Raising the Bar: Getting Large Energy Savings through Programs that Support Energy-Efficiency Codes and Standards

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ABSTRACT

Since the 1990s, utility energy-efficiency planners have envisioned a role for energy-efficiency codes and standards (C&S) in achieving large savings through market transformation. Around 2000, the first significant utility proactive participation in the development of such C&S began. In the past decade, a growing number of utilities, program administrators, advocates, regulators, and other stakeholders have focused on the role that utilities can play in upgrading codes and standards. Recently, interest in this area expanded because of the widespread adoption of building efficiency codes in response to the Recovery Act.

Utility advocacy for codes and standards, however, raises several policy, planning, and regulatory issues:

- How can the savings from such programs be quantified?
- How can attribution to the utility program be quantified?
- What are the consequences for other programs if codes and standards raise the efficiency bar?
- How should compliance be measured and how can the effects of efforts to improve compliance be analyzed?
- How should utility efforts be treated under reward mechanisms?

This paper reviews the history of the origins of these efforts, focusing on California, and discusses the significant magnitude of energy savings possible from C&S programs. It identifies issues that such programs raise and provides a status report on programs across the country and how regulators and others are analyzing and treating them.

Background

Energy-efficiency building code and appliance standards (C&S) establish a minimum efficiency level for new buildings and products. C&S are adopted by a governmental entity with the required authority or through legislation. In theory, at least, all new buildings and products covered by C&S will consume no more energy than allowed by the regulation. Since appliances are being continually replaced as existing units wear out or users decide to upgrade them, a new standard can have a very large impact on energy consumption of a specific end use. Similarly, new buildings are being added to the stock, or demolished buildings are being replaced, in large quantities every year, so tighter building codes can produce large energy savings in the building stock. The quantities of units affected by C&S are usually orders of magnitude larger than the numbers of appliances or buildings in typical utility efficiency programs.

The minimum efficiency level established by C&S is critical to most utility efficiency programs. Such programs usually use existing C&S as the baseline efficiency level that must be

exceeded by participants to receive an incentive. Thus, programs do not pay incentives for buildings or products that just meet the code or standard.

If it chose to, a program administrator (PA) or utility could dedicate resources to influencing adoption and implementation of a code, though it would not have authority to adopt it. Because of their unique position, skills, and role, PAs and utilities can be effective advocates for upgraded codes and standards (Lee 2009). The costs incurred by the PA would be the direct costs of its advocacy only—no incentives would be required since the resulting code would be the law. Consequently, the PA or utility cost would likely be very much less than a program that required providing an incentive to every participant and, importantly, utility costs would be largely independent of the number of buildings affected by the code. From a conventional PA or utility cost perspective, a program comprising such advocacy efforts could offer the possibility of being far more cost-effective than a traditional program.

Origins of Utility C&S Programs

In 1974, California legislation created the California Energy Commission (CEC) and gave it the authority and mandate to develop and adopt building energy codes (referred to as Title 24) and appliance standards (Title 20). The legislation established basic criteria to use in selecting C&S to adopt; the CEC issued its first C&S in 1978. In addition, federal efforts began in 1977 through legislation directing the U.S. Department of Energy (DOE) to adopt federal appliance standards. By the mid-1980s, both California building codes and California and federal appliance standards were in effect.

Into the mid-1990s, the CEC was very active developing new C&S. CEC staff conducted technical studies, held workshops, and worked with stakeholders to propose C&S that were then reviewed by CEC Commissioners, modified as needed, and adopted through a formal process. During this time, utilities were actively engaged in designing and implementing diverse energy-efficiency programs for buildings and appliances across all sectors, but were playing a very limited role in the CEC C&S process.

In the mid-1990s, efforts to deregulate industries swept across the country, and led to proposals to deregulate energy utilities in California and elsewhere. Interested parties raised concerns about what role energy efficiency would play in a deregulated utility world.

Market transformation was put forth as a primary concept to prevent energy efficiency from being lost in the transition to deregulated utilities. Basically, this concept looked at inexpensive ways to induce fundamental changes in the market that led to long-lasting efficiency improvements. One cornerstone of the approach was adoption of codes and standards.

Largely due to the actions of key utility staff in response to this changing landscape, California utilities took initial steps to advocate for C&S in the CEC process. They prepared Codes And Standards Enhancement (CASE) reports to provide technical and other information to support adoption of selected C&S. Around 2001, the four investor owned utilities (IOUs) launched a coordinated statewide program to advocate for C&S. Over the next few years, they took steps such as preparing CASE reports, testifying in public hearings, and working with industry, that led to adoption of 12 specific building code changes in the 2005 Title 24 and 27 Title 20 appliance standards effective starting in 2006.

This effort raised two concerns for the utilities. First, it required IOUs to spend resources on staff to oversee the process, consultants to conduct research, and other activities. Second, the codes and standards influenced by the IOU activities raised the efficiency baseline for IOU

efficiency programs, diminishing potential savings potential for these programs. Utility management recognized these concerns and the potential for the consequences to grow if IOUs' C&S investments increased.

The utilities brought these issues to the attention of the California Public Utilities Commission (CPUC). One CPUC role is setting savings goals for the IOUs and establishing a financial reward mechanism based on the utilities' performance. Since the C&S program was new, there was no protocol in place for evaluating its performance or determining an appropriate financial reward. The CPUC responded through a series of decisions that led to implementation of an evaluation protocol to determine program savings.

The evaluation for the 2006-2008 program cycle was conducted successfully. Based on the utilities' claimed savings, the overall C&S program realization rate was 113% for net electric savings and 91% for net gas savings.

Recent Developments

Codes and standards adoption has accelerated in recent years. The American Recovery and Reinvestment (ARRA) required states to commit to adopting the latest national model codes as a condition of receiving specific federal funds, and the governor from every state made this commitment, along with agreeing to implement a plan to reach at least 90% compliance by 2017. Additionally, after years of slow progress, DOE has moved forward quickly to adopt several appliance standards.

In California, the utilities have continued expanding their C&S program. In addition to advocacy for new C&S, the IOUs have engaged in additional activities including:

- Conducting stakeholder meetings to present, discuss, and vet potential changes to Title 24
- Sponsoring code enforcement/compliance training
- Working with local governments to implement local reach codes

For the current program cycle, the CPUC has agreed to count the full verified savings from the C&S program toward the utilities' savings goals. Utilities estimate the program is contributing about 30% of gross portfolio savings during this cycle.

Other states, regions, and utilities have become aware of the California program and the significant magnitude of savings it offers. Several have expressed an interest in how a similar program could be implemented in their location.

Issues

Codes and standards programs face unique challenges that are quite different than those faced by other types of utility efficiency programs. The core challenges include: planning and coordinating; measuring impacts; assessing cost effectiveness; measuring and ensuring compliance; and dealing with federal standards.

Planning and Coordinating

At the highest level, it is essential that C&S savings be properly and consistently accounted for in the process used to set energy savings goals and measure achievement of those

goals. When determining energy savings potentials, the regulator or other responsible party needs to clearly identify how C&S savings are incorporated, and when savings are evaluated they must be treated in a consistent way.

As previously mentioned, when a measure is adopted into code, this raises the baseline for other energy-efficiency programs, making savings harder to achieve. Due to this dependent relationship, utilities must be strategic in deciding which measures are appropriate for a C&S program, and which are more suitable for inclusion in an energy-efficiency or emerging technologies program. In California, new products ideally flow from a utility's research-based emerging technologies program, then to an energy-efficiency program, and finally to the C&S program. Determining the appropriate program mix requires strategic portfolio planning.

Since codes and standards usually impact the state as a whole,[1] different types of relationships and interactions must be considered. Whether a state entity, the legislature, or other body is responsible for adopting building codes or appliance standards establishes the rules a PA must follow. If there are different utilities or organizations within the state advocating for C&S, coordination between them is necessary. Communicating and collaborating allow these various entities to conduct advocacy activities in a way that moves the collective stakeholder group towards their shared C&S goals. Also, if there are other state mandates or goals, these must be considered and factored into planning, as well as goal setting.

Measuring Impacts

Measuring the impacts of C&S programs presents unique challenges. Codes and standards generate energy savings as the buildings and products that they affect enter the market. A C&S program can only claim savings from a code or standard to the extent that it had influence on the adoption of the code or standard. Other factors that must be taken into account include the degree to which C&S compliance occurs and what the baseline efficiency would have been without the new code or standard.

In California, the methodology used to evaluate energy impacts of the C&S program has evolved from the first evaluation protocol developed in 2006, requiring a consistent, prescribed approach (TecMarket Works Team 2006). The approach used consists of estimating the total potential savings of a code or standard, and then applying various adjustments to arrive at the savings attributable to the IOUs' advocacy efforts though the C&S program. The analysis includes adjusting potential savings based on the rate of compliance, the naturally occurring market adoption, and the effect the IOUs had on adoption (the attribution).

In California, attribution to the IOU C&S program is determined by systematically reviewing documentation supporting the code or standard development such as CEC hearing transcripts, workshop meeting notes, and CASE reports, and interviewing various stakeholders involved in the process. Because this information is essential to the attribution analysis procedure, a process for documenting all advocacy efforts is critical.

Development of an approach to quantify energy savings from C&S programs is not as far along in other areas. Initial steps have been taken in Arizona and in the Northeast, with a general objective of creating an approach that is simpler to implement.

To date, less progress has been made in developing methods for evaluating impacts and determining attribution for other C&S efforts such as enhanced code compliance. Trying to

[1] The exception is local codes.

quantify and attribute the energy impacts of activities such as training code officials poses difficult research challenges.

Measuring Cost-Effectiveness

Most regulatory bodies require evaluation and demonstration of the cost-effectiveness of energy-efficiency programs. Cost-effectiveness tests vary; two of the most common are the Total Resource Cost (TRC) and Program Administrator (or Utility) Cost (PAC) tests. The former includes the costs to both the participants and the program administrator, while the latter excludes participant costs. Both metrics are relatively easy to calculate for typical resource acquisition programs through which a given number of participants receive incentives for installing energy-efficiency measures. Costs include the incremental measure costs, administrative costs, and any other costs resulting from implementing the program; benefits are the value of avoided energy purchases. The costs are linked to the measures incentivized during the program, and the value of the benefits generally continue over the life of installed measures.

Since a C&S program is an alternative to a standard energy-efficiency program, it is logical that the cost-effectiveness of the C&S program should be estimated and compared to the alternatives. However, the basic cost-effectiveness analyses must be modified significantly to take into account the characteristics of a program advocating for upgraded C&S such as:

- Resources spent advocating for the C&S produce savings starting a year or more after the expenditures
- The adopted C&S generate savings from *all* covered products and buildings produced once the codes or standards go into effect
- Incremental costs are likely to decrease due to adoption, and are likely to decline over time
- Given that incremental costs are often defined relative to the cost of items that just comply with an existing code or standard, there may be a question of whether any incremental cost should be counted
- There are no nonparticipants
- There are no incentives

Given the usual definition of the PAC, a C&S program has the potential to be far more cost-effective to a PA than an acquisition program. How a C&S program fares under the TRC is very much dependent on how the characteristics of the program above are addressed.

Until recently, analyzing the cost-effectiveness of California's C&S program was not required. In the current evaluation cycle, however, cost-effectiveness will need to be determined and these issues will have to be resolved. To date, no other jurisdiction has attempted to answer the question of how to determine C&S program cost-effectiveness, but this will clearly become an important topic as other regulators and PAs incorporate C&S programs.

Assessing and Ensuring Compliance

A major aspect of a C&S program's success lies in the rate of compliance. Building code compliance studies have been undertaken for at least two decades, yet no widely accepted method exists to measure compliance. DOE's Pacific Northwest National Laboratory (PNNL)

has developed a proposed protocol. But tests of the protocol are still going on and the methodology is continuing to evolve.

PAs in California, New York, and a few other states have recognized the value of increasing code compliance and have developed code compliance training programs. The impact of these trainings is difficult to determine, however, due to the challenging nature of measuring knowledge gained through training, and the additional challenge imposed by attributing energy savings in the field to increased knowledge. To date, a successful method of measuring the energy savings from code compliance training has not been established.

Addressing Federal Standards Issues

DOE has authority to adopt national appliance standards and this poses unique challenges for PAs, regulators, and evaluators. States cannot regulate the efficiency of an appliance after the federal government sets a standard. With heightened federal activity under the Obama administration, more and more product types are being regulated at the national level. States are still free to regulate appliances not covered by federal standards, but this means PAs have to get more creative pursuing standards, often leading to considering technologies that require more intensive research and analysis to determine the feasibility, cost-effectiveness, and energy savings potential. California utilities are dealing with this situation and it is a significant barrier that PAs new to C&S efforts would have to consider in implementing a program. Nevertheless, there are still good opportunities for very large potential savings, and multiple PAs and states working together can cost-effectively promote state or regional appliance upgrades.

PAs banding together also can influence the federal process to tighten proposed standards and counter industry opposition. This is often done in conjunction with other advocacy groups through the Appliance Standard Awareness Project (ASAP).

A challenge for PAs and evaluators is how to assess the energy savings attributable to the activity of an individual PA in the federal arena. Because there are likely to be multiple parties involved, the share attributed to any one PA is likely diluted. In California, the savings attributable to the C&S program through federal standards will be analyzed for the current cycle.

Status of Programs

This section provides a brief summary of the status of C&S support programs across the nation, with a particular focus on the role played by utilities and program administrators.

California

As discussed above, California has the most complete process for determining and claiming savings resulting from enhanced C&S. In California, IOUs actively promote codes and standards efforts, and they have worked with their regulator to ensure that they can get credit for the energy savings attributable to their efforts. Approximately 10% of savings claimed by the four major California IOUs in 2006-2009 were from the support of increased codes and standards.[2] For that cycle, the CPUC did not include the C&S program in its incentive mechanism accounting for the IOUs.

[2] This value does not include the 50% discounting required by the CPUC in this initial evaluation.

In the 2010-2012 program cycle, the CPUC will allow utilities to receive full credit for verified energy savings resulting from codes and standards efforts. The CPUC also intends to include the C&S program in the IOUs' financial incentive process. Initial estimates indicate that the C&S program savings may be as much as 30% of the total portfolio gross electricity savings and over 20% of the portfolio net savings.

Arizona

To date, the only other state that allows utilities to claim savings from implementation of codes and standards programs is Arizona. As part of the state's 2010 Electric Energy Efficiency Standard, the Arizona Corporation Commission (ACC) created a mechanism through which IOUs could claim C&S savings. Up to a third of savings associated with codes and standards are eligible to be claimed by utilities, which must establish savings through measurement and verification studies.[3] To claim savings, utilies are also required to document their actions in support of adoption or implementation.

In response to this ruling, Arizona IOUs have begun to develop C&S inititiaves to add to their energy-efficiency programs portfolio. Two early efforts are Arizona Public Service Company's (APS) Codes & Standards Support Project and Tuscon Electric Power's (TEP) Energy Codes Enhancement Program. APS and TEP proposed a combined budget of $175,000 in 2012 to advocate for and support implementation of updated codes and standards, focusing initially on collaboration and training. TEP also proposes to explore conducting evalations that demonstrate 90% energy code compliance to fulfill ARRA requirements.

A significant portion of the state's electricity is provided by the Salt River Project (SRP), a public utility not governed by the ACC rules. In May 2011, SRP revised its Sustainable Portfolio Principles to include a commitment to aid in the effort to implement advanced building codes. SRP will credit up to 50% of savings due to energy codes to its Sustainable Portfolio.

Codes and standards efforts in Arizona are complicated by its status as a "home rule" state in which no statewide energy code is in effect and locally adopted building codes can vary across the state. Consequently, a major component of the utilities' proposed approach is to work with local jurisdictions to both understand applicable building codes and advocate for the adoption of more advanced codes in areas where they have not already been implemented.

Massachusetts

In Massachusetts, program administrators (PAs), the Energy Efficiency Advisory Council (EEAC), and the Department of Public Utilities (DPU) are developing a framework for PAs to promote energy codes and ultimately claim savings in their energy-efficiency portfolios (Cooper & Wood 2011). In recent meetings, stakeholders have discussed a framework that combines Arizona's percentage approach and California's evaluated approach (Faesy 2011). Meetings have also focused on what steps PAs can take to promote energy codes.

[3]The original ruling allows only gas savings from appliance standards to be counted.

C&S program activity in Massachusetts covers four general categories:

- Performance improvement and compliance enhancement
- Base code advocacy and support
- Stretch code advocacy and support
- Appliance standard advocacy and support

PAs have funded a statewide baseline and compliance study to understand compliance for base and stretch codes, under multiple compliance paths. As of January 2012, 104 of Massachusetts' 351 municipalities had adopted a stretch code.[4] In Massachusetts' stretch code communities HERS ratings are required to demonstrate code compliance.

New York

To promote code compliance, the Long Island Power Authority (LIPA) has developed HERS rater infrastructure and support programs. LIPA also provides additional energy code training, incentives for higher tier ENERGY STAR homes, and up to $20,000 funding for towns that adopt ENERGY STAR specifications as local code.

Like other states, New York State accepted ARRA funds to adopt the IECC 2009 and ASHRAE 90.1-2007 and develop an approach to achieve 90 percent compliance by 2017. To promote energy code compliance, New York State Research and Development authority (NYSERDA) funds energy code trainings for builders and code officials. NYSERDA has also supported a baseline and energy code compliance study.

Vermont

Efficiency Vermont (EVT), the sole administrator of energy-efficiency programs in the state, has supported energy codes through training and technical assistance for builders and code officials (EPA 2009; Faesy 2011). Regulators have questioned the availability of methods for quantifying energy code savings and the state has not adopted an attribution framework. In spite of this, EVT has worked to promote new codes and support existing codes. EVT has 20 non-resource acquisition goals that have allowed EVT to use ratepayer funds to promote codes and standards without a saving attribution framework. EVT's C&S support includes (VEIC 2011):

- Providing residential and commercial specialists staffing an Energy Code Assistance Center and a hotline for general and technical code inquiries
- Distributing code books to the building community
- Providing outreach and consulting to builders, designers, and real estate professionals
- Conducting trainings and direct outreach to town clerks and zoning administrators
- Providing code development support to the Department of Public Service

EVT also provides a Home Energy Rating Certificate and the opportunity for financial incentives for homes where builders exceed code.

[4] http://www.mass.gov/eopss/docs/dps/buildingcode/inf2/stretch-code-effective-1-01-12.pdf

Maine

Following a 2004 legislative directive for the Maine Public Utilities Commission (PUC) to research and report on the implementation of building energy codes, the Maine PUC recommended the adoption of the latest energy code as well as providing training and support to builders and code officials. In 2008, Maine adopted the Maine Uniform Building Energy Code (MUBEC), making it one of the last states in the Northeast to adopt a statewide energy building code. Efficiency Maine, Maine's energy-efficiency program administrator has subsequently developed training resources and delivered training programs to builders and code officials.

In June 2011, Efficiency Maine (with assistance from DOE and the State Planning Office) funded a baseline study to characterize construction practices and energy consumption for small- and medium-sized commercial buildings (Efficiency Maine Trust 2011).[5] The study focused on energy use and code compliance in buildings constructed between 2006 and 2010.

Recent legislation, however, may pose challenges to the enforcement of Maine's building energy codes. Act LD 1787 – "An Act to Create Efficiencies in the Administration and Enforcement of the Maine Uniform Building and Energy Code" proposes the abolishment of the Bureau of Building Codes and Standards, moving the Bureau's authority to a new division in the Office of the State Fire Marshal.[6] Critics of the legislation say that it will shift the responsibility of code enforcement to a department without energy building code expertise and reduce the pool of qualified building inspectors.

Northwest

Energy efficiency activities in Idaho, Montana, Oregon, and Washington are coordinated to a large extent by the Northwest Power and Conservation Council, thourgh periodic 20-year Power Plans that include goals for energy-efficiency and conservation initiatives. The Council's Sixth Power Plan recommends that 85% of the region's new electricity needs be met through energy efficiency and includes codes and standards efforts as a component in this approach.

In the Northwest, actions to support new building codes are largely conducted by non-utility actors. The Northwest Energy Efficiency Alliance (NEEA) has led in advocating for code adoption and increased compliance, with additional support coming from the Bonneville Power Administration. NEEA has also assumed the responsibility for coordinating evaluations of the extent of compliance with the energy code in the Northwest for the purposes of complying with ARRA. A major focus of NEEA's efforts regarding compliance has been to involve the utilities. In a recent compliance evaluation in Montana, NorthWestern Energy expressed interest in an estimate of compliance specific to their service territory.

In Washington, the Washington State University Extension Energy Program has also been very involved in the effort to implement more advanced energy codes. While the majority of states and municipalities that adopt new energy codes implement an approximation of the 2009 IECC, Washington developed its own state-specific code—the Washington State Energy Code—that is a distinct departure from efforts in other states.

Utilities have generally taken a backseat to these organizations in the development of updated energy codes, with the notable exception of Seattle City Light, which has been proactive

[5]Baseline studies are crucial to understanding potential energy code savings because they characterize energy savings prior to the implementation of C&S programs.

[6] http://www.mainelegislature.org/legis/bills/bills_125th/billtexts/HP131201.asp

in advocating for updated energy coded at the municipal level. Utilities do offer indirect asssistance, however, through their support of the Northwest ENERGY STAR Homes initiative. The Energy Trust of Oregon, a nonprofit PA responsible for carrying out energy-efficiency programs on behalf of customers of the state's IOUs, has been particularly effective in increasing the share of Northwest ENERGY STAR homes in Oregon.

Midwest

There has been relatively little progress made to date on implementing utility codes and standards efforts in the Midwest. Minnesota is the state furthest along, having begun preliminary discussions on how utilities might claim savings from codes and standards efforts. Xcel Energy has been a major proponent of this push, but there does not appear to be a huge amount of momentum behind the effort. In Iowa and Illinois, utilities are required to provide funds to support compliance efforts, but are not currently allowed to claim any resulting savings. In Iowa, utilities have also been encouraged to assume an enforcement role regarding compliance.

Conclusions

1. *The feasibility and design of C&S programs are location-specific:* How a PA can influence C&S adoption depends on whether codes and standards are adopted in a state or local jurisdiction and how they are adopted.
2. *Progam administrators and utilities are well positioned to support C&S efforts.*
3. *C&S can produce large energy savings.* Because they affect all new units, an appliance standard or building energy code can produce very large energy savings compared to conventional energy-efficiency programs.
4. *From the program administrator perspective, C&S programs have the potential to generate energy savings very cost-effectively.* In general, the costs of advocating for adoption of a code or standard are likely to be considerably less than the costs of incentives that would be required to produce equivalent energy savings. This may not be so if the number of PA customers is relatively small and C&S advocacy costs are large.
5. *A portfolio view is essential to determine where C&S fit in energy-efficiency planning.*
6. *C&S programs have some unique differences from conventional energy-efficiency programs:*

    - Among other requirements, advocacy of C&S requires technical and economic research; staff participation in public hearings; and interaction with entities responsible for C&S adoption.
    - C&S programs require adjustments to protocols used for evaluation and reward mechanisms.
    - Internal PA staff, regulators, and other core stakeholders lack an understanding of C&S programs and their benefits.
    - Unlike conventional energy-efficiency programs, C&S advocacy does not involve direct outreach to customers that can increase customer satisfaction.
    - C&S savings generally do not occur until years after the program activities.

7. *Since C&S raise the baseline efficiency level, they can reduce potential savings from conventional resource efficiency programs.*
8. *To date, there is no consensus on a logically consistent way to assess the cost-effectiveness of C&S programs.*
9. *To date, only two states – California and Arizona – have established policies that allow utilities to be credited for savings from C&S programs. The California framework is more complex, but allows for full credit for C&S savings, while the Arizona framework is simpler, but limits credit to one third of savings. Massachusetts is actively working to establish appropriate policies to address C&S programs.*

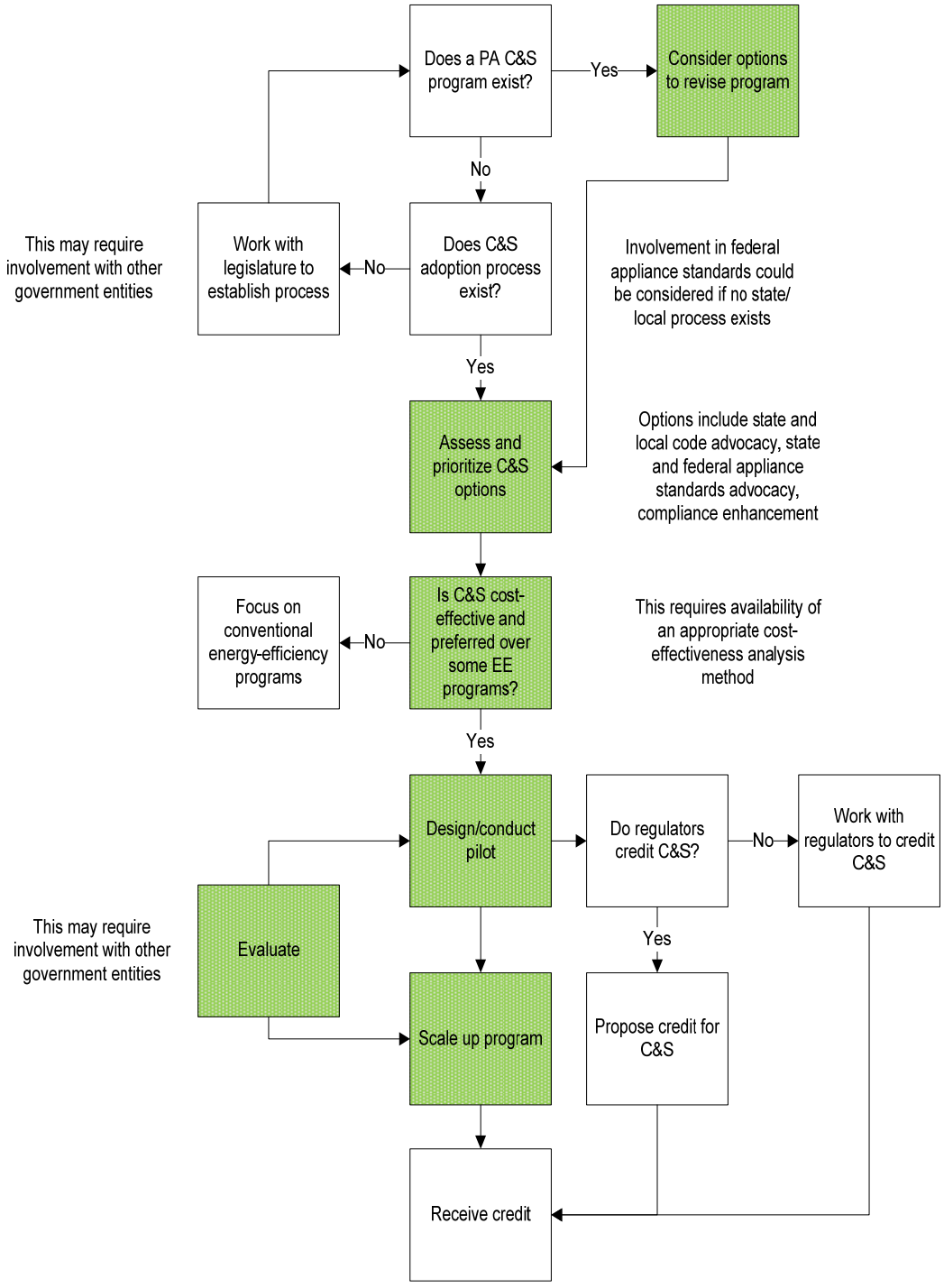
Recommendations

Given the significant energy savings that C&S offer, PAs and regulators should investigate the feasibility and benefits of conducting a C&S program. We recommend that utilities and other PAs conduct this assessment through a multistage process such as illustrated at a high level in Figure 1. The shaded boxes in the figure indicate steps where information can be leveraged from other programs, such as the California IOU C&S program, or research.

The process begins with the determination of whether such a program already exists in the jurisdiction. If it does, possible program changes should be considered. If none exists, the next step is to investigate the state/local C&S adoption process. If a C&S adoption process does not exist, the PA should work with the appropriate governing body to develop one. Clearly, this could be a lengthy and politically challenging step. When an adoption process is in place, the PA should assess various C&S program options, prioritize them based on specific criteria, and then compare them to conventional energy-efficiency programs. We recommend that selected C&S program components then be introduced through pilot efforts and the PA work with regulators to determine how energy savings will be credited. Once the pilot has been completed and evaluated, the program could be scaled up.

Since the feasibility of C&S programs is location-dependent, decisions about whether to launch C&S initiatives and the elements of those initiatives are also likely to be unique and tailored to the local conditions. In some states, it is possible that C&S efforts should be focused on enforcement of existing codes and measurement of compliance. In these cases, the PAs need regulators to recognize savings that result from such effort in order to justify their investments. Other states may be able to support something closer to a “full-spectrum” C&S program.

Figure 1. Recommended Codes and Standards Multistage Process



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