. and L. Wood. 2011. *Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010 - 2025).* http://www.edisonfoundation.net/iee/reports/IEE_CodesandStandardsAssessment_2010-2025_UPDATE.pdf. Washington, D.C.: Institute for Electric Efficiency.

[DOE] U.S. Department of Energy. 2011. *Building Energy Codes: State Compliance Evaluation Procedures.* http://www.energycodes.gov/arra/compliance_evaluation. Washington, D.C.: U.S. Department of Energy.

[IMT] Institute for Market Transformation. 2010. "Policy Maker Fact Sheet Building Energy Code Compliance." http://imt.org/files/PolicymakerFactsheet-EnergyCodeCompliance.pdf. Washington, D.C.: Institute for Market Transformation.

[IMT] Institute for Market Transformation. 2012. *Third-Party Performance Testing: A case study of residential energy code enforcement in Austin, Texas.* http://imt.org/files/FileUpload/files/IMT_Austin_CCCS_Nov2011.pdf. Washington, D.C.: Institute for Market Transformation.

Kunkle, R. 1997. *The Washington State Energy Code: Certification for Inspectors and Plan Reviewers for the Non-Residential Energy Code*. Prepared for the U.S. Department of Energy. Olympia, Wash.: Washington State University.

[PNNL] Pacific Northwest National Laboratory. 2010. *Measuring State Energy Code Compliance.* PNNL-19281. Prepared for the U.S. Department of Energy. http://www.energycodes.gov/arra/documents/MeasuringStateCompliance.pdf. Richland, Wash.: Pacific Northwest National Laboratory.

[TEP] Tucson Electric Power Company. 2011. *2011-2012 Electric Energy Efficiency Implementation Plan.* https://www.tep.com/doc/efficiency/tep-eeplan.pdf. Tucson, Ariz.: Tucson Electric Power Company.

[VEIC] Vermont Energy Investment Corporation. 2012. *New York Energy Code Compliance Study*. Prepared for the New York State Energy Research and Development Authority. http://www.cx-associates.com/images/stories/pdf/nyserda_code_compliance_final_report_with_appendices_sm.pdf. Burlington, VT.: Vermont Energy Investment Corporation.

Yang, B. 2005. *Residential Energy Code Evaluations.* http://bcap-energy.org/files/BCAP_RESIDENTIAL_ENERGY_CODE_EVALUATION_STUDY_June2005.pdf. Providence, R.I.: Building Codes Assistance Project.