How to Achieve All Cost-Effective, Measurable Energy Savings in Existing Homes: Conclusions of a Multi-Stakeholder Working Group

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ABSTRACT

This paper highlights the best approaches to increase the energy efficiency of existing homes across the United States and Canada as determined by a multi-stakeholder Working Group using a consensus based content development process. The Consortium for Energy Efficiency (CEE) convened the working group, which included participants from energy efficiency program administrators and the manufacturers, retailers, and trade associations from the following industries that serve the existing homes market: lighting, appliances, water heating, HVAC, insulation, windows, and electronics. These participants worked together to develop an Existing Homes Program Guide, a document whose purpose is to enable efficiency programs to work with manufacturers, retailers, non-governmental organizations (NGOs), and other stakeholders to deliver programs that capture all cost effective, measurable energy savings opportunities in existing homes.

To provide context for the efficiency strategies recommended in the Program Guide, the author first reviews the importance of increased efficiency in existing homes and details the logic behind convening a multi-stakeholder Working Group to address the savings opportunity. The paper then reports on the efficiency program elements that were evaluated and judged to be appropriate for inclusion in the Existing Homes Program Guide. Throughout the paper, several case studies are provided as examples of how energy efficiency programs have incorporated the efficiency program elements into their work locally.

Existing Home Efficiency and the Need for a Working Group

Consumer interest in home energy efficiency is on the rise. Forty-four percent of American consumers find it difficult to afford their utility bills according to a recent study by the Pew Research Center (Kohut, 2008). This issue is not limited to low-income consumers. The same survey found that 38 percent of upper-middle class households (earning $50,000-$100,000 annually) had difficulty with their utility bills, up from 27 percent in 1992. Data from Ontario shows a similar pattern, despite electricity rates ranging from 5 to 5.9 cents/kWh. According to a survey for the Ontario Power Authority, 34 percent of Ontarians were very concerned about the impact of electricity costs on their personal finances (Ipsos, 2008).

In addition, homeowners appear willing to pay for efficiency improvements. A 2006 study by Decision Analyst found that homeowners are willing to spend an average of $856 to optimize their home comfort and $720 to improve energy efficiency by 25 percent. The Joint Center for Housing Studies of Harvard University found that in 2004, owners of homes built before 1970 spent an average of almost $500 on projects that promote greater energy efficiency.

In addition to these data, CEE observed several trends within the efficiency program community that underscored the importance of increasing program attention on existing homes. The most important of these trends are described below.

First and foremost, regulators are increasing overall energy savings goals. Many CEE members now need to deliver significantly greater energy savings even more cost-effectively in the past. For example, the California Long Term Energy Efficiency Strategic Plan finalized in 2008 stated a vision for the residential sector that "all cost-effective potential for energy efficiency, demand response and clean energy production will be routinely realized for all dwellings on a fully integrated, site-specific basis."

Second, typical per-unit end use savings are diminishing. Minimum energy performance standards have been developed or increased for many residential end uses in recent years, including central air conditioners (2006), clothes washers (2007), and general service light bulbs (effective 2012). In the absence of rapid technological improvement for these products, higher minimum efficiency standards reduce the energy savings that programs can garner from high-efficiency products. As a result, efficiency programs are beginning to turn their attention from individual end use programs to the existing homes market, where a comprehensive focus is needed to capture the largely untapped remaining energy savings.

Third, the housing crisis and economic recession has decreased the energy savings available in new construction. One measure of new construction activity (the National Association of Home Builders/Wells Fargo Housing Market Index) uses a rating of 50 to indicate that the number of positive responses received from builders is about the same as the number of negative responses. From a high of 39 in February 2007, the index has fallen consistently and has leveled off at a rating of 17 in February 2010.

Fourth, interest in promoting efficiency in existing homes among equipment manufacturers is increasing. In 2008, CEE staff learned that several individual manufacturers and industry associations were contemplating public relations and marketing campaigns to promote energy-efficiency improvements in existing homes.

The Multi-Stakeholder Working Group

The Existing Homes Working Group was launched at the 2008 CEE Industry Partners Meeting. Since that time, over 100 organizations have participated in the effort, including 78 CEE member organizations and 31 organizations representing the industries that serve the existing homes market.

The Working Group established a vision for the Program Guide, which was to enable efficiency programs to work with manufacturers, retailers, non-governmental organizations (NGOs), and other stakeholders to deliver programs that capture all cost effective, measurable energy savings opportunities in existing homes. The Working Group also established the following objectives for the document:

- More existing homes programs will be rolled out across the US and Canada to assist consumers in existing homes in lowering their energy bills;
- Those programs will be more consistent and effective due to their use of the information in this Program Guide; and
- Industry representatives will increase their participation in efficiency programs, bringing knowledge, expertise, and resources to the table.

Table 1: Existing Homes Working Group Participants

Type	Organizations	
Energy Efficiency Programs	Alliance to Save Energy	Northeast Utilities
	Ameren	Northern California Power Agency
	Austin Energy	Northern Indiana Public Service
	Avista	Northwest Energy Efficiency Alliance
	BC Hydro	NSTAR Electric
	Berkeley Lab	NV Energy
	Bonneville Power Administration	NW Natural
	California Energy Commission	Oak Ridge National Lab
	Cape Light Compact	Oncor Electric Delivery
	Cascade Natural Gas	Ontario Power Authority
	City of Palo Alto Utilities	Oregon Department of Energy
	Commonwealth Edison	Pacific Gas & Electric
	Connecticut Light & Power	Pacific Northwest National Lab
	Department of Energy	PacifiCorp
	DTE Energy	Pepco
	Efficiency Maine	PPL Electric Utilities
	Efficiency Vermont	PNM
	Energy Trust of Oregon	Progress Energy
	Environmental Protection Agency	Public Service Electric & Gas
	Eugene Water and Electric Board	Questar Gas
	Federal Energy Management Program	Rocky Mountain Power
	FortisBC	Sacramento Municipal Utility District
	Georgia Power	Salt River Project
	Hydro Quebec	San Diego Gas & Electric
	Idaho Power	SaskPower
	Long Island Power Authority '	Seattle City Light
	Mass Division of Energy Resources	Sempra Utilities
	MidAmerican	Snohomish County PUD
	Midwest Energy Efficiency Alliance	South Jersey Gas
	Minnesota Office of Energy Security	Southern California Edison
	National Grid	Southern California Gas
	National Renewable Energy Laboratory	Southwest Gas
	Natural Resources Canada	Teresen Gas
	Natural Resources Defense Council	U.S. Environmental Protection Agency
	New Jersey Clean Energy Program	United Illuminating
	New Jersey Natural Gas	US Department of Energy
	New York State Energy Research and Development Authority	Vectren
	Northeast Energy Efficiency Partnerships	WI Division of Energy Services
	Nicor Gas	Xcel Energy
Industry Organizations	Air Conditioning Heating and Refrigeration Institute	North American Insulation Manufacturers Association
	American Gas Association	North American Technician Excellence
	Andersen Windows	Osram Sylvania
	Bradford White Corporation	Pella
	BSH Home Appliances	Pepco Holdings, Inc.
	Carrier	PNM

Type	Organizations	
	Danfoss	Progress Lighting
	GE Appliances	Regal Beloit
	GE Lighting	Rheem
	Globe Electric	Rinnai
	Heating, Airconditioning & Refrigeration Distributors International	Satco
	Home Automation, Inc.	Sea Gull Lighting
	Home Lighting Controls Association	Trane
	IBACOS	Whirlpool
	Kichler	White-Rodgers
	Lennox	Windows & Door Manufacturers Association
	Mitsubishi	

Efficiency Program Design

Key Considerations

To guide energy efficiency program design, several key considerations were identified that must be addressed before program planning can begin in earnest. Each of these is described below.

Cost effectiveness. There are several different cost effectiveness tests being used by efficiency programs across the United States and Canada. There are five tests that are widely used, which include the Participant Cost Test, the Program Administrator Cost Test, the Ratepayer Impact Measure, the Total Resource Cost Test, and the Societal Cost Test. The choice of test is determined by the regulatory body overseeing the efficiency program.

In addition to using one or more of these tests, the program administrator should explore whether non-energy effects (societal benefits, greenhouse gas reductions, etc.) can be considered. The program administrator also needs to consider the level at which it will examine the cost effectiveness of its programs. The different levels include the following:

- Measure Level – This screen will analyze the energy savings benefits over the life of the measure divided by the costs. Incentives should not be included in this calculation as this is simply a cost shift from the consumer to the utility within the denominator. The measure level is typically the most difficult level at which to show the cost effectiveness of home performance programs.
- Project Level – This level of screening combines all of the costs and all of the benefits for all of the measures that will be installed at an individual home and looks at them as a package or "project" rather than as individual measures. This is especially relevant for programs that promote a comprehensive approach. While some individual measures may be highly cost effective and others may not be at all, in aggregate the project may be cost effective.
- Program Level – This is a more complex calculation that aggregates various measure level assumptions, multiplied by the number of assumed installations, and adds in program administration costs (marketing, education, EM&V, etc.). If the regulatory body

allows it, technologies not passing the measure level screen may be included in the program if the overall program is highly cost effective.

- Portfolio Level – This calculation involves aggregating various programs and arriving at a single value. For instance, a program manager might aggregate three residential programs (lighting, whole house, and appliance recycling) to find a portfolio level value.

Baseline market assessment. After existing homes program managers establish which cost effectiveness tests they will use and the level at which their program will be evaluated, they should determine the baseline or standard practice in their market. For example, a baseline market assessment can uncover the typical size and energy use of a single family home in the service territory and reveal the number of contractors offering efficiency upgrades and the number and type of improvements being made in the absence of the program. All of this information is valuable in program planning and accounting for program impacts after the fact.

The baseline market assessment is also valuable in identifying other local stakeholders that should be included in program planning discussions. For example, home performance contractors and city or county building inspectors can provide valuable input on the feasibility of the program and on any hurdles to its success later on in the planning process.

Policy context. Energy efficiency program administrators need to evaluate the policy context—including both federal, state, and local regulations—when they design program efforts to increase the efficiency of existing homes. This is particularly important given increasing federal and state/provincial activity in the United States and Canada.

Program goals and objectives. The goals of a particular program can vary based on several dimensions and are critical to establish at the beginning of program development. For example, will the efficiency program seek high levels of customer participation or "deep" savings from each customer that participates? Will the efficiency program aim to support a home performance contractor infrastructure that delivers comprehensive efficiency improvements or use existing contractors to provide a bundled energy efficiency program? Is it important that the program tie to an existing program model such as Home Performance with ENERGY STAR or develop a unique approach?

Efficiency program elements. The challenge of designing effective energy efficiency programs can be daunting. The following definition, which was developed at the CEE 2009 Industry Partners Meeting, underscores the number of elements needed for a successful program: "The energy efficiency program needs to build a network of contractors who employ trained and certified technicians to assess and complete the needed efficiency upgrades while simultaneously increasing consumer understanding of and willingness to pay for these services in a manner that motivates action and by reducing first cost barriers, all in a manner that leverages existing infrastructure and delivers energy savings cost effectively over both the short and long term."

This section of the paper identifies the six key elements that should be included in any energy efficiency program effort in existing homes. It presents the Existing Homes Working Group's conclusions and recommendations about each.

1. Identify Potential Customers

Due to the expense of widespread marketing campaigns, energy efficiency program administrators can benefit from identifying a subset of customers who will be most interested in upgrading the efficiency of their homes. Working Group participants have suggested that identifying consumers with high bills and moderate incomes is fruitful because these people will be motivated to act. Efficiency programs should consider whether billing analysis is a viable option for this purpose. If not, an alternative is to encourage customers to self-identify using EPA's Home Energy Yardstick or other simple audit tools.

Though more expensive than online audits, detailed in-home audits can also effectively identify customers that would benefit from comprehensive efficiency improvements. An important component of using in-home audits to identify customers is "conversion rate." The higher a program's conversion rate, the more successful it is in converting audits into full home performance jobs. Offering incentives for completing efficiency improvements, not just for having an audit done, is one way to increase the conversion rate.

One example of using audits to identify potential customers is occurring in Canada. A federal initiative, EcoEnergy, offers a full assessment of the home, including modeling. After modeling is completed, an EnerGuide rating is given for the home and recommendations are made for upgrades. This initiative helps the efficiency program identify promising customers; after the recommendations for improvements are made, the efficiency program can introduce applicable rebates.

Another approach is to utilize the existing infrastructure of contractors and home improvement service providers to identify customers. For example, when consumers are putting on new roofs, they are already engaged in home improvements and may be interested in incorporating energy efficiency into the job.

2. Ensure Capacity and Capability of the Workforce

The Working Group has defined training and certification as working with contractors (the businesses) and technicians (the people doing the work) to enhance their skills and business practices to deliver efficiency and to improve the likelihood that they will do so on a regular basis. This element of program design is thought to be needed, at least initially, to help develop and identify knowledgeable contractors who can fulfill efficiency program requirements.

A robust training and certification effort includes a building science education component, an apprenticeship component, sales training, testing materials, an understanding of local program requirements including financing, and in-field training (like boot camp) to ensure technicians can perform the needed work well. Robust, ongoing participation in training and certification efforts requires management buy-in; to achieve this, efficiency programs should position training as a competitive advantage for contractors that participate since many programs require training and certification of their participating contractors.

Efficiency programs and industry groups have many options for training and certification, several of which are listed here:

- Rely on an external organization to certify technicians and auditors (e.g., BPI, RESNET, or other)
- Conduct post-retrofit site inspections on every home participating in the program

- Offer technical and/or sales training developed and implemented by the efficiency program
- Offer a tiered contractor accreditation program based on expertise and other factors
- Offer training on skills that may be underrepresented in local markets, e.g., thermography certificates for infrared camera technicians

Most of the current efficiency programs are taking the first approach and using BPI or RESNET certification in their programs. These are seen as valuable because they are standardized national programs that set clear expectations with contractors and technicians. In addition, using third party certification reduces the efficiency program's liability and enforcement tasks.

Training and certification is one area where partnerships with industry representatives can be particularly fruitful. For example, in the HVAC industry distributors are a key player in achieving trained and certified technicians because they are the delivery mechanism for training efforts to technicians working in homes. Efficiency program training that incorporates HVAC components, therefore, should complement existing practices.

The Working Group identified the following questions that efficiency program managers should ask in developing a workforce program element:

- What type of workforce is needed to support the program? For example, are auditors, real estate agents, building performance contractors, insulation contractors, or HVAC technicians needed?
- What skills are required for each type of worker? Are there consistent job descriptions that the program can reference?
- Are there workforce sectors that are currently underutilized in the program's service territory that can be cross trained in energy efficiency?
- How can the program ensure that the workforce is qualified to do the work? For example, are there training and certification requirements for each type of worker?
- What is the existing capacity in the service territory for each type of worker?
- How can capacity be increased over time?
- What funding sources (e.g. federal tax credits and/or other incentives) are available for companies adopting whole home energy efficiency into their business model?

Case Study: Workforce Development

New York State Energy Research & Development Authority (NYSERDA) currently has ten Centers for Energy Efficiency and Building Science (CEEBS) operating throughout New York State, to deliver workforce development training in several aspects of home energy efficiency. The curriculum for these training programs is designed to prepare participants for BPI certification exams, through both classroom education and in field training. NYSERDA uses a network of community colleges and other adult training centers provides flexibility in scheduling classes to meet the needs of a diverse set of students; allows for the incorporation of whole building energy efficiency topics (building analyst training, for example) into degree programs to develop an emerging workforce already trained in energy efficiency; enables a professional staff with expertise in adult education to deliver training; accommodates distance learning for hard-to-reach markets. NYSERDA provides workforce development incentives for individuals that participate in CEEBS courses, reimbursement is provided for 75 to 100 percent of the cost of the course, depending on the status of the region's market development. Additional incentives are provided for certification costs, and specific auditor equipment.

3. Engage Trade Allies

From an efficiency program perspective, working with primary trade allies is an essential strategy in successfully launching and sustaining programs designed to improve whole house energy efficiency. Primary trade organizations are the following: heating and cooling contractors, insulating, weatherization, and air sealing companies, residential building designers (which includes architects and engineers), equipment manufacturers, distributors, and retailers.

It is important for program designers, managers, and implementers to understand that primary trade allies provide customers with the information they need to make decisions about energy efficiency. Energy saving programs need to be designed to be profitable for both primary trade allies and for their customers. One way to achieve this is to engage primary trade allies during the program design phase to understand what program elements will work with their business models. In addition, efficiency programs can develop strong trade allies by keeping abreast of each industry related to their existing homes program (insulation, HVAC, etc.) and by recruiting champions within each to showcase the benefits of participation to their peers.

Because primary trade allies include the companies responsible for completing efficiency upgrades in homes, it is also important to engage them in discussions about quality assurance. Quality assurance includes delivery of energy savings and adherence to standards required by the program, such as those combustion safety. The long term viability of an efficiency program is bolstered when there is a strong quality assurance component developed with input from primary trade allies.

In order to generate the necessary base of primary trade ally delivery resources to satisfy existing residential housing market demand, secondary trade allies need to be nurtured and supported at the same time. Secondary trade organizations include supportive organizations such training, certifying, and accrediting organizations. Other secondary organizations include program design facilitators such as CEE, ACEEE, and regional energy efficiency partnerships who help raise market awareness for whole house energy efficiency programming, develop strategic objectives, and inform program designs. Above all, successful programs are those that consider the needs of all of the organizations mentioned above and design programs that create an atmosphere of customer demand.

Case Study: Reducing Financial Barriers

New Jersey Natural Gas (NJNG) provides two types of incentives to reduce the financial barriers to comprehensive existing homes efficiency improvements. The first type is a whole building incentive that provides 0% financing up to $10,000 on the balance for up to 10 years for eligible customers. To qualify, customers need use participating New Jersey Home Performance with ENERGY STAR (HPwES) contractors and have their work approved in advance. NJNG also anticipates receiving authorization to fund the cost of the HPwES Tier II and Tier III incentives available under the New Jersey Clean Energy Program for customers in its service territory. The second type of incentive offered by the program is specifically for equipment being replaced due to immediate or imminent failure. In this scenario, NJNG offers enhanced rebates of $900 for qualified WARMAdvantage furnace or boiler installs. This incentive requires a HPwES Tier I Audit to be performed, with the cost funded by NJNG. This audit entitles the customer to (up to) $1,000 of air and duct sealing measures funded by NJNG and performed by a participating HPwES contractor.

4. Reduce Financial Barriers through Financing and Incentives

The Existing Homes Working Group defined financing and incentives as levers that can be used to remove a financial barrier and make implementation of comprehensive energy efficiency retrofits possible. Of the two methods of reducing the financial barrier, they concluded that financing, not just incentives, is needed to achieve the number of jobs and the large scopes of work desired to maximize energy savings.

The Working Group developed the following list of financing methods, though it notes that there are not data at this point to enable conclusions to be drawn about which methods are most effective. The Working Group plans to monitor financing program activity over time to narrow this list to the most successful approaches.

- Energy efficiency programs and industry groups take advantage of existing tax credits and provide bridge financing to consumers.
- Energy efficiency programs and industry groups form a coalition to communicate all types of available financing and incentives, such as tax credits, and market the total amount to consumers.
- Energy efficiency programs and industry groups work with consumers so that when equipment breaks, a bridge loan is made to finance the repair and later, an audit of the entire house is done to identify how the recently repaired equipment could be addressed as part of a larger, more permanent efficiency upgrade.
- Energy efficiency programs and industry groups redirect the funds set aside for incentives into hiring energy efficiency case workers who help consumers work through the process of making decisions.
- Energy efficiency programs and industry groups work with local and state governments to enable financing through property tax bills.
- Energy efficiency programs offer on-bill financing.
- Energy efficiency programs offer incentives to manufacturers, distributors, retailers, and contractors so that they help consumers with financing.
- Energy efficiency programs and industry groups work with other organizations such as NASEO on a nationwide financing model.
- Energy efficiency programs consider bundling in non-energy improvements (e.g., granite countertops) that motivate the homeowner to take action and secure their own financing.

5. Motivate Consumer Action through Marketing

The Existing Homes Working Group has defined marketing as motivating consumers to take action to improve the efficiency of their homes. Different marketing approaches are needed for different customers. Customer segmentation is important to identify appropriate solutions with unique challenges of that segment. Efficiency programs should explore what consumer segments comprise their markets and which would be most receptive to various marketing messages.

To be effective, the Working Group has concluded that marketing should be simple, consistent, and persistent and should target the consumer segments that are most likely to take action. Of these, consistency is particularly important. As energy efficiency gains prominence and new players enter the market offering services, consumers are likely to hear multiple

messages that could be confusing and even conflicting. Due to the fact that comprehensive home retrofits can be complex, marketing should seek to alleviate any confusion (which leads to inaction). In addition, a clear pathway should be laid out for the consumer so they know what to do after they become aware of and engaged in the program. Messages shouldn't be limited to energy efficiency or energy savings but can include emotional messages that motivate action and a focus on increased comfort, which is also important to consumers.

The Working Group has concluded that consumers are savvy about marketing messages and therefore it is important for the agent delivering the messages to be seen as a trusted information source. To date, successful marketing actions have included cooperative marketing, community outreach (partnering with non-profits, senior centers, etc.), targeting schools (particularly high school since they can champion it at home), web advertising (Google search terms can be effective because they are "pay per click" and can be evaluated, as can banner ads), billboards, and event sponsorships. Less successful actions have included phone outreach (because the consumer may not trust the messenger) and paid ads in publications. Efficiency programs are considering newer methods of marketing, such as social media, though at this point, data to gauge their success are lacking.

Case Study: Motivating Action through Marketing

The primary marketing message that Efficiency Vermont uses in its Home Performance with ENERGY STAR Program is: "When you have a drafty home, you aren't just losing heat, you're losing money. Improving the energy efficiency of your home through Home Performance with ENERGY STAR can make you more comfortable - and save you up to 30% on your energy bills. Take advantage of new incentives from Efficiency Vermont with up to $2,500 in incentives for energy efficiency improvements completed by a certified Home Performance with ENERGY STAR contractor." To deliver that message, Efficiency Vermont uses a variety of marketing strategies:

- Word-of-mouth (neighbor to neighbor visits, open homes, etc.)
- Traditional public relations channels (radio, newspaper, etc.)
- Website & keyword search
- Customer testimonials
- Contractor marketing support (yard signs, "tell a friend" cards, advertising templates, etc.)

Efficiency program managers should also carefully consider the timing of their marketing efforts to ensure 1) they will be well received by consumers and 2) any consumer demand that is built can be addressed by contractors, manufacturers, and retailers. For example, HVAC marketing is typically done during the "shoulder" heating and cooling seasons because contractors need more business then and can respond to new leads that are generated by the marketing effort.

6. Verify Savings

Evaluation of energy efficiency programs is a very broad area. It includes "formative" evaluation, which provides information to help in program design and implementation, such as market characterization and feasibility studies or process evaluation. It also includes "outcomes" evaluation, which focuses on the results of program activities, such as estimating net to gross impacts, or determining market transformation. This section of the paper focuses on measurement and verification (M&V) of project savings for use in impact evaluation, with a discussion of inspections.

Measurement and verification of savings from existing homes efficiency programs is a significant component of the evaluation process, typically performed after the project

completion. Existing guidelines for energy savings estimates are found in International Performance Measurement and Verification Protocols (IPMVP) as well as in the Federal Energy Management Program's (FEMP) Verification Protocols and in American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Guideline 14-2002. These guidelines and protocols are narrow in scope in that they focus on the energy savings for a building or measure, not an entire program. Statistical sampling and analysis are required to scale savings estimates based on one energy efficiency measure or a single site analysis to the efficiency program level.

Before any verification is performed, energy efficiency programs should develop an M&V plan be written that explains the assumptions, methods, and responsibilities of all parties in performing a verification study. Templates for M&V plans can be found on the Berkeley Lab Applications Team Web site. The details incorporated into a M&V plan should be sufficient to allow a third party to repeat the analysis and should include the verification protocols employed and statistical methods used for determination of program savings.

There are several options that efficiency programs have in developing their M&V plans:

- Measure short term or instantaneous power changes in equipment load before and after the retrofit. This method is preferable when savings relative to the entire electric bill are small, and a high confidence in estimated runtime exists. For comprehensive home retrofit programs, this option is one with the least cost but the lowest accuracy.
- Use long term monitoring of an equipment retrofit. This verification path requires more resources and time to monitor a specific end use. This option is usually the most accurate method, but can be the costliest option.
- Employ modeling software to estimate energy use of an entire building. This is generally used for new construction (where a baseline energy use is not available) or when an existing building undergoes significant changes, making past billing data obsolete. Although simulating building energy use is useful for finding insightful information about the interaction of conservation measures, it is resource intensive and requires a specialist in building simulation.
- Conduct billing analysis. Provided that expected savings are at least 10 percent of the total bill, billing analysis is the most cost effective method for verification. An existing home that has gone through a comprehensive energy efficiency program should demonstrate sufficient savings to be realized on an energy bill. Billing analysis has one distinct advantage: all, or a representative sample of, participant homes can undergo some rudimentary analysis.
- Conduct on site verifications. Third party inspections of post retrofit work yield high quality data and provide assurances to the efficiency program administrator that conservation money is effectively utilized. As with billing analysis, data from on-site inspections can also be mined for additional information to improve program or contractor performance. An effective impact evaluation of the program can compliment an inspection team to provide services where needed and potentially reduce the number of inspections depending on utility or commission requirements.

Conclusions

To meet their savings targets and help their consumers save as much energy as possible, energy efficiency program administrators should seriously consider adding a comprehensive existing homes program to their portfolios. By keeping in mind the above key considerations and including the six program elements outlined by the Existing Homes Working Group, new program administrators can greatly increase their chances of success in this market.

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