

Home Performance with Energy Star[®]: Delivering Savings with a Whole-House Approach

Michael Rogers, GreenHomes America

Megan Edmunds, E-Star Colorado

Robert Knight, Bevilacqua-Knight, Inc.

ABSTRACT

Improving existing homes has long been a challenge, not only because of the variety of technical issues, but also because of the unique characteristics of each home and the need to convince homeowners one at a time to make needed improvements. Technologies exist to make those improvements. However, they are usually delivered in a piecemeal by individual trades, with rebates and incentives attached to single measures. Not only does this miss tremendous opportunities, it may actually create new problems as system interactions are ignored.

Home Performance Contracting has emerged as a significant market opportunity to use building-science based approaches to improve existing homes. This approach greatly reduces energy use in existing homes, often by 50% or more of total energy use. It taps into a variety of market drivers, including comfort, durability, health and safety, along with energy efficiency. Homeowners are responding well to solutions to these solutions, and are spending considerable amounts to improve their homes. This panel will discuss why and how the home performance contracting approach works, emphasizing program design considerations and results from programs with up to 5 years experience. The results reported in this paper's case studies provide evidence of growing momentum in home performance contracting, achieving continuing growth and success in long-term energy savings.

Introduction

New housing units are added to the U.S. housing stock at a rate of one to two percent of total units each year. About two-thirds of those new units are single family homes—about the same proportion as in the total housing inventory. The nation's population increases at about the same rate. This means that the nation will not “build our way to efficiency;” most homes existing today will be needed indefinitely despite recent record construction rates. In addition, existing homes tend to be less energy efficient than today's new homes, due to code changes and initiatives such as Energy Star[®] Homes. Existing homes represent a huge opportunity for large-scale, long-term residential energy savings (CEE 2005; CBPCA 2006; SCE 2006).

To address this opportunity, the EPA's Energy Star[®] Homes program instituted the “Home Performance with Energy Star[®]” (HPwES) initiative in 1999. That initiative provides guidelines and marketing support to encourage state and local groups to fund and implement programs in contractor training, consumer education, and quality assurance for comprehensive home energy-related improvements based on building science “house as a system” principles. This paper provides a brief introduction to a variety of HPwES implementation programs, illustrating the potential and the challenges involved in the quest for more comprehensive and widespread energy efficiency improvements in the existing housing stock.

Background

HPwES is one of the home energy efficiency services being developed by the U.S. Department of Energy (DOE), U.S. Department of Housing and Urban Development (HUD), and U.S. Environmental Protection Agency (EPA) under the new Partnerships for Home Energy Efficiency (Energy Savers, USEPA 2006). Rather than labeling a particular product or building, HPwES focuses on a comprehensive “home performance contracting” service. The effort emphasizes consumer education, value, and one-stop problem solving. While the broad program goal is saving energy, its market-based approach and message also emphasizes a variety of customer needs from comfort to durability to health and safety. It also encourages the development of a skilled and available contractor infrastructure that has an economic self-interest in providing and promoting comprehensive, building science-based retrofit services.

HPwES has several key components: a bona-fide whole-house approach; an inspection that includes diagnostic testing; “best practice” installations; and quality assurance. The inspection includes a complete visual and diagnostic inspection of all of the home’s thermal and mechanical systems. Diagnostics include air infiltration testing and duct leakage testing, combustion safety testing, and where possible, electric baseload analysis. The inspection leads to targeted advice on the home’s energy and maintenance problems, which forms the basis of the contractor’s bid for making comprehensive improvements (USEPA 2006).

In most HPwES programs, participating contractors are trained to perform all of the recommendations. Alternatively, contractors can coordinate a variety of services provided by other specialists. In concert with the programs, Energy Star® staff and others work to standardize protocols for whole house inspections and installations, and to expand quality assurance mechanisms to support the program nationally (USEPA 2005). HPwES taps the growing awareness and credibility of Energy Star® to facilitate whole-house energy improvements. Current approaches to quality assurance include the use of contractor certification from the Building Performance Institute, or the alternative of training and oversight through the inspection of completed work (e.g., Wisconsin, California, Colorado).

Home Performance with Energy Star® has been implemented over the past five years in 12 locations, as shown in Table 1 below. New programs are planned in Maine, Ohio, and Anaheim, CA, among others (USEPA 2005; USEPA 2006). From program experience to date, there appears to be a substantial market for this comprehensive approach. Customers have been

Table 1. Home Performance with Energy Star® Programs

<i>HP with Energy Star® Program</i>	<i>Sponsor/Operator</i>
Atlanta, GA	Southface Energy Institute
Atlantic City, NJ	Board of Public Utilities
Austin, TX	Austin Energy
Colorado	E-Star Colorado
Idaho	Idaho Energy Division
Kansas City/St. Louis, MO	Metropolitan Energy Center/Earthways Center
Massachusetts	NSTAR Electric & Various Utilities
New York	New York State Energy Research and Development Authority
Northern California	California Building Performance Contractors Association
Oregon	Energy Trust
Vermont	Efficiency Vermont
Wisconsin	Focus on Energy

satisfied with the quality and benefits of improvements to their homes. Participating contractors are seeing the fruits of the business opportunity in better differentiation, happy customers, reduced seasonality, and increased profits.

Case Studies

The remainder of this paper discusses the programs implemented by the New York State Energy Research and Development Authority (NYSERDA) in New York, by E-Star Colorado, by the California Building Performance Contractors Association in Northern California, and observations from other HPwES programs. The three example programs illustrate different levels of funding, duration to date, and design details.

New York State

Background. NYSERDA has helped improve the efficiency of more than 10,000 homes through its Home Performance with Energy Star[®] program. Building on a long history of program experience, NYSERDA developed a whole-house program which was innovative not just in its comprehensive approach, but also in its use of a comprehensive consumer and contracting marketing. The program was designed to address a variety of concerns including comfort, health and safety, and positive impact to the environment and the economy. NYSERDA was then the first to use HPwES. Alignment with Energy Star[®] provided synergies with other market transformation programs it had run and new programs that it anticipated running. NYSERDA won the flexibility to market and advertise heavily, to provide financing of comprehensive work scopes, and to avoid rebates focused on single measures. The program was launched in six markets beginning in March, 2001: Albany, Buffalo, Rochester, Syracuse, Binghamton, and the Hudson Valley. The program is now expanding into Long Island and Westchester, with footholds in New York City and around the state (Anon 2005a; Fisk, et al 2003; Fisk & Knight 2005; Gerardi & Fisk 2006; Rogers, Edmunds, & Fisk 2005). Contractors have stepped up to get trained and certified and to deliver whole-house solutions (James 2004a; James 2004c; SCE 2006). Homeowners have seen significant energy savings and a host of other benefits. And the program has demonstrated that the market will pay for real solutions backed by quality assurance. Indications are that the market will transform to fully adopt this approach beyond program implementation (Gerardi & Fisk 2006; Rogers 2005b).

Design and operation. With an annual budget of approximately \$5,000,000 per year, NYSERDA HPwES is a comprehensive program, aimed at providing a “one-stop shopping” approach to whole-house improvements. The program attempts to transform New York’s trade contractor infrastructure by facilitating training and requiring mandatory contractor certification and accreditation by the Building Performance Institute (BPI). To stimulate the market, NYSERDA developed and deployed an aggressive marketing campaign, including paid broadcast media with the goal both of increasing consumer awareness and demand for whole-house services and of attracting more contractor participation. NYSERDA also arranged for and bought down the interest rate on financing to help consumers pay for comprehensive jobs (Fisk, et al 2003, Fisk & Knight 2005, NYSERDA 2005). Participating contractors are required to have relevant BPI certifications in disciplines such as building analysis, shell improvements,

heating systems, and cooling systems. By requiring certification, training is not required for participation in the NYSERDA program. Nonetheless, the majority of contractors go through some training, usually that developed and, subsidized by the NYSERDA program (Fisk, et al 2003, 7).

Incentives. Incentives are provided to both contractors and consumers. Contractor incentives have included subsidies for up to 75% of the cost of training, partially forgivable equipment purchase loans, and a 5% total job cost incentive. NYSERDA continues to explore incentives which will lead the contractors to deliver comprehensive, high-quality improvements (Fisk, et al 2003; Gerardi & Fisk 2006; Rogers, Edmunds, & Fisk 2005).

Consumer incentives include an unsecured Fannie Mae Home Improvement loan (through Energy Finance Solutions) at a subsidized rate, and a secured New York Energy SmartSM Loan. Initially, reduced rate loans were the only consumer incentive. However, in part to help track smaller jobs, and in part to offer an incentive to homeowners who could not qualify for or did not want the loan, a 10% “Homeowner Financing Incentive” was created.

Results to date.

- Number and Size of Jobs: Over 10,000 jobs have been completed at an average job cost of over \$7,000 per job to date. Customers have invested more than \$50 million of their own money in home energy improvements. NYSERDA has also subsidized over 3,500 income-eligible households for installation of eligible measures under the New York Assisted HPwES Program (Gerardi & Fisk 2006).
- Average Electricity and Gas Savings: Estimates of the per home average annual savings are as high as 800 kWh and 33 MMBtus (gas or oil) over the life of the program, with trends over the past two years showing higher average savings. An independent measurement and verification study has determined that the savings estimates reasonably reflect the actual savings—and they may even be conservative. Participating contractors frequently report observed savings in excess of the modeled and estimated savings and as high as 50% of the total energy use in some homes (Fisk & Knight 2005; Gerardi & Fisk 2006; James 2004c; NYSERDA 2005; Rogers, Edmunds, & Fisk 2005).
- Program is Cost-Effective: The independent evaluation found a benefit-cost ratio greater than one, based on energy-savings alone. When non-energy benefits are added, the ratio is as high as 5 (NYSERDA 2005).
- Contractor Participation: More than 330 technicians have been certified, and more than 100 contracting firms have been accredited by BPI (Gerardi & Fisk 2006).
- Other Notable Results: Consumer awareness of Energy Star[®] products and services has increased as a result of NYSERDA’s marketing campaign and cooperative advertising program with contractors. New York now ranks among the highest in the nation for Energy Star[®] awareness and increased understanding of the label from 20% in 1999 to about 60 % today (USEPA 2005).

Key lessons learned.

- Start at a level where you can provide market-by-market focus: Rather than diluting funds across the entire state, NYSERDA launched this program successively in discrete markets. This allowed them to quickly reach a critical mass of contractors, and to create awareness and demand (Rogers, Edmunds, & Fisk 2005; USEPA 2005).
- Significant spending on market and advertising can stimulate demand for whole-house services: Its robust marketing campaign was crucial to the success of their program. They demonstrated that they could stimulate demand beyond what contractors could provide, and had to strike a balance between consumer demand and contractor infrastructure. Their marketing campaign also helped demonstrate the serious program commitment, which helps recruit contractors (Rogers, Edmunds, & Fisk 2005).
- Quality Assurance, Quality Control: Quality assurance systems are important in delivering results to homeowners. It will be necessary to provide a strong, market-based QA system, such as a strong BPI accreditation program, to continue to deliver the program message of quality and results (Gerardi & Fisk 2006; Rogers, Edmunds, & Fisk 2005).

California

Background. In a project overseen by Pacific Gas & Electric Company, the California Building Performance Contractors Association (CBPCA) has shown that contractors can successfully market and deliver services that embrace home performance contracting principles and practices, even in the absence of special homeowner incentives or rebates. This Home Performance with Energy Star[®] project has covered much of the PG&E service territory (most of Northern and Central California) since 2002, and a similar CBPCA program is now beginning in the Southern California Edison territory covering most of the Los Angeles suburban area (CBPCA 2006; Lutzenhiser 2006).

Design and operation. The California Home Performance Program is aimed at training contractors in the diagnostic, remediation, business and marketing skills necessary to incorporate home performance services into their ongoing business. A secondary goal is to make homeowners aware that this service is now available in California and why it is valuable. The Program is administered by the non-profit California Building Performance Contractors Association and has been funded by California energy ratepayers under the auspices of the California Public Utilities Commission.

The program budget for 2002-05 averaged approximately \$900,000 per year including administration, marketing, training support, and verification. This is far smaller than the flagship NYSERDA program but still substantial. No financial incentives have been offered to homeowners. PG&E is now sponsoring the CBPCA contractor training, and CBPCA has matured into a contractor-member supported organization for other services to its trained contractors and their customers (CBPCA 2006).

Contractor training and mentoring. The Program developed its own curriculum and does its own contractor training. It recruits trainees from trades including HVAC, insulation, and general

remodeling. The first step in the training process has been a one-day Business and Marketing session for contractor company management that also serves as a program initiation and self-screening for potential participants. The second step in the training program is Diagnosis and Remediation (technical) training. This is a 6-day session in which the first three days are held in a classroom, the following two days are spent diagnosing homes in the field, and the final day concentrates on writing work scopes for the homes diagnosed and testing competency.

The final stage involves field mentoring. Soon after the technical training is completed, trainers meet with each student to discuss mobilization strategies including equipment purchases, staffing, pricing, and marketing. The trainers then accompany each student on their initial diagnoses and sales calls. This insures quality assurance for both the student and the homeowners. Program trainers maintain contact with each student and perform “test outs” on 10% of each student’s jobs. On-call mentoring is also available when necessary. Occasional local group meetings are held to discuss specific topics, introduce new technologies, and share remediation tips, and CBPCA also operates a contractor web-chat system for sharing of problems and solutions(CBPCA 2006).

Marketing. The program budget did not permit a NYSERDA-style mass marketing campaign, although it originally used limited radio, TV and print advertising as well as exhibits at events such as home shows. However, program marketing has evolved to concentrating most resources on training contractors to market home performance themselves and providing them with the basic materials they need. In addition, efforts continue at home show exhibits and articles in local media, which have generated many customer leads. This combined approach has proven to be a satisfactory long-term solution for many contractors (Lutzenhiser 2006).

Results to date.

- Number and Size of Jobs: The program had difficulty in securing job reports, due to the lack of direct contractor incentives for reporting. Based on contractor interviews, however, the number of home retrofit jobs completed in 2005 is estimated at 1000-1200 in a rapidly rising trend as more contractors were trained and became effective. Average job cost for jobs reported was approximately \$12-14,000 with a range up to \$40,000 and more. Most common measures include shell sealing, duct repair and replacement, and HVAC equipment upgrade/replacement. Other measures such as window replacement, extensive insulation upgrading, moisture remediation, and addition of mechanical ventilation have been less dominant but not infrequent.
- Average Electricity and Gas Savings: For jobs for which data is available, modeled average annual energy savings are nearly 6000 kWh and 375 therms of gas per home. Note that since the average estimated *total* electricity and gas usages in California homes is near those levels, it appears that homes with above-average square footage and energy deficiencies have been the principal targets.
- Contractor Participation: Since the first trained contractors began work in 2003, approximately 180 individuals representing 75 firms have completed the training. However there is wide variation in the commitment and effort of the contractors trained, and the majority of jobs are done by a minority of the contractors trained.

- Evolving contractor incentives: In addition to extensive free field mentoring, the program added partial rebates on training fees, marketing costs, and equipment purchases after completion of 15 jobs in order to encourage commitment and job reporting during the difficult initial period of adaptation to the home performance business and technical requirements. The program also began using more sophisticated methods of contractor identification and categorization to appeal to the most promising training candidates. However, even these incentives failed to generate high levels of job reporting. In the new Southern California Edison program, direct cash incentives will be used to encourage reporting of diagnostic and test-out results.
- Transition to Self-Funding: PG&E is continuing to fund CBPCA's contractor training activities, but California's intensified emphasis on immediate large energy savings for 2006-08 made it impossible for the utility to continue funding the program's administration, marketing, and mentoring. The CBPCA's contractors are supporting its transition to a membership structure with fee-based services, and training classes continue to be oversubscribed. The CBPCA has also qualified as one of the state's three HERS Providers and is training both raters and contractors in the quality installation and verification provisions of the Title 24 energy code. These roles are expected to bring more and more HVAC contractors toward the home performance business model.

Key lessons learned.

- Not all contractors are well suited: Contractor outreach efforts have involved trade associations, equipment distributors, and connections with events that offer useful tools for contractors (such as estimating seminars). The lesson is that no one outreach method is best, nor is any one type of contracting specialty. The program's original intent was to focus on finding HVAC and insulation contractors but that quickly progressed to adding general remodeling contractors and, recently, solar contractors. The qualities that successful candidates possess center mostly on financial strength, business acumen, and an attitude that embraces innovation, growth, planning, acceptance of risks, and excellent customer service. Custom contact listings and interviews are now being used to screen contractors for such qualities in scheduling training.
- Contractors need post-training support: As important as the formal training process is, it is even more important to individually mentor the trainees. The CBPCA curriculum is necessarily challenging, and the average contractor cannot be expected to absorb and use all of it at first. Only through individual mentoring, field assistance, and experience can contractors transform their firms into true home performance businesses. The average contractor may need up to one full year to make the transformation, or even more. At the same time, even "failed" trainees have learned skills that improve their understanding of the home and allow them to do better work.
- Self-reliance is essential: The California program has operated under the assumption that it would not have strong utility support forever. It instructs contractors on how to do the work, find the resources, organize and manage, and identify the solutions themselves. CBPCA provides the tools to be self-reliant--in marketing and sales as well as technical skills. The transition to contractor membership and funding has been a crucial step.

- Marketing must emphasize all the benefits: The program's interviews with customers have shown that energy efficiency is often not the homeowner's main motivation for entering the home performance process. A combination of non-energy benefits such as asthma relief, comfortable temperatures throughout, and increased durability of the home and its equipment, with emphasis on each varying among homeowners, appears often to be substantially more important and critical to the sale. Homeowners see that when they address the health, safety, and comfort problems in their homes, maximum energy savings are a natural outgrowth.
- Future Plans and Expectations: Home performance contracting in California has significant growth and momentum in Northern California. CBPCA's new Southern California program is building on the lessons of that initial effort and is expected to achieve similar momentum much more quickly. Ultimately the CBPCA expects to be able to transition to a self-funded basis with membership-based services throughout the state.

Colorado

Background. The Colorado program exemplifies a low-funding approach. E-Star Colorado, in conjunction with the Southwest Energy-Efficiency Project (SWEET), introduced the HPwES program in 2004 on as a pilot with support from a municipal utility. The utility was interested in the program as a potential demand-side management solution for the existing home market. E-Star Colorado has since introduced the program to two municipalities, Boulder and Fort Collins. In addition to implementation lessons learned, E-Star Colorado is exploring a number of policy issues including:

- the contrast between a utility's emphasis on component-specific rebates, driven by the total resource cost tests mandated for demand-side management programs, vs. the "whole-house" systems approach promoted by DOE's Building America program and Home Performance with Energy Star®;
- the contrast between a standardized comprehensive upgrade package vs. a complete "test-in/test out" approach, the willingness of contractors to adopt one strategy over the other, and the effectiveness and risks of one strategy over the other; and
- the actual energy savings that result from these jobs.

As more contractors are trained, as the quality assurance infrastructure is solidified, and as performance data is acquired, these questions will be explored more fully. In the meantime, E-Star Colorado has learned a few lessons in the implementation process.

Contractor recruitment and training. To avoid the expense of free riders in the program, contractors must apply to participate in the program, demonstrate an annual revenue of over \$500,000 per year, and pay for the training and their own tools. Class sizes have been limited to three companies per training, with multiple attendees per company. By screening for substantial businesses, E-Star Colorado ensures two things:

- The contractors are already skilled at generating their own leads, and can use the program to build on existing leads for conventional services such as an HVAC repair or replacement.
- If successful, contractors will be handling larger sales. This requirement helps ensure that the pilot participants' companies will not be hurt by a working capital crunch.

E-Star Colorado also looks for some level of building science awareness and existing-home experience.

Contractors are required to attend both classroom and field training sessions, with emphasis on field training. Classroom training provides an overview of basic building science concepts, utility bill analysis, and the use of an audit checklist. Similar to the HERS industry and its RESNET-accredited software, the audit checklist ensures consistency amongst participating contractors.

All contractors are then required to complete five jobs observed by course instructors before being certified as an HPwES contractor. Once the observed jobs are completed and the course instructors sign off on the contractor, contractors sign a participation agreement in which they commit to (1) using a whole-house approach with the audit checklist, (2) participating in a quality assurance program, (3) making cost-effective recommendations based on findings from performance testing, (CBPCA 2006) training internal staff to field customer inquiries on the Home Performance with Energy Star[®] program, and (Energy Savers) adhering to the Energy Star[®] guidelines.

Incentives. There are no statewide incentives or rebates available at this time. However, contractors provide homeowners with information on any component-specific rebates available in their area.

Summary results to date. Nine firms have completed training. Six of those nine have completed the observed job, or “mentoring” phase and are in the quality assurance phase, and three have completed one or two of their mentored jobs. 33 jobs have now been bid as whole-house upgrades under the mentoring phase, and an additional 6 jobs have been bid by the contractors who have completed the process. Seven out of the 39 jobs bid to date have been completed. E-Star Colorado is currently following up to see what issues create the lag between jobs bid and jobs sold. E-Star Colorado is preparing customer surveys to assess initial customer reactions for completed jobs, and to request that those customers participate in a utility bill analysis program.

Contractor evaluation and quality assurance. E-Star Colorado has outlined the following quality-assurance process:

- Initial Mentoring: As mentioned above, all contractors are observed and assisted with the whole-house diagnostics, specifications, job order and final inspection of the first five (5) homes on which they work. All inspections are completed while the contractor is at the site before final sign-off to minimize impact on the customer.
- Ongoing Quality Assurance: After the first five mentored jobs, fifteen percent of all subsequent homes in a calendar year undergo inspection by a third party, after work has

been completed. E-Star Colorado will also survey the customers during the first year of operation.

- Reporting Function: Participating contractors are required to submit copies of the following materials to E-Star Colorado for all homes for which work is completed: Diagnostic/audit checklist, initial job bid to homeowner, final job bid to homeowner, and utility bill analysis. E-Star Colorado is exploring ways to create efficiencies to minimize the reporting burden.
- Continuous Improvement: E-Star Colorado plans to establish a self-evaluation mechanism for its contractors similar to the NAHB's Total Quality Management process. Once this element is developed, it may become a requirement for participation in the program.

Other Key Implementation Observations

- The Wisconsin Focus on Energy program uses a third-party "home performance consultant" approach. These consultants sell their services either directly to homeowners or to remodeling or other trade contractors. With more than 100 completions each month, even while reducing program incentives and support, Wisconsin has demonstrated increasing market acceptance of this approach (Anon 2005b; Fisk, et al 2003; James 2004c; USEPA 2005).
- Homeowners perceive a wide variety of benefits from comprehensive retrofits. Energy cost savings, while important to most, are often overshadowed by a variety of non-energy benefits. All benefits should be emphasized in marketing, and the use of simulation models to forecast energy savings in the sales process is not uniformly accepted among programs due to its undue emphasis on that single benefit as well as inherent inaccuracies and the risk of subsequent buyer disappointment. (Rogers, Edmunds, & Fisk, 2005; Thomas 2006)
- While New York HVAC contractors have been slow to embrace the program, other programs have seen strong participation from the HVAC community. California, Colorado, Atlanta, and Austin have attracted HVAC contractors who have firmly moved toward home performance. Large HVAC contractors are starting to head in this direction on their own, even ahead of programs. Examples include nationally recognized contractors Larry Taylor of AirRite and Steve Saunders of Tempo Mechanical, both in Texas (Fisk & Knight 2005, Gerardi & Fisk 2006, Home Energy 2006).
- Other large contractors are moving in this direction. For example, Neil Kelly, a leading remodeling company based in Portland, Oregon, is establishing a home performance division as a natural complement to their remodeling and handyman businesses. GreenHomes America, a large home performance contracting company operating in several locations in New York, is opening centers in California and beyond in 2006, with plans to move into new states in 2007 including areas without home performance programs.
- The Building Performance Institute, with funding support from EPA, DOE, HUD, and NYSERDA, is strengthening its certification and accreditation program, and is being used not only in several Home Performance with Energy Star[®] programs, but also in areas without current programs.

Conclusions

- **There is a market for home performance contracting.** Consumers are willing to pay for a comprehensive whole-house approach to improving the performance of their homes. Contractors use building science to differentiate themselves based on added value, high quality, and solutions that deliver results. This increases homeowners' trust and confidence in contractors, and leads to comprehensive job scopes.
- **A whole-house, home performance approach can greatly reduce energy use in existing homes.** Although more research needs to be done to quantify delivered energy savings, it is clear from modeled estimates, initial program evaluation, and considerable feedback from contractors and homeowners that home performance contracting does save energy. Savings of 20-30% of total energy use should be typically achievable, with savings of up to 40-50% of total energy use possible with some degree of regularity.
- **Consumer marketing needs to address non-energy benefits.** Although the primary program goals focus on energy savings, many consumers are more interested in—and willing to pay for—comfort, health and safety, building durability, and indoor air quality (Fisk & Knight 2005; Gerardi & Fisk 2006; James 2004c; Home Energy 2006).
- **Home performance contracting is a sustainable business opportunity for contractors.** Contractors report that using home performance can lead to higher closing rates, expanded jobs, and higher margins, all of which increase profitability (James 2004a; James 2004b; James 2004c; Home Energy 2006).
- **Contractors need to “own” this innovation.** Third party program support and marketing helps. However, to be successful, contractors must make this their business—not just mount a half-hearted attempt to pick up some government- or utility-subsidized work (James 2004a; James 2004b; James 2004c; Home Energy 2006).
- **There is a variety of successful business models.** From pure consultants, to one-stop-shop contractors, with many variations in between, different business models can succeed. Programs should recognize this in their design (James 2004a; James 2004b; James 2004c; Rogers 2005a; Home Energy 2006).
- **Financing is important.** With larger, more comprehensive job scopes, financing is necessary to ensure that a maximum number of homeowners can get the work done. Lower interest rates help, but more important is ease of access. Qualification should be simple, quick, and as hassle-free as possible (Fisk, et al 2003; Fisk & Knight 2005; James 2004a).
- **Program support can speed adoption.** Home performance contracting is going to happen—it's just a matter of how long it will take. It is clear that funding programs can help to greatly accelerate this process by providing quality training and mentoring; serving as a trusted third party messenger to increase market awareness; helping secure preferred financing; and helping provide quality assurance. Conversely, increased interest and investment by the private sector that is already being observed should help speed future program deployment, and improve TRC and other benefit/cost tests for comprehensive programs such as Home Performance with Energy Star® (Gerardi & Fisk 2006; NYSEDA 2005; USEPA 2005).

The comprehensive home performance concept offers both an enticement and a challenge to contractors. They can differentiate themselves from their competitors, avoid low-bid business, and achieve prestige status and stability. At the same time, the technical and business changes required are extensive and difficult. These case studies indicate that extensive support and effort are required to build momentum with both contractors and homeowners. They also show that customer response is strong when made aware of the availability of these broad solutions to home deficiencies. In the future, home performance contracting may succeed in the quest to save energy because deficiencies in non-energy qualities such as home health effects, safety, durability, and comfort begin to be recognized as widespread and often severe.

References

Much of this paper draws on the work and observations of the authors in implementing Home Performance with Energy Star[®]. In addition, there is a wealth of resources from which the observations described herein can be found. However, it was the generous sharing of information from all sponsors of Home Performance with Energy Star[®], especially the informal exchanges through countless discussions, conversations, and emails, that made this paper possible.

Anonymous. 2005. "A New York Energy Smart Program." *Home Energy*, 2005 Special Edition: 24.

_____. 2005. "Wisconsin's Home Performance with Energy Star[®]." *Home Energy*, 2005 Special Edition: 25.

[CEE] Consortium for Energy Efficiency. "Residential Home-Performance Programs National Summary." August. <http://www.cee1.org/resid/hp/hp-ps.pdf>. Boston, Mass.: Consortium for Energy Efficiency.

[CBPCA] California Building Performance Contractors Association. 2006. *Final Report, 2004-05 Comprehensive Retrofit Home Performance Program*. Submitted to Pacific Gas & Electric Company, March.

Energy Savers website. <http://energysavers.gov>.

Fisk, A., G. Newman, B. Knight, R. Rudy, and J. Hanna. 2003. "Summary of Existing Programs." In *Proceedings for Building Solutions 2003 Conference, Home Performance with Energy Star[®] Exchange*. Bloomington, Minn.: Energy & Environmental Building Association.

Fisk, Andrew, and Bob Knight. 2005. In *Proceedings for the "National Home Performance with Energy Star[®] Symposium," Affordable Comfort, Inc. Conference*, May 17.

Gerardi, Rick, and Andrew Fisk. 2006. In *Plenary Presentation at "Solutions for Success" Affordable Comfort, Inc. Conference*, February 1-2.

Home Energy. 2006 "Profiting with Home Performance." *Home Energy Magazine*, Home Performance Special Edition, April.

James, Mary. 2004. "Strictly Shell Man Converts." *Home Energy Magazine*. May/June: 40-43.

- _____. 2004. "His Own Brand of Marketing." *Home Energy Magazine*. July/August: 43-45.
- _____. 2004. "Remodeling a Business." *Home Energy Magazine*. September/October: 42-44.
- Lutzenhiser Associates. 2006. *Evaluation of the 2004-05 CBPCA Comprehensive Retrofit Home Performance Program*. Pending submittal to Pacific Gas & Electric Company. Summer.
- [NYSERDA] New York State Energy Research and Development Authority. 2005. "New York Energy Smart Program Evaluation and Status Report." Report to the System Benefits Charge Advisory Group, Final Report, May. http://www.nyserdera.org/Energy_Information/05sbcreport.asp.
- Rogers, Mike. 2005. "Learning and Working Our Way to Success." *Home Energy Magazine*. Special Edition: 20-23.
- _____. 2005. "Introduction to Home Performance with Energy Star[®]", In *Proceedings for Affordable Comfort, Inc. Conference*, May 16.
- Rogers, Mike, Megan Edmunds, and Andrew Fisk. 2005. "Introduction to Home Performance with Energy Star[®]." In *Proceedings for RESNET 2005*. <http://www.natresnet.org/conference/2005/presentations/Fisk.pdf>.
- [SCE] Southern California Edison Company. 2006. *Implementation Plan for the 2006-07 Home Performance with Energy Star[®] Program by California Building Performance Contractors Association*. Pending availability from SCE.
- Thomas, Greg. 2006. "Greening of a Home Performance Contractor." *Home Energy Magazine*. May/June: 24-31.
- [USEPA] U.S. Environmental Protection Agency. 2005. *Home Performance with Energy Star[®]*. Program summaries shared with program sponsors.
- [USEPA] U.S. Environmental Protection Agency. 2006. Energy Star[®] website. <http://www.energystar.gov/homeperformance>.