REGIONAL EVALUATION, MEASUREMENT & VERIFICATION FORUM

Regional EMV Forum and NEEP Public Policy Workshop: Roadmap to Claiming Savings from Building Energy Codes and Appliance Standards

September 28, 2010

Why Are We Here?

We are here because codes and standards (C&S) are Hot!

- Efficiency identified as priority resource—affordability, climate, reliability, and economic development
- States setting aggressive new goals for energy, emissions or both, with new resource priorities mandated and funding set at historic levels
- Need to go broader & deeper—all fuels, whole-building approaches, new program strategies, better coordination with other public policies, recognition of the market value of energy efficiency
- C&S identified as a low-key and highly cost-effective opportunity for savings through energy-efficiency building codes (new/renovations) and appliance/equipment standards efforts
- American Recovery and Reinvestment Act (ARRA) requires that states meet minimum compliance levels with most recent codes by 2018
- DOE has renewed emphasis on standards
- States in the region are just beginning to address how ratepayer-funded energy efficiency programs work together with other policies to achieve state goals for energy and emissions.
- The administrators of energy efficiency programs (PAs) have good cause to be interested and potentially more involved in C&S. Their programs are directly affected by baseline changes resulting from advances in code and standards. Furthermore PAs have expertise and contacts that make them valuable and potentially highly effective stakeholders in efforts to advance C&S.

Studies have shown that there is a very substantial opportunity for savings through efforts to upgrade codes and standards (C&S) and improve compliance with existing C&S. (Note that, while the use of these terms is not always consistent, in order to avoid confusion the Northeast region might be well served to start out by using "codes" in reference to new construction and renovation, and "standards" in reference to equipment.)

Meanwhile, there are some key barriers to the effective implementation of activities advancing C&S as part of conventional (ratepayer-funded energy efficiency) programs:

- The need for regulatory approval of a means of attributing savings to program administrators' C&S efforts
- Reluctance by some program administrators to take on C&S programs because of the threat to existing programs—that is, because C&S programs increase the baseline against which conventional energy efficiency programs are assessed

- C&S activities don't easily fit into cost-effectiveness screening for rate payer efficiency programs
- Measuring the impact of Program Administrator activities intended to advance C&S is challenging.
- For some equipment types, federal standards preempt state standards, unless a petition for an exemption is approved

NEEP and the EMV Forum aim to help find ways to address barriers, facilitate dialogue, and identify ways to realize the opportunity for individual states—which is why NEEP and the Forum are involved.

What Is the Opportunity?

Estimates for electricity savings though upgraded building codes in the US range from 18 TWh by 2020 under a "moderate" scenario to 59 TWh under an "aggressive" scenario. The "moderate" scenario for standards upgrades is 86 TWh in savings, and the "aggressive" scenario is 234 TWh. Together, IEE estimates that C&S upgrades could save from 104 to 293 TWh by 2020, or from 2.5% to 7.1% savings relative to the baseline forecast from the Energy Information Administration's Annual Energy Outlook. The moderate scenario assumes implementation of building codes equivalent to IECC 2009 or ASHRAE 90.1 2007 with 100% compliance adopted in all states, and appliance & equipment standards for items scheduled or overdue under EPACT 2005 and EISA 2007. The aggressive Scenario assumes that building codes outlined in the Waxman-Markey Bill are passed and adopted in all states with 100% compliance, and in addition to moderate scenario, it assumes that the standards expand to address all possible devices with a second set of standards for some technologies in later years (e.g., screw-in lamps and central AC).

Table 1: Summary of C&S Electric Impacts in 2020 in the United States: Residential, Commercial, and Industrial Sectors

Scenario	Electricity Use in 2020 (TWh)	Savings from Building Codes (TWh)	Savings from Equipment Standards (TWh)	Total Savings (TWh)	% of Baseline
AEO Baseline Forecast	4,117				
Moderate Scenario	4,012	18	86	104	2.5%
Aggressive Scenario	3,824	59	234	293	7.1%

Source: *Assessment of Electric Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010-2020)*; Institute for Energy Efficiency, December 2009

The American Council for an Energy-Efficient Economy (ACEEE) estimates that by 2020, upgrades to C&S could reduce electricity use by 4.5% and natural gas use by 1.6%.[1]

In California, investor-owned utility efforts in the 2006-2008 program years, from changes to 2005 C&S, resulted in savings of 599,000 MWh (600 GWh, 0.6 TWh), 175 MW, and 12 million therms through code efforts, and 1,065,000 MWh (1,000 GWh, 1 TWh), 162 MW, and 7.4 million therms through standards efforts. For reference, 175 MW is the equivalent of a mid-sized power plant, and would provide the power for roughly 100,000 or more households in the Northeast[2]. The electric savings from C&S programs in California represent 60% of all savings from investor-owned utility programs, and 19% of residential and commercial electricity use.

And, while California appears to be the only state where program administrators have received *credit* for savings through C&S efforts, other states are close to doing so, or for making the claims. For example, Arizona plans to credit up to 1/3 of the savings from utility C&S efforts towards its 2020 Energy Efficiency Standards (EES) target. In the Northeast, NYSERDA is leveraging ARRA funding to increase compliance with the building code in New York. The Massachusetts program administrators have estimated savings from enhanced compliance with the IECC 2009 Residential Building Code, and are developing a mechanism for measuring savings from increased code compliance and from upgraded stretch codes (that is, codes higher than the state level for communities that choose to adopt them); the Massachusetts program administrators have also made preliminary estimates of potential savings from upgrades to the standard for residential forced hot water boilers. Other states in the Northeast are also developing C&S efforts, which are to be summarized during the NEEP EMV Forum Workshop.

Meanwhile, the American Recovery and Reinvestment Act (ARRA) requires that states requires that states meet minimum code compliance levels by 2018, and some states are leveraging ARRA funds to jumpstart this effort.

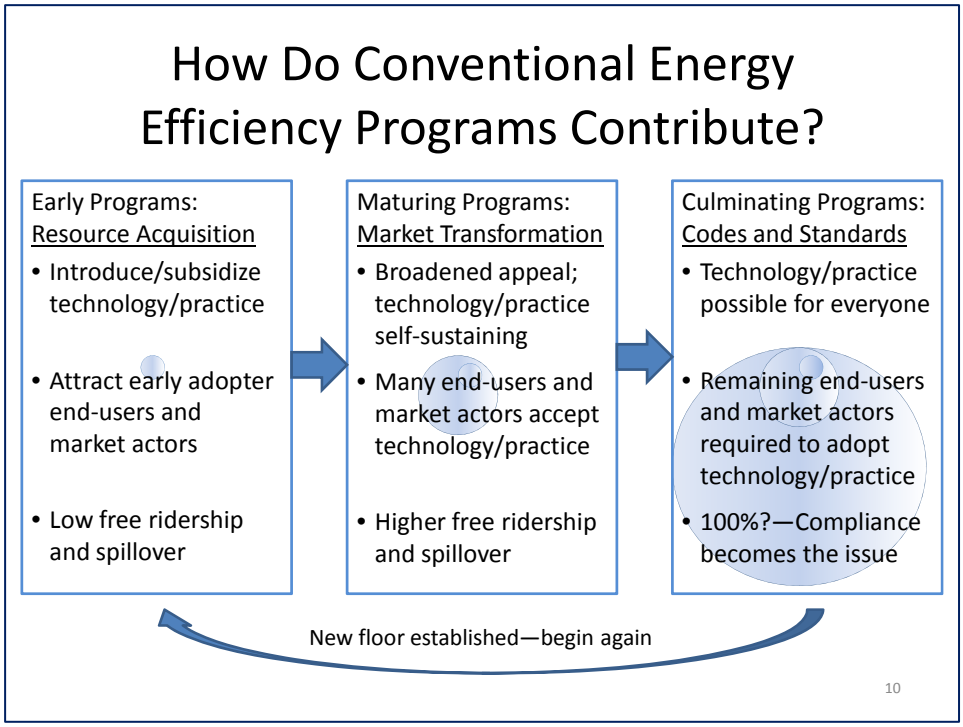
How Do Conventional Energy Efficiency Programs Contribute?

As depicted in Figure 1 below, conventional energy efficiency programs help set the stage for C&S programs by introducing and subsidizing technologies and practices before there is a market for them, and in the process help to establish a market. Program administrators bring building science and evaluation expertise, as well as resources to assist in training and education to the table already through ongoing programs.

Once market actors are able to make money on the technology or practice, more end users accept it and are willing to pay full price for it, it becomes more widespread, its viability is demonstrated, and it is then possible to consolidate the changes through an upgrade to C&S. An effective energy efficiency program can accelerate the practicability of a C&S upgrade.

[1] Fact Sheet: "Energy Savings from Codes and Standards Count Towards EERS Savings Goals," American Council for an Energy-Efficient Economy, April 2009.

[2] Based on information available from http://www.utilipoint.com/issuealert/print.asp?id=1728



What Is the Effect on Conventional Energy Efficiency Programs?

While C&S savings are potentially quite substantial, they represent a potential threat to conventional energy-efficiency programs because they shift the baseline upward and make it more difficult and more expensive for them to achieve savings. Thus getting PA buy-in and support for C&S programs necessitates that they have a path for claiming some of the C&S savings, provided they play a significant role in getting them adopted and are able to demonstrate it.

In addition to promoting C&S upgrades and documenting their role in the upgrades, PAs can adapt by focusing on early replacement and retrofits in existing buildings to achieve savings not reached for many years by C&S, promoting the next generation of super-efficient technologies, and linking their conventional programs to future C&S upgrades—that is, more explicitly making them part of the same cycle.

What Are the Aims of C&S Programs?

C&S programs run by energy efficiency PAs, then, can serve the following functions:

- Advocate and provide supporting evidence for upgrades to existing codes and standards
  - National
  - State
  - Local "stretch" or "reach" codes and standards (going above state requirements)
- Provide training and enforcement support to ensure compliance

- Document efforts so they are not "lost to history" and so that savings claims can be justified
- Measure costs and benefits to assess their overall effectiveness and provide information to allow improvements
- Keep new technologies and practices in the pipeline through conventional energy efficiency programs
- Petition for exemption from preemption of state standards by federal standards

What Is the Role of Regulators?

Regulators, of course, must oversee PA's C&S efforts, and weigh the programs' costs and benefits in the context of existing mandates or directives—e.g., the mandate of achieving "all cost effective savings" given the political implications of possible rate impacts. Regulators must also consider not just PAs' costs, but also the added costs for other entities, such as municipalities that will have added cost for enforcement. Key roles include:

- Understanding the policy context for program administrator activities;
- Identifying how administrator investments in conventional programs interact with and may affect beyond-code programs;
- Working with program administrators to address questions related to cost recovery, goal setting and incentives.

Regulators can also encourage and facilitate coordination and collaboration among program administrators and building departments, government agencies and other stakeholders. Where applicable they may facilitate petitions for exemptions from federal preemption of state standards.

Finally, *regulators have the power to make codes and standards programs happen, or to stop them*—either by purposely blocking them or simply by failing to act. To quote former New England Electric System CEO John Rowe, it is essential that PAs are able to "smell the cheese" of monetary rewards for successful C&S programs. Hence regulators must approve mechanisms for program administrators to claim savings from C&S efforts. These savings claims could be based on evaluation, such as the system being used in California or the less complex system being contemplated in Massachusetts, or they could be deemed or negotiated, such as the system recently agreed to in Arizona.

What Is NEEP's Potential Role?

NEEP and the EMV Forum could play a coordinating role in C&S efforts in the Northeast in the following ways:

- Help build coalitions of stakeholders to support C&S upgrades and enforcement
- Conduct outreach and education in support of code adoption and increased compliance with existing codes
- Leverage resources
  - Secure funding for studies

  - Bring in other parties—DOE, EPA, national and international code bodies, other not-for-profit organizations, manufacturers, builders, PAs and regulators outside the Northeast
- Provide training and materials for code officials, building trades, and product distributors/suppliers
- Link codes to ratings of building performance to get "currency" on the market for securing financing
- Develop or improve methods for estimating the costs, savings, and other impacts of C&S
- Provide information and resources to help overcome barriers such as
  - Lack of regulatory approval of savings claim mechanism
  - Lack of buy-in from program administrators because of the threat to conventional energy efficiency programs
  - Lack of cost effectiveness screening tools
  - Possibility of preemption of state standards by federal standards
- Facilitate learning from each other
  - Expand peer-exchange opportunities for code officials, regulators, and program administrators
  - Establish working group
  - **This workshop is the first step in the learning and coordinating effort—glad you are here!**

Where Can We Get More Information?

Energy Efficiency Program Administrators and Building Energy Codes, A Resource of the National Action Plan for Energy Efficiency, September 2009, http://www.epa.gov/cleanenergy/documents/suca/codes.pdf

Assessment of Electric Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010-2020); Institute for Energy Efficiency, December 2009, www.edisonfoundation.net/iee/reports/index.htm

Codes & Standards (C&S) Programs Impact Evaluation California Investor Owned Utilities' Codes and Standards Program Evaluation for Program Years 2006-2008, Study ID: CPU0030.06, http://www.calmac.org/search.asp

STATE STANDARDS FOR NATIONWIDE PRODUCTS REVISITED: FEDERALISM, GREEN BUILDING CODES, AND APPLIANCE EFFICIENCY STANDARDS, Alexandra B. Klass, http://www.law.harvard.edu/students/orgs/elr/vol34_2/335-368.pdf

Valuing Building Energy Efficiency through Disclosure and Upgrade Policies, A Roadmap for the Northeast U.S., A Dunsky Energy Consulting Report for NEEP, November 2009, http://neep.org/public-policy/building-energy-codes/building-energy-rating

Getting to Zero: Final Report of the Massachusetts Zero Net Energy Buildings Task Force, March 11, 2009, http://www.mass.gov/Eoeea/docs/eea/press/publications/zneb_taskforce_report.pdf

Rethinking Percent Savings: The Problem with Percent Savings and the New Scale for a Zero Net-Energy Future, for Southern California Edison, by Architectural Energy Corp., July 31, 2009 http://www.newbuildings.org/sites/default/files/Rethinking_Percent_Savings.pdf

Building Energy Codes Glossary, Building Energy Code Resource Center, http://resourcecenter.pnl.gov/cocoon/morf/ResourceCenter/article/1295

State Energy Efficiency Resource Standard (EERS) Fact Sheet: Updated August 2010, http://www.aceee.org/files/pdf/State%20EERS%20Summary%20Aug%202010.pdf

Testimony of Steven Nadel, Executive Director, for the the U.S. Senate Committee on Energy and Natural Resources Hearing on Appliance Standards, March 10, 2010, http://www.aceee.org/files/pdf/State%20EERS%20Summary%20Aug%202010.pdf

ACEEE Summer Study Papers, August 2010

- Lessons Learned from Building Energy Code Compliance and Enforcement Evaluation Studies, by Harry Misuriello, Sarah Penney, Maggie Eldridge, and Ben Foster, http://neep.org/uploads/EMV%20Forum/EMV%20Studies/misuriello.pdf

- Savings from Codes and Standards Activities: Developing an Evaluation Mechanism in Massachusetts, by Betty M. Tolkin, et al. http://neep.org/uploads/EMV%20Forum/EMV%20Studies/tolkin.pdf

- The Future of Energy Codes, by David Cohan, Northwest Energy Efficiency Alliance Dave Hewitt and Mark Frankel, New Buildings Institute
  http://neep.org/uploads/EMV%20Forum/EMV%20Studies/future_codes.pdf

- Re-Inventing Building Energy Codes as Technology and Market Drivers, by Jeffrey Harris, et al.
  http://neep.org/uploads/EMV%20Forum/EMV%20Studies/reinventing_codes.pdf

- The Regional Standards Agreement for Residential Furnaces, Air Conditioners, and Heat Pumps: Process, Results, and Implications, by Karim Amrane, Air-Conditioning, Heating, and Refrigeration Institute, Harvey Sachs and Steven Nadel, American Council for an Energy-Efficient Economy
  http://neep.org/uploads/EMV%20Forum/EMV%20Studies/regional_standards.pdf