Comprehensive Existing Home Retrofit Programs: Designing Programs in a Stakeholder Rich Environment

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ABSTRACT

In past years, utilities often bore the full burden of designing, creating, and implementing comprehensive (i.e., whole house) energy efficiency programs for the existing home marketplace. These responsibilities included 1) building a supply of contractors through recruitment, training, certification, mentoring, and retention; 2) creating market demand through advertising, rebates, financing, and other marketing efforts; and, 3) providing quality assurance and control.

The public and private demand for energy efficiency services has dramatically altered that environment. Federal, state and local funding for a variety of programs are combining with rapidly growing customer and contractor knowledge to become both a threat and an opportunity for utilities. Workforce development programs, property tax financing, and community rebate programs are new variables for which utilities must account. Without proper coordination, customers (and contractors) may face conflicting programmatic requirements and/or messaging.

This paper highlights the key programmatic areas in which utilities and other stakeholders may intentionally or unintentionally compete and/or cooperate. Particular focus is paid to 1) how local efforts have often lacked the full range of support needed to successfully deliver home performance services, 2) the roles and responsibilities of different groups during implementation, and 3) how different state-centric and utility-centric implementation models appear to be emerging.

By learning how some regions of the country are addressing these issues, the author hopes readers have a general framework and starting point to enhance stakeholder cooperation in supporting the home performance industry.

Introduction

The intent of the paper is to give a broad overview of the different approaches available to promote residential energy efficiency retrofits. The paper begins with a historical look at utility programs that promote energy efficiency, and why utilities are increasingly focusing on the delivery of comprehensive retrofit services. The paper will highlight some of the key programmatic challenges that are common to virtually every home performance program, and how programs address those challenges. Despite these common challenges, the author intends to demonstrate that a variety of models are evolving to delivery these common elements. This paper serves as a starting point to discern those features of home performance programs that are consistent between programs, and those features that will vary. Much of the variance results from the local factors in which the program operates. A key variance that will be discussed is whether home performance programs are managed by a statewide entity such as a state energy office, or whether utilities are the primary controller for such programs.

Historical Environment

Utilities have implemented Demand Side Management ("DSM") programs for decades, employing demand response and energy efficiency strategies to achieve the benefits of deferred generation, deferred transmission and delivery costs, and deferred fuel, operations, and maintenance costs. Until the past two decades, most Public Service Commission used the Ratepayer Impact Measure ("RIM") test to evaluate the cost-effectiveness of a utility's DSM program. RIM favored demand response approaches; most energy efficiency programs did not pass RIM measures (Doyle, 2010). More recently, the Total Resource Cost ("TRC") test has been adopted throughout the country (although many jurisdictions in the southeast still use RIM). TRC includes both program participant and program administrator costs, and also captures more benefits than the RIM test (CA Standard Practice Manual, 2001). The end result is that energy efficiency programs are more likely to pass cost-effectiveness tests using TRC.

Under the TRC test, prescriptive rebate programs are generally the most cost-effective. CFL replacements, refrigerator swap-outs, and other technology-focused approaches have lower levels of program administrative costs as compared to whole house approaches. The scope of work is often well defined, oversight is not overly difficult (e.g., confirm nameplate information on a newly installed high efficiency AC), existing worker capabilities are sufficient to install measures, and deemed energy savings make measuring the benefits more manageable.

While promoting the use of more energy efficient products is a necessary component to reduce energy use, utilities and other organizations such as the Environmental Protection Agency and the Department of Energy recognize that a building's overall energy use is not simply the sum of its parts. Several factors play into the growing importance of deploying a holistic building science approach to implement energy efficiency programs:

- The opportunities to save energy using prescriptive approaches are shrinking. Higher energy efficiency standards combined with a higher market penetration of efficient products means the incremental savings a utility can claim are becoming harder to find. When 100% of the market was using incandescent bulbs, a CFL replacement program had plenty of room to achieve energy savings. In today's market, the successful market penetration of CFLs can make additional opportunities harder to find. For example, programs have to penetrate tougher customer segments (skeptical homeowners) and tougher applications (e.g., dimmers). In tomorrow's market, incandescent may be banned completely, eliminating one of the more dependable methods for utilities to achieve kWh savings.
- Assumptions about energy savings are changing. Prescriptive approaches that promote a single technology have often claimed energy savings based upon the assumption that a particular energy efficient product would be a specified amount more efficient than a standard product. For example, a program may assume that a SEER 16 AC is twice as efficient as the SEER 8 it is replacing. More likely, a program may assume that a SEER 16 is a certain percentage more efficient than the SEER 13 a typical homeowner would purchase if the utility didn't have an incentive on the SEER 16 product. However, these assumptions are increasing being challenged. In reality, little is known about the relative efficiencies of two products without knowing about the environment in which they operate. If the ducts leak 30% and the new SEER 16 unit's coils don't match the handler, the deemed energy savings a utility claims may have little bearing on reality.

- New “prescriptive” measures are being recognized that save energy. Duct sealing, air sealing, crawlspace wall insulation, and other retrofit measures are increasingly being acknowledged as effective tactics to address energy use. However, incentivizing these measures using a prescriptive approach can be more challenging than traditional measures. Part of that challenge deals with the loading order in which individual measures should be installed. Another part of the challenge is simply that the more one learns of the interactive nature of these parts, the harder it becomes to use a simplistic prescriptive approach that relies on savings that are “deemed” to save a set amount of energy.
- Health and safety issues are increasingly being acknowledged. As homes become more energy efficient, it becomes more important to understand moisture and energy flow. Programs that incentive air sealing are addressing one of the more important factors that affect energy use. However, promoting air sealing without properly diagnosing and addressing the overall effect on air quality and moisture management can lead to catastrophic results.

Large-scale comprehensive (i.e., whole-house) energy efficiency programs began in the new home sector. Employing building science and understanding the interactions that occur between a home’s shell, mechanical systems, moisture flow, weather, occupant behavior, and other factors are difficult to address in new homes. However, building science issues and other factors make the existing home market even more difficult. Utilities that support energy efficiency in the new home market face some advantages over comparable programs in the existing home marketplace. In new homes:

- Most costs are incremental. A typical new home may have a 80+ AFUE furnace. A utility that promotes a 90+ unit incurs the incremental unit and labor cost associated with that change.
- Fewer transaction points. Utilities incent homebuilders, not each individual homeowner. This lowers transaction costs on several fronts.
    - Easier mechanism for providing QA/QC. Scheduling visits to unoccupied homes, visiting homes in a new neighborhood, and having established relationships with a superintendent and trades create economies of scale.
    - Simpler messaging. Builders have more common interests with other builders than homeowner do with other homeowners. As a result, messaging energy efficiency to builders is more straightforward than to individual homeowners in the existing home market.
- Less burdens on the building scientist. In new homes, the HERS rater can focus on diagnostic testing, but does not have to manage trade contracts, develop a scope of work, schedule trades to do work, or other burdens of getting the home built. In existing homes, in order to get the work done, a building scientist often has to play the role of the architect, builder, sales person, superintendent, and tradesperson.
- Less burdens on the trade contractors. Working in a new build environment, trades have a clearer understanding on the home’s attributes. An HVAC contractor performing Manual J and S calculations knows the characteristics of the building shell - on the blueprints and by visually confirming during the construction process.

Despite the higher administrative costs vis-a-vis prescriptive single measure DSM programs, new homes programs have often been able to pass TRC costs.

While it is tempting to argue that society should focus on new home programs and gradually phase out the existing housing stock, that approach is increasing being seen as an unfeasible option. Even if all new homes were built net zero, existing homes would still consume a significant amount of energy for generations. According to DOE, 70% of the housing stock in the year 2030 will have already been built in the year 2009 (U.S. Department of Energy, 2009, 4). In other words, comprehensive home programs must address existing homes if society wants to meet increasingly aggressive energy savings goals in the residential sector.

In order to address the many challenges of providing comprehensive retrofit services, programmatic approaches have been developed to assist utilities and other entities that promote energy efficiency. Home Performance with ENERGY STAR ("HPwES") is one example. Virtually any home performance program must address three critical areas.

The Three Legged Stool

One way to view the essential components of a comprehensive retrofit program is to think of a three-legged stool. Without the proper support of all three legs, the stool no longer has any stability and it can't serve its intended function. While the analogy may be useful - as with all analogies - it's simplistic. When building a real stool, the legs can be built at different times. In home performance, each leg must have various cross-connecting supports, and all three legs must be built in unison. While the following two pages explain these legs in a sequential order, it is not intended to imply that this occurs in a linear fashion. The supply of qualified contractors must be pushed into the marketplace at the same time that homeowner demand pulls the need for their home performance services. In fact, this iterative development process can be one of the most challenging aspects when building a program. These infrastructure-building activities need to be done in parallel, not in series.

Creating Sufficient Supply of Contractors That Can Provide Retrofit Services

One of the first challenges for providing comprehensive energy retrofits is having the workforce capacity to deliver assessments.[1] At the most fundamental level, an assessor[2] must have a sufficient knowledge of building science and the understanding to follow accepted protocols to convert that knowledge into recommended actions for a homeowner. Over the past decade, programs have increasingly recognized that this ability is a necessary but not sufficient component of delivery energy savings. As noted above, the existing home marketplace has unique challenges that differ from the new home market. Homeowners have to take time off work to schedule the assessment, each homeowner (and spouse) has a different opinion about their wants and needs, and they don't necessarily have the time or ability to procure multiple bids from a variety of contractors (many of whom may not understand the assessor's recommendations).

[1] For purposes of this paper, an "assessment" is synonymous with a comprehensive, diagnostic (i.e., blower door and combustion safety) baseline analysis. Other terms that are sometimes used synonymously are "audit" and "survey".

[2] The term "assessor" is meant to include a variety of terms - "auditor", "HERS rater", "home performance contractor", "building scientist", "energy advocate". This person performs the diagnostic tests.

In order to actually get the improvements made, the assessor not only has to understand the building science (including addressing the unique building science issues in existing homes - combustion safety testing, knob and tube wiring, vermiculite, etc.), but he or she has to sell the recommendations and facilitate the delivery of the work. In essence, they have to be a:

- Sales person
- Architect (providing sufficient level of details for crews to implement recommendations)
- Superintendent (schedule visits, manage trades or crews, manage the customer experience, obtain final sign-off on work performed)
- Marketing department (articulate the value of the process to new customers, harvest testimonials)

Many of these skills are also important in the new home marketplace, but the retail nature of home performance makes these skills fundamentally different than those needed when dealing with builders. Many home performance programs have recognized the necessity of these added skills sets, and have recruited traditional trade contractors to become assessors. These contractors may have more experience with retail retrofit work, but the "silo-ed" nature of the building trades present challenges on both the individual level (educating personnel on building science) but also on the company level (e.g., creating proper accounting metrics that measure profit on delivering energy efficiency, not installing specific technologies / products). Successful home performance contractors need to be more than a jack of all trades, but masters of most (Murphy, 2009). Extended mentoring and apprenticeship is necessary, but very difficult to implement within the confines of an energy efficiency program subject to cost-effectiveness constraints.

No matter which worker population a home performance program may target, significant workforce development issues remain. As a result, programs have administrative and direct incentive costs associated with developing this infrastructure. Traditionally, all of these costs are borne by the program, and weigh against the cost-effectiveness of comprehensive residential retrofit approaches. Unless the TRC calculations have sufficient "adders"[3], programs cannot claim the benefits of creating green jobs.

Creating Sufficient Demand for Retrofit Services

Once a minimum supply of qualified assessors can perform services in a given marketplace, a program must build homeowner demand for retrofit services. Broadly speaking, demand can be generated in three ways:

- Promoting the program. Promotion usually occurs using two engines: the marketing department of the program, and the marketing efforts of the participating assessors/contractors. Many programs have a systematic approach to facilitate and leverage the marketing efforts of their participating assessors. Marketing channels include bill inserts, various types of advertisements (e.g., print, radio, TV, billboard, online), development of collateral (e.g., fact sheets, yard signs, door hangers, leave-

[3] For more discussion on "adders", see California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. 2001, p. 20

behinds, banners), event promotion, and driving homeowner website searches to the program.

- Providing homeowner and contractor job incentives. Homeowners can expect to make a significant investment to improve the energy efficiency of their home. Programs provide a number of different methods to reduce the level of investment necessary. Some programs offer incentives for specific measures (e.g., insulation, HVAC replacement). Other programs offer a general rebate on all measures (e.g., 10% of the eligible work scope).
- Providing homeowner financing. While rebates can lower the total cost of improvements, significant initial cost hurdles remain. Even a 50% or higher reduction in total cost (or, for example, a 1 year payback) are moot if the homeowner does not have the ability to make the initial investment. Several programs have promoted and funded financing as a means to address the initial cost barrier in order to increase homeowner demand.

As with workforce development efforts, home performance programs have generally borne the full costs associated with these demand generating elements. However, there are many external benefits that accrue based on home performance work:

- For society:
  - Reduced carbon emissions
  - Reduced local / regional pollutants
  - Improved housing stock for neighborhoods, counties, and cities
  - Stronger small business community and tax base
- For homeowners:
  - Increased comfort
  - More durable home
  - Better indoor air quality
  - Increased home value

As with workforce development, unless the TRC calculations have sufficient "adders," programs cannot claim the benefits of creating green jobs, carbon reductions, pollution reduction, etc.

Providing a Quality Assurance Framework and Other Programmatic Infrastructure

Even if supply and demand are perfectly matched, a program must provide the overarching framework to deliver and manage the quality of the program. Programs have to report on progress, process payments, and manage the trade ally/assessor population, among other overhead. Arguably the most critical is managing the customer experience. Delivering on the **explicit** promise of energy savings is important. Delivering on the **implicit** promise that the health and safety of the homeowner's family will not be compromised is essential.

The Home Performance with ENERGY STAR program addresses this issue in several of ways. Some ways are a:

- Review of the assessor qualifications to determine if the technical standards, standard work procedures, and certifications cover the requisite job tasks
- Mandatory file (a.k.a., desk) review of 100% of completed jobs
- Minimum random spot checks of 5% of each assessor's completed jobs. For 5% of the reported homes, a third party will interview the homeowner, visually confirm installation of the reported measures, and perform combustion safety and blower door tests to compare the diagnostic results of the assessor.

Cross Connecting Infrastructure

Viewing the home performance programmatic functions into these three buckets, or "legs of the stool", is not intended to underemphasize the interactions between these components. Ensuring the high quality of the program is perhaps the most critical. If the credibility of the program is in question, homeowners will not have confidence to seek services (reducing demand) and participating assessors will not invest their time, energy, and equity into the program (reducing supply).

A subset of providing quality assurance is striving to provide accurate, quality recommendations that reduce energy consumption. The assessor's qualifications are critical; proper building science training goes a long way in enabling an assessor to identify an appropriate package of improvements. However, an increasing number of programs have found that the use of software is also critical.

This discussion of software is relevant for two reasons:

- It provides an example of cross connecting infrastructure that impacts the supply, demand, and quality of home performance jobs
- It can be a significant infrastructure cost for a program that impacts cost-effectiveness. Costs may include purchase price, maintenance costs, and administrative/transaction costs.

Ideally, software should work to enhance all aspects of the programmatic framework:

- Energy modeling capabilities (quality assurance)
  - Provide accurate energy savings calculations for the program and other stakeholders (i.e., accurate savings numbers in the aggregate[4])
  - Provide accurate energy savings calculations for the homeowner (i.e., accurate savings numbers based upon occupant's usage and other factors)
- Serving assessor's needs (facilitating the building and maintenance of a supply of contractors)

[4] A Public Utility Commission or utility may be satisfied to know the total impact of energy reduction. If 2,000 homes have saved 20%, they can calculate if they achieved energy reduction goals. If there is a large standard deviation (i.e., a third of homes achieved a 5% reduction, a third achieved a 20% reduction, and a third achieved a 35% reduction), that may not have a direct impact on their goals. However, a homeowner would like to know if they are in the 5% or the 35% group.

- Helping with the sale of the job (good customer report, ability to create report on the spot)
- Facilitating programmatic reporting. Most assessors understand the necessity of reporting, but appreciate if the reporting process can be simplified
- Providing other types of business value. Assessors and contractors usually have a variety of software needs (e.g., accounting, scheduling, marketing, estimating). Programmatic software may perform additional functions to serve these other needs, or can "play nicely" with other software to reduce the contractor's IT burdens. As more sophisticated home performance companies enter the market, they will be looking for complete CRM systems, and programmatic software mandates should acknowledge those needs.

- Serving homeowners' needs (building demand)
  - As noted above, energy estimating should be specific to the home. Homeowner's generally don't care if a package of improvements saves 20% on average - they want to know what they should expect.
  - Many homeowner's primary value proposition will not be energy efficiency. Software reports should acknowledge that different people buy for different reasons, and assessors should have the flexibility to tailor reports to homeowner needs. Many "kitchen table" sales have probably been lost when the assessor feels obligated to talk simple payback or ROI when the homeowner has no intention of investing $8,000 as a purely financial investment opportunity.

Traditional Guidance

Individual programs have traditionally been solely responsible to build the entire "three-legged stool" of home performance in their respective territories. Guidance by the U.S. EPA and U.S. DOE address the rigors of establishing a successful program. Suggested best practices include performing stakeholder outreach, performing market assessments, and running a pilot program. A sample budget suggests that a typical program may spend $14,500,000 over a five-year period. The HPwES Sponsor Guide (U.S. Environmental Protection Agency, 2008) provides more detailed information about the issues addressed above.

Programs run by utilities have often struggled with passing TRC tests or other cost-effectiveness tests. Even for programs run by state energy offices or other entities, it has been difficult to justify the investment in infrastructure when success is measured exclusively in increments of energy savings. The holistic nature of building science has an analogue in the home performance industry. One cannot look solely at the individual parts (e.g., just energy savings). One must look at all of the interactions and understand the ramifications when each component is affected – from jobs, improving the existing housing stock, and other benefits. As with all systems-thinking approaches, the challenges are multi-threaded.

A New Opportunity --- and New Challenges

The public and private demand for energy efficiency services has dramatically altered the environment for organizations promoting home performance contracting services. Federal, state and local funding for a variety of programs are combining with rapidly growing customer and contractor knowledge to become both a threat and an opportunity for these organizations. Even

before the shift in federal priorities due to the new Administration and the response to recent economic downturn that spurred energy investment funding through the American Recovery and Reinvestment Act of 2009 (”ARRA”), the stakeholder community was growing. Legislative and regulatory mandates were altering the dynamics of home performance programs. For example, in some areas of the country, home performance contractors pre-existed the emergence of a program. The following three examples indicate how different stakeholder communities are cooperating to promote energy efficiency services.

Arizona

Partial list of stakeholders (role in parentheses):

- Established HPwES sponsor, FSL Home Improvements (supply, QA/QC)
- Partnered utility – APS (demand, QA/QC support)
- Interested utilities – SRP, TEP (Potential Demand)
- Emerging software consensus, Home Check (cross connecting)

Several years ago, the Foundation for Senior Living Home Improvement program became a HPwES sponsor. Over the years, FSL was able to recruit and train scores of contractors to BPI standards. However, modest funding did not allow for significant customer incentives, and there was little reason for participating contractors to report home performance work. In the middle of 2009, the program was almost suspended, in large part due to lack of the “demand” leg of HPwES.

In the latter part of 2009, APS - a leading Arizona utility - breathed new life into the program. Working under energy efficiency mandates by the PSC, APS recognized that the existing HPwES framework and infrastructure could deliver comprehensive home retrofit services if APS and other utilities could promote homeowner demand. In other words, APS and other utilities could prop up two of the existing legs of the home performance stool by addressing the missing third leg of market demand.

In March of 2010, the new FSL HPwES program was launched, with a unified webpage that promotes home performance services. Any utility customer can visit the page and find contractors that can assess and improve their home. A separate section of the website directs homeowners to utility-specific rebate information.

One strong advantage to this approach is that FSL provides the core programmatic framework that any home performance program requires - the QA/QC. As long as utilities and others have confidence in the quality of the program, they can “plug into” the framework:

- Workforce development agencies can provide direct or indirect support to create green jobs. These agencies can support their missions by tailoring worker training to meet FSL contractor requirements. Since the utilities accept the FSL contractor qualifications, the workforce development agencies have confidence their efforts have a potential job at the end of the process.
- Utilities can provide rebates for their customers and receive energy efficiency savings. Since utilities do not have to fully create and manage the QA/QC infrastructure that is run by FSL, they lower their costs and increase the likelihood that they pass TRC tests.

- Lending institutions (or localities) can rely on the rigorous quality framework as an important underwriting precondition, so they have better knowledge of the risks and benefits of a loan product. Underwriters know that trained building scientists are following accepted protocols using approved energy modeling software to recommend a package of improvements that lower a homeowner's monthly utility payments. That provides assurance that the homeowner is more likely to be able to repay the loan.

By maintaining the quality assurance of the program (with support from APS), FSL HPwES provides a "home performance clearinghouse" or matchmaking service, so various entities can work cooperatively. FSL provides the QA/QC, utilities provide market demand, and workforce development agencies can provide a supply of qualified workers.

Kentucky

Partial list of stakeholders:

- State Energy Office grant of $4 million from ARRA (driver)
- Kentucky Housing Authority, $2.1 million (QA/QC, Demand)
- Kentucky Community Technical College System (Supply)
- Electric - E-ON US, Blue Grass Energy, American Electric Power, Duke Energy (Demand)
- Gas - Atmos Energy, Columbia Gas, and Delta Gas (Demand)
- Emerging consensus on software – Green Energy Compass and Surveyor

An emerging HPwES program in Kentucky is funded with a $4 million State Energy Program grant, provided for under the American Recovery and Reinvestment Act (ARRA) and $2.1 million funds from the Kentucky Housing Corporation. Kentucky began working on a KHP program in 2009. With support from the Kentucky Department for Energy Development and Independence, the Kentucky Housing Corporation is to be a HPwES Program Sponsor.

Several electric utilities have expressed an interest in home performance: E-ON US, Blue Grass Energy, American Electric Power, and Duke Energy. The Tennessee Valley Authority and the Eastern Kentucky Power Cooperative have expressed support of the program. The program sponsor also anticipates that rural electric cooperatives may join as the program develops over time.

Natural gas providers, including Atmos Energy, Columbia Gas, and Delta Gas, have shown an interest in the program and most have recently secured PSC approval for demand side management program incentives. Many of these utilities already have varying forms of home performance programs as a fully-implemented program or as pilots, offering services such as education, rebates for high performance equipment, CFL give-aways, and clipboard style energy audits and prescriptive implementation.

Providing a sustainable funding source for the program will be a critical challenge. Kentucky will be seeking taxpayer funding after the ARRA funds end. As a result, a chief goal of the program may include articulating the value of the program to state legislators or administrators as they develop budgets. The wind down in ARRA funding sources and the (potential) uptick in more sustainable funding sources will be a significant challenge.

Maryland

Partial list of stakeholders/drivers:

- EmPower Maryland Act - 15% reduction in energy consumption by the year 2015 (driver)
- Maryland Energy Administration HPwES program (supply, QA/QC, limited demand)
- MD Public Service Commission mandate to achieve *electric* energy savings. Utilities mandated to use the HPwES programmatic framework. (driver)
- BG&E, Pepco, Pepco Delmarva, SMECO, Allegheny Power (build supply, demand, QA/QC)
- Montgomery County HELP legislation - establishment of PACE financing (demand)
- Community College course development of curricula for market rate and weatherization work using BPI curricula (supply)
- Emerging consensus on software - Beacon HEA (cross connecting)

In late 2006 / early 2007, the Maryland Energy Administration ("MEA") began their initial sponsorship of HPwES. At the time, the full infrastructure burden was on the MEA. In late 2007, they initiated recruitment of home performance contractors. The program had limited funds to reimburse contractors for 50% of training funds after 10 completed reported jobs, and a $150 job reporting bonus. While the program had no homeowner rebate or financing options, they were able to use program funds and leverage EPA marketing funds to provide a three-month marketing campaign using billboards, radio ads, and purchasing Google Adwords. The program also used creative approaches to leverage participating contractor marketing efforts, arranging for contractors to represent the program on radio interviews and local events. The program managed the QA/QC protocol for file review and onsite job review. While the marketing support did assist in creating homeowner demand, the lack of any customer rebates or financing limited the impact. In some respect, the MEA HPwES program stood on two legs, but was not strong enough to create a sustainable and transformative home performance industry.

Concurrent with these initial efforts, the MD PSC and utilities were developing plans to meet aggressive goals set by the Empower Maryland Act. Discussions at PSC hearings did discuss the role (and suitable entity) of the HPwES sponsor. However, internal disagreements within the Maryland state government coupled with the strength of the utilities' ability to deliver DSM programs led to the decision to have each utility be its own HPwES sponsor. Despite having each utility run its own program (with its own rebate levels, etc.), the commission and others sought harmonization on several fronts:

- By mandating HPwES, a common programmatic approach was encouraged. Historically, in order to promote innovation and localized solutions, EPA and DOE have allowed considerable flexibility in programmatic approaches that meet the minimum requirements. However, in MD and other regions where HPwES programs are developing in unison, there have been efforts to create a more consistent framework, while still meeting the unique needs of the sponsors. EPA and DOE have suggested they will review and evaluate separate HPwES implementation plans within the context of the local ecosystem of other HPwES programs.

- MEA, the utilities, the community colleges, and other stakeholders have developed curricula to train workers in the home performance and weatherization industries. The goal is to have a worker trained to perform work in all of the available programs, with only minimal programmatic training needed for each separate program (e.g., how to talk about the program, how to report completed jobs, etc.)
- The PSC ordered a General Awareness Campaign that consists of statewide messages focused on common themes that educate consumers about the benefits of energy efficiency and conservation. This is not a single statewide campaign, but rather a statewide awareness effort by the EmPower Maryland utilities, the Maryland Energy Administration (MEA), and others with a consistent, common theme. The utilities use these common themes to individually market their specific programs in their service territories.

In theory, these coordination efforts can lower the infrastructure burdens for each HPwES sponsor. Utilities would not have to invest in worker training, as the state and community colleges are educating workers in the skills needed by the HPwES contracting community. Additionally, a coherent and consistent marketing message can improve homeowner awareness and demand for home performance services. To date, utilities have still had to bear some of the costs associated with increasing the supply of available contractors. Additionally, it's unclear if the administrative/transactional costs associated with harmonizing marketing messages is lower than the costs associated with running a marketing campaign in isolation.

Frameworks / Lessons

Which type of organization becomes the "controlling" entity is perhaps the most striking difference between the different states / regions. Pre-existing mandates and infrastructure can be a critical factor during the development of these approaches. In locales where utility companies have specific mandates to achieve energy savings goals, it is very difficult for them not to play a formidable role in the program. To some extent, these approaches are (and should be) based upon accountability and responsibility. In states where a utility must meet PSC mandates, arguments for statewide control are difficult to support. Success or failure for a utility's program should be based upon those factors that the utility can control. Alternatively, if a statewide approach is established by fiat, the utilities' obligations to meet energy savings goals should arguably be suspended.

When comparing these two frameworks, some of the strengths for each approach include:

Utility Strengths

- Experience running DSM programs
- Consistent touch points with all of their customers
- Generally a high level of satisfaction from customers
- A more consistent funding stream to implement programs[5]

[5] Inconsistent funding of programs can be a significant source of friction for contractors and homeowners. In HPwES programs, the critical nature of the QA/QC component (i.e., health and safety) makes ongoing funding even more important. Utilities are certainly not immune to suspension of programs, but they are arguably less likely to have lurches in their funding stream relative to funds that are subject to changes in administrations or other changes

- More sophisticated IT backend infrastructure
- Access to utility billing data
- Lead market actor in Advanced Metering Initiatives
- Possibly a more response organizational framework to adjust program to lessons learned and meet evolving needs
- For some utilities, an established relationship with trade ally partners
- ***If properly structured***, a financial incentive (e.g., decoupling) for utilities to produce energy efficiency savings can enhance programmatic administrative efficiencies

Statewide Program Strengths

- Lower risk of duplicate infrastructure
  - Consistent contractor/customer facing software approach (preferably an open standard - but nonetheless a "standard")
  - Same processes to perform file and field checks of completed jobs
  - Common IT database
  - Common methodology to calculate energy savings
- Ability to promote energy efficiency for all fuel types
- Aggregated contractor/assessor base
  - Common requirements (certification, licensing, insurance, etc.)
  - Common listing on website (see immediately below, homeowner interface)
- More seamless homeowner interface
  - Unified website
  - Unified messaging
  - Unified financing mechanism

In both the utility-centric and statewide approaches, the full burden of building up the home performance infrastructure of the "three-legged stool" no longer rests squarely on the shoulders of a single program administrator. For utilities, the argument can be made that whole house retrofit programs are more likely to pass TRC or other cost-effectiveness tests. In the case of Maryland, California, and Michigan, utilities are positioned to be the HPwES sponsor, but they can "outsource" some of the traditional sponsor obligations (e.g., contractor training) and thus not incur those costs against their TRC. In Nevada, Kentucky, and Arizona, utilities can simply "plug into" the existing QA/QC and contractor infrastructure, again avoiding costs that have traditionally made home performance programs a challenge to pass TRC.

In states that use ARRA funds to build a statewide HPwES program, the wind down in ARRA funding sources and the (potential) uptick in more sustainable funding sources will be a significant challenge. The source of those longer-term funds will vary. As mentioned in Kentucky, some programs may seek taxpayer funds. In Illinois and Nevada, the program may rely in part on internal cost recover (e.g., fees paid by contactors to be listed on the website). Utilities may also be able to cost-share, each contributing to the administrative costs of a single

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to public priorities. For a more detailed discussion of this matter, see "Advancing State Clean Energy Funds", USEPA, May 2008.

program. Both DOE and EPA have a significant obligation to capture and share lessons between the various home performance programs so stakeholders can make planning decisions as quickly as possible based on quality information.

Conclusions

All of the highlighted states/regions are confronted with the challenges and opportunities of a stakeholder rich environment. To the extent that the home performance industry provides a wide variety of value to multiple stakeholders, it would be ideal if each unit of value could be unbundled and "sold" to each stakeholder for a price. For example, each home performance job provides a certain increment of value: comfort, building durability, kWh savings, KW savings, therm (or other site fuel) savings, job creation, tax base support (via home value, job creation, materials sold), carbon reduction, local pollution reduction (e.g., emissions from smoke stacks, destruction of habitat from hydropower, wind, concentrated solar), indoor air quality (which itself can be disaggregated into homeowner vs. societal costs), and more. Homeowners would pay the costs of the job that create their value (e.g., comfort, lower bills). Utilities would pay for (incent) an amount equal to their benefits (e.g., deferred generation and transmission costs), and society would pay for the beneficial externalities (job creation, reduction of global and local pollution, etc).

In reality, the unbundling of these units of value is not possible. Instead, various stakeholders need to work together to promote the delivery of home performance work to the homeowner. While utilities want to promote job growth and to support financing for homeowners, that is not their core mission or part of their core competencies. Alternatively, community colleges and workforce development agencies want to create green jobs, but they don't necessarily have the expertise to fully understand all of the job tasks necessary to deliver home performance improvements to meet the utilities' and homeowners' needs.

By learning how some regions of the country are addressing these issues, the author hopes readers have a general framework and starting point to enhance stakeholder cooperation in supporting the home performance industry.

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