

The Building Codes Assistance Project

Roundtable Discussion on Energy Code Compliance and Evaluation



INTRODUCTION

Adoption is the first and most publicized step in the energy code process, yet it is only half of the equation. Implementation connects energy codes to actual energy savings. The most well-written code is no more than words on paper without the efforts of design professionals, builders and code officials to comply with and enforce the code, and often such implementation is woefully lacking. It is disconcerting, then, that this topic receives disproportionately little attention in the world of building energy codes.

In order to better understand the problems associated with energy code compliance, BCAP and the Energy Foundation teamed up to explore two crucial issues: 1) why most states and jurisdictions have poor compliance rates, and 2) how we can measure and quantify compliance in ways that add value to promoting and assuring sustained investment in better energy code implementation.

THE ISSUE

Simply put, energy code compliance is abysmal. Comprehensive energy code evaluations show that compliance hovers around 40% or worse, and many state evaluations indicate much lower levels. These bleak numbers stand in stark contrast to the lofty 90% compliance target outlined in the conditional language of the American Recovery and Reinvestment Act of 2009 (Recovery Act) and underscore the need for states to address compliance failures with new approaches to implementation, particularly for training programs. States that value improved building energy performance, reductions in peak load and demand requirements, energy savings for consumers and the overall health of their economy should have a vested interest in improving code compliance.

Furthermore, how we measure compliance is another cause for concern. Experience tells us that, without a standard to guide the process, state evaluations of code efficacy vary wildly in what they measure and how. Sometimes an evaluation measures compliance variations from prescriptive code requirements for envelope R-values. Other approaches measure percent deviations from baseline total U_o (heat loss) calculations. Most of the time, evaluations fail to quantify deviations from 100% compliance, and rarely are these evaluations conducted in terms of actual energy use. In short, there is little uniformity in the evaluation methodology, and the information is often of little use. The conditional language in the Recovery Act provides us with an opportunity to create a standardized method for energy code evaluation that states and jurisdictions can use to measure actual building energy use and compliance, as well as provide data for investments in higher compliance levels.

PREVIOUS RESEARCH

Multiple states evaluated the effectiveness of their energy codes in the late eighties and early nineties, particularly after the first federal EPAct in 1992,



Courtesy of DOE/NREL, Credit—University of Texas-Austin

The Building Codes Assistance Project

Roundtable Discussion on Energy Code Compliance and Evaluation

which directed states to compare their energy codes to the national model codes to determine whether revisions would be appropriate. Often, though, these evaluations contained little information on compliance rates. While some included compliance measurements, particularly those where proof of efficacy helped promote state investments, there was no consistency in how each state conducted its evaluation. Few, if any, measured energy savings.

As part of a “Gap Analysis” study we conducted in 2004-05, BCAP attempted to research and quantify the energy and climate “savings gap” between complying and non-complying building stock. We concluded, however, that the data available was too variable to compile into a “savings gap” analysis. Moreover, the compliance metrics differed across the board, making it impossible to simply measure a basic compliance rate. The study also showed that, outside of the Pacific Northwest states and California, compliance rates were alarmingly low, which not only raised the question of how we should measure compliance, but also of what implementation methods were already working in the few states and jurisdictions that had strong compliance rates. Thus, we decided to conduct a roundtable discussion with professionals in the field to discover what they thought might serve to increase compliance and standardize the evaluation process.

THE ROUNDTABLE

BCAP held a roundtable discussion at the Residential Services Network (RESNET) Building Performance Conference in New Orleans in early 2009. The audience was composed primarily of national residential building energy program service providers, HERS raters, homebuilders and efficiency organizations engaged in beyond-code programs. All of these participants worked with energy and other codes as part of their jobs, including many who conducted



Courtesy of DOE/NREL, Credit—Paul Norton

energy code compliance training. Most have learned to work around code shortcomings, as is the nature of beyond-code energy efficiency work, and could offer insight into where the code infrastructure “goes wrong” in attempting to provide safe and durable residences that are also energy efficient. Forty-five people attended the roundtable, with roughly equal representation from each of the various groups.

Prior to the open discussion, we “seeded” the audience with some information on the conditions in the Recovery Act for 90% compliance and a few questions to get them thinking and help prepare their thoughts:

Compliance

- Is the energy code being enforced (or complied with) in your area?
- How can we improve compliance?
- Do you think the traditional code enforcement infrastructure can assure energy code compliance? Or building performance? Or energy savings?
- What compliance approaches do you see working in your area?

The Building Codes Assistance Project

Roundtable Discussion on Energy Code Compliance and Evaluation

- Should we have third-party compliance?
- Can HERS Raters or the HERS infrastructure be part of the answer?

Evaluation

- How do we know whether we are getting the savings that we want from energy codes?
- How should we measure their efficacy?
- Do we measure only compliance? Or do we need to be more concerned about energy savings?

ROUNDTABLE OUTCOME

The roundtable produced a lively discussion, which supplied us with the following information:

Compliance

- The audience agreed that energy codes are not well enforced in their areas (Note: all the attendees



Courtesy of DOE/NREL, Credit—Warren Gretz

came from locales that had energy codes).

- The perception among the group was that Code Enforcement Officials (CEOs) lack a solid understanding of energy efficiency, energy systems and how they work, knowledge that is critical to their ability to enforce regulations based on these concepts, as is often the case. The group also cited a lack of understanding among CEOs of basic building science.
- In some areas, CEOs are begging for additional training, but are barely receiving the support they need for Life Health Safety (LHS) codes, much less for energy.
- Everyone agreed that CEOs do not have much time for energy work in the scope of their daily activities. Moreover, they have almost no QA/QC in the field through inspections, as the energy inspection process often conflicts with the LHS processes.
- CEOs almost never enforce energy code requirements for substantial alterations in existing buildings save for replacement windows, and then only occasionally.
- The HERS and building performance community welcomes the opportunity to take part in the energy code compliance (and evaluation) process. HERS-As-Codes, known in the building industry as the use of Home Energy Ratings (HERS) as a performance compliance methodology, might provide a readily accessible, quantifiable evaluation process (i.e. HERS energy modeling for code compliance and energy use). It may also provide even more accurate energy use data if utility bills are accessible and used to normalize the modeling data. Using the HERS-As-Codes approach could provide a very accurate measurement of current practice and code compliance. Additionally, the

The Building Codes Assistance Project

Roundtable Discussion on Energy Code Compliance and Evaluation

Energy Star Program collects all this data, which serves to provide a national database for benchmarking homes.

- Some audience members suggested that the codes industry stop training CEOs, builders and design professionals separately. Instead, they should “get everyone in the room” for energy and other code training to facilitate understanding between the groups.
- Many in the group wanted to see proper needs assessments for training in jurisdictions and states.

Evaluation

Based on the comments and general sentiment of the roundtable participants, we offer the follow summary points:

- State and local governments need to use Recovery Act funding to evaluate and measure energy code compliance—as is required by the legislation—and validate compliance data by tracking actual energy use through energy bills. They can do this on a sampling basis.
- Measuring energy savings will help draw support from utilities and energy offices for ongoing energy code implementation efforts.
- Involved actors in the energy code compliance process should increase integration with HERS and other beyond-code programs. Both sides benefit from more interaction: Code officials learn about advanced building practice, while beyond-code programs receive more program marketing opportunities.
- Those involved in national code improvement and adoption efforts are rarely in the room for discussions of the inadequacies and problems associated with compliance and evaluation. Thus, their focus is largely on upgrading the codes. Exposing na-

tional code improvement advocates to these issues could help them expand their advocacy efforts to include improved measuring and compliance.

- We should explore similar evaluation techniques for the commercial side as well.
- Developing a national energy code evaluation standard will make compliance more efficient and effective.

SUMMARY AND NEXT STEPS

It is apparent that there is great interest in energy code compliance and evaluation within the building community, in theory if not always in actual practice. BCAP recommends that we continue the discussion by offering the following course of action:

1. Conduct a follow-up discussion with other active players in the energy code arena, including energy code administrators and code officials, among others. We are tentatively planning to hold our next roundtable, which NYSERDA has agreed to host, in late April/early May, pending funding approval.
2. Present the first roundtable findings at the follow-up session.
3. Conduct similar roundtables with commercial construction audiences.
4. Design a track or sessions at the DOE National Energy Codes Conference in Portland in August 2009 to bring the discussion to a wider national audience, including the states, jurisdictions and individuals that are the most active in energy codes.
5. Develop a project to design a national energy code evaluation standard.

For more information please consult the Building Codes Assistance Project website at www.bcap-energy.org.

