Extra Credit: How utilities can receive credit for savings from building energy codes

Dan Groshans, Allen Lee, Cadmus, Portland, OR

ABSTRACT

For at least two decades, building energy codes and appliance standards have been identified as important strategies for transforming the energy-efficiency market (Geller & Nadel 1994). The American Recovery and Reinvestment Act of 2009 (ARRA) led to a surge in building energy code adoption at the state and local level. These codes affect all new buildings and can contribute to major energy savings. In recent years, advocacy organizations have made utilities and program administrators (PAs) aware of the potential for energy savings from building energy codes and utilities in several states are examining ways to support building energy codes; only a few have received credit for energy savings (or soon will).

What conditions must exist for a building energy code program to generate savings? How can these savings be measured? How can a utility receive credit for energy savings?

In a recent study for the Northeast Energy Efficiency Partnerships (NEEP), Cadmus led an investigation into the conditions that must exist for utilities to receive credit for energy savings from building codes. The study assessed building code and energy-efficiency program policies in 17 states; in Arizona, Rhode Island, and Massachusetts, utilities are close to receiving credit; in California, utilities have already have received credit; in some other states conditions may support savings in the future. In this paper, we describe conditions in 17 states and identify actions utilities can take to develop, adopt, and enforce building energy codes. We also recommend actions utilities in particular states should consider, depending on savings potential, local conditions, and current regulatory framework.

Introduction

For at least two decades, building energy codes and appliance standards have been identified as important strategies for accomplishing energy-efficiency market transformation (Geller & Nadel 1994). This process was accelerated with the American Recovery and Reinvestment Act of 2009 (ARRA), which has led to a surge in building energy code adoption at the state and local level in the past three years. These codes affect all new buildings and can contribute to major energy savings. Building energy codes have received considerable attention lately from utilities and other program administrators (PAs) because they represent significant energy-savings opportunities.[1] The first statewide evaluation of the California investor-owned utilities (IOUs) codes and standards (C&S) program (KEMA et al. 2010),[2] for example, found 312 GWh in cumulative savings from building codes for the program years 2006-2008. For the nation as a whole, a recent report estimates that upgrading building energy codes and appliance standards could offset all electricity consumption growth through 2025 (Rohmund et al. 2011). For PAs working on programs to save energy, building codes and appliance standards have many

[1] For simplicity, this paper refers to both utilities and program administrators as PAs.
[2] Pacific Gas and Electric, San Diego Gas and Electric, Southern California Electric, and Southern California Gas.

similarities so are often grouped together as "codes and standards." For the remainder of this paper, the focus is on building energy codes only.

In recent years, a number of advocacy organizations have been working to make utilities and PAs aware of the potential for energy savings from building energy codes. These organizations include the Regional Energy Efficiency organizations,[3] the Building Codes Assistance Project, the Institute for Market Transformation, and the Edison Foundation. As a result, many PAs have begun to realize the potential opportunities to either advocate for adoption of more stringent codes or support improvements in code compliance or both. However, there are roadblocks in that process.

However, nearly all of the energy savings for which utilities have received formal recognition have been associated with resource acquisition programs in which an incentive is paid to a utility customer for a measure—such as a furnace or water heater—or combination of measures that improve energy efficiency. When utilities have pursued efforts to upgrade codes and standards or to increase compliance, most have not received credit for any resulting energy savings. Moreover, if they support energy code efforts, however, PAs' resources are diverted from other energy-efficiency opportunities and the possibility arises that savings from traditional energy-efficiency programs will be reduced as codes increase energy-efficiency baselines. By receiving credit for energy savings, PA efforts become directed towards positively impacting code adoption and maximizing compliance.

PAs in several states have started examining ways to support building codes to achieve significant energy savings, but only a few have received credit (or soon will) for savings from code programs. Therefore, the following questions are being asked:

- What conditions must exist for PAs to receive credit for building energy code savings?
- What are some of the possible activities for building energy code programs?

On behalf of the Northeast Energy Efficiency Partnerships[4] (NEEP), a Cadmus-led team conducted in-depth research (Lee et al. 2013) to identify what conditions must exist for utilities to receive credit for energy savings from building codes. We assessed policies regarding building energy codes and energy-efficiency programs in 17 states. In Arizona, Rhode Island, and Massachusetts, several utilities are close to receiving credit; in California, utilities already have received credit for certain types of code related activities;[5] and in other states, some conditions exist that may support savings from building codes in the future.

Once the conditions in a particular state are understood, PAs must identify the actions to take to support codes and receive credit at some point in the future. These activities include supporting energy code development, adoption, and enforcement. In the small group of states where have received credit PA's supported code development and adoption. In those and other states, interest has been growing to achieve the savings that result from improvement in energy

[3] This group includes the Midwest Energy Efficiency Alliance (MEEA), Northwest Energy Efficiency Alliance (NEEA), Northeast Energy Efficiency Partnership (NEEP), the Southwest Energy Efficiency Partnership (SWEEP), and the Southeast Energy Efficiency Alliance (SEEA).

[4] Substantial support for this study was also provided by the Institute for Electric Efficiency (IEE), an institute of the Edison Foundation, and the Institute for Market Transformation.

[5] In California, investor-owned utilities have received credit for energy savings that resulted from code development and adoption. Their activities have included development of an evaluation protocol, development of code proposals, and advocacy that contributed to adoption of new building codes and appliance standards.

code compliance. In addition, utilities have often worked to establish policies that enable energy savings to be counted. For example, the attribution policy that provides a defined mechanism for crediting code savings to a PA was developed by PAs in California and Rhode Island.

The actions PAs should consider depend on identified potential, local conditions, and the current regulatory framework. The paper concludes with recommendations for PAs and other stakeholders in each of the states examined.

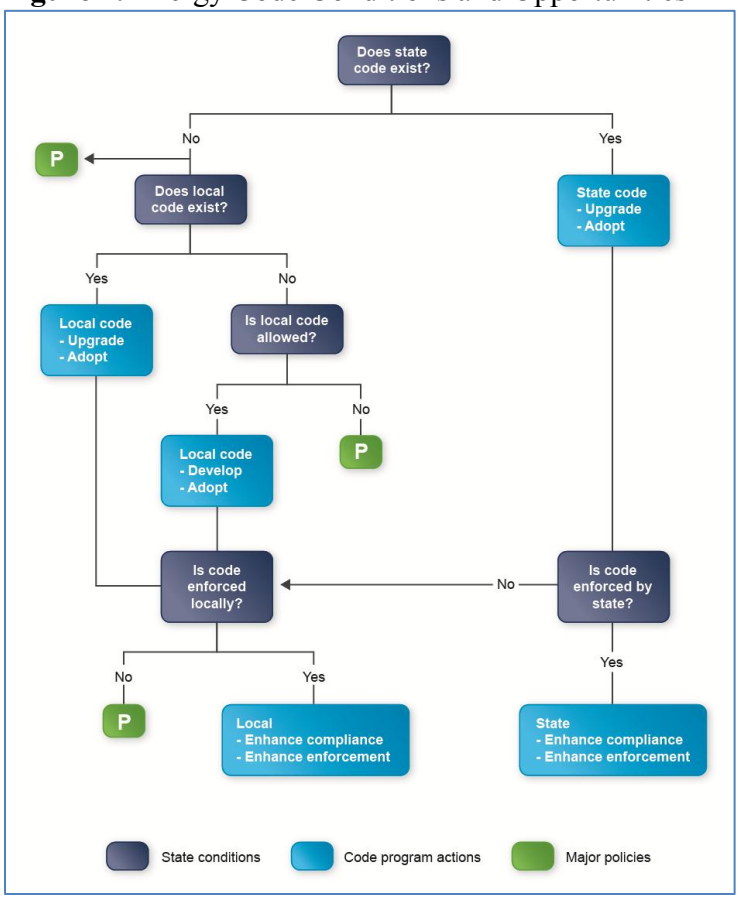
What conditions have to exist for PAs to receive credit for building energy code savings?

In each of the states in our study where PAs have either received credit for building energy code savings or are likely to in the near future, a combination of regulatory policy, energy-efficiency program structure, and attribution methods have made it possible. We found that in all of these areas it is necessary to have the support and cooperation of regulators, PAs, and evaluators and over an extended period of time to overcome obstacles in each state.

Regulatory Policy

Determining what code activities are good candidates for PA involvement depends on local code processes and policies. We developed a process chart to illustrate the types of code process conditions that are possible in a state and the opportunities that PAs could pursue. Figure 1 displays key steps in the process as a decision tree. The darker boxes indicate conditions and the lighter boxes indicate actions that can be pursued. The boxes containing "P" indicate actions that involve major policy changes. The figure suggests that compliance enforcement and enhancement are either local or state-level activities. In practice, however, compliance enforcement is often implemented through local (permit) processes and state-level activities such as training or certification. Similarly, compliance enhancement can include state and local elements.

Figure 1. Energy Code Conditions and Opportunities



The first question is whether a state energy code exists. If none exists, then policymakers may need to introduce a state code requirement (Foster et al. 2012).[6] Since this is a major policy initiative it would likely require several years to accomplish and necessitate the development of broad support; consequently, it would likely be necessary for a state energy code to be part of a long-term strategy in order for a PA to pursue adoption.

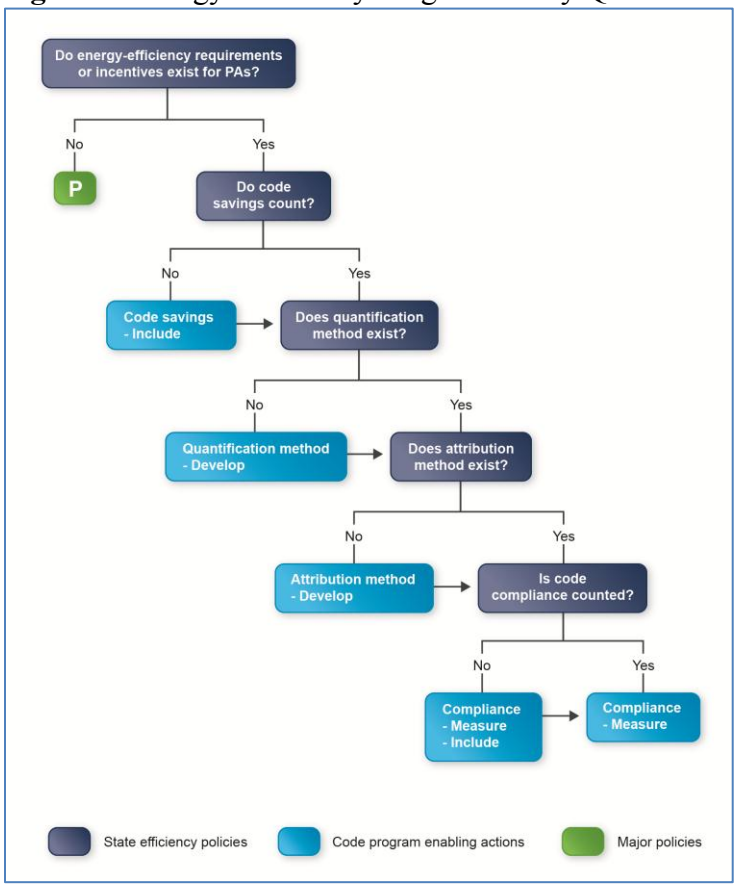
Even if a state code does not exist, there may be a local code in some jurisdictions. This is often the case in "home rule" states that do not have a mandatory statewide code, but in which local governments can adopt and implement a code.[7]

Energy-Efficiency Program Structure

Figure 2 illustrates how the energy-efficiency policy and program structure defines building code opportunities for PAs. PAs can choose the most-appropriate activities to support energy codes by asking questions about energy-efficiency policies (shown in darker boxes). The lighter boxes show the code-enabling actions that can lead to energy-savings credit from a building energy code program.

[6] Currently, 10 states do not have mandatory statewide energy codes for either residential or commercial buildings: Alaska, Arizona, Colorado, Kansas, Mississippi, Missouri, North Dakota, Oklahoma, South Dakota, and Wyoming.
[7] Home rule describes the relationship between the authority of state and local government. Home rule also provides for local government autonomy, but the degree of autonomy and the areas in which local autonomy is allowed vary.

Figure 2. Energy-Efficiency Program Policy Questions and Code-Enabling Actions



Many, but not all, states require PAs to meet energy-efficiency savings goals or provide incentives that encourage energy efficiency. If such requirements do not exist, however, the PA can advocate for such policies, which likely will require significant effort over an extended period of time. In states that have policies or mechanisms that require or incentivize PAs to promote energy efficiency, PAs must then determine whether code savings count—does the state recognize savings from building energy codes? If the state doesn't recognize such savings, then PAs need to advocate for a change in policy such that code savings are recognized.

In a state that does recognize code savings, PAs must have methods to quantify savings, assess attribution, and account for the degree of code compliance. This is especially important if an energy code exists and the PA has dedicated resources to increasing compliance.

We studied the process by which a state's energy code was established and the policies and procedures guiding energy-efficiency activities in 17 states. These states were chosen because they each had state or local energy codes and there is energy-efficiency program activity. The states represent a range of conditions across the country and provide useful insights into the opportunities and obstacles that have helped shape strategies for PAs, regulators, and other stakeholders in determining the best approach to establishing building energy codes.

Table 1 presents a matrix showing the energy-efficiency policy conditions that PAs can use as a starting point to assess the strategic situation and their options in implementing a code support program. The matrix combines the energy code decision tree shown in Figure 1 (on the horizontal axis) and the major energy-efficiency policy questions from Figure 2 (on the vertical

axis) to categorize the strategic situation in a state. The answer must be "yes" to both the column and row question in order to move to the next row down. Shaded cells indicate that a specific condition is not met. In most cases, any effort should focus on areas where a condition is not satisfied; that is, if a state appears in a shaded area, this is where the strategy should be focused.

Table 1. Strategy Matrix for Developing PA Code Programs

Energy-Efficiency Policy Condition		Does state code exist?		Does local code exist?		Who enforces code?			Row No.
		Yes	No	Yes	No	Local	State	Not enforced	
1. Are there energy-efficiency goals and/or incentives for PAs?	Yes	CA, CT, GA, IL, IA, MD, MA, MN, NH, NY, OH, OR, RI, VT, WA	AZ, CO	AZ, CA, CO, IL, MD, MA, NY	CT, GA, IA, MN, NH, OH, OR, RI, VT, WA	AZ, CA, CO, CT, GA, IL, IA, MD, MA, MN, NH, NY, OH, OR, RI, VT, WA	GA, IA, NH, OH, OR, VT, WA	MN*	1
	No								2
2. Do code savings count towards an energy efficiency goal?	Yes	CA, NY, OR, RI, WA		AZ, CA, NY		AZ, CA, NY, OR, WA	OR, WA		3
	No	CT, GA, IL, IA, MA, MD, MN, NH, OH, VT		CO, IL, MA, MD		CO, CT, GA, IL, IA, MA, MD, MN, NH, OH, RI, VT	GA, IA, NH, OH, VT	MN	4
3. Does a quantification method exist?	Yes	CA, NY, OR, RI, WA		AZ, CA, NY		AZ, CA, NY, OR, WA	OR, WA		5
	No								6
4. Does a method exist to attribute savings to PAs?	Yes	CA, NY, OR, RI, WA		AZ, CA, NY		AZ, CA, NY, OR, WA	OR, WA		7
	No								8
5. Is a change in code compliance counted?	Yes	RI							9
	No	CA, NY, OR, WA		AZ, CA, NY		AZ, CA, NY, OR, WA	OR, WA		10

*Minnesota is identified here as a state where code is not enforced in some rural areas. Cadmus has learned that the situation is very likely the same in other Midwestern states (at least).

From the matrix, we can observe that all 17 states have energy-efficiency goals and/or incentives for PAs (row 1). Nearly all have a statewide building code. The two exceptions are the

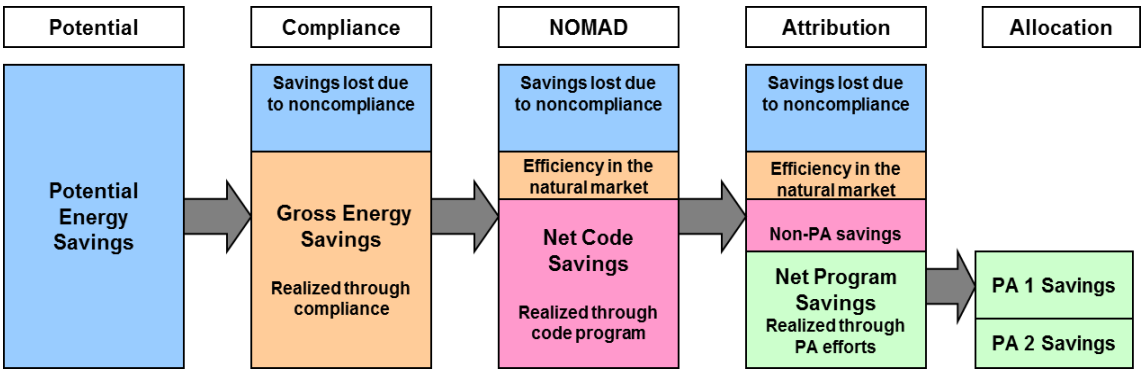
"home rule" states of Arizona and Colorado where we found that, even without statewide codes, there is potential for energy code savings since local codes are in place for the largest jurisdictions and, therefore, for a substantial part of the population.

Although there is potential in all 17 states to realize savings from energy codes, only six count code savings toward an energy-efficiency goal. Arizona, California, New York, Oregon, Rhode Island, and Washington (rows 3, 5, and 7) have regulatory structures that define how to quantify savings from code programs and attribute these savings to PAs. These states are unique in the level of development among the 17 states and, in fact, among all 50 states.

Attribution Methods

For PAs to receive credit for code savings, there must be methods—sometimes described as an attribution framework—for measuring savings and for assigning those savings to PAs. These methods are a requirement once there is discussion of allowing savings from energy codes to count towards PAs' efficiency goals. The specific methods vary somewhat between states. We present the model defined by the California evaluation protocol to illustrate the basic concepts (Figure 3). This model uses terms similar to other energy-efficiency programs. The emphasis in this model is on savings from the adoption of new or more stringent codes.

Figure 3. General Model of Energy Code Evaluation and Attribution to Utilities / PAs



This model was developed by the statewide C&S program and the California IOUs, whose support continued as the model was applied in a series of pilot investigations and eventually adopted by the state regulatory authority as part of a C&S-specific evaluation protocol. Key characteristics of the model include:

1. Adopted by the California Public Utilities Commission (CPUC), which means recognition by the regulatory authority.
2. Defined a process for measurement of energy savings from codes (and standards).
3. Defined an attribution step in which savings are credited to the PAs.

These characteristics are addressed in each state where code savings have been recognized, although the specific path and documents are unique in each state. In Rhode Island, for example, the Energy Efficiency Program Plan for 2013 (National Grid 2012), recognizes and authorizes the program, describes expected savings in terms of a deemed value in the near term and projected values in subsequent years, and defines the methods to be used for attributing

savings to the PA (National Grid). In both California and Rhode Island, it was the utility sponsor(s) that developed the initial framework for measurement and attribution.

What are some of the possible activities for C&S programs?

Once the PAs understand the conditions in their state, they can determine the actions to take to support building energy codes. This section describes three categories of activities:

- **Energy Code activities.** These affect building energy codes. See Figure 1 above.
- **Enabling activities.** These enable PAs to receive credit for energy-efficiency programs (including C&S programs). See Figure 2 above.
- **Additional activities.** These have been under-utilized or do not fit into the first two categories.

Of course, program resources are limited and activities need to be screened and prioritized. In our study, we describe several useful criteria that can be used to choose from among many possible actions. In the next section we describe a process that can guide program design.

Energy Code Activities

These activities directly address the regulatory policy area. In all cases where PAs have received credit, the building energy code savings have been the result of code adoption or compliance improvement. Any activities of a code program that have resulted in adoption of a more stringent energy code or that have improved compliance with existing code fall into this group.

PAs in California, Arizona, New York and Massachusetts have supported the development and adoption of state energy codes. This support has included participation in national model code development such as the International Energy Conservation Code (IECC) for residential construction and the ASHRAE code for commercial buildings. In California, program staff have worked with builders and builder associations to assess feasibility of code proposals and to gain industry support for proposed code changes. PAs in these states have also provided technical analyses to state government entities, such as the California Energy Commission, of the energy savings and cost-effectiveness of proposed codes. PAs have also provided testimony and actively participated in the code adoption process.

Local code development and adoption is another area where PAs have been active. In states like Arizona and Colorado that do not have a statewide energy code, this has been the only way for PAs to create potential savings from adoption. In states like California and Massachusetts that do have a statewide code, working with local jurisdictions can have additional benefits beyond the possibility of energy savings for a number of municipalities: it can also provide a number of test areas where a new more stringent code has been tried. Successful implementation of a new code in one part of a state can help to strengthen the argument for statewide adoption at a later time. PA support of local jurisdictions has included assistance with development of a model code, support for cost-effectiveness analysis, and direct participation in the adoption process.

For several years, PAs in a number of states have supported state and local energy code enforcement and compliance. Recently, interest has been growing in the potential to receive

credit for energy savings as a result of these activities. PAs have been most active in training industry stakeholders and compliance assessment. They have also provided technical assistance and support for third parties. These activities and the states where PAs have been active are listed below:

- ***Assess compliance with the existing code.*** It is important to determine the current code compliance level for at least two reasons: (1) establishing a baseline for energy savings from new building efficiency programs and (2) identifying opportunities for increasing compliance and code savings. [CA, CT, GA, NY, MA, NEEA, RI, VT]
- ***Conduct training of energy code officials and building industry members.*** PAs and others have delivered training programs to energy code officials and members of the building industry to increase their understanding of the codes, which then leads to improved enforcement and compliance. [AZ, CA, CO, CT, MA, NY, RI, VT]
- ***Provide technical assistance, materials, and equipment to energy code officials and industry.*** PAs have provided various technical assistance and materials to help officials enforce energy codes. They also have provided equipment in some cases, such as blower doors. [IA, GA, MA, VT]
- ***Support third-party enforcement or specialized inspection.*** In some cases, PAs have funded third parties (such as Home Energy Rating System [HERS] raters) to provide code enforcement assistance. [IA, GA, MD, WA]

Enabling Activities

These activities address energy-efficiency program structure, code program evaluation, and savings attribution. In each state where PAs have received credit for code programs, a combination of these activities has enabled the process to function (though these activities do not produce the energy savings).

PAs can work with the legislature or state agencies and governing bodies to set statewide energy savings goals and/or energy savings targets for the PAs to meet. Mechanisms such as Energy Efficiency Resource Standards (EERS) or strategic plans can be used to establish goals. These efforts can take years and considerable effort, but more than half the states now have policies in place such as an EERS (all of the study states except Georgia).

PAs can work in the state policy arena to support recognition of savings from code programs. Although it can take years to achieve policy changes, PAs in California, Arizona, and Massachusetts have been successful in this area.

PAs can define methods to quantify savings from energy code programs. The California protocol defines methods for evaluating savings from adoption of unique building codes. PAs in California, Arizona and Rhode Island have also established methods to quantify savings from local code adoption. Several states allow local jurisdictions to adopt building codes that exceed the statewide standard by 15% or more. PAs have been active in their support of such reach or stretch codes. Efforts to quantify the resulting savings are in progress in these three states.

PAs can establish methods for crediting savings to specific PAs and utilities. PAs in California, Rhode Island, and Arizona have supported development of an attribution framework that assigns savings to specific utilities. To date, California is the only state in which the attribution method has been applied to distribute savings among the IOUs that sponsor the statewide program.

PAs can also develop methods for quantifying compliance savings. As noted, development of methods to quantify savings from changes in compliance is an area of growing interest among PAs nationally. An in-depth discussion of the status of this work is included in another paper presented at the IEPEC 2013 (Lee & Groshans 2013)

Additional Activities

There is a wide variety of activities or strategies PAs could consider. Some have been tried on a limited basis; others have rarely been implemented. Briefly these activities are:

- Integrate energy code adoption and compliance efforts into energy-efficiency resource planning.
- Advocate for legislation that requires the state to adopt the latest national model codes automatically.
- Advocate for legislation that allows local governments to adopt codes exceeding state code.
- Implement a variable rate schedule based on a building's code compliance rating.
- Require builders/owners to prove code compliance as a requirement for utility service and for program participation.
- Provide plan review services or other innovative approaches to support enforcement.
- Support development of compliance assessment tools and methods.
- Initiate or support an energy code collaborative or task force.

General Process

In the process of developing a building energy code program, we identify three stages—initial, intermediate, and final—as they progress from an informal concept into a fully functioning program. Table 2 briefly describes each stage, the role of the PA, the role of the regulator, and some of the barriers that energy code programs typically encounter. Using the findings from the strategy matrix and other research, we placed each of the 17 states into one of the three stages.

Table 2. Process Roadmap for PA Energy Code Program Development

	Initial Stage	**Intermediate Stage**	**Final Stage**
State Status	**CO, GA, IL, IA, MD, MN, NH, OH, VT**	**AZ, CT, MA, RI**	**CA, NY, OR, WA**
Description	Situation analysis in progress	Code program established and funded	Code program produces savings (claimed)
	Code program not yet staffed, funded	Enabling issues are being addressed	Evaluation process validates savings
	Stakeholders not connected	Savings not yet claimed	Attribution process assigns savings to PAs
		Evaluation and attribution processes not exercised	

	Initial Stage	Intermediate Stage	Final Stage
State Status	**CO, GA, IL, IA, MD, MN, NH, OH, VT**	**AZ, CT, MA, RI**	**CA, NY, OR, WA**
PA Role	Initiate code collaborative / task force	Continue collaborative / workshops	Plan for ongoing program operation
	Develop code program proposal	Engage with stakeholders	Claim program savings
	State / local code adoption	Administer program	Support evaluation
	Compliance enhancement	Drive code adoption / compliance	Provide evidence for attribution
	Plan to address enabling issues	Propose solutions for EM&V, attribution	Continue to plan for future code actions
	Define resources and timeline		
Regulator Role	Participate in code collaborative	Continue to work with stakeholders	Recognize program savings
	Support program funding	Support longer-term funding needed	Support future funding
	Work to address enabling issues	Consider proposals on enabling issues	Expect code savings in portfolio
Barriers	Potential studies do not include savings from building energy codes.		
	Regulatory processes do not recognize savings from code programs.		
	Multiyear timeframe of code programs fails single-year cost-effectiveness tests.		
	Evaluation methods are not defined for energy savings from code.		
	Cost / benefit analyses are not designed to measure compliance improvement programs.		
	Stakeholders question the need for a program that gives credit for meeting the law.		

Description. The description lists a few characteristics meant to convey the general situation for programs in each of the three stages. In the *initial stage*, the energy code program does not exist and, perhaps most importantly, stakeholders and key advocates are not yet supporting the program. Nine of the 17 states studied do not have a code program and are in this stage.

In the *intermediate stage* are states where PAs have found support for an energy code program with some resources that allow the program to be staffed and carry out its activities. Programs in the intermediate stage are still at risk; it may be difficult to secure additional funding since they have not yet produced savings. It is also possible that some of the enabling issues have not been addressed. Arizona, Connecticut, Massachusetts, and Rhode Island are in the intermediate stage.

In the *final stage*, the mature program has been successful in claiming savings and receiving credit through the full evaluation and attribution process. California, New York, Oregon, and Washington are in the final stage since PAs have received credit for savings in each of these states. By classifying these states as being in the final stage, however, does not mean that nothing more can be accomplished. For example, California has yet to develop an approach for assessing and crediting savings for efforts to enhance code compliance.

PA and regulator roles. These categories list a few of the key activities expected of PAs and regulators during each stage. PAs are expected to take an active role in creating interest in the concept, designing the program, securing resources, and making the program successful. On

the other hand, regulators are not expected to drive the process, but are to provide feedback on the proposed changes.

Barriers. There are many barriers and issues that may slow the development of a code program or prevent a program from receiving savings credit. Four such barriers are identified in Table 2. Among the most challenging of these are time requirements. Most energy-efficiency programs produce savings within one or two years; in contrast, programs supporting building codes may take several years to generate savings. For example, California's code program operated for several years before the IOUs received credit for savings.

Recommendations

In our experience with energy code programs in California, Rhode Island, Arizona, Massachusetts, Oregon, and Washington, we found one common element was critical to the development of the programs: the code collaborative or task force (listed for the PA and regulator roles under the initial stage in Table 2). In most cases, a group of stakeholders has an interest in developing a code program throughout the stages described in the roadmap. This group often meets outside of the mainstream processes for other energy-efficiency programs during the early part of the program, though this may change as awareness of code programs grows in the coming years.

In California, development of a code program began in the early part of the last decade. PAs recognized the need for an evaluation protocol that would allow quantification and evaluation of energy code savings. They worked with the CPUC to obtain approval of this protocol. Also involved at several points were other stakeholders including many consulting firms, the Natural Resources Defense Council, and other energy-efficiency advocates.

Other states have a similar history. The Southwest Energy Efficiency Project (SWEEP) worked with regulators and utilities to advance the code concept in Arizona. In the Northwest, the Northwest Power and Conservation Council worked closely with the Northwest Energy Efficiency Alliance (NEEA), Bonneville Power Administration (BPA), and many of the utilities in the region to integrate energy code savings into the regional regulatory and planning processes. In New York, Massachusetts, and Rhode Island, NEEP has been an advocate as utilities and regulators worked to establish code programs and overcome issues.

We recommend that PAs begin developing code programs by identifying stakeholders in their state and region, verifying if an energy code collaborative has been set up either by the Building Codes Assistance Project (BCAP) or a regional alliance, and exploring mutual interest in achieving a functioning energy code savings program.

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