Charting the Home Performance Contractors Territory

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ABSTRACT

Home Performance with Energy Star® programs are emerging around the nation and stimulating the market for residential energy retrofits. Contractors, both inside and outside funded programs, have been adopting a variety of new business models in an effort to profit from this emerging market. What lessons can we learn from the successes of contractors in this market? What works, what doesn't work, and why?

This paper will present results of a new research project developing guidelines for home performance contractor business and technical practices. In this project, funded by the California Energy Commission's (CEC) Public Interest Energy Research (PIER) Program, the researchers conducted a national survey and a set of qualitative follow-up interviews of home performance contractors. The results were used to help draw conclusions about how contractors build successful business and technical systems to deliver home performance. By combining this information with the gritty experience of a program trying to transform various types of contractors into true whole house performance contractors and a whole house contractor/trainer working with both customers and contractors, the project is developing guidelines for program design, training content and support for contractors entering this field.

An Introduction to Home Performance

What is home performance and how does it benefit both consumers and society? Home performance is a term used to describe energy related services offered by contractors who use performance testing and building science to diagnose and treat performance problems in houses. These problems typically affect the comfort, safety, durability and energy efficiency of a house. Contractors and home performance programs market these and other energy and non-energy benefits to consumers.

"Home Performance" labeled programs were first developed in New York (Thomas, 1997; Rogers, 2003; Kushler & York & Witte, 2003) and Wisconsin (James, 1999), and have now been adopted by the US Environmental Protection Agency Energy Star program as a branded service that can be offered by programs that meet certain standards for the type of service offered and the associated quality assurance systems. Programs are actively being marketed in New York, Wisconsin, California, Texas, Kansas and number of other states.

Home performance services can be delivered using a "whole house" contracting approach in which a contractor bundles, within his own company or in partnership with other companies, a combination of services that include heating and cooling system improvements along with load reducing envelope improvements such as insulation, air sealing and windows. The one-stop shop aspect of the whole house approach tends to increase consumer investments in home performance. This allows greater control over the flow of air, heat, and moisture as well as allowing cost-effective tradeoffs between improvements to the building envelope and

improvements to heating and cooling systems. Energy efficiency is integrated into the contractor's design and implementation process.

Home performance programs intervene in the market by helping to create both supply and demand for these services. Such programs typically help consumers understand the benefits of home performance retrofits, train and monitor contractors in delivering those services, and provide access to those qualified contractors.

Consumers benefit from home performance programs through increased investments in performance improvements and from the increased energy and non-energy performance of tested, building science based improvements relative to any competing improvements that they might have made. For example, a replacement cooling system installed correctly sized with sealed ducts will perform better than the typical oversized replacement cooling system hooked up to still leaky ducts. The consumer benefits from the performance tested, integrated installations.

Societal benefits from home performance activities include energy and demand savings, stimulating increased consumer investments in efficiency. There are also a wide range of non-energy benefits such as improved safety and health (combustion safety, controlled ventilation, and moisture control are examples), increased durability of the housing stock, and reductions in greenhouse gas production.

The long term opportunity for home performance programs is to significantly increase consumer investments in improving the existing housing stock and reducing energy use, creating a sustainable market for improving home performance.

The PIER Whole House Contractor Study

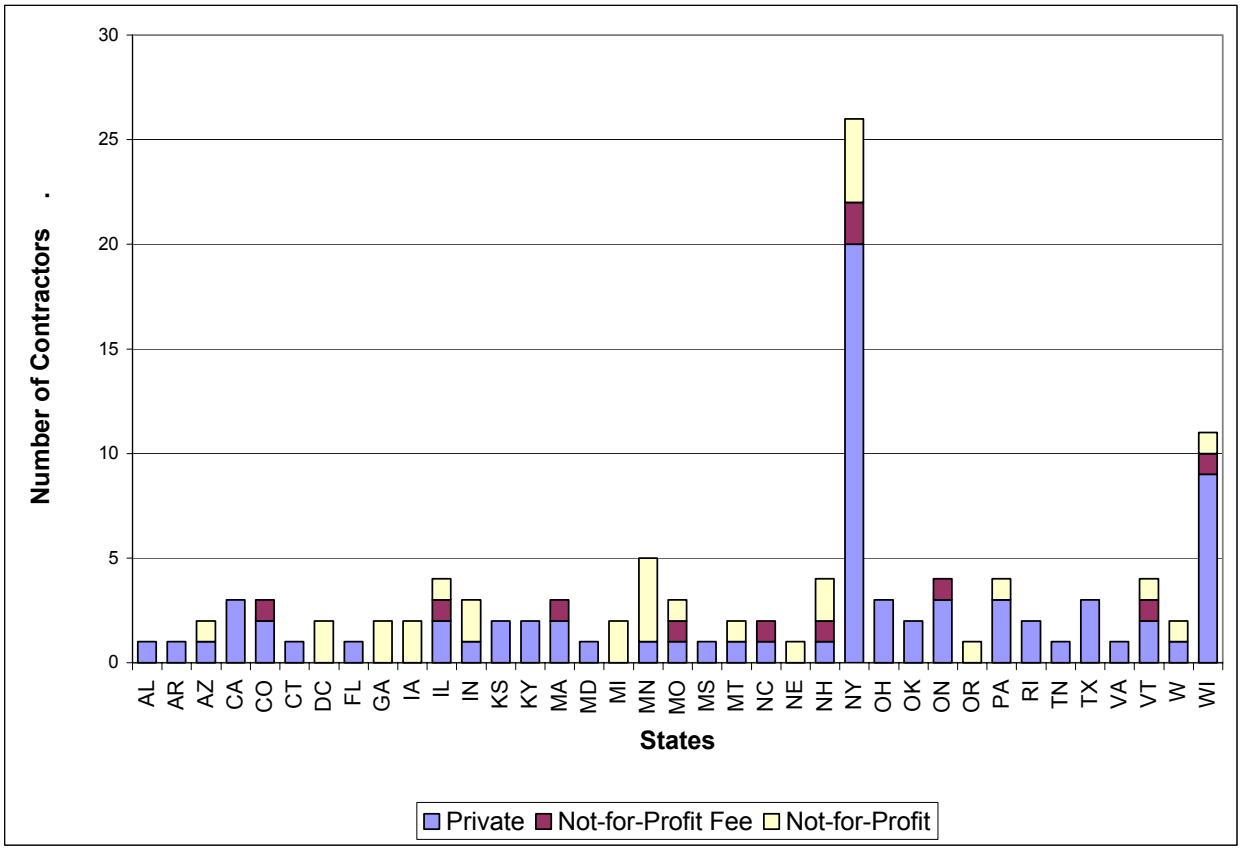
The California Energy Commission Public Interest Energy Research group contracted with Bevilacqua-Knight, Inc. (BKi) and its subcontractor Performance Systems Development, Inc. (PSD) to help develop home performance and whole house contracting practices for California. This project includes documenting successful business approaches for home performance contractors nationwide and developing resources that can be used to help more California contractors succeed at the transition to home performance contracting. Both companies are closely involved in the home performance industry, BKi as a program manager for the Home Performance with Energy Star program funded through the California Public Utilities Commission and PSD as a home performance software developer, trainer and contractor.

A National Survey of Contractors

The first objective of the PIER project was to develop a clear understanding of the knowledge and systems necessary for success as a home performance contractor through a national screening survey of home performance contractors (Thomas, 2003). To do this we conducted a two phase study. The first phase was an online survey offered to a wide audience of contractors who have attended conferences or registered at home performance related websites. We used the results of this survey to help us select participants for inclusion in the second phase – a set of follow-up in-depth interviews.

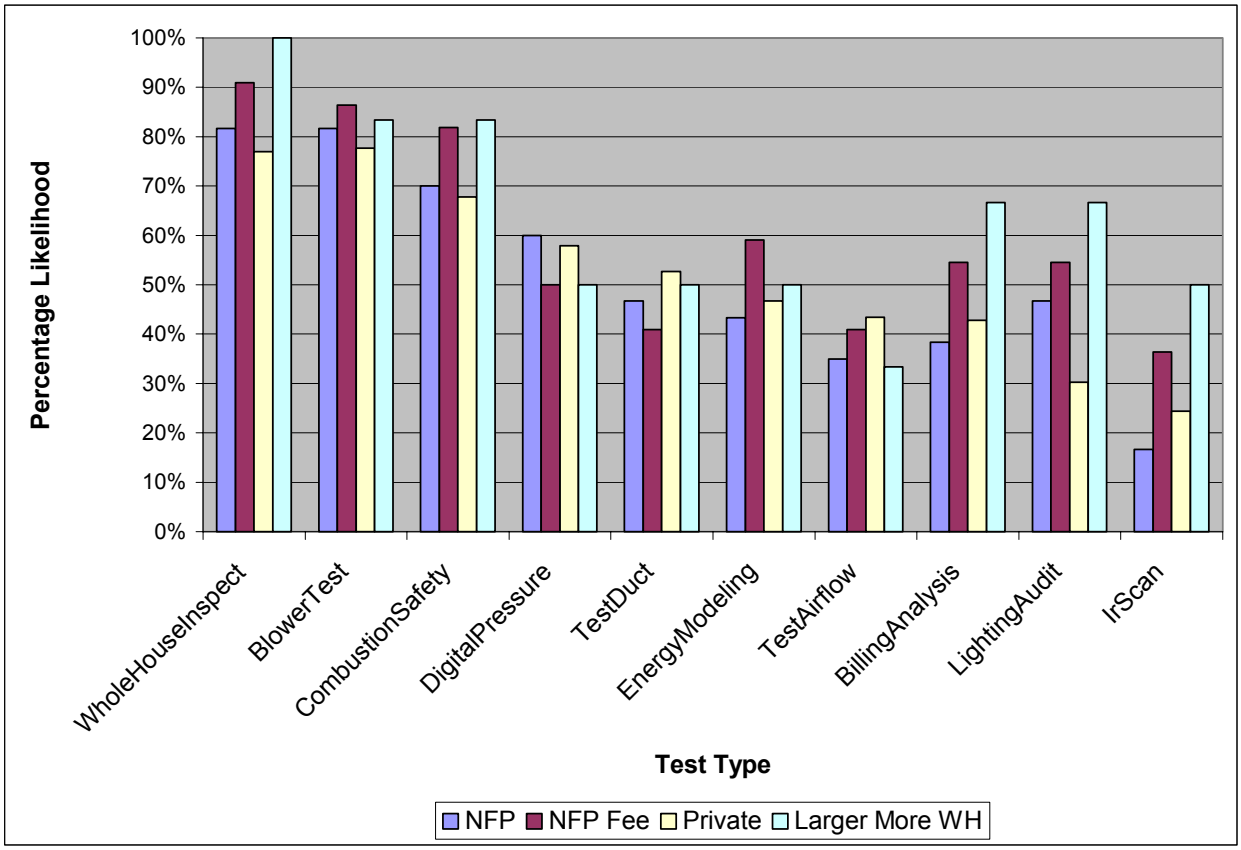
From a total of approximately 3000 emails from the various conference and online lists, we estimate there were roughly 25% or 750 unique contractor emails. A total of 118 contractors from 35 states responded to this survey a contractor response rate of roughly 16%. The geographic distribution of the responses indicates both the success of early programs in creating home performance contractors and the national scope of contractor interest in home performance, with New York and Wisconsin leading the pack. Respondents were separated into private contractors, conventional not-for-profit organizations (i.e., in weatherization programs), and not-for-profit contractors who also do some fee-for-service contracting.

Figure 1. Geographic Distribution of Home Performance Contractors Who Responded to the Online Survey, by Business Type



The online survey looked at what type of work was being done by self-identified home performance contractors and what types of testing they were using. The likelihood that various types of contractors would use a specific test was analyzed and is shown in Figure 2. Of interest is the increased commitment of the larger more whole house contractors (Larger More WH) to billing analysis, lighting baseload analysis and infra red scanning, inspection activities that are much less common for the typical home performance contractor.

Figure 2. The Likelihood That a Contractor Would Perform a Range Of Performance Tests As Part of an Inspection or Treatment of a House



The second stage of the study consisted of extensive phone interviews and information collection with sixteen of the more successful home performance contractors. These contractors were selected based on criteria that included the degree of integration of home performance into their business process (i.e. "success") and efforts to maintain variations in climate, size, and business model. All of the contractors selected were using performance testing at a higher level relative to other contractors in the online survey. The information from this detailed survey was used to create indicators of the skills and knowledge required for success as a home performance contractor. The phone interviews focused on private contractors with the exception of two not-for-profits conducting fee-for-service home performance work. The interview questions covered a wide range of potential business and technical practices (Thomas, 2003).

Whole House or Home Performance Business Models

The results of the interviews indicated a fair degree of commonality in the technical approach used by contractors and more significant differences in the various business models used to sell and install the home performance improvements. The interviews revealed that many of even the successful home performance contractors were not necessarily doing "whole house" installations. It became clear from the interviews that many of the contractors who might aspire to do true whole house retrofits were often trapped by limitations of their current business models and habits. These contractors tended to focus on installing performance tested

improvements which were typical in their existing line of business, whether HVAC or envelope related. These "home performance" contractors were using performance testing to help sell higher quality installations but were not selling a broader "whole house" scope of improvements. While this is clearly a step in the right direction, these contractors and their sponsoring public programs lose important opportunities for higher levels of home performance and the potential advantages of cost tradeoffs through integrating HVAC and envelope improvements.

Contractors frequently cited previous experience with utility or low income weatherization programs as their initial exposure to performance testing and building science. Recruiting contractors from outside this pool of early adopters may require extra effort in both recruitment and training.

There was also a tendency of larger dollar volume contractors to have a larger average size contract than the smaller contractors. Given the relatively high cost associated with obtaining a home performance customer, the larger contractors have found ways to maximize energy savings as well as their own earnings from each customer by offering more comprehensive workscopes.

The average job size for the private contractors doing some significant part of the installation was $9333. In contrast, the not-for-profits averaged $4500; these tended to be low-income weatherization specialists. The remaining contractors, most of whom act primarily as diagnosticians and coordinators of work by others, billed an average of only $2250. These small jobs tended to involve no or very little remediation work, with a focus on specialty services such as air sealing or duct sealing.

A Typical Home Performance Process

The interviews indicated that the typical business model for home performance revolves around the use of testing to investigate the problems in houses, to help sell the improvements to the customer, and to verify the performance of the installed improvements. This model may be used by an installing contractor or by a third party diagnostician working with or supervising other installation contractors. The survey indicated the importance of various activities in each stage of this process.

- **Marketing** – Contractors engaged in a variety of marketing practices, from intensive investment in paid media, customer referral, and third party referral. Most of the successful contractors worked to educate their customers or leveraged someone else educating the customer for them.
- **Selling the inspection** – The fee for the inspection was a primary mechanism used by contractors to pre-qualify customers. The installing contractors were able to discount the cost of the inspection with the potential for significant follow on income from installation. Diagnostic third party inspectors typically relied heavily on referrals from other contractors and previous customers. Program marketing was also an important influence on strategy in this area. Where subsidized financing was available, prequalification for financing was sometimes used as a screening, with pre-qualified customers offered a free inspection, if both decision makers were able to attend.
- **Conducting the inspection** – The contractors used many of the same inspection techniques, testing the tightness of the building envelope and ducts and investigating induced pressure effects and combustion safety in the buildings. Most of the contractors

took from three to four hours in the building to perform the inspection. This long inspection effectively discouraged most contractors from using a one-stop sales process. After that long crawling around the house, most contractors tend to be ready for a break and for some time to think through the workscope. A number of the larger contractors had expanded their inspection to include items such as appliances, lighting, infrared scanning and billing analysis. Lack of fast cost estimation techniques for home performance tasks may also be contributing to the typical use of a two-stop sales closing process.

- **Making savings projections** – Most of the contractors used some sort of analytical tool for estimating savings. Tools ranged from energy rating systems to home performance simulation tools and load estimation programs.
- **Making estimates of installation cost** – Some installing contractors offered on the spot quotes using unit prices, but most went back to their shop to price the work and produce a report and proposal. Many reported using unit pricing.
- **Reporting on findings and making recommendations** – Some contractors were very quick, but overall the survey respondents took a week on average to get back to customers.
- **Selling the job** – Access to financing was identified as an important tool to help contractors close large and larger than expected jobs.
- **Installation** – As noted earlier, installing contractors who started out with an existing trade based business tended to focus on installation services in that trade. Startups and remodelers tended to be able to offer whole house services more readily.
- **Testing out** – Post retrofit combustion safety testing was a strong element of the interviewed contractors both inside programs and outside formal sponsored programs.

The survey and interviews provided key insights into how contractors in the field are actually implementing performance testing and whole house technologies and provided new insights into the changes in business process that successful home performance contractors undergo. The text of the full report is available for downloading at www.psdconsulting.com.

From Research into Development

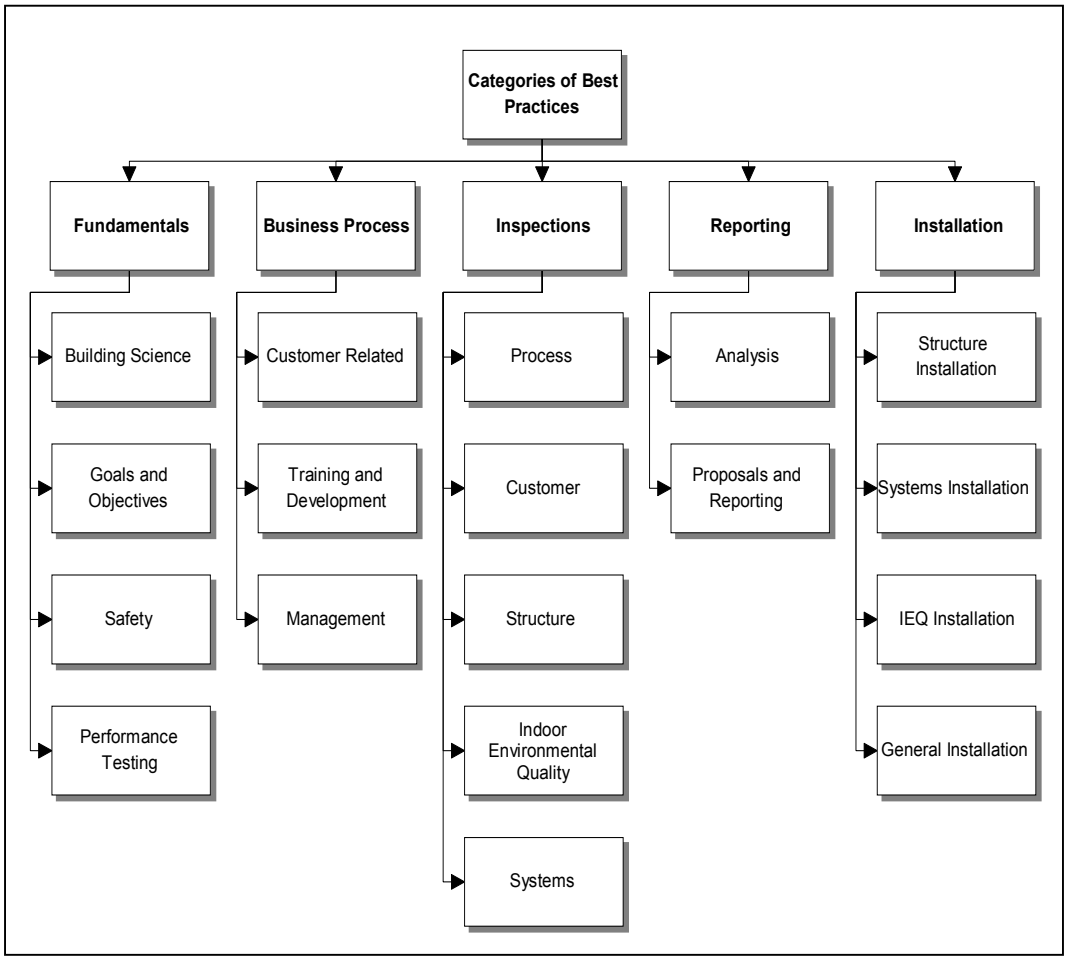
The survey and interviews were just the first step in a larger project to support the development of home performance and whole house contracting in California. There are a wide range of development and research efforts currently underway, informed by the information on contractor activities gathered in the survey process. A brief summary of each of these efforts follows.

Mapping the Best Practices

Information from the survey was combined with previous information and program experience to help create a comprehensive set of best practices for contractors. These best practices describe the knowledge and skills used by the successful contractors and informed by the researchers' own detailed experiences in program operation and the operation of a whole house contracting business. There are currently over 460 topics covered in the project's best practices set. These topics span a wide range of activities from business process to installation.

Initial development of roughly 300 of the best practices occurred in a previous effort in Wisconsin that resulted in a curriculum for contractors in their technical colleges and was refined based on training offered in California, New York and New Hampshire. The PIER project research has enhanced the best practices most significantly in the areas of business process and installation procedures. The enhanced set of best practices are currently being grouped and documented in detail. This documentation will support a training curriculum and help define future research needs. The following chart provides a high level view of this emerging map of home performance contractor knowledge.

Figure 3. A Map of Whole House Best Practices



The development of a formal structure for this broad range of information can provide guidance to contractors as they seek training in technical aspects as well as business and marketing-related skills. The mapping process is identifying areas in which standards have been well developed versus those where additional research might help support the development of standards now missing or inadequate. The goal is to link the best practices to a curriculum that will enhance the success of contractors in making their home performance work profitable and effective.

Defining Mechanisms for Supporting Home Performance

A parallel project to the PIER research effort is the ongoing development and day-to-day operation of a home performance program. This effort is continually refining its approach to recruiting and training contractors. One of the keys to the success of the program is to successfully bring more contractors to incorporation of the best practices in their businesses.

Contractors encountering information about home performance, both inside and outside programs, go through a process of increasing both their level of knowledge and their commitment to the technical and business practices of home performance. Not all contractors encountering this information continue on with the learning process and business model adoption. Increasing our understanding of this adoption process will assist us in helping more contractors increase their level of commitment. Increasing the numbers of contractors committing to the home performance model and the rate at which contractors adopt the model will help home performance programs that focus on recruiting contractors to undergo training and commit to selling home performance services.

The typical adoption of the home performance business model starts with a contractor's exposure to technical or business opportunity information about home performance. The contractor may come across information in program mailings or phone solicitations, a magazine or newspaper, a radio or television advertisement, a conference advertisement, at a wholesaler or home show, etc. The process typically proceeds in stages:

1. **Initial Exposure** – Contractor is exposed to home performance information.
2. **Information Acquisition** – Contractors seek additional information from sources such as websites and magazines.
3. **Personal Engagement** – Company principals spend time attending conferences and trainings, but without commitment of staff time or other resources.
4. **Commitment of Staff Time** – Staff are assigned to attend trainings and conferences, with expenditures limited to education related expenses.
5. **Commitment of Capital** – Expenditures of funds to obtain equipment and software.
6. **Trying Out Testing** – Experimentation with testing and technical approaches under safe circumstances, such as a contractor's own house, friendly customers or their mother-in-law's house.
7. **Initial Changes to Business Practices** – Initial implementation of some aspects of home performance, such as fees for performance testing, preliminary marketing efforts, and some limited-scope retrofits.
8. **Conversion of Business and Technical Practices** – Broader adoption of performance testing and associated business practices across the operations of the business. Broader marketing of the inspection and installation services.

This sequence is typical, based on a gradually increasing level of risk due to expenditures of resources such as time or investment capital and changes to time tested business practices. Contractors may also fail to progress past a stage or opt out of the process, deciding that the potential benefits may not warrant the risks to their businesses. Providing support to contractors through this transition must be a major objective of home performance programs. Table 2 provides samples of potentially effective program activities in support of the contractors involved.

Table 2. Possible Market Interventions by Stage of Contractor Development

Stage	Possible Market Interventions
Initial Exposure	Programs conduct marketing for consumers and contractors. Consumer marketing also acts as recruitment for contractors. Websites and materials should indicate how contractors can investigate more.
Information Acquisition	Programs can provide easy access to additional summary and detailed information via the web, printed materials, audio CD's, etc.
Personal Engagement	Programs can provide subsidized full or half day workshops, conferences and other opportunities for personal contact with program staff and participating contractors.
Commitment of Staff Time	Programs can offer additional subsidies for staff participation in training. Staff training may be more detailed and of longer duration.
Commitment of Capital	Programs can loan or lease required equipment, provide software demos, etc. Contractor upfront expenditures for equipment and software may be forgiven if program participation goals for that contractor are met.
Trying Out Testing	Programs can provide support through field mentoring, technical support hotline. Test results and reports can be submitted for review and comment.
Initial Changes to Business Practices	Programs can provide sales and marketing training. Good documentation of necessary business practices is important. Program can provide business mentoring and support groups such as ACCA's MIX groups where similar contractors from different areas share business ideas and experiences.
Conversion of Business and Technical Practices	Programs can provide or support certification of individuals' skills and knowledge and accreditation of companies' business practices. (Knight, 2000) Access to leads can be provided to contractors who meet threshold requirements. Program quality assurance efforts help to ensure that participating contractors have a level playing field and that the investments of both the program and participating contractors in the marketplace are not threatened by contractors doing poor quality work.

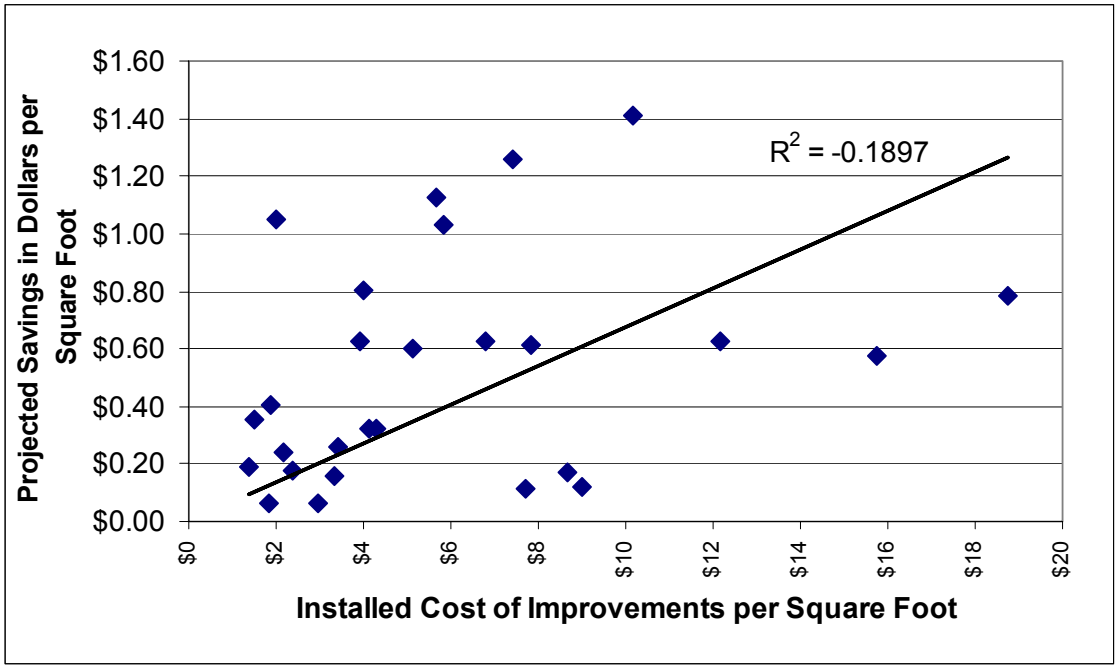
What Are Consumers Really Buying?

A desired outcome of both the research effort and the home performance program operation is the development of an increased understanding of how to motivate consumers to make home performance investments. Participating consumers are currently being interviewed, but some preliminary information based on investments made is available for review.

Are these consumers investing in home performance services because the energy savings available makes those investments financially attractive? An early sample of 27 jobs with savings projections from contractors in California and New York in Figure 4 shows a broad range of both investment and savings levels. The data indicates that some of these consumers are investing in home performance far past the level of investment justified by cost effective energy improvements. Are non-energy benefits enhancing the investment level and therefore the increasing the total energy savings?

Based on their comprehensive home diagnostics, the participating contractors can combine a complete package of efficiency related improvements to correct the home's deficiencies and provide both energy and non-energy benefits. This diagnostic approach results in significant variations in both investment and energy savings levels. For example, customers unhappy with the ability of their heating and cooling systems to condition their home may decide to invest not just in replacement equipment but also building envelope improvements and air distribution system repair or replacement.

Figure 4. Consumer Investment and Annual Projected Savings for Twenty Seven Projects in New York and California



The project is currently surveying participants in the California Home Performance with Energy Star program to help determine the factors behind their decisions to make these investments. Initial observations suggest that non-energy benefits are often critical factors cited by the customer as part of their decision to invest in a whole-house solution. If true, this will have major implications for energy efficiency program design and evaluation. This topic will be reported later in the project.

The Energy Efficiency Program Evaluation Barrier

Obtaining accurate evaluation of program impacts is an important part of designing and operating a successful energy efficiency program. As programs move into home performance, it is important for the program designers and implementers to understand how home performance activities fare under various evaluation standards. One issue seems to be of particular significance. The high level of individual customer investment in home performance work is creating comfortable homes and profitable contracting businesses that can continue to provide high performance installations. But the combination of energy and non energy customer investments in a single transaction is also creating a potential evaluation liability for the home performance programs. The gold standard for installation program evaluation is the Total Resource Cost test (TRC) (CEC 2001). The TRC compares the total customer and utility energy savings benefits of a program with the total costs borne by both the customer and the program in its implementation.

Home performance contractors are becoming successful at combining energy efficiency with other customer requested improvements, a strategy that can result in deep levels of energy savings and satisfied customers. The TRC evaluation test is usually viewed as being friendly to efficiency investments, since the energy benefit to the customer is fully included in the cost

effectiveness calculation. But when a program, such as home performance, is increasing the efficiency of customer investments that are only partially energy related, the standard TRC calculation fails to separate out the costs related to non-energy improvements from the energy related portion of the investment. This lack of an accepted methodology for separating energy related investments from the non-energy related investments is a serious barrier to adoption of home performance programs. Programs that cannot show cost-effectiveness under current energy-only TRC requirements are not likely to be funded, despite the wide range of beneficiaries from customers and contractors to the environment and society as a whole. The result is program designs that have an incentive to focus exclusively on energy investments.

As indicated above, research is currently underway to attempt develop a methodology for defining customer motivations for making home performance investments. This research may support the development of a methodology for backing out the energy driven portions of customer investments in home performance. The goal is to allow the comparison of energy benefits with energy related costs.

Conclusions

The online survey and interview information gathered from contractors represents some of the first formal documentation of the range of business and technical processes used by successful home performance contractors. This information is providing the foundation for additional research activities and the development of tools and resources that should help programs and contractors in their efforts to successfully promote home performance.

The information collected from contractors' interviews showed them using a range of business models, from inspection and consultation to trade based installations to whole house installations. There was more commonality on technical approach than business approach across the interviewed contractors. Another key finding was the tendency of trade contractors to rely much more heavily on their ability to install improvements in their native trade, with fewer contractors routinely creating cross-trade, whole house solutions. The information gathered from the interviews is being combined with previous materials and in field experience to create a set of best practices that can be used to help guide other contractors to success in both energy efficiency and in successful home performance business practices.

Program experience and practices are also being documented through coordination with the California Home Performance with Energy Star implementation program. The contractor and customer driven aspects of the home performance process are creating both opportunities and barriers. For example, increases in customer investments help make home performance approaches attractive to contractors, but also cause issues when it comes time for the home performance program to pass evaluation thresholds.

Home performance programs have the potential to provide significant public benefits and significant private benefits for customers and contractors. Charting this new territory will hopefully help others realize this rich source of value with less risk of taking a wrong turn.

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