

Final Report

Green Building Technical Support Services Program Evaluation

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1. Executive Summary

Introduction

This report provides the evaluation of Frontier Associates' Green Building Technical Support Services Program (the Program) conducted during the period 2004 to 2006. This third-party-implemented Program was described in Frontier's revised proposal submitted to the California Public Utilities Commission (CPUC) on January 5, 2004 and revised again in early 2005. This study was conducted at the request of the California Public Utilities Commission (CPUC) and it was funded through the public goods charge (PGC) for energy efficiency. It is available for download at www.calmac.org.

Program Overview

The Program built on the 2002–2003 version of the Program. It focused on primarily two market segments: residential market-rate new construction and remodeling; and affordable housing. For the market-rate component, it targeted both supply-side and demand-side market actors in the residential new construction and remodeling industries. For the affordable housing component, it continued to direct efforts to the development and maturation of the Green Affordable Housing Coalition (GAHC) as a central source of information and resources for affordable housing developers and public agencies with housing-related functions.

Because of the nature of the Program, it extended beyond the direct promotion of energy efficiency to include resource-efficient building design and construction. Green building takes a holistic view of building design and construction by also considering other major energy issues, such as the energy used to deliver clean water; the energy and resources used in the production, transport, use, and disposal of building materials; and the relationships between the building's energy systems and indoor air quality. It promoted integrated design, which is a basic tenet of green building.

EM&V Approach

Quantec, LLC, conducted the EM&V study of the Program. The study objectives, as defined in the CPUC Energy Efficiency Policy Manual, and our originally planned approaches to address them are shown in Table 1. Given the information-only nature of this Program, activities such as quantifying the energy impacts of the Program were not planned.

Table 1. Original EM&V Components

CPUC/Policy Manual Evaluation Goal	How the plan addresses the Policy Manual or justification for not doing so.
Provide upfront market assessment and baseline analysis.	Baseline information is available from the 2002-2003 Program Implementation Plan Non-participant surveys will be used to update baseline.
Provide ongoing feedback and guidance.	Monthly reports will include any key findings to report to-date An interim report based on document review and interviews completed to-date will be provided at the end of 2004/early 2005.
Measure indicators of effectiveness and testing program theory (PT/LM) and approach.	Specifically will address PT/LM development Will use pattern matching of barriers and program effects and compare expectations from program design with participants v. non-participants, where applicable.
Assess the overall levels of performance and success.	<p>Process evaluation approach: Program theory based evaluation with pattern matching approach Review of new document materials (case studies and fact sheets) Review point-of-purchase (POP) materials and conduct shopper exit interviews at stores with POP materials</p> <p>Sampling plan for process evaluation: End-of-session survey feedback with sample of participants at: Half-day workshop presentations, presentations at community events, presentations to elected and appointed officials, brownbag presentations to local government staff, inspector training sessions, and Green Home Tour. Participant interviews will be held with: Participants in telephone and email consultations (Ask an Expert¹), builders and developers, GAHC members that received organizational support, local governments receiving support, and those that received website assistance. Non-participant interviews with builders and developers, affordable housing developers, and local government officials.</p>
Help assess the continuing need for the Program.	To be included in final EM&V report based upon pattern matching and participant/non-participant comparisons.

One of the most innovative elements of this study was the use of a simplified pattern-matching approach to develop the program theory and test it against the actual outcomes of the Program.² We used this technique to assess the importance of perceived barriers tackled by the Program and the effectiveness of specific Program elements.

We designed and conducted the evaluation in a way to provide ongoing feedback to Frontier about the effectiveness of the specific components of the Program with the intent to allow the implementers to make real-time adjustments to the Program to maximize effectiveness. This overall approach allowed application of the adaptive management strategy.

¹ Ask an Expert is a consultation service, conducted in conjunction with the Program, providing free green building technical and other information to building professionals and the general public in the Bay Area.

² For one description of this approach see Marquart, Jules. "A Pattern-Matching Approach to Link Program Theory and Evaluation Data" in *New Directions for Program Evaluation, Advances in Program Theory*, No. 47, Fall 1990, Jossey-Bass, Inc.

Findings

Observations about the Study Approach

The Program presented significant challenges for this study for several reasons:

- Since the Program was designed to be multifaceted, it required our evaluation approach to consist of many separate data collection and analysis efforts.
- The Program evolved over the two years it was implemented and our approach had to be adjusted as the Program evolved.
- Because the Program leveraged the efforts of many other organizations, individuals, and programs, it was not always possible to identify a clear link between the Program's activities and outcomes, or define exactly what contribution the Program made to a specific activity or service.
- The Program did not lend itself well to researching the differences between groups of participants and non-participants.

In the interest of meeting the requirements established by the CPUC, Quantec identified a research approach relying on primarily process evaluation techniques to assess the different Program elements. From the outset, we identified with the implementers the discrete Program activities and services. In all cases, we obtained the perspectives of participants and their assessment of the Program elements. When it was possible, we identified non-participants and characterized their knowledge of the Program, attitudes, and perceptions. We employed written evaluation sheets, telephone interviews, and web-based data collection to compile study data.

The most innovative technique used in this study was an application of simplified pattern-matching. Using pattern-matching led us to define from the beginning what the Program implementers saw as the barriers that the Program would tackle and what role each Program activity and service was intended to play in mitigating those barriers. The simplified pattern-matching approach proved to be a very effective way to assess the expectations of the implementers and provide feedback on the success of the Program. The application in this study was limited by the budget constraints, but we believe the technique demonstrated its usefulness. Even though our application of the technique was limited and was a challenge given the complexity of this Program, we believe it should be considered in future evaluations as a way to clearly assess how closely the program theory was realized in actual implementation.

Study Findings and Conclusions

Given the nature of this Program, our study focused primarily on accomplishing those goals related to assessing the effectiveness of the Program and its performance.

Market Assessment and Baseline Analysis

Based on our study, we believe Frontier effectively used the information from this assessment to design its Program to address the most critical market needs and target its activities. Frontier’s assessment identified that there had been an explosion of interest in green building in recent years, but that only a limited number of programs had been implemented to address this market need.

Frontier drew upon and supplemented existing information on Northern California local green building programs to get a good understanding of the market and market needs. Table 2 summarizes the status of green building programs in 35 cities and counties in the region. Nearly one-fourth of the local jurisdictions had undertaken no activities. About half were in the earliest stages of developing a program and no mature programs were in place.

Table 2. Local Green Building Program Status

	No Activities	Introduction or Concept Stage	Building Support	Program Planning	Tools Development	Program Implementation	Market Outreach	Maturation
No. of Cities or Counties	9	8	9	1	1	3	3	0

Frontier’s assessment identified the clear need for assistance to local jurisdictions seeking to develop a program. It also identified the barriers on both the supply and demand sides of the market and helped Frontier design the activities that the Program could implement to address these barriers.

Ongoing Feedback and Guidance

Throughout this study we maintained close contact with the Program implementers to track Program progress and provide feedback. One step that was instituted to ensure that the implementers received timely feedback was to prepare and submit memoranda summarizing our findings from each of our research activities. These memoranda were the basis for several of the chapters in this report.

We did find it difficult to monitor the changes in the Program as they occurred. This was primarily because the resources for this study were not sufficient to allow the level of tracking required for a program that was very flexible and involved a large number of parties.

Program Effectiveness

Point-of-Purchase (POP) Displays

Our assessment of the POP displays occurred early in the Program and found that the displays at retail outlets were not as effective as desired. Few of the customers interviewed at the stores had seen the displays. Several interviewees did offer suggestions for how the POPs could be made more effective.

In-Depth Consultations

Participants who took advantage of in-depth consultations tended to have some knowledge of green buildings; those who did not use the service were most likely ones who had either no knowledge or a lot of knowledge about green building. Based on the responses of interviewed participants, the Program did a very good job delivering these services. One of the major benefits noted by participants was the networking opportunities that came out of the consultations.

Half-Day Workshops

The two workshops we assessed attracted primarily supply-side market actors. Most of these participants were already fairly familiar with green building practices. Although most of the attendees were already somewhat knowledgeable about green building, most said that the workshops did increase their knowledge of building green particularly in terms of costs and financing and green products/practices.

Community Events

One of the main way consumers (i.e., the demand side of the market) were reached was through community events. The typical participant was already somewhat familiar with green building. The events received high ratings. As with most of the other activities, participants rated the knowledge and professionalism of the implementers very highly.

Inspector Training

Our review of the inspector training materials showed that the materials were well presented, well-targeted, and useful. Feedback from training participants was consistent with our assessment of the training materials—participants gave the training session high ratings in all areas.

Support to GAHC and Local Governments///

Providing assistance to the affordable housing community and local governments was a key objective of the Program. Based on our interviews of GAHC members who had received assistance in conjunction with the Program, it had done a good job of increasing their knowledge of green affordable housing opportunities and increasing their willingness to pursue green options. Similar to the responses from other market actors, several respondents indicated that a benefit of the Program was the networking that occurred.

Feedback from local governments receiving Program assistance also demonstrated that the assistance was valued. The Public Agency Council (supported in part by the Program) was cited as an especially beneficial resource.

Green Home Tour

The green home tour appeared to be a very effective way to increase consumer awareness and knowledge of green buildings. Even though most participants said their knowledge of green

building was already better than average, the tour also attracted a sizable group of homeowners (14%) who had very little knowledge of green building. Based on survey responses, we believe the opportunity for participants to talk to green building owners and builders is very effective.

Case Studies and Fact Sheets

Overall, the quality of the information provided by case studies was good and the presentation was effective. Two additions could make the studies even more effective: an extended project contact list and consistent cost and financial information.

In general, the Program fact sheets are effective and well targeted. They do vary, however, in their structure and content and we believe this detracts from their usability.

Ask an Expert

The Ask-an-Expert consultation service provided in conjunction with the Program is a key resource that assists a wide range of users. The service is doing a very good job of meeting users' needs as evidenced by the ratings it received. Users perceive the service to be an objective source of information about green buildings.

Test of Program Theory

We used the simplified pattern-matching approach to compare the program theory developed through our initial rating exercise with implementers with findings from our surveys and interviews of various market groups.

Based on the comparisons we made, it was possible to conclude that the program theory proposed by the implementers matched quite closely the actual functioning of the Program. The barriers anticipated by the implementers were basically consistent with those experienced by the various market actors. Similarly, the activities and services delivered by the Program were about as effective at addressing these barriers as the implementers expected when designing the Program.

Levels of Performance and Success

The findings showed that most of the Program activities and services performed well in terms of meeting the needs of the targeted market actors. The one Program component that our assessment found was not very effective, the retailer POPs, was identified early in the Program and the implementers scaled it back and redirected the effort. Though experience with the POPs was quite limited when we conducted our assessment, it was clear that the content and placement of the displays was not likely to influence the professional buyers that were targeted.

The Program did a good job overall of leveraging and building upon other programs. It was able to make effective use of the resources and expertise available through other programs and thus multiply the effects it could achieve with only the funds provided through the Program.

The Program also was successfully modified as new needs were identified. Consequently, opportunities were not missed because of rigidities in the Program design or implementation.

There were two related areas, however, in which we believe the Program suffered from how it was implemented. From our perspective, the efforts were diluted somewhat because so many different activities were supported directly or indirectly by the Program without a clear path charted connecting each activity to measurable outcomes.

In a similar way, the contributions of the Program were hard to identify because there was little branding of the Program's services or activities. This posed a challenge for the evaluation. As the Program evolved, the Build It Green name became more associated with the efforts and it became a recognizable product.

Continuing Need for the Program

There is considerable evidence that the need for this type of program continues to exist. There are many more individuals on the supply and, especially, the demand side of the housing market who have only limited awareness of green building.

The market barriers that the Program addressed remain. In addition to the limited awareness and knowledge about green buildings, the uncertainties about the performance and cost of building green are still prevalent in the market.

One of the most effective things this Program has done is contribute to the infrastructure and networks needed to support green building. Yet, this infrastructure is still in the growth phase and needs continued support to become self sustaining.

Recommendations

We recommend that a more strategic approach be implemented from the beginning in which the desired outcomes are identified; all team members are made aware of these desired outcomes and buy into them; and a limited set of activities and services are defined that will produce these outcomes. The Program did establish objectives and a strategy for accomplishing them, but we believe more concentration on specific activities would have been helpful.

A more uniform and visible branding of the Program would be essential. As this Program evolved, the linkages to Build It Green increased and this became the recognizable brand for the Program's activities with which the targeted audiences could identify.

On the demand side, the home tour we assessed did draw a significant proportion of homebuyers who had very little knowledge of green buildings. Seeing real green buildings and being able to talk to buyers, occupants, and builders provide persuasive evidence and information to buyers and professionals alike. Consequently, we recommend that the home tours be continued and that they be publicized as much as possible to increase participation and leverage the power of word-of-mouth communication.

On the supply side, efforts also should be increased to inform less knowledgeable professionals about green building and the Program offerings. Green building pioneers are self-selected and to make changes in the building market it is essential to educate and convince the large proportion of professionals who are slow to adopt new, unfamiliar practices.

One of the barriers that numerous respondents identified was the lack of information about energy-efficient and green products. We believe it will be useful to increase the availability of this type of information through the Program and provide it through multiple channels.³

The focus on inspector training was important and our review of the training materials and feedback from attendees was positive. To enhance this component of the Program we recommend that the materials be disseminated beyond the course attendees through code organizations and websites.

The Program should continue to seek ways to influence additional local governments to adopt green building policies and implement programs. It will be important to ensure that such programs include requirements that produce savings (in energy, water, and other resources) that make them cost effective. Continued assistance with the development of model ordinances and other tools that can reduce the effort required to implement green building programs is one approach that should be emphasized. Providing assistance to the Public Agency Council has been effective in the past and this organization provides a useful channel for promoting local government involvement.

The Program's efforts with the GAHC were well received and we believe it is important to continue such activities, particularly those that promote networking among affordable housing developers and organizations including those that operate at the regional and state level.

³ We note that the Build It Green website now provides a link to a comprehensive product database assembled in conjunction with the Alameda County Waste Management Authority.

2. Introduction

This report provides the evaluation of Frontier Associates' Green Building Technical Support Services Program (the Program) conducted during the period 2004 to 2006. This third-party-implemented Program was described in Frontier's revised proposal submitted to the California Public Utilities Commission (CPUC) on January 5, 2004. This evaluation was conducted by Quantec, LLC, based on our evaluation, measurement, and verification (EM&V) plan submitted on September 10, 2004. This plan incorporated revisions to the draft plan in response to comments provided on behalf of the CPUC. This study was conducted at the request of the California Public Utilities Commission (CPUC) and it was funded through the public goods charge (PGC) for energy efficiency. It is available for download at www.calmac.org.

In early 2005, Frontier submitted a change order for the Program to modify the scope and focus of activities. One of the most significant changes was to include the provision of significant support to Build It Green, a nonprofit organization composed of both private-sector and public-sector green building advocates. Largely in response to these Program changes, Quantec had a series of discussions with the Program manager and documented proposed EM&V plan changes in a memorandum submitted to the CPUC and Frontier on February 16, 2006, which modified the original evaluation plan.

Program Description

The Program built on the 2002–2003 version of the Program. It focused on primarily two market segments: residential market-rate new construction and remodeling; and affordable housing. For the market-rate component, it targeted both supply-side and demand-side market actors in the residential new construction and remodeling industries. For the affordable housing component, it continued to direct efforts to the development and maturation of the Green Affordable Housing Coalition (GAHC) as a central source of information and resources for affordable housing developers and public agencies with housing-related functions.

Because of the nature of the Program, it extended beyond the direct promotion of energy efficiency to include resource-efficient building design and construction. Green building takes a holistic view of building design and construction by also considering other major energy issues, such as the energy used to deliver clean water; the energy and resources used in the production, transport, use, and disposal of building materials; and the relationships between the building's energy systems and indoor air quality. It promoted integrated design, which is a basic tenet of green building. Integrated design requires that all of the key players in the design, construction and operation of a building (client, architect, engineer, builder, subcontractors, consultants, etc.) work together from the beginning of a project to set and achieve common goals, design the building and its systems, and work through construction and maintenance issues as an integrated team. The objective of integrated design is to produce building systems that actually work together as a system, reduce construction problems and delays, and improve building quality and resource efficiency.

Green Building Market Barriers

The Program identified a set of market barriers and established activities to address those barriers. On the supply side, the barriers included:

- **Lack of information:** There is a general lack of knowledge of green building techniques and products within the building industry. Contractors, architects, and engineers often lack the detailed knowledge and experience they need to specify or recommend green building measures with confidence.
- **Risk aversion:** Builders are resistant to new products and new construction techniques if they think there is any risk that the changes will add to construction costs, result in construction delays, require skills and experience that their usual subcontractors do not have, or generate additional call-backs.
- **Organizational practices:** Builders tend to select contractors based on their ability to meet basic project specifications and deliver the project on time, within budget, and with minimum hassles and call-backs. Contractor knowledge and experience with green building practices do not typically enter into the selection decision.
- **Lack of coordination:** Builders tend to ignore the importance of integrated design with their projects. Buildings tend to be more energy and resource efficient when the key designers and contractors work together as an integrated team to resolve design issues.
- **Regulatory barriers:** Green building may be perceived to conflict, or may actually be in conflict, with local codes or ordinances. Conflict most commonly arises due to lack of education or experience with specific practices or products and lack of effective communication and flexibility in the process of submitting and approving on the part of both the practitioners and the regulating bodies. For affordable housing projects, many funders impose requirements that are inconsistent with green building practices.
- **Split incentives:** Builders perceive their customers to be uninterested in paying extra for green measures and especially for energy efficiency. Since builders do not pay utility bills, provide maintenance and upkeep, or live in the home, they are concerned about long-term financial and health consequences of their construction practices only if they impact home sales value and the builder's overall profitability or if they develop and build the project and then retain a post-occupancy equity ownership stake.

On the demand side, barriers identified included:

- **Lack of awareness:** Home buyers have relatively low awareness of the existence and nature of energy-efficient and green features in a home. They lack the information to recognize those features and to evaluate their potential costs and benefits.
- **Inseparability of product features:** Energy efficiency and green home features are rarely important enough to drive the purchase decision compared with features such as home size, location, and other more conventional characteristics. Energy efficiency becomes more influential when it is tied to more core concerns, particularly health, comfort, and maintenance considerations.

- **Asymmetric information:** For many features, the costs and benefits cannot be evaluated independently and the home buyer must rely on information from the sales agent, which may not be a credible source. In the absence of solid and credible information about a home's performance and construction quality, buyers are disinclined to pay more for features they cannot see.

Finally, a set of barriers is linked to local government issues, policies, and practices. Local governments (cities, counties, and special districts) are logical agents for promoting innovative design and construction practices that improve building resource efficiency and construction quality. However, local governments face significant constraints in their funding, staffing, expertise, and other resources needed to aggressively promote best practices within the local construction community. In the short term, at least, they remain very interested in providing green building information, but are not able to take on any additional responsibilities that add in any way to their already limited staffing or budget allocations.

Program Efforts to Address Barriers

The main thrust of the Program was on addressing supply-side and demand-side informational barriers. On the supply side, it emphasized teaching production and how to apply green products and practices with reduced risk to custom builders, remodelers, and affordable housing developers; evaluate and select good subcontractors who can meet their key criteria *and* build green; and achieve an integrated design and construction process that maximizes construction quality within the constraints of their project schedule and budget.

One planned activity was to train contractors how to meet the increased demand for green building skill sets. These activities addressed the barriers of lack of information, risk aversion, organizational practices, and lack of coordination. The desired outcome was a supply chain that was better equipped to deliver green-built homes and understood how to define and assess green building.

On the demand side, the Program was intended to address lack of awareness and information via aggressive home buyer education. One tactic was to link energy efficiency to more core concerns, particularly health, comfort, and maintenance considerations. This strategy was intended to partially mitigate the inseparable product features barrier. The net desired outcome was a set of home buyers and home owners who understood the value of green features, knew how to shop for and find what they wanted, and thereby push the marketplace to respond to their desires.

On the public-sector front, the Program partnered with local governments to take advantage of their long-standing relationships with the community and the construction industry. Local governments were enlisted to help communicate with residents and business groups. The plan was to offer limited technical and organizational consulting services to cities that wished to develop their own green building programs. One step was to train building inspectors about what to expect when they inspected a green building. The Program also assisted them in reviewing their role in affordable housing projects to ensure that they were encouraging rather than discouraging green building.

Program Objectives and Implementation Strategy

The stated objectives of the Program included:

1. Expand both the local supply of and demand for green building services and products
2. Create a broad awareness of the benefits of green building
3. Continue development of organizational frameworks to deliver green building education, services, and resources to local governments, building industry professionals, affordable housing developers, and the community
4. Maximize participation in the California ENERGY STAR® New Homes Program

This Program was essentially an information program based on a voluntary education and training model with a regional scope. It was intended to develop a consistent program design and market identity across multiple cities and counties, combined with local co-branding. The Program was planned to incorporate the following components:

- Continued organizational support for the GAHC
- Supply-side stimulus via technical training for builders, architects, contractors, and real estate professionals
- Demand-side stimulus via aggressive public outreach and education regarding the benefits of building and buying “green”
- State-of-the-art green building website
- Local government support, including building inspector training and technical and programmatic support to local governments that wish to “green” their capital improvement programs and/or their affordable housing policies and procedures
- Project-specific technical support for home owners, builders, and contractors, via the Green Resource Center

Specific activities were set out in the original Program Implementation Plan to fulfill the Program objectives. As it progressed, however, its implementers responded to feedback from the targeted stakeholders and participants and made adjustments intended to increase effectiveness and efficiency. As noted earlier, in early 2005 a change order was submitted that reduced some activities, increased others, refocused some, and added new activities. One of the biggest changes was the increased linkages between this Program and Build It Green.

EM&V Approach

Our EM&V approach was developed in accordance with the requirements set forth by the CPUC. Given the information-only nature of this Program, activities such as quantifying the energy impacts of the Program were not planned. The components of the original adopted EM&V plan that responded to the CPUC Policy Manual are shown in Table 3. The modifications made to this plan are presented later.

Table 3. Original EM&V Components

CPUC/Policy Manual Evaluation Goal	How the plan addresses the Policy Manual or justification for not doing so.
Provide upfront market assessment and baseline analysis.	Baseline information is available from the 2002-2003 Program Implementation Plan Non-participant surveys will be used to update baseline.
Provide ongoing feedback and guidance.	Monthly reports will include any key findings to report to-date An interim report based on document review and interviews completed to-date will be provided at the end of 2004/early 2005.
Measure indicators of effectiveness and testing program theory (PT/LM) and approach.	Specifically will address PT/LM development Will use pattern matching of barriers and program effects and compare expectations from program design with participants v. non-participants, where applicable.
Assess the overall levels of performance and success.	<p>Process evaluation approach: Program theory based evaluation with pattern matching approach Review of new document materials (case studies and fact sheets) Review point-of-purchase (POP) materials and conduct shopper exit interviews at stores with POP materials</p> <p>Sampling plan for process evaluation: End-of-session survey feedback with sample of participants at: Half-day workshop presentations, presentations at community events, presentations to elected and appointed officials, brownbag presentations to local government staff, inspector training sessions, and Green Home Tour. Participant interviews will be held with: Participants in telephone and email consultations (Ask an Expert⁴), builders and developers, GAHC members that received organizational support, local governments receiving support, and those that received website assistance. Non-participant interviews with builders and developers, affordable housing developers, and local government officials.</p>
Help assess the continuing need for the Program.	To be included in final EM&V report based upon pattern matching and participant/non-participant comparisons.

Program Theory and Pattern Matching Approach

One of the most innovative elements of this study was the use of a simplified pattern-matching approach to develop the program theory and test it against the actual outcomes of the Program.⁵ We clarified the program theory by developing an initial theory based on the program materials and reviewed it with Frontier’s Program team at the project initiation meeting and through follow-up discussions. The revised theory was used to guide subsequent evaluation activities.

To investigate the program theory and test whether actual Program outcomes matched expectations, we used pattern matching to assess the importance of perceived barriers tackled by the Program and the effectiveness of specific Program elements. The following steps were followed:

⁴ Ask an Expert is a consultation service, conducted in conjunction with the Program, providing free green building technical and other information to building professionals and the general public in the Bay Area.

⁵ For one description of this approach see Marquart, Jules. “A Pattern-Matching Approach to Link Program Theory and Evaluation Data” in *New Directions for Program Evaluation, Advances in Program Theory*, No. 47, Fall 1990, Jossey-Bass, Inc.

- Information was gathered from the Program designers/implementers at the project initiation meeting and through subsequent emails. During this exercise, the management team was asked to create the list of barriers and associated Program activities. They then assigned importance scores to perceived barriers and provided similar ratings of the expected effectiveness of specific Program activities to overcome the barriers.
- Through surveys and interviews with targeted audiences we obtained similar ratings. This information was used to provide feedback on their perceptions about the barriers and Program effects. Ratings provided by participants were used to assess the Program effects.
- Comparisons between the data from groups targeted by the Program and the responses of the Program designers/implementers provided a measure of how well the Program did in achieving the effects that the designers/implementers had intended.

Given the diversity of the audiences and Program activities, the pattern matching approach was applied selectively. We worked with Frontier to select the most appropriate Program activities to evaluate with this methodology. The implementers' priorities and the suitability of the method were used to decide where to apply it.

Planned Evaluation Steps

After completing the above process with the implementers, we focused on reviewing Program documentation and initiating the data collection and analysis steps. The goal of these activities was to address the overall evaluation objectives.

We designed and conducted the evaluation in a way to provide ongoing feedback to Frontier about the effectiveness of the specific components of the Program with the intent to allow the implementers to make real-time adjustments to the Program to maximize effectiveness. This overall approach allowed application of the adaptive management strategy.

Our approach was intended to be flexible and adaptive to accommodate the fact that some of the Program specifics were anticipated to change over time, which they in fact did. To allow the flexibility needed, we identified the necessary evaluation adjustments after delivery of the interim report in February 2005, and reached agreement on appropriate scope adjustments.

The specific steps we proposed in the original EM&V plan were as follows for the first round of data collection:

- Provide an independent, professional review of the following materials:
 - One case study
 - Inspector training materials
 - Presentation materials for public officials
 - Workshop and brownbag presentation materials
 - Five fact sheets
 - Presentation materials for community events

- To assess the effectiveness of the training and education activities, we will obtain feedback from the participants. These include participants who have attended the following:⁶
 - Half-day workshop presentations (1)
 - Presentations at community events (3)
 - Presentations to elected and appointed officials (2)
 - Brownbag presentations to local government staff (1)
 - Inspector training sessions (1)
- Collect data from recipients about specific services and assess performance:⁷
 - Telephone and email consultations (Ask an Expert)
 - In-depth consultations with builders and developers (3)
 - Organizational support services to the Green Affordable Housing Coalition (3)
 - Support services to local governments (3)
 - Website assistance
- Assess the POP materials and conduct exit interviews with shoppers at four stores where the POP displays are present

After completion of the interim report submitted to the CPUC in February 2005, we intended to conduct these activities (these are listed later in Table 4 also):

- Review new training and educational materials:
 - Three new case studies
 - Five new fact sheets
- Obtain feedback from a sample of participants attending the following:⁸
 - Half-day workshop presentations (1)
 - Presentations at community events (3)
 - Presentations to elected and appointed officials (2)
 - Brownbag presentations to local government staff (1)
 - Inspector training sessions (1)
 - Green home tours (1 additional tour)
- Collect information from a sample of recipients of the following services:⁹
 - Telephone and email consultations (Ask an Expert)

⁶ Numbers in parentheses indicate the number of events for which participant responses would be analyzed.

⁷ Numbers in parentheses indicate planned number of individuals to be interviewed. Number of responses analyzed for telephone/email consultations and Website assistance would depend on responses to the electronic questionnaires.

⁸ Numbers in parentheses indicate planned number of events for which participant responses would be analyzed.

⁹ Numbers in parentheses indicate planned number of individuals to be interviewed. Number of responses analyzed for telephone/email consultations and Website assistance would depend on responses to the electronic questionnaires.

- In-depth consultations with builders and developers (6)
- Organizational support services to the Green Affordable Housing Coalition (3)
- Support services to local governments (3)
- Website assistance
- Conduct interviews with individuals from three groups who did not receive any of the primary training or assistance services:¹⁰
 - Builders and developers (6)
 - Affordable housing developers (3)
 - Local government officials (3)
- Interview key Program implementers to document their observations on Program processes and operations, Program effectiveness, dissemination of Program materials, and views on the continuing need for the Program

Modified Evaluation Steps

Early in the evaluation process, Frontier expressed a desire to receive “real-time” feedback on the effect of its Program activities. To accommodate this request, the original EM&V plan was modified slightly. In lieu of communicating with Frontier primarily through monthly reports designed to summarize evaluation progress and provide interim findings, several activity-specific memos were submitted to Frontier as we completed our assessments. These memos contained more detailed evaluation results, which proved to be valuable to Frontier for assessing the Program’s ongoing progress and effectiveness. Based on these memos, we prepared our interim report that was submitted to Frontier and the CPUC.

Many of the Program activities originally contemplated for inclusion in the first phase of this study were not completed during 2004. Consequently, the interim report covered fewer activities than listed in our original plan. The interim report provided results of the following EM&V activities:

- Market barriers and Program effectiveness pattern matching exercise
- Assessment of POP displays
- Review of in-depth consultations provided to three individuals in builder or developer organizations
- Assessment of two half-day workshops¹¹
- Assessment of one case study
- Performance of technical consultations (Ask an Expert service)

¹⁰ Numbers indicate the quantity of individuals to be interviewed.

¹¹ Note that the EM&V goal was to conduct two assessments for the entire study so this overall goal was met during this phase.

In response to the Program changes, we adjusted our EM&V targets for the second stage of this study as documented in our February 16, 2006, memorandum. The original and revised targets, as well as actual completions, are shown in Table 4. Explanations for the changes are presented in the table.

One of the serious difficulties encountered throughout this evaluation was the lack of a “brand” for Frontier’s efforts. Because the Program’s goal was largely to educate, inform, and facilitate, there was little attempt made to brand the Program distinctly. Most of the Program’s activities were conducted through partnerships or provided leverage to the activities of other organizations. Consequently, our interviews showed many respondents were not aware of this Program as a separate entity. Over time, Frontier’s activities became closely intertwined and identified with Build It Green, largely as a result of the intentional actions of Frontier to leverage the work of the two organizations. The tight connections between the Program and the work and activities of other organizations made it difficult to evaluate the effects of the Program in isolation.

Presentation of Study Findings

The following chapters present our findings from both stages of this study. Several chapters are based on the memoranda that were submitted to Frontier providing them ongoing feedback on the Program.

The final chapter summarizes our overall findings about the Program and links the results of our original rating exercise conducted with the implementers to the findings on individual Program activities.

Table 4. Comparison of EM&V Second Stage Original and Revised Targets and Achievements

Evaluation Activity	Original Target	Revised Target	Revised Target Achieved?
Review of Educational Materials			
New case studies	3	Review 3 drafts	No, one final case study was received and reviewed instead
New fact sheets	5	Review 5	Yes
Participant Feedback			
Half-day workshop presentations	1	<i>Conduct no assessment</i>	Yes, one additional workshop assessment was already completed during Phase 1 thus exceeding original target
Presentations at community events	3	Summarize data collected at 3 events by implementer	Yes, results reported for 7 events
Presentations to elected and appointed officials	2	<i>Conduct no interviews; presentations were very brief and not suitable for evaluation</i>	Yes
Brownbags to local government staff	1	<i>Conduct no interviews; presentations were very brief and not suitable for evaluation</i>	Yes
Review inspector training materials	0	1	Yes, reviewed training materials for one session that were not available for review during Phase 1
Inspector training session participant interviews	1	Review results from participant evaluation sheets	Yes
Green home tours	1	Analyze evaluation forms for one tour	Yes
Telephone & email consultations (Ask an Expert)	1 (analyze survey responses)	Analyze survey responses from users	Yes
In-depth consultations with builders and developers	6	Interview approximately 6 builders/developers	Yes
Organizational support services to GAHC	3	Interview 3 members of Coalition	Yes
Support services to local governments	3	Interview 3	Yes
Website assistance	Sample of users and Quantec review of website	<i>Website was undergoing major revisions so feedback on existing site from users was not considered relevant. Review database accessible from website.</i>	No; the timing did not permit a review of the database
Interview implementers	3	Interview 3	No; only Program Manager was interviewed
Non-participant Interviews			
Builders and developers	6	<i>Conduct no interviews; defining and identifying non-participants was determined to be problematic</i>	Yes
Affordable housing developers	3	<i>Conduct no interviews; defining and identifying non-participants was determined to be problematic</i>	Yes
Local government officials	3	Interview up to 3 local governments that have not implemented programs and review Frontier's survey of local governments	Yes

Note: Changes in Original Targets are italicized.

3. Market Barriers Rating Exercise

As described in Chapter 2, the first step in this study was development and application of a simplified pattern matching methodology to develop and test the program theory for this Program. In general terms, we documented the perceptions of the implementers about the barriers to residential green building and their views about how effective key Program activities would be in addressing those barriers. The barriers were identified with respect to the targeted stakeholders and the likely effectiveness of the Program was assessed for each barrier and stakeholder. The pattern matching process took place when we obtained feedback from the stakeholders and were able to compare it to the implementers' perceptions.

Ratings were obtained from the four implementers who responded, and scores were analyzed to get an indication of how barriers and activities were viewed. Ratings were averaged across all responses and the range of the ratings was examined. This chapter provides the findings about barrier significance, the perceived effectiveness of Program activities, and any differences in the views of the implementers.

The barriers and effect of Program activities by market actors are presented and the most significant barriers for each market actor are then identified. The effectiveness of Program activities in addressing these barriers is discussed briefly. The next section focuses specifically on findings for each of the Program activities. The following section discusses the quality of the information presented and comments from the Program implementers. The final section summarizes the findings from this analysis.

Builders/Developers

Barriers

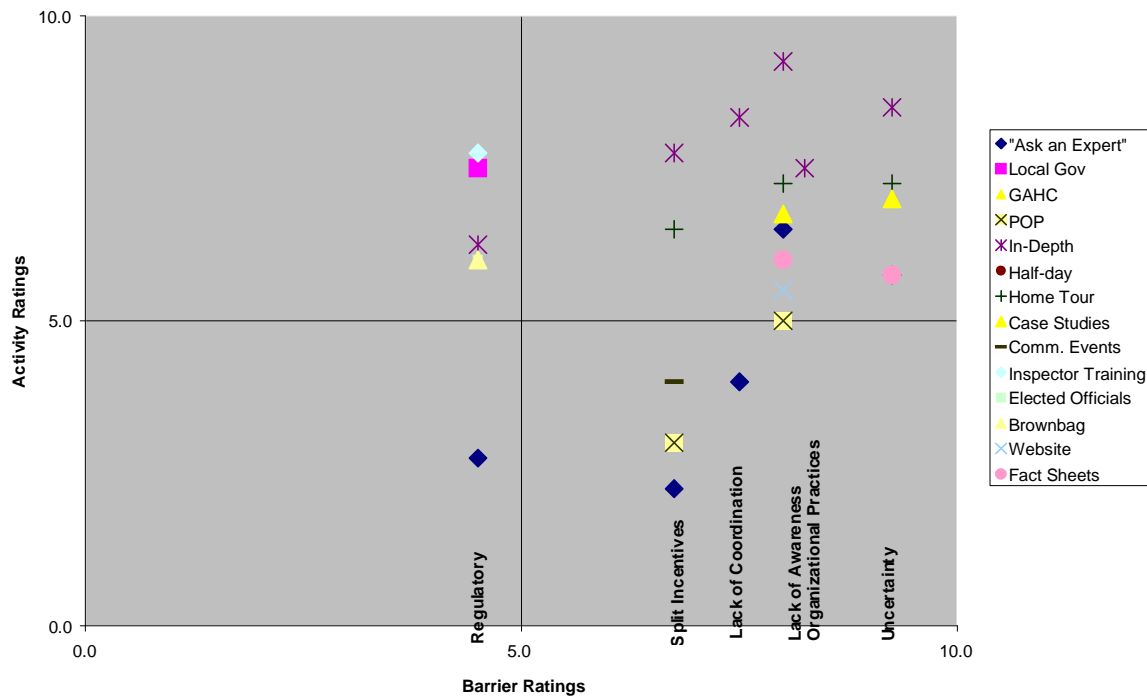
Figure 1 summarizes how the Program implementers' rated the barriers and Program activities with regard to builders/developers. Based on Program implementers' perceptions, the most significant barriers (average ratings of 7.0 or higher on the scale ranging from 0 to 10) are uncertainty, organizational practices, lack of awareness and information, and lack of coordination.¹² Uncertainty is rated as the most significant barrier (9.3). Regulatory barriers and split incentives were considered to be relatively minor barriers for builders and developers.

Program Activities

The general pattern in Figure 1 shows that many Program activities were believed to address the major builder/developer barriers. "In-depth consultations" were the only activity thought to address all these barriers very well. "Green home tours" received high ratings for reducing

¹² All barrier ratings use a scale from 1=no barrier to 10=very significant barrier. The effectiveness of Program activities is rated from 1=no effect to 10=very significant effect.

Figure 1. Implementers' Ratings for Builders/Developers



uncertainty and improving awareness. “Ask an Expert,” “point-of-purchase displays,” “website support,” and “fact sheets” received consistently lower ratings for effectiveness in addressing the key builder/developer barriers.

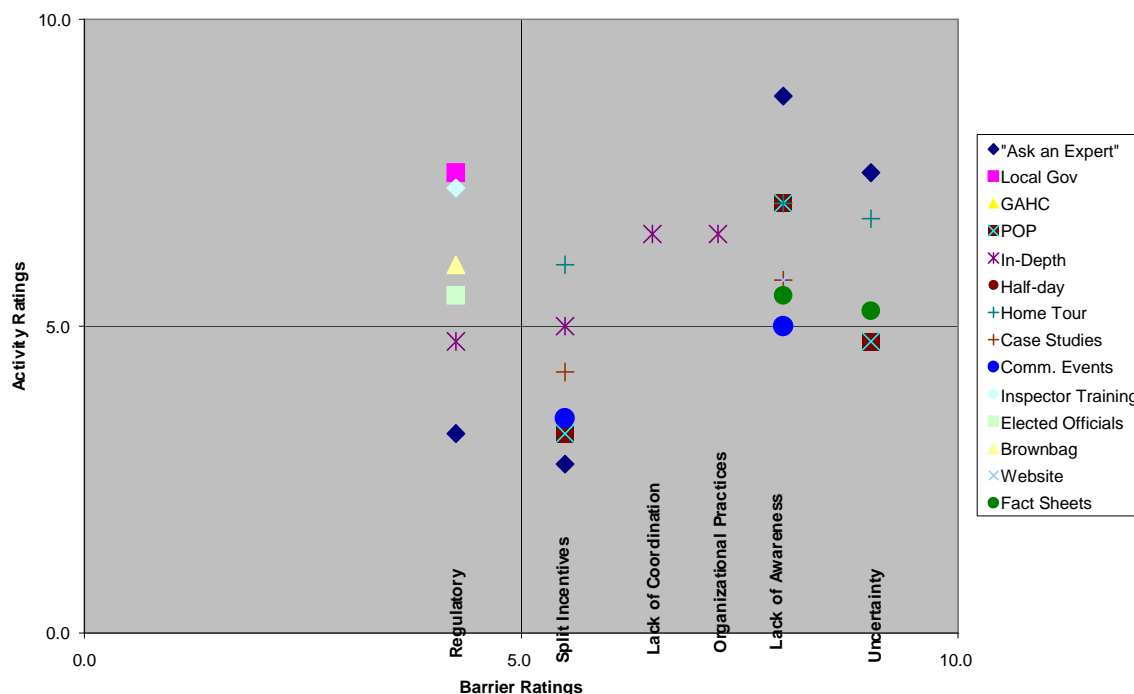
While “providing support services for local governments” and “inspector training sessions” received high ratings for addressing regulatory barriers, these barriers were not thought to be very significant for builders and developers.

Remodelers/Contractors

Barriers

The implementers’ results for remodelers and contractors were similar to those for builders and developers. Figure 2 shows that uncertainty and lack of awareness and information were thought to be significant barriers. Uncertainty was rated as the major barrier (9.0).

Figure 2. Implementers' Ratings for Remodelers/Contractors Barriers



Organizational practices and lack of coordination were perceived to be fairly significant barriers. Regulatory barriers and split incentives were considered to be only relatively minor barriers.

Program Activities

Figure 2 suggests that several activities were believed to address the key remodeler/ contractor barriers. However, the ratings of the effectiveness of Program activities were generally lower than they were for the builders/developers. “Ask an Expert” was the only Program activity that received a very high rating for addressing the two main barriers. “Green home tours” and “point-of-purchase displays” received moderately high ratings for addressing the “lack of awareness and information” barrier.

As with builders/developers, providing “support services for local governments” and “inspector training sessions” received high ratings for addressing regulatory barriers, but these barriers were not considered to be very significant. “Case studies,” “presentations at community events,” “presentations to elected officials,” “website support,” and “fact sheets” were not perceived to have significant effects on any of the remodeler and contractor barriers.

As noted before, lack of coordination and organizational practices were considered to be fairly significant barriers, but the only activity that addressed them was “in-depth consultations.”

Affordable Housing Developers

Barriers

Figure 3 shows the results for affordable housing developers. As with the supply-side market actors discussed above, uncertainty and lack of awareness and information were expected by Program implementers to be the major barriers facing affordable housing developers.

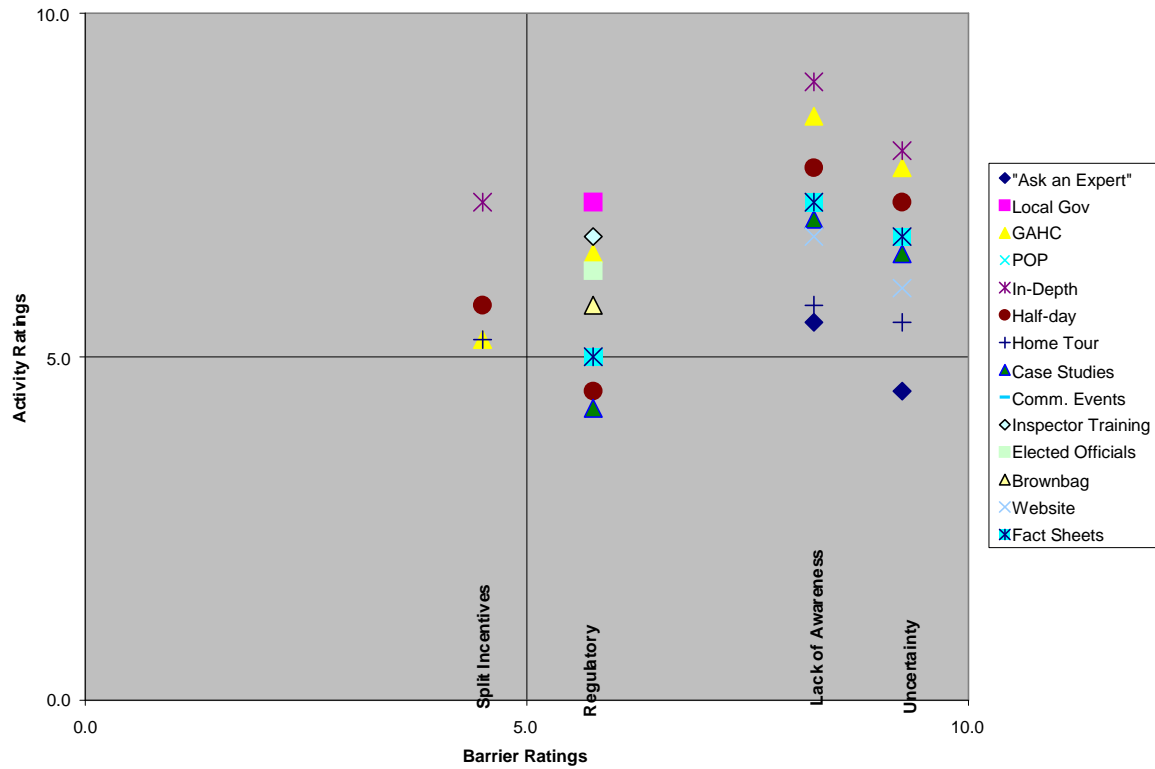
Regulatory barriers and split incentives were considered to be only moderate barriers for affordable housing developers.

Program Activities

Three activities - “organizational support to the GAHC,” “in-depth consultations,” and “half-day workshops” - were judged to be highly effective (ratings from 7.3 to 9.0) at addressing the two major barriers. “Case studies” and “fact sheets” received moderately high ratings (6.5 to 7.3) for effectiveness dealing with these barriers. “Green home tours” and “Ask an Expert” received only moderate ratings for addressing the major barriers.

Most of the activities were also considered to have moderate effects on regulatory barriers. Only four activities were believed to address the split incentives barrier, the least significant of the four barriers reviewed.

Figure 3. Implementers' Ratings for Affordable Housing Developer Barriers



Architects

Barriers

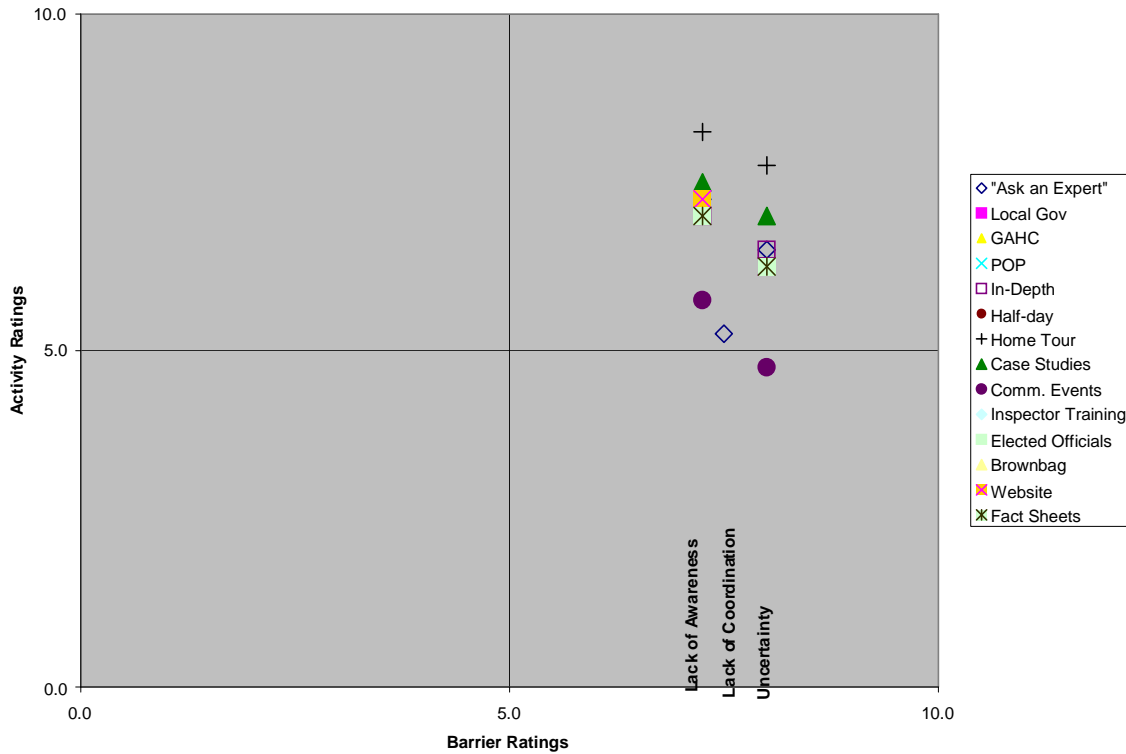
Figure 4 shows that for architects uncertainty was also seen by implementers as the most significant barrier (8.0). Lack of awareness and information and lack of coordination were also considered to be significant barriers (ratings of 7.3 or larger). No other barriers were deemed to be very significant.

Program Activities

Several activities were believed to affect the uncertainty and lack of awareness and information barriers. “Green home tours” received the highest rating (7.8) for addressing the uncertainty barrier and “case studies” also received a high rating (7.0). Multiple activities received high ratings (7.0 and higher) for addressing the lack of awareness and information barrier; these included “Ask an Expert,” “in-depth consultations,” “green home tours,” “case studies,” “website support,” and “fact sheets.”

No activity received a high rating for dealing with the lack of coordination barrier. This finding suggested that additional activities focused on this barrier could be justified.

Figure 4. Implementers' Ratings for Architects' Barriers



Homebuyers

Barriers

Figure 5 shows that the Program implementers felt that overriding barriers for homebuyers (ratings of 8.5 and higher) were lack of awareness and information and lack of knowledge of green home benefits.

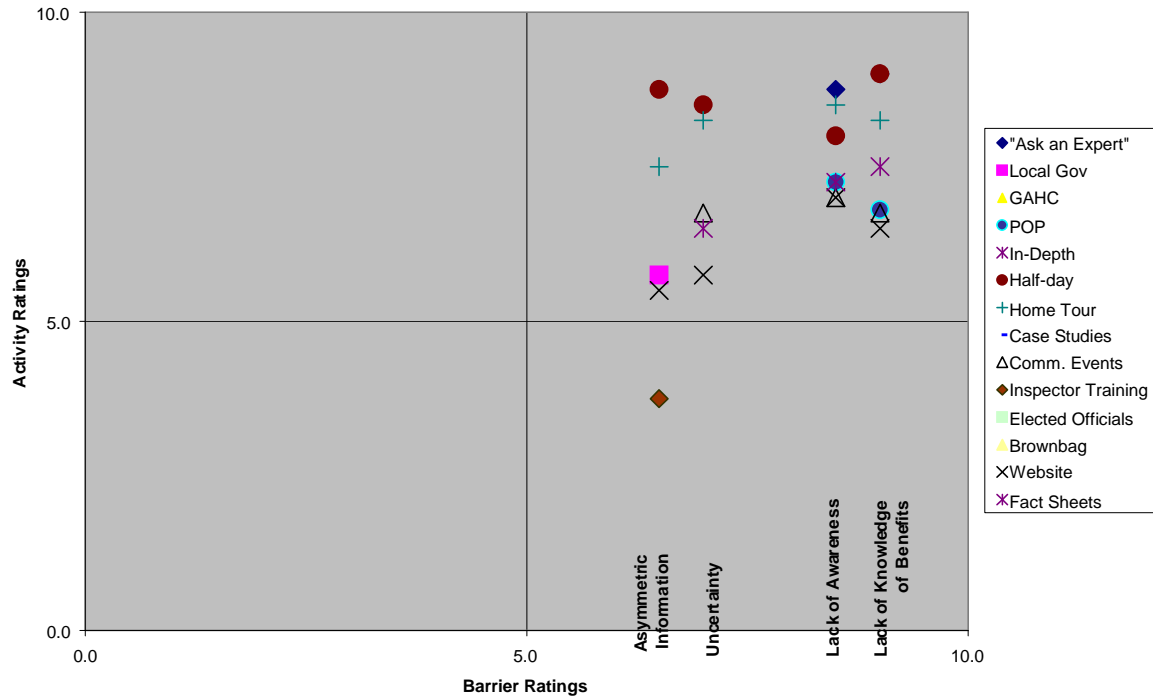
Uncertainty (7.0) and asymmetric information (6.5) were considered to be less significant barriers for homebuyers, though they were still relatively important.

Program Activities

The Program implemented numerous activities that were expected to have a significant effect on the major homebuyer barriers. “Ask an Expert” and “green home tours” were considered to be the most effective activities for homebuyers across all the barriers. “Ask an Expert,” “green home tours,” “half-day workshops,” and “fact sheets” received high ratings (7.3 and higher) for addressing the two major barriers, lack of knowledge of green home benefits and lack of awareness.

“Point-of-purchase displays” received a relatively high rating (7.3) for overcoming the homebuyer lack of awareness and information barrier.

Figure 5. Implementers’ Ratings for Homebuyer Barriers



Local Government Agencies

Barriers

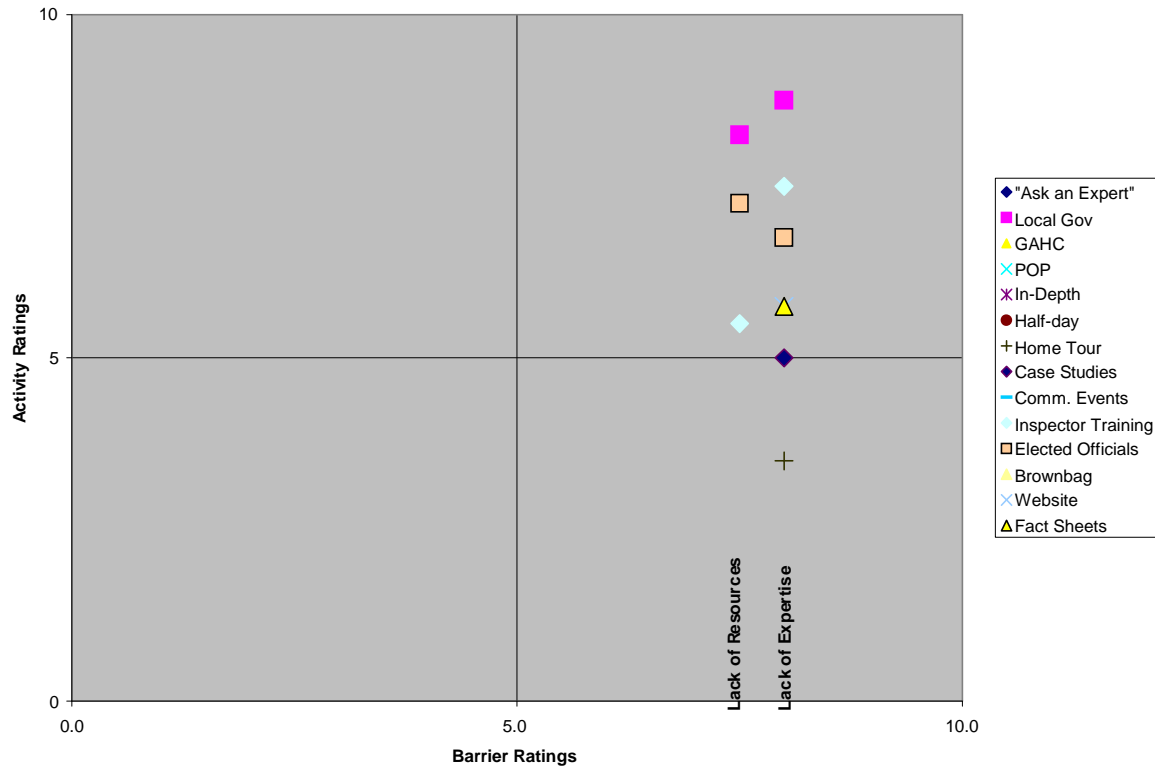
Figure 6 shows that the two barriers identified by implementers for the local government agencies group – lack of resources and lack of expertise – were both considered to be significant (ratings of 7.5 or higher).

Program Activities

A relatively small number of activities were directed at these market actors. However, providing “support services to local governments” received a very high rating (8.3 or higher) for addressing both of the major barriers. “Inspector training sessions” received a high rating (7.5) for overcoming the lack of expertise barrier.

“Green home tours,” “case studies,” “brownbag presentations,” “Web site support,” and “fact sheets” all received only moderate ratings (3.5 to 5.8) for their effect on the barriers.

Figure 6. Implementers' Ratings for Local Government Agency Barriers



Assessment of Program Activities

Program implementers' views on the effectiveness of the different Program activities and services are summarized below.

“Ask an Expert” was considered to be a highly effective tool for dealing with the major barriers faced by remodelers/contractors and homebuyers. It received a moderate or relatively low rating, however, for addressing major barriers for other market actors.

“In-depth consultations” were rated as highly effective for overcoming a wide range of barriers faced by builders/developers and affordable housing developers and several barriers affecting remodelers/contractors.

Providing ***“support services to local governments”*** was considered to be by far the most effective Program activity for resolving the barriers faced by local government agencies. This activity was also seen as having significant effects on reducing regulatory barriers faced by supply-side market actors; however, such barriers alone were not considered to be very significant.

“Half-day workshops” received very high ratings (at least 8.0) for all barriers facing homebuyers and are seen as effective at increasing awareness for affordable housing developers (7.8).

However, they were only thought to be slightly less effective with regard to the important barrier of affordable housing developers' uncertainty (7.3).

“Organizational support to the GAHC” was considered highly effective in addressing affordable housing developers' lack of awareness (8.5) and uncertainty (7.8). This activity did not target any other market actors.

“Green home tours” were deemed to be most useful as a way to overcome all the barriers faced by homebuyers. They also were rated as having significant effects on reducing awareness/information and uncertainty barriers for all supply-side actors except affordable housing developers.

“Fact sheets” were seen to enhance homebuyers' knowledge of green home benefits (7.5) and general awareness (7.3) significantly. However, their effects on the major barriers facing builders, remodelers, and local government agencies received somewhat lower ratings.

“Inspector training sessions” were rated as quite effective (7.5) for enhancing local government expertise, but did not receive high ratings with respect to any other important barriers.

“Case studies” were thought to have a moderate effect on the major barriers faced by supply-side market actors. They were rated to be most effective at reducing the lack of awareness and information barrier for architects.

“Presentations to elected officials” received moderately high ratings for overcoming local government barriers, but their effectiveness was limited for other market actors.

“Website support” received relatively low ratings, although it was expected to address several barriers across the market actors, in particular homebuyers.

“Presentations at community events” did not receive very high ratings for dealing with any barriers. They received ratings of 5.8 or less for 5 of the 8 barriers they address.

“Point-of-purchase displays” were considered to be most effective at increasing awareness and providing information. However, they were rated as only moderately effective, on the average, for addressing this barrier. Although the displays were linked to reductions in other barriers, the rated effects were quite small.

“Brownbag presentations” were believed to influence only a small number of barriers across the market actors. In fact, for the only significant barrier they addressed - lack of expertise of local government agencies - they received a relatively low rating (5.8).

Information Quality and Comments

As noted earlier, we obtained ratings from four of the key members of the Program implementation team. The plan was to collect responses from additional members; however, we believe that the ratings obtained represent the diversity of views and perspectives. Overall, the ratings were quite consistent.

Variations in Barrier Ratings

Only four of 25 market actor/barrier ratings had a spread of five points or more between the highest and lowest respondents' rankings, and none of these four are those that have been identified as the most significant barriers. Three of the four involved the split incentive barrier. The diversity in ratings for this barrier might be due as much to the difficulty of comprehending this barrier as genuine differences in perspectives.

Variations in Program Activity Ratings

The ratings of Program activities were very consistent, with a few exceptions. There were fairly large ranges between the highest and lowest ratings for the effect of "point-of-purchase displays," especially when dealing with significant barriers for both remodelers/contractors and homebuyers. These spreads might represent clear differences of opinion across the implementers about the effectiveness of these displays.

"In-depth consultations" received relatively consistent ratings except for their influence on regulatory barriers and the split incentive barrier. The extreme responses gave both very high and very low ratings for their effect on these barriers.

Rater Comments

The implementers were asked to rate the effect of only certain activities on the barriers identified for each market actor. The selected relationships were based on an original round of data collection and discussions with the Program manager. During the rating exercise, implementers were given the opportunity to indicate whether they thought the Program activities affected other barriers as well.

Two participants believed that "Ask an Expert" could be highly effective for addressing the major barriers faced by local government agencies. One respondent felt that point-of-purchase displays could be highly effective for reducing local government agency barriers.

One participant suggested that providing "organizational support to the GAHC" could be moderately effective as a way to reduce barriers for local government agencies. One suggested that "in-depth consultations" could have an effect on both lack of awareness and uncertainty barriers for builders.

Two raters noted that "case studies" could help reduce various homebuyer barriers (although not significantly), particularly if they were readily available online for homebuyers. Another respondent felt that "case studies" could have some effect on reducing the asymmetric information barrier for homebuyers. Another noted that "case studies" could help address builders' organizational practices and lack of coordination barriers.

Summary of Findings

Generally, uncertainty and lack of awareness and information were considered by the implementers to be the most significant green building barriers across the market actors. This was the case for both the supply and demand sides of the market.

Organizational practices were the third most significant barrier for builders, developers, contractors, and remodelers. Lack of coordination in the design/construction process was considered to be a moderately significant barrier on the supply side. Regulatory barriers were rated as less significant. The split incentives barrier was considered to be moderately significant only for builders/developers.

On the demand side, homebuyers' lack of knowledge of green building benefits was rated as the most significant barrier, followed closely by lack of awareness. Uncertainty and asymmetric information were regarded as moderately significant barriers for homebuyers.

The results suggested that the Program was doing a good job at the time this exercise was done of targeting activities to respond to the significant barriers relevant to each market actor. The most significant barriers facing each market actor were addressed by one or more activities. Since the most effective activity was expected to vary by market actor, the multi-pronged approach of the Program appeared to be appropriate.

“Ask an Expert,” “in-depth consultations,” “support services to local governments,” “half-day workshops,” “organizational support to the GAHC,” and “green home tours” were perceived to be the most effective activities and ones that addressed major barriers faced by one or market actors.

The more general information transfer activities, such as “case studies” and “website support,” were rated as only moderately effective. It would be useful to examine whether there are ways to increase the reach of these tools or enhance their usefulness.

The results suggested, also, that some activities had not been particularly effective when these ratings were provided. Based on the implementers' feedback at this point, “brownbag presentations,” “presentations at community events,” and “point-of-purchase displays” fell into this category. Because of their potential to respond to major homebuyer barriers, it could be productive to examine ways in which the effectiveness of “presentations at community events” and “point-of-purchase displays” could be improved.

Finally, coordination among designers and builders is the cornerstone of green building construction, but none of the Program activities was given a very high rating for addressing this barrier. Given the feedback from this process, it would be useful to explore ways the Program could mitigate the lack of coordination barrier.

4. Point-of-Purchase Displays

Quantec assessed the point-of-purchase display materials (POPs) through site visits by a Quantec team member to three retail stores in the San Francisco Bay Area on October 12-13, 2004. Both Quantec and the implementation team, however, had some reservations about conducting the POP review at this time. This was mainly because set-up of POPs had not occurred as rapidly as expected so the number of stores to choose from was less than anticipated. In addition, the displays had not been in place for very long so regular customers may not have had many opportunities to see them. The original intent was to visit four stores with displays, but feedback from the Program implementation team suggested that efforts concentrate on the three sites most likely to provide useful information.

Despite these reservations, Quantec proceeded with the site interviews in October for two reasons. First, this was one of the original planned milestones to be completed in 2004. Second, the implementers were looking for early independent feedback on the POPs because of their uncertainty about the POPs' effectiveness.

Customer Interviews

Visual review of materials and intercept interviews were conducted at three stores that targeted primarily professionals including

- Truitt & White in Berkeley
- Golden State Lumber in San Rafael
- EarthSource Forest Products in Emeryville

A short, 12-question interview was administered in-person to a sample of customers as they exited the stores. Although the initial intent of these interviews was to assess the effectiveness of the in-store displays, but since only about one-third of the interviewees recalled seeing the displays and few had much recall about the content, the interviews largely transitioned into an interview about general attitudes and experiences regarding green building products and practices. Our findings and observations are presented below.

Demographic and Background Information

A total of 25 customers were interviewed as they exited the stores. Of these, there were 24 men and one woman. The customers were predominantly professionals. We interviewed:

- 16 builders
- Three (3) homeowners
- Three (3) renters
- Two (2) furniture builders
- One (1) architect

Customers were asked about the displays, a range of questions about their knowledge and prior use of green building products and materials, and their feelings about barriers to the use of green products. All customers were asked if they noticed the in-store display, how useful they thought the information was, and whether they had any suggestions for how the information and presentation could be improved.

Truitt & White was the only store with a significant POP display. However, the main display was developed by the store and was more comprehensive than the Program display, which was also present.¹³ Golden State Lumber had a simple display consisting of a cardstock sign and brochures. Although EarthSource usually had a substantial display, the store VP said that it had been taken to a trade show, so the store only had brochures during our visit.

Summary Results

The majority (19 of 25) of customers indicated that they were familiar with green building products and materials. Only about one-third (9) said they had seen the in-store displays.¹⁴ It is important to note that there are inherent limitations on the influence that these POPs could have had because of their placement in the stores, limits on the amount of information they could present, and the fact that the targeted customers were usually contractors who had come to the stores and had limited time to spend.

About half of those people who recalled the display indicated that they either did not have time to take a closer look, or that they were already familiar with green building and were not looking for more information.

All customers were asked what they thought the major barriers to the use of green building products were. Ten customers thought that cost was the most significant barrier; four indicated lack of availability; three said lack of information; three thought that quality/performance were issues; and two who were builders felt that designers needed to specify green materials because builders didn't have a choice of materials. The people who recalled seeing the display said that it did not adequately address the areas they considered to be green building barriers.

Although most of the people we interviewed could not recall seeing the display, many were willing to discuss their impressions of green building in general, and offer suggestions on how to better educate the public. Seven customers provided suggestions on how in-store displays could be made more effective. A sampling of these follows.

“Have actual products side by side for comparison. It is important for customers to be able to compare quality and prices of different materials.”

“Place the display at the counter so everyone will see it.”

¹³ It is important to note that the Truitt & White representative we spoke with said that their display had been in place only a short time and she felt that it would have more impact the longer it was in the store.

¹⁴ Interestingly, the largest percentage (4 of 5) who stated they had seen the display were customers at EarthSource, whose large display was not in the store at the time of our visit. These customers probably had seen the display during another visit to the store and were able to respond to our questions based on their recall from prior visits.

“These things need to be geared more toward designers because builders don’t have a choice in materials.”

“Lots of text is not effective, people can’t digest it. Display actual products that people can touch and see.”

“Put displays in more homeowner-g geared stores ... because when the customers start asking for it, the builders will use it.”

When asked how often they specifically looked for green building products, ten customers (40% of those interviewed) said either “always” or “often.” Another ten said “occasionally” and five said “never.” By far the most common green building products that customers had used in the past were sustainable wood products, with about half (12) customers responding this way. Other common materials were paint (7), energy-efficient windows and doors (5), green flooring products (5), and recycled decking (4).

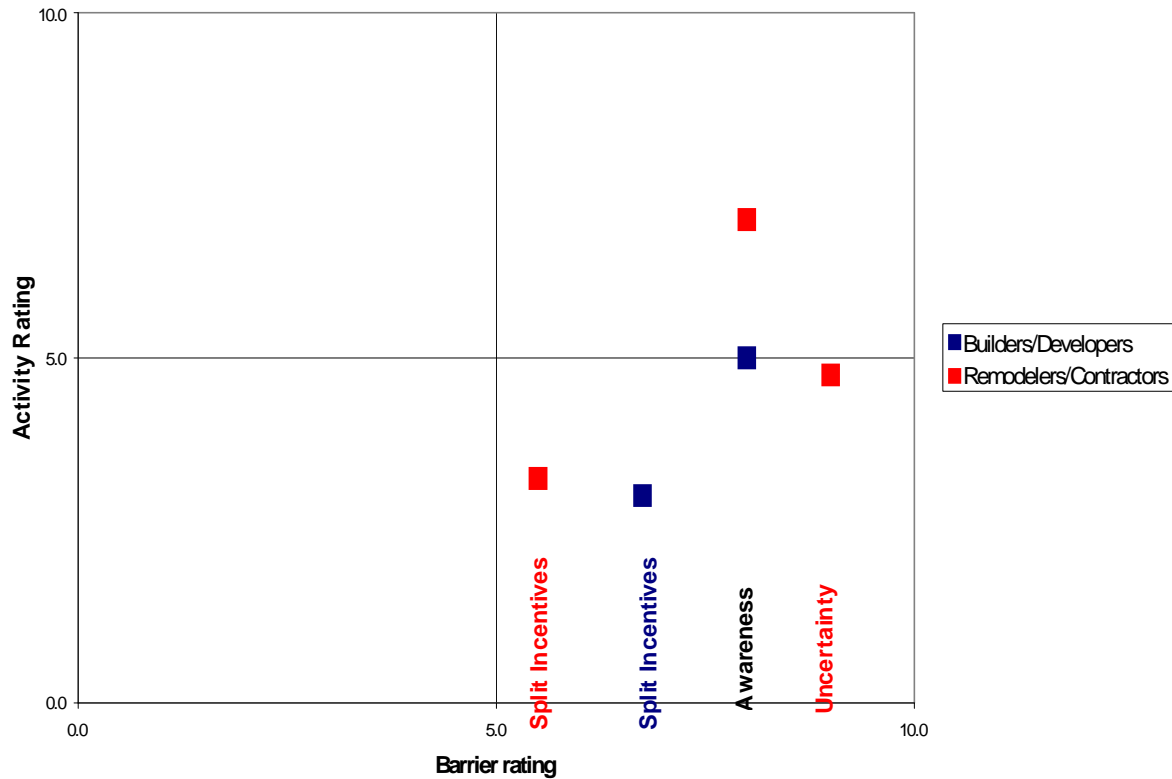
Customer Interview Conclusions and Observations

As noted earlier, the small sample size and status of the store displays limited our ability to extract from these interviews highly reliable indicators of the value and effect of retail POPs. Nevertheless, the limited information was quite consistent and provided useful insights and feedback.

At the beginning of our evaluation of the overall Program, we conducted the rating exercise described in Chapter 3 with the Program implementers to get their assessments of how significant they felt various green building barriers were to different market actors and how effective each of the Program activities would be in addressing these barriers. Figure 7 shows how the implementers’ rated market barriers (Barrier Rating) for builders/developers and remodelers/contractors and how significant an effect (Activity Rating) they expected the POPs to have on each barrier. The most significant barriers implementers expected the POPs to address were uncertainty about performance and cost and lack of awareness of green products and services (and their availability). These expectations agreed fairly well with the feedback from the POP interviewees.¹⁵

¹⁵ It is important to note that the cost issue raised by the professionals was often the perceived unwillingness of their customers to pay more for green buildings, which is really an issue of customers not knowing the benefits offered by green buildings.

Figure 7. Implementers' Significance Ratings of Barriers for Builders/Developers and Remodelers/Contractors and Effect of POP Displays



The implementers' ratings showed that they expected the POPs to have relatively modest effects on the barriers. The most significant influence was expected to be on reducing the remodeler/contractor lack of awareness.¹⁶ It was difficult to draw meaningful conclusions from the small number of interviews conducted, but from this limited information it appeared that the POPs had little effect on any of the identified barriers.

We believe there were at least three ways in which the effectiveness of the POPs was limited. First, only a relatively small share of customers could recall seeing them. Part of the reason appeared to be that the professionals shopping at these stores were there to find specific items and were in a hurry. Second, the content or presentation of the POPs did not sufficiently address the concerns that these customers had about green products and services. Third, many of these customers were already knowledgeable about green buildings and were unlikely to be able to get the targeted information they might need from a general display.

We note that some of the customers at these stores were homeowners or renters, not building professionals. In the initial rating exercise, the Program implementers expected the impacts of

¹⁶ Compared to other barriers and Program activities, only Activity Ratings greater than about 6 were deemed to have a relatively large influence on the barriers.

the POPs on homeowners/renters to be very significant at increasing awareness and knowledge about green building benefits. However, none of the six owners/renters recalled seeing the POPs.

Even though only about one-third of all the customers we interviewed recalled the displays, useful suggestions were received for how to make such displays more effective. One theme was that the displays should contain actual product samples and present them side-by-side with conventional products so that customers could assess them directly. A few comments reflected the view that the displays should be targeted more at the market actors who have significant influence over product decisions or specifications, e.g., homeowners and designers.

One customer, a professional builder, made a suggestion that was also made at the October 12 project team meeting preceding the site visits. This was that a more effective place to educate builders, contractors, and homeowners on green building products and practices might be in permitting offices, where people were “captive audiences.” This person suggested a short video or loop tape showing the benefits of green building products.

Follow-up Retailer Interviews

Due to the small sample of customers interviewed and the short duration that the displays were in place prior to the interviews, follow-up phone interviews were conducted with retail representatives from the three stores. These interviews were intended to document the experiences of the retailers with POP displays and the green building market in general, to provide a different perspective on the POP assessment as a whole and insights into how to leverage the retailers’ role in the Program. A brief, eight-question interview was designed to gauge the retailers’

- Overall interest in the green building market
- Familiarity with Build It Green and the Program
- Assessment of POP effectiveness
- Perceptions of barriers to adoption
- Ideas for how Build It Green could work most effectively with the stores

Interest in pursuing the green building market at the three stores was “very high” or “extremely high.” Two retailers were already involved with Build It Green. The one who was not stated that he was “relatively familiar” with the organization, and expressed a desire to learn more and become more involved.

Ratings of the effectiveness of the POP displays ranged from “somewhat effective” (2 respondents) to “not very effective” (1 respondent). Explanations of these ratings included an observation by one retailer that their display was at the checkout counter and he felt that it was being overwhelmed by the other materials and displays in the same area. He suggested that a stand-alone display would probably be more effective. One retailer suggested that a more effective approach would be to have salespeople educate customers on green products and their benefits. The representative for this store also expressed a desire for a chart of green items that broke down product specifications for customers. The representative from another store said that

targeted education providing information and educational materials at clinics and seminars held in their conference room had proven to be very effective in the past.

On average, customer breakdown at the three stores was estimated at 85% building professionals and 15% private consumers.

When asked how to best reach their customers with information on green building, responses included having salespeople lead customers to green products and educate them during this interaction; a direct mail piece to be enclosed with invoices; and a multi-pronged approach employing multiple media.

The retailers were asked how Build It Green could most effectively work with the stores to help drive demand for green building products. In general, respondents said that increasing consumer awareness was important and one respondent expressed a desire for help in driving more traffic to the store's website.

The primary barriers to adoption of green building products/practices were cited as cost, lack of availability of products, lack of consumer awareness of green building products and practices, and engrained organizational practices on the part of the contractors. Cost was cited most commonly, in terms of both actual and perceived cost.

In sum, the three retailers appeared to have similar experiences and observations. Two of the three interviewees specifically cited the complexity of driving demand for an emerging green building market as a “chicken and egg” conundrum—higher demand is needed to increase availability and lower costs, while increased availability and lower costs are needed to promote more demand. Final thoughts also included the sentiment that very different campaigns were needed to most effectively reach consumers, designers, and contractors. One retailer felt that Build It Green mostly targeted builders and that it would be worthwhile to target the design community as well.

Final Observations

Although the data from these retail customer and retailer interviews were not sufficient to draw definitive conclusions, some common themes emerged.

First, the effectiveness of POPs is likely to be limited unless the displays are significantly expanded, their content is changed, and retailers place them in prime locations. To implement recommendations such as including side-by-side comparisons of green and standard products would require more complex and larger displays.

Second, POPs may not be the most effective way to reach builders and contractors. They tend to shop for specific products and are unlikely to spend much time while shopping to gather general information.

Third, customers responsible for product specification or final selection (particularly homeowners) may be a better target for POPs. This would mean placement in stores catering to homeowners.

Overall, the original POP approach did not appear to have accomplished its objectives very effectively. Given this, we believe that it would be useful to explore either different POP types and locations or alternative approaches to reach the targeted audiences. In either case, Program resources would have to be redirected.

5. In-Depth Consultations

This chapter provides the results of an assessment of the builder/developer In-depth Consultations component of the Program. The assessment was based on two sets of interviews with members of builder or developer organizations that received in-depth consultation services. The interviews were conducted in November 2004 and mid-April to mid-May 2006. The organizations were selected randomly from the organizations that had received these services. Representatives from three organizations were interviewed in November 2004: Mt. Diablo Habitat for Humanity, Santa Rosa Habitat for Humanity, and Christopherson Homes. Two Program team members provided services to these organizations. The interviews conducted in spring 2006 included representatives from four organizations: Fairfax Lumber, Jim Murphy & Associates, Contra Costa Community Development Corporation, and Tenderloin Neighborhood Development Corporation.

The purpose of these interviews was to evaluate awareness of the availability of Program in-depth consultation services, assess the delivery of services provided during consultations, and obtain opinions on the significance of market barriers and these consultations' impact on them. We note that all findings and results should be considered as only indicative because of the small number of interviews conducted.

Results

The length of involvement with the Program to date varied from six months to two years. Since the 2004-05 Program was in existence for less than a year at the time of the first interviews, some interviewees had been aware of the earlier version of the Program implemented during 2002-03.

All of the respondents learned about Program services through networking and/or word-of-mouth. One participant was a member of the Santa Rosa Green Building Council where he learned of the Program from Program team members. Another heard about the Program through a sister organization that had participated.

The overriding reason for requesting in-depth consultations was to access materials to educate the organization about green building concepts, practices, costs, benefits, technical details, etc. One participant also wanted to learn about greening existing buildings and sought assistance in organizing a Green Team within their organization.

We asked participants to list the services received to date through the in-depth consultations and to rate the usefulness of each on a scale from 1 to 5, where 5 was "extremely useful." The types of services offered included:

- Job site walkthroughs
- Technical assistance for assessing green building processes, materials, or systems

- Assistance earning Green Point rating system credits¹⁷
- Assistance identifying green building processes, materials, or systems
- Assistance developing project goals
- Assistance with Energy Star financial incentives or design assistance

The services received very high ratings. Two (of seven) participants had received jobsite walkthroughs (the third hoped to do so in the future), and both gave the walkthrough a rating of 5. Four participants had received technical assistance for assessing green building processes, materials, or systems. Only two had received assistance earning credits in the Green Points rating system. The average rating received from the participants for both types of assistance was very high. Two of the organizations had received presentations to members or employees to educate them about basic concepts of green building and the Green Points program, and the respondents gave these presentations an average rating of 4.8. One organization had also received assistance developing project goals and rated this service at 4.5.

Two participants interviewed in 2004 who had received assistance in more than one area both said that the Green Points assistance and checklists were the most useful. They stated that they thought the Green Points system provided legitimacy to claims that a project was “green.” One respondent noted that the assistance they received was applied to designing their own green building program and they gave this service a rating of 4. None of the respondents said that they had received assistance with Energy Star financial incentives or design assistance.

The 2006 interviewees responded that the most useful results of Program participation was the ability to network with other organizations and to share resources. One respondent indicated that the coordination among different public agency councils “had been great.”

When asked what service was least useful, none stood out, though some suggestions and comments were made about possible improvements:

- One participant noted that, though the Green Points presentations were very useful, some builders and contractors refused to attend because they felt insulted that they were being “taught” when they thought they were the experts.
- One participant felt there was too much emphasis on the actual credits within Green Points, without a consideration of what was most cost-effective. He felt that cost-effectiveness information would be helpful.
- Another hoped that more on-demand technical assistance could be provided, such as a troubleshooting hotline where builders could get answers about green products and practices at any time.¹⁸

¹⁷ In conjunction with other organizations, the Program supported development of a green building rating system called Green Points. It evolved out of an effort to support the City of Santa Rosa and the Public Agency Council.

¹⁸ These are the types of assistance that the Ask an Expert could provide so this respondent was probably not aware at the time of the interview that this service was available.

- Another suggestion was that an outline be provided during the jobsite walkthrough, summarizing what topics would be covered and what the issues were, and that they would have an opportunity to take notes during the walkthrough.¹⁹
- Evaluation of project design and on-site visits during construction were also requested.

Participants were asked to rate both the significance of various green building barriers and the Program’s in-depth consultations’ effect on these barriers. Table 5 summarizes the results for both the 2004 and 2006 respondents²⁰.

Table 5. Ratings of Barriers and Effectiveness of In-Depth Consultations

Green Building Barrier	Significance of Barrier	Effectiveness of Consultations at Addressing Barrier*	No. Respondents Rating Barriers
Lack of awareness and knowledge about green products or practices	3.8	4.0	6
Difficulty finding green products	2.8	2.0	5
Difficulty finding experienced practitioners	3.7	4.0	5
Uncertainty about performance or time required to apply green products or practices	3.0	3.0	5
Cost of green products and practices	3.1	3.3	5
Added coordination required during design and construction	2.8	3.5	5
Need to change how design/construction are done	3.3	3.5	4
Reduced profit margin	1.0	N/A	5
Confusion or conflicts with local codes	0.8	N/A	4

Note: 4=Very Significant/Effective, 1=Not At All Significant/Effective

* Only one of the three 2006 respondents was able to respond to the question of the effectiveness of consultation services

It is interesting to note that there appeared to be trends in the responses about the barriers. In 2004, the builders/developers rated lack of awareness/knowledge and difficulty finding practitioners to be considerably more significant barriers than the 2006 respondents did. Since the in-depth consultations received high ratings for effectiveness addressing these barriers, it is reasonable to conclude that the consultations, over time, were helping alleviate these barriers.

In the case of two barriers there were considerable differences in how individual respondents rated the consultations’ effectiveness. Regarding the effect of the consultations on uncertainty about performance or time required one participant said they were “not at all effective” and one said “very effective.” A wide spread also occurred in how the effectiveness of alleviating the “difficulty finding green products” barrier was rated. One respondent rated the in-depth consultations “very effective” and one rated them “not effective at all.”

¹⁹ It was noted that this walkthrough was not scheduled very far in advance, and this may have been the reason such an outline was not provided.

²⁰ Not all participants expressed views on all barriers. Some were not applicable to the services they had received or their personal involvement with the Program.

When asked about their green building knowledge before receiving Program assistance through an in-depth consultation, the responses ranged from “below average” to “above average.” On the average, respondents indicated they had relatively little knowledge before using this service.

When asked how much the in-depth consultation services had expanded their knowledge of green products and practices, most said it had expanded their knowledge significantly. One elaborated on the question and made a distinction between green products and green practices, noting that the consultation had expanded their knowledge of green processes and Green Points “significantly,” while their knowledge of green products had only expanded “somewhat.” All participants said that they were “much more likely” to utilize green building products and practices after receiving these services, and all said that they would recommend the Program’s consultation services to colleagues.

When asked what could be done to improve the in-depth consultations, one participant requested that lists of green products be made available. He stated that, ideally, this list would explain where to buy the products, how much they cost, how cost-effective they were, and how available they were. Four participants said that they couldn’t think of any improvements to recommend. One respondent offered the view that the staff providing the consultations were relatively young and might not be perceived to have enough experience to make their advice as credible as it could be. One participant went on to say that Frontier was equipped to provide any service the organization would need—“you just need to ask.”

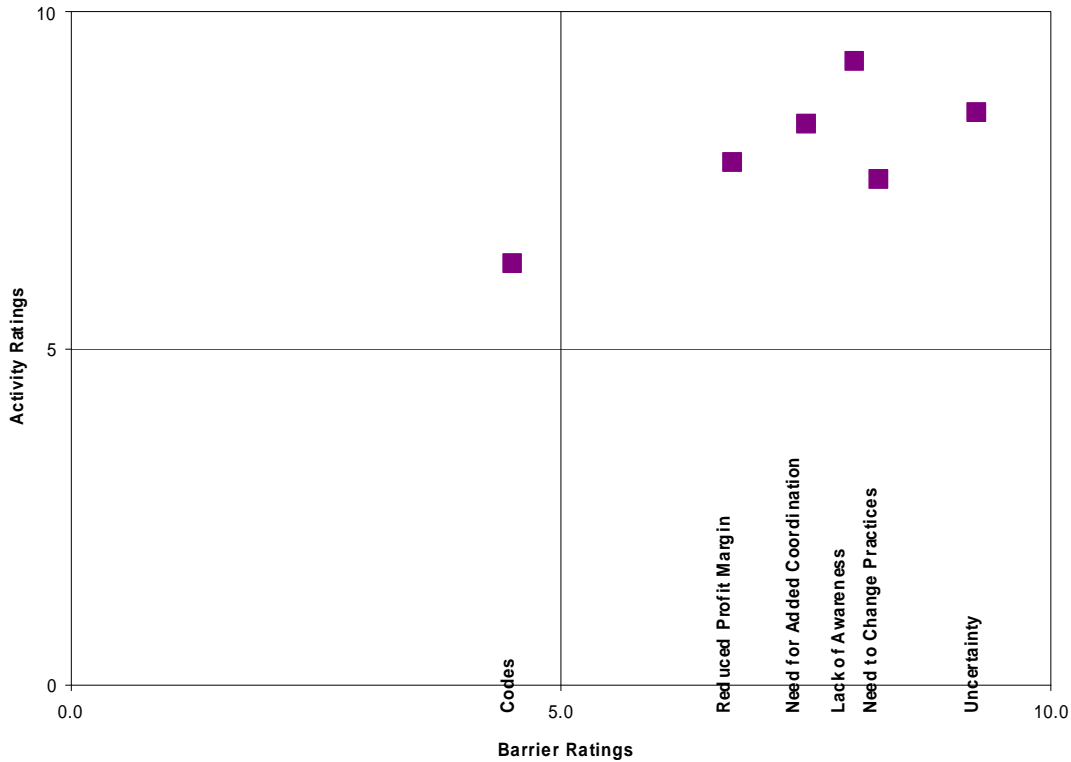
Summary and Implications

Across these organizations, all of the Program’s consultation services had been provided with the exception of ENERGY STAR financial incentives assistance or design assistance, allowing us to get feedback on the effect of individual services, as well as the consultation service on the whole. The ability to generalize our findings was limited, however, by the relatively small number of participants we were able to interview and by some staff turnover at the organizations during the study period. Nevertheless, the results should prove useful to the Program implementers for assessing the effectiveness of the consultation services and identifying areas for improvement or focus.

Participants gave the in-depth consultations high ratings for usefulness. Each of the services provided through the in-depth consultations received an average rating of at least four (out of five) for usefulness. The walkthroughs and assistance with the Green Points rating system received special recognition for their benefits. It is worth noting that relevance to Green Points appeared to be important because this rating system was perceived to help legitimize claims of “greenness.”

Figure 8 shows the Program implementers’ ratings provided at the beginning of the Program for comparison with the feedback from builders/developers. The figure shows how the implementers had rated green building barriers and how they assessed the effects of in-depth consultations on reducing these barriers for builders/developers. The barrier rated as most significant was “uncertainty about performance or time requirements,” and the implementers thought that in-depth consultations would have their greatest effect in “increasing awareness of green products and practices (lack of awareness barrier).”

Figure 8. Implementers' Significance Ratings of Barriers for Builders/Developers and Effect of In-Depth Consultations



Comparing Figure 8 and Table 5, there is a fairly good match between implementers' assessments of green building barriers faced by builders/developers and the assessments provided by these market actors themselves. In both cases, "lack of awareness," "uncertainty," and "need to change practices" were among the most significant barriers identified for these supply-side market actors. Thus, the implementers anticipated these issues quite well.

The one major difference is the "difficulty finding experienced practitioners" barrier. The industry respondents rated this as the second most significant barrier, suggesting that builders and developers had a hard time finding subcontractors in the building trades who were sufficiently knowledgeable and experienced in green building practices. This was not included explicitly as a barrier in Frontier's original proposal for the Program and, as a result, was not addressed during our rating exercise with the Program implementers. However, this barrier was implicitly recognized in the "lack of awareness and information" barrier assessed by the implementers, which was rated by them as the third most significant barrier.

One other difference in the implementer and industry ratings was in the case of the "reduced profit margin" barrier. The implementers rated this as a considerably more significant barrier than the builders/developers did. There are at least two possible reasons for this difference. First, builders and developers might be biased toward understating the significance of this barrier in this type of forum. Second, because the participating builders and developers are self-selected

they might represent those who had been successful already at making a reasonable profit on green homes.

There were no significant differences between how the implementers and builders/ developers rated the effectiveness of the in-depth consultations. One interesting trend observed between the first and second round of interviews was a notable increase in how effective the builders/developers thought the consultations were in reducing uncertainties associated with building green.

Overall, the participants we interviewed were all very pleased with the services provided and said they would definitely recommend these services to similar organizations. The fact that they all heard about the availability of the in-depth consultation services through contacts and word-of-mouth suggests that information is getting around effectively through existing market networks. Staff turnover is an issue since it is a reality among any organization. The inability of two individual staff members to readily access resources that their organizations had previously received through in-depth consultation services may suggest that future consultations include a recommendation that some strategy be established to minimize the loss of cumulative knowledge when turnover does occur.

6. Half-Day Workshops

This chapter provides the findings from two workshop events that took place on July 31 and December 14, 2004. Phone interviews of attendees were conducted in two phases – in November 2004 and in May 2006. The interviews were conducted over a period of time in order to allow for changing trends and to capture the different phases of the evaluation period.

Results

The first workshop, “100% Renewable Energy: An Ultimate Green Goal Tour” (the tour) took place on July 31, 2004. Randomly selected participants were surveyed on the telephone. Out of roughly 40 attendees, only four were reached who agreed to take the survey.²¹ Due to this small sample size, it is difficult to draw firm conclusions from this group. For this reason, the following discussion focuses on assessment results for the second workshop event. Relevant findings from our assessment of the tour are incorporated where they provide additional insights.

The second workshop, “Greening Affordable and Multifamily Housing” (the Conference), took place on December 14, 2004. Building professionals and government representatives attended this Conference. Approximately 100 people participated, 63 of whom returned an evaluation form. This high response rate provides a large set of data from which to analyze the effectiveness of the event and provide suggestions for how future events might be improved.

Participants at the Conference were asked how they heard about this event²². Responses were as follows:

- 30 heard about the event through email lists, websites, or their affiliation with an organization
- 15 heard from individuals involved in the program or at Sonoma State University
- 19 heard through friends, colleagues, or work contacts
- One person cited seeing a flyer for the event

All respondents from the tour heard about it through connections with the Environmental Technology Center or affiliation with other sustainable organizations.

When asked in what capacity each attended the Conference, the breakdown was as follows:²³

- Market-rate housing developer9
- Affordable housing developer.....12

²¹ The contact information for the attendees was not readily available so this limited the pool of participants from which we could draw a sample.

²² Some respondents listed multiple sources of information.

²³ Some respondents used multiple categories to classify the capacity in which they attended.

- Contractor8
- Architect12
- Engineer1
- Government agency representative.....8
- Other25

The “other” category included students, green building/energy consultants, builders, and various other positions with an interest in green building.

Participants were asked to rate their knowledge of green building prior to attending this event as “below average,” “about average,” “better than average,” or “extensive.” In order to allow responses to be averaged, these designations were coded 0, 1, 2, and 3, respectively. One person did not answer this question. The average of the 62 who did was 1.7, indicating that the typical level of prior green building knowledge was a little less than “better than average.” The distribution of responses was as follows:

- Below average (8)
- About average (12)
- Better than average (34)
- Extensive (8)

This average is quite close to the average of 1.75 for the tour group.

Many varying answers were provided when participants were asked what they hoped to learn from the December Conference. Aside from merely seeking to expand general knowledge about green building, the most popular responses involved:

- Financing and funding (13)
- Available products/practices/technologies (10)
- Making contacts and networking (4)
- Seeing case studies (3)

When asked what the most useful information provided at the Conference was, the responses aligned well with what attendees were looking for. The most common responses were:

- Costs and financing (11)
- Green products/practices (9)
- Case studies (4)
- Guidelines (3)

Additionally, three people mentioned specific presenters as the most useful part of the Conference and two said “the last presentation.”

Asked how much the event expanded knowledge of green building, the responses were very positive. The distribution was as follows (with number used for averaging in parentheses):

- 1 “not at all” (0)
- 11 “a little” (1)
- 25 “somewhat” (2)
- 24 “significantly” (3)

Using this scoring, the average rating was 2.2, or slightly above “somewhat.” This agrees with the average answer of 2.3 from the July 31st tour.

Table 6 summarizes participants’ ratings of aspects of the Conference, where 4 is “excellent,” 3 is “good,” 2 is “fair,” and 1 is “poor.” Overall the ratings were very positive. Because the December Conference and July tour were so different in nature and format, it is difficult to compare ratings, but the July tour also received all ratings of at least 3 (except for a 2.7 for the usefulness of the steel roofing presentation) and the event was rated as 4 overall.

Table 6. Ratings of Conference Aspects

Workshop Aspect	Average Rating	Number Rated “Poor”	Number Who Rated
Format (schedule, organization, etc.)	3.3	0	61
Content of presentations	3.3	2	60
Knowledge of panelists	3.6	1	61
Overall quality of event	3.4	1	60
<i>Focus on green building issues that are important to you of...</i>			
Panel 1: Green guidelines	3.3	0	56
Panel 2: Green financing	3.2	2	54
Panel 3: Green planning	3.5	0	58
Entire event	3.4	0	56

Participants were then asked how this event affected the likelihood that they would build green. Most participants indicated that the Conference increased the likelihood. Fifteen said that there was no change in the likelihood, with eight of this group stating that this was because they were already building green. Twenty-seven said that the event made it “much more likely,” 20 said “somewhat more likely,” and one said “much less likely.” The average response was slightly above “somewhat more likely.”

Next, participants rated the significance of barriers to green building and how effective they thought the Conference was at addressing them. Here, a significance or effectiveness rating of 1 is “not at all,” 2 is “not very,” 3 is “somewhat,” and 4 is “very.” Table 7 summarizes these results.

Table 7. Supply-Side Attendees’ Ratings of Barriers and Conference Effectiveness

	Average Significance Rating	Average Effectiveness Rating	No. Who Rated Significance/ Effectiveness
Lack of awareness and knowledge about green products or practices	3.8	3.2	56 / 48
Difficulty finding green products	3.1	2.8	54 / 44
Difficulty finding experienced green building practitioners	3.3	2.6	55 / 45
Uncertainty about performance, cost, or time required to apply green products or practices	3.4	3.0	55 / 47
Cost of green products and practices	3.0	3.1	53 / 46
<i>For builders, developers, contractors, designers only</i>			
Added coordination required during design and construction	2.8	2.7	30 / 25
Need to change how design/construction are done	2.9	2.7	29 / 26
Reduced profit margin	2.5	2.8	26 / 21
Confusion or conflicts with local codes	2.7	2.2	28 / 23

The results show that for this overall audience the most significant barrier was “lack of awareness and knowledge.” The Conference received the highest effectiveness rating for addressing this barrier. The industry professionals in attendance were asked to rate other barriers that they faced. These all received lower average ratings than the other barriers. The lowest average rating for the Conference was in addressing “conflicts with local codes.”

When asked for suggestions on the best ways (other than workshops) to inform others about green building products and practices, the most common suggestion was to get the information where people were likely to see it, such as on the internet, email lists, public television, and at large home improvement stores. Others suggested encouraging friends/colleagues to join organizations that deal with green building.

Asked the same question, the four respondents suggested:

- Encourage less knowledgeable people to take courses and educate themselves
- Show that greening saves money in the long run through better advertising
- Have more green tours designed for general public
- Create “green sheets” to educate owners, builders, contractors, suppliers, etc., including lists of local suppliers and costs. Include this information with architectural drawings so that owners could make informed decisions instead of relying on builders for information.
- Convince hardware stores to promote green products

Asked for general comments, 16 December Conference participants thanked program organizers and panelists for putting on this event. Seventeen (17) used the superlatives “good,” “great,” “excellent,” or “fantastic” to describe the event, and feedback in general was very positive.

Summary and Implications

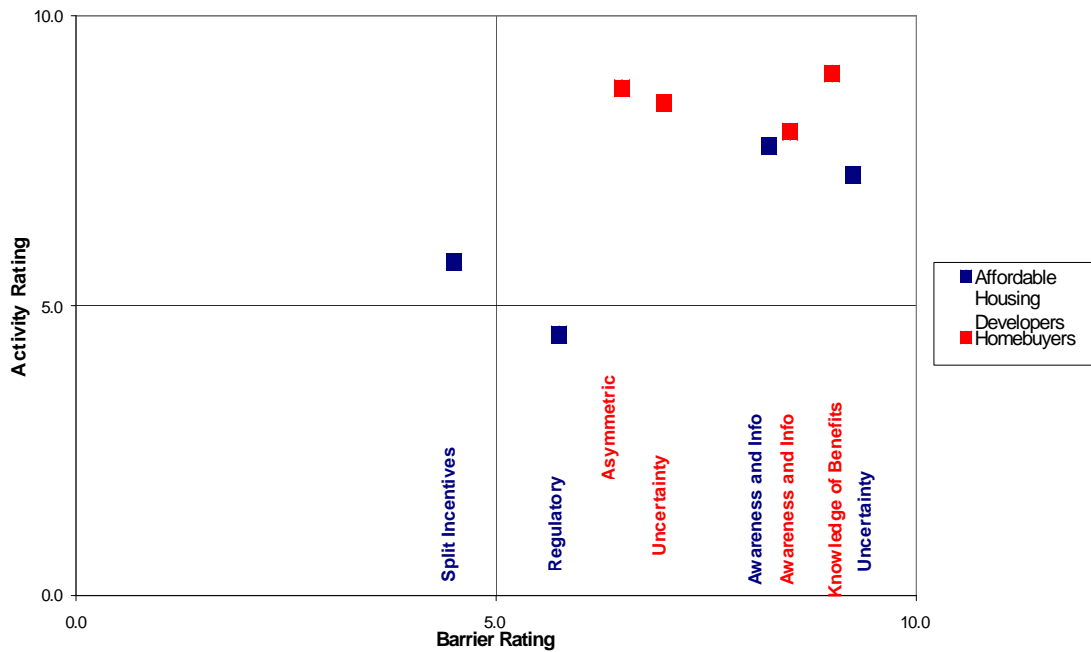
On the whole, both events and the services received earned high quality ratings. All aspects of the December Conference averaged a rating between “good” and “excellent” and few ratings of “poor” were provided. However, various suggestions were provided on ways to improve the event:

- Six people suggested technical improvements, such as a better microphone and less backlighting
- Eleven suggested format changes, including making the event longer, having breakout sessions, allowing an afternoon coffee break, and providing more time for questions
- Several thought too much was covered, which didn’t allow for significant depth into issues
- Other suggestions included providing speaker contact information for interaction at a later date, less focus on basics of green building, and better coordination among speakers to make sure presentations don’t overlap²⁴

Figure 9 shows the ratings that Program implementers gave during the evaluation’s initial exercise assessing the significance of market barriers for groups that would be affected by these workshops and how effective implementers thought the workshops would be at addressing these barriers. “Barrier Rating” corresponds to the average rating of the barrier’s significance to the given group, and “Activity Rating” represents implementers’ average rating of how effective these workshops would be at addressing each barrier for these groups. Implementers thought that these workshops would primarily target affordable housing developers and homebuyers; however, none of the attendees classified themselves as homebuyers, suggesting that at least these two events had not attracted or targeted an audience consistent with original expectations. On the other hand, the wide variety of professionals who attended the Conference indicates that these workshops may be an effective way to reach a broader audience than originally thought.

²⁴ One participant felt that one of the presenter’s presentations was “a bit scattered.”

Figure 9. Implementers' Significance Ratings of Barriers for Affordable Housing Developers and Homebuyers and Workshops' Effect



As shown earlier, respondents at both events saw “lack of awareness and information” as the most significant barrier, followed by “uncertainty.” This was quite consistent with the implementers’ expectations since they also saw these as the largest barriers for affordable housing developers (for comparison with the Conference attendees), but in the reverse order. By comparing the implementers’ ratings to the attendees’ responses, it appears the Conference was a little less effective at addressing the two major barriers than the implementers had expected.

Event organizers originally expected 60 to 80 participants, and the fact that around 100 attended is a very positive sign. Most people heard about this event through affiliation with green organizations or program organizers, and most were already knowledgeable about green building. This suggests that word of such events may not be getting out to the general population, or the general population does not have sufficient interest yet to attend. One architect expressed a concern that if it had not been for a friend at the Environmental Technology Center, he would have never heard about this event. Also, only one person mentioned seeing a flyer for this event. These results indicate that future events might look for more effective ways of targeting people who are not affiliated with these organizations.

7. Community Events

We reviewed questionnaires that were completed by attendees at seven community events conducted by the Program. The attendees were primarily homeowners or buyers, though about one-fourth were building professionals. These questionnaires asked for an evaluation of the event and responses to specific questions about green building.

Description of Events and Attendees

Table 8 provides an overview of the seven community events. All were held between the spring and fall of 2005. A total of 188 people attended these events and 52% provided responses to a brief written survey that Quantec developed in conjunction with Frontier about the event.

Table 8. Summary Community Event Information

Event	Date	No. of Attendees	No. of Respondents
Green Remodeling 101	4/28/2005	40	13
Green Remodeling 101	5/5/2005	31	14
Green Remodeling One Room at a Time Workshop	5/7/2005	48	26
Green Home Systems	5/14/2005	30	24
Green Remodeling 101	9/28/2005	20	8
Green Home Systems	10/1/2005	9	7
Hiring and Working with Green Professionals	10/6/2005	10	5

Table 9 shows the most common ways that participants heard about the event they attended. These results demonstrate the effectiveness of the home tours in informing participants and creating interest in green building information.

Table 9. How Participants Heard about Event

Source	%
Green Home Tour	19%
Websearch	16%
Friend	11%
Stopwaste.org	10%
Radio/Newspaper	4%

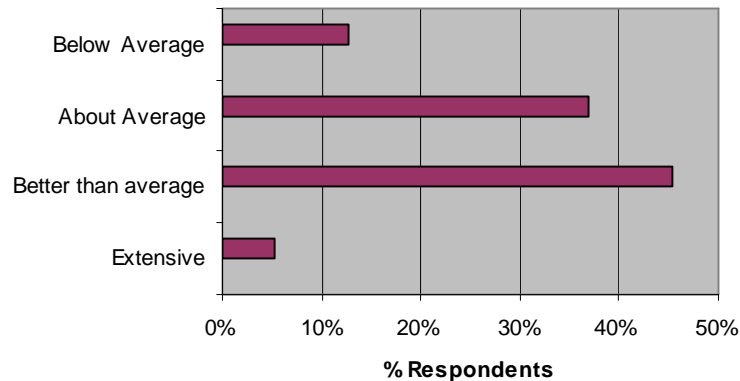
As shown in Table 10, nearly three-fourths of the attendees were homeowners or buyers. The remaining attendees were distributed primarily among different categories of building suppliers.

Table 10. Type of Attendees

Type of Attendee	%
Homeowner/homebuyer	73%
Contractor	6%
Other	6%
Builder/developer	5%
Architect	4%
Renter	4%
Affordable developer	2%
Government rep	0%

As Figure 10 shows, nearly half the attendees rated their knowledge of green buildings as “better than average” prior to the event. Another one-third rated their knowledge as “about average.”

Figure 10. How Attendees Rated Knowledge of Green Buildings Prior to Event



The two most common things attendees hoped to get out of the sessions were information about specific materials or products and a general overview and introduction to green building. Types of information that attendees were looking for about materials included:

- “Green technologies for home building; practical methods & products”
- “‘RAM’ brick making and other low-cost building materials; solar energy”
- “Approved material options”
- “Safer indoor paints”
- “Practicality of certain sustainable materials”

Green Building Barriers

The attendees were asked how significant they thought several potential barriers to green building were. The consumers (homebuyers and owners) rated the barriers from most to least significant as follows:

- Lack of awareness and knowledge
- Uncertainty about performance, cost or time required to apply green products or practices
- Difficulty finding experienced green building practitioners
- Cost of green products or practices
- Lack of knowledge about possible health, comfort, environmental and other benefits
- Lack of unbiased info about green products or services
- Difficulty finding green products

It is important to note that the barriers all received average ratings of least 3.4 on a scale ranging from not at all significant (1) to very significant (4).

The suppliers (builders, architects, etc.) who attended the events were asked for their ratings of other potential green building barriers. They rated them in the following order from most to least significant:

- Added coordination required during design and construction
- Need to change how design/construction are done
- Confusion or conflicts with local codes
- Reduced profit margin

Overall, the suppliers rated these barriers as less significant than the buyers and owners rated the other set of barriers. The average ratings ranged from 2.8 to 3.3 on the 4-point scale.

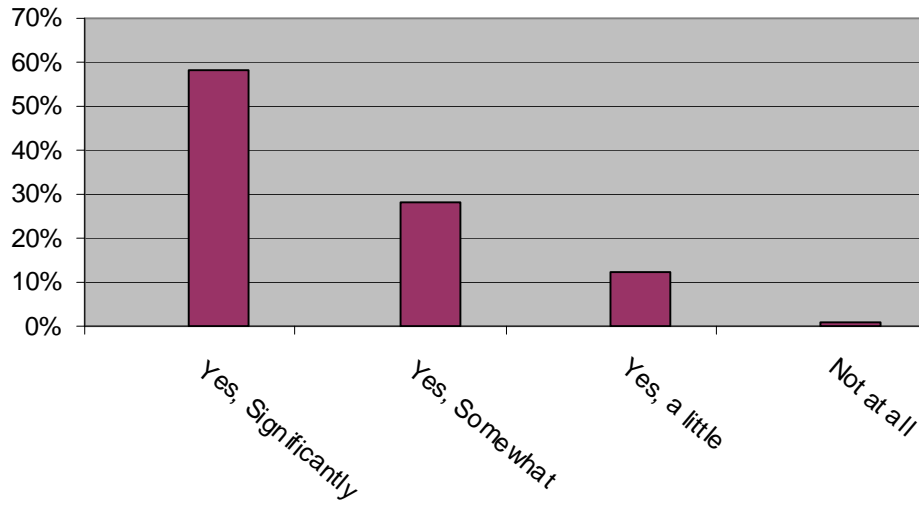
Effect of the Events

When participants were asked what the most useful things were that they got out of the event there were very diverse responses. The most common was good leads on information sources. Tied for the second most common response were information on heating/cooling systems and health concerns, including indoor air quality. Other benefits of the events that were mentioned included:

- An appreciation for the planning required; as one respondent stated: “I understand how complicated it is so I’ll do more planning before building.”
- Better understanding of a wide range of technologies and products including insulation, siding, certified wood, and on-demand water heaters.

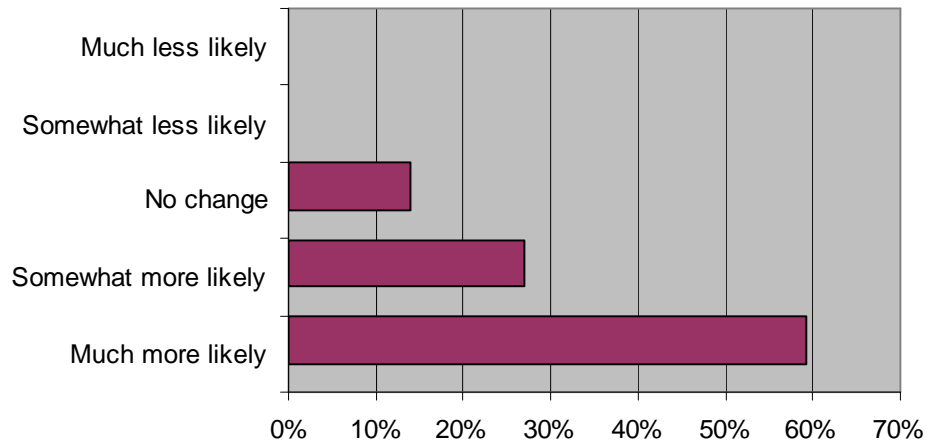
The event attendees were asked how much, if any, the event affected their knowledge of green buildings. Even though most of the respondents assessed their knowledge of green building to be good prior to these events, nearly 60% said that the event had a significant effect on increasing their knowledge of green buildings (see Figure 11). Nearly 90% of the attendees who responded indicated that the event had increased their knowledge at least “somewhat.”

Figure 11. Effect of Event on Attendee’s Knowledge



The event attendees were asked how their likelihood of using green building practices and products had changed as a result of attending the event. Figure 12 suggests that the events had a very positive effect on the intended behavior of the participants. None of the respondents said they were less likely to do so after attending the event, and 60% said they much more likely to use these products and practices after they attended.

Figure 12. Effect on Likelihood of Using Green Practices/Products



Evaluation of the Events

The attendees were asked to rate the event in the following categories:

- Appearance and preparation of presentation materials
- Clarity of presentation materials and presentation

- Content of presentation
- Knowledge of presenter
- Usefulness of supplemental materials
- Focus on green building issues that are important to me
- Overall quality of presentation

On a scale ranging from poor (1) to excellent (4), the overall quality of the events received an average rating of 3.7. The highest average rating went to the knowledge of the presenter; all 81 respondents gave the presenter a rating of “excellent.” The lowest ratings went to “usefulness of supplemental materials” and “focus on green building issues important to me”; nevertheless, the average rating for each was a very respectable 3.4.

When asked for suggestion on ways to improve the events, 38 comments were received. Nine addressed issues related to time management, primarily that there was not enough time for the session and the presentations sometimes were rushed. Several other comments were related to the use of time during the event to deal with questions. They tended to fall into one of two categories: 1) dedicate more time to Q & A or 2) reduce the amount of time spent responding to questions that were off the topic. Five respondents recommended either providing handouts, improving the handouts provided, or making the presentation available on the internet. Four comments recommended including more details in the presentations and less general information; one commenter noted: “Too much fluff, wanted to get to practical applications.”

Event participants were also asked what other ways they would recommend to inform colleagues and friends about green building practices and products. Respondents provided a wide range of answers. Several participants recommended increased use of media including radio and newspapers. Three recommended advertising and displays at retailers such as building supply stores and supermarkets. Several mentioned conducting specific events including additional green home tours, seminars at home improvement centers, and hands-on workshops. Two specifically mentioned targeting children and their parents. Several types of tools and materials were mentioned including case studies, information specifically on the costs of building green, and new home ratings. Sectors that should be targeted were also identified including real estate agents, architects, builders, and organizations constructing houses for the homeless.

8. Inspector Training

This chapter presents our review of training materials developed for a building inspector training session. It also summarizes the evaluation questionnaire responses of attendees.

Training Presentation Material

The Quantec evaluation team reviewed the training presentation entitled “Green Building” for the October 2004 CALBO (California Building Officials Association) Education Week given by Armando Navarro, Director of Environmental Technology Center (ETC), Sonoma State University, and Peter Bruck, Deputy Building Inspector, City of Rohnert Park. We reviewed the training material, which was geared toward inspectors for both residential and commercial construction, for the following attributes:

- Format and graphic presentation
- Clarity and completeness of information
- Usability by targeted audiences
- Sources of training materials
- Effectiveness of distribution

The training review was done from a project professional’s perspective, and included an interview with the Director of the ETC. The target audience was building inspectors employed by building departments in local jurisdictions, as differentiated from special inspectors. This training was given twice as half-day sessions during the 2004 CALBO Education Week in Concord and Ontario, California.

The purpose of the training was to educate the audience of building inspectors about the relationship between the California Building Code and current green building practices. Often, building inspectors are unfamiliar with new practices and materials, and are wary of reviewing and approving them. The CALBO training was developed to address this lack of information and knowledge with respect to green buildings, with the goal of diminishing this barrier to the wider acceptance of green building products and practices.

Information for this training was gathered and assembled by Mr. Navarro and Mr. Bruck, two building professionals very familiar with both green building and building inspection.

Review Results

Format and Graphic Presentation

The training was presented in PowerPoint format with handouts for participants. Contents of the presentation included:

- Introduction to Green Building: What it is and is not

- Impacts of Buildings: Resource use, waste generation, indoor air quality, energy use
- Green Building Programs: Voluntary or mandated, government adopted, utility company based, home builder associations, non-profit, Bay Area programs, guideline programs
- Green Building Categories: Site Design and Development, Water Efficient Practices, Energy, Green Materials, Indoor Environmental Quality
- Specific Inspection and Plan Check Concerns: Green building program requirements, codes and standards, site, graywater systems, foundations, structural frame, exterior finishes, plumbing and water conservation, energy-efficient lighting, electrical, appliances, insulation, windows, HVAC systems, indoor air quality, photovoltaics, solar hot water heating, roofing, low/no VOC paints and adhesives, flooring
- Inspector Requirements
- Additional Resources

We found that the structure and format of the presentation were logical, clear, and concise. The graphics were generally pleasing, using color and photos with a balance of text and tables. In short, the information was easily navigable and well presented.

Clarity and Completeness of Information

The training information was clearly presented, very useful, and thorough. It addressed the issues from an inspector's perspective, e.g., citing building codes directly, which successfully spoke to the target audience. The training also referenced several green building programs that have been adopted by local jurisdictions in California. It approached the subject logically by organizing the code-related content into the various building components, such as structural frame, foundation, and finishes, and made direct connections to pertinent code sections.

We noted one potentially important gap in the materials covered – waterless urinals as a low-flow plumbing fixture. At the time of our review, this was a controversial topic among building inspectors statewide, so in our view discussing these fixtures during the trainings could help head off some of the inspectors' concerns and aid in adoption of policies on the inclusion of waterless urinals.

Usability by Targeted Audiences

Based on a review of evaluation forms by the instructors, attendees gave the training high marks in their evaluations. Based on our review, the level of information presented was on target for educating building inspectors. It was directly relevant to the plan check and inspection process to reference specific code sections.

In addition, it was extremely valuable to have one of the co-teachers be a building inspector, as it is very helpful for inspectors to hear new information from someone within their profession. This fact alone would help overcome lingering skepticism and barriers.

Sources of Training Materials

Training information was gathered from the building inspector's direct experience and the ETC Director's experience with green building practices. Information for the trainings was also gathered from relevant project examples.

The CALBO training took a comprehensive approach, covering many areas with specific detail. We note that it is important to keep a building inspector on the team to facilitate updates to the training materials as code changes occur.

Effectiveness of Distribution

This training was given to a total of 55 building inspectors in California. There was significant interest in the "Green Building" presentation at the CALBO education week, and there were several building departments around the state coming up to speed on green building practices.

Although this material would probably be most effectively learned in a workshop setting because of the discussions that take place, we noted that it would also be valuable to make it available outside of the trainings to reach a larger audience. One way to do so would be to make this material available through a website link, so that any building inspector could access it at any time. In addition, it could be productive to conduct a targeted outreach effort to local jurisdictions as budget and funding allow. Finally, inspectors might find it handy to have a summarized "tip sheet" on the codes and standards content section.

Summary and Recommendations

Overall, the quality, depth, professionalism, and relevance of this inspector training were excellent. Based on our review, we provide the following recommendations for further improving the effectiveness of the training:

- Include waterless urinals in the plumbing section, clarify code acceptance
- Post the workshop materials on the Build It Green, or other, website
- Develop a "tip sheet" summarizing the code issues for each of the sections covered
- Keep this information current as codes are updated and as new materials and systems come on the market
- Develop an outreach strategy to train additional building inspectors around the state

Feedback from Attendees

In October 2005, the same training was presented at the CALBO Education Week. CALBO requested the attendees to provide feedback on evaluation forms and a summarize of the results were provided to Frontier. We had no input to the evaluation form design and did not receive the individual responses.

Average ratings of various aspects of the training are summarized in Table 11. The instructor received very high ratings in terms of preparation and knowledge, as well as overall performance. One attendee commented, “Instructor did an excellent job of presenting new subject matter and answering questions honestly.” The lowest ratings were received for the course meeting attendee expectations. Without more complete information it is difficult to know in what ways the course didn’t meet expectations, but one attendee commented, “Thought it would be more new methods and more incentives for convincing others.” One addition to the course that was recommended was a visit to an actual green building construction job.

Table 11. CALBO Training Ratings

Area Rated	Average Rating*
Instructor’s preparation and subject knowledge	4.7
Appropriateness of materials to course	4.3
Ability of course to meet expectations	3.8
Instructor overall	4.6
Course overall	4.1
* 1=Poor, 2=Below Average, 3=Average, 4=Good, 5=Excellent	

9. Support to GAHC and Local Governments

GAHC Interviews

Quantec staff conducted a series of four interviews with members of the GAHC. The interviews were conducted in November 2004 and at the end of the evaluation period in May 2006. Generally, the telephone survey respondents spoke favorably of Build it Green and Frontier. All respondents agreed that participation in the Program had helped to increase their knowledge of green buildings. Similarly, respondents indicated that they were “more likely” or “much more likely” to “build green” after having received assistance from Frontier.

All respondents agreed that the opportunity to network with and learn from other affordable housing developers was very worthwhile.

The time gap between the first and second round of surveys (18 months) permitted some insights about changes since the Program started. While the sample size was too small to make the results anything more than anecdotal, it is interesting to note that there was a trend over the 18-month period. The average rankings of the significance of various market barriers declined from a range from 2.4 to 3 in 2004 (3 = somewhat significant) to the range from 1.8 to 2.5 in 2006. As one example, there were comments from some of the respondents that finding green building materials had gotten somewhat easier.

In terms of constructive feedback about the Program, one interviewee had the following observation: “Build It Green is doing a great job, but staff could be more diverse. The staff is very young, so sometimes the Program is not viewed as credibly as it could be. They need a more diverse staff.”

Local Governments

We also conducted interviews with six public officials to assess the Program services provided to local governments. Three were with agencies that had participated in some Program activities, and three were with agencies that had not. The interviews took place via telephone in November 2004 and May 2006.

Reasons to Participate

Each participating interviewee said that a desire to gather informational resources and networking opportunities was a primary reason for participating in the Program.

Most Useful Services

The participants had various answers to the question “What was the most useful service provided?” One felt that it was the customized assistance available. Another emphasized the involvement with the GAHC, stating that the “work of the Green Affordable Housing Coalition

has been very helpful for the affordable housing community, and Frontier has helped local governments to coordinate their efforts [in this area].”

Least Useful Services

Responses to a question about what services were least useful, also demonstrated the strength of the Program. Two participants said that all the services provided were useful. One participant stated that “...the point-of-purchase display signs were not very useful. Retailers had not used them, but they had been adopted primarily by local government offices.”

Public Agency Council

Respondents from the three participating agencies agreed that the Public Agency Council (PAC), supported by the Program (see Chapter 13) had played an important role in fostering regional cooperation. One person credited the PAC with supporting regional standards and providing a common forum for building professionals interested in green building development.

Views of Non-participants

Perhaps not surprisingly, the non-participating local governments represented smaller communities. Smaller communities typically have relatively less resources with which to work and take on initiatives such as supporting green building. One non-participant respondent stated: “Our city council voted against [getting involved in green building programs] and they will again in the future. They are viewed as an ‘unfunded mandate’ from the state.” Another respondent also specifically cited resource concerns as the reason his city had not participated.

Recommendations

Based on the feedback from participants and non-participants two recommendations for dealing with local governments emerged:

- A program template or guide should be offered so that agencies moving forward “do not have to start from scratch.”
- The Program should reduce its offerings of “green building 101” type courses since practitioners understand the basics and are more interested now in more detail.

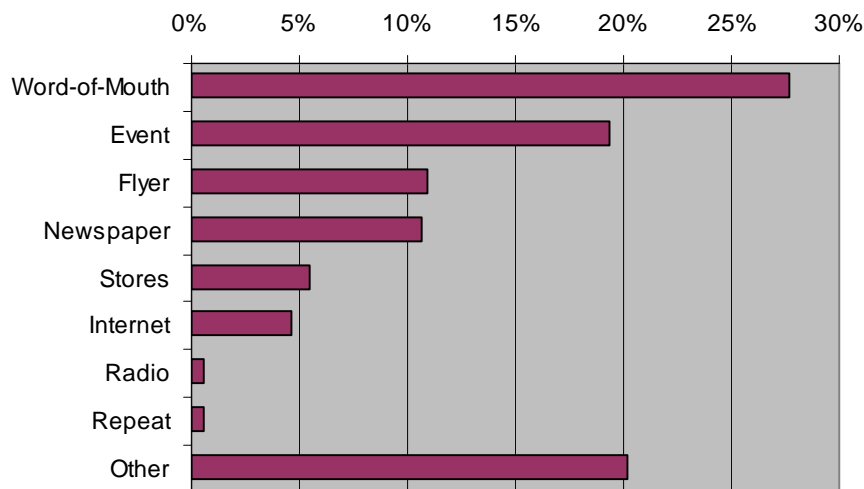
10. Green Home Tour

On September 25, 2005, Build It Green hosted their second Green Home Tour. The home tour program gives people the opportunity to view applied green building practices first-hand. Tour participants were able to choose from 14 different private homes whose owners had agreed to open them to the public. Build It Green collected 347 surveys from tour participants. To encourage participants to complete and turn in a survey, the survey forms also served as a raffle ticket and as a ballot in a local People’s Choice Award contest for the area’s greenest home. This chapter presents the results from Quantec’s analysis of the survey data.

How Participants Heard about the Tour

The North Bay Green Home tour was promoted in a number of different ways. The most effective was word of mouth – approximately 28% of the respondents indicated that they had heard of the event from a friend, colleague, etc., who, presumably, had participated in some other Program event or activity. The second most effective way was through other events, which was cited by nearly 20% of respondents. Eleven percent (11%) read a flyer and another 11% had read about the tour in a local paper. Some articles were written and advertisements were purchased in the local paper. According to one of the organizers, these cost effective, “grass-roots” approaches will be used again to promote upcoming and future Green Home Tours²⁵.

Figure 13. Green Home Tours Promotion

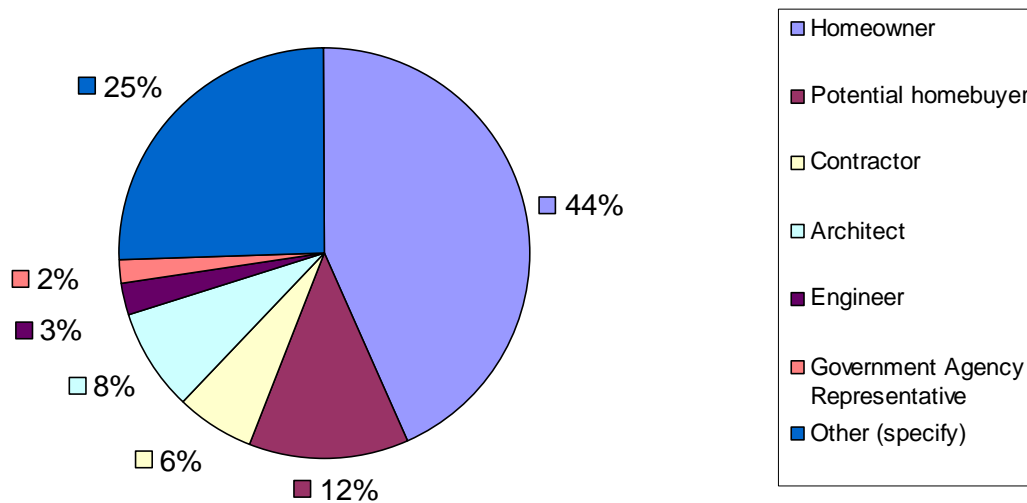


²⁵ Phone interview with Michele Brown, May 17, 2006.

Who Attended and Number of Homes Visited

As shown in Figure 14, the majority of the tour attendees were either current home owners (44%) or potential home owners (12%). Supply-side participants included building design and construction trade members such as architects (8%) and builders (6%).

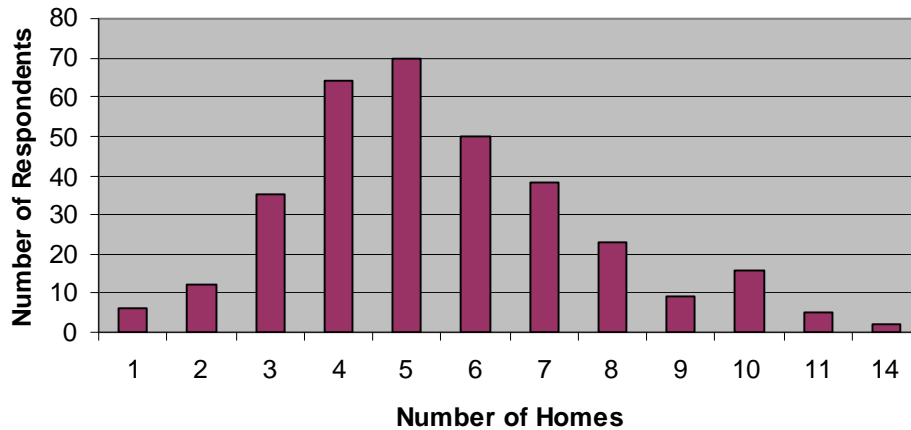
Figure 14. Home Tour Attendees



When asked how they would rate their knowledge of green buildings, nearly half the respondents said their knowledge was “better than average.” Another 10% said their knowledge was “extensive.” A sizable minority of 13%, however, said their knowledge was “below average.”

Figure 15 shows that the largest number of respondents visited five homes on the tour and over half visited from four to six. Two of the respondents visited every home on the tour

Figure 15. Number of Homes Visited

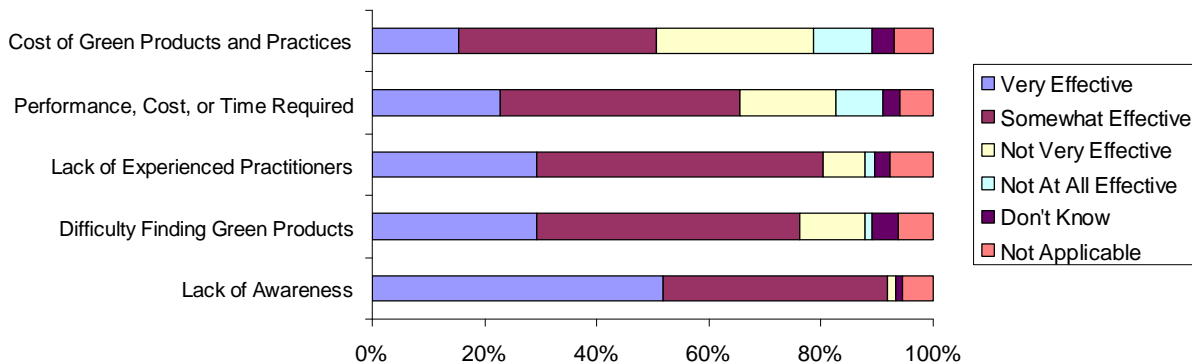


The question “What did you hope to learn by participating in the tour?” was asked in an open-ended format, resulting in 328 unique responses. The most common responses related to learning more about building materials, design ideas, and energy savings ideas, and to learn directly from the experience of other people.

Assessment of the Tour

Participating consumers were asked to rate the effectiveness of the tour in addressing some of the key market barriers likely to be impediments to wider use of green building practices and products. As shown in Figure 16, the tour was felt to have the most significant effect on reducing the lack of awareness barrier. It was felt to be least effective in addressing the cost issues.

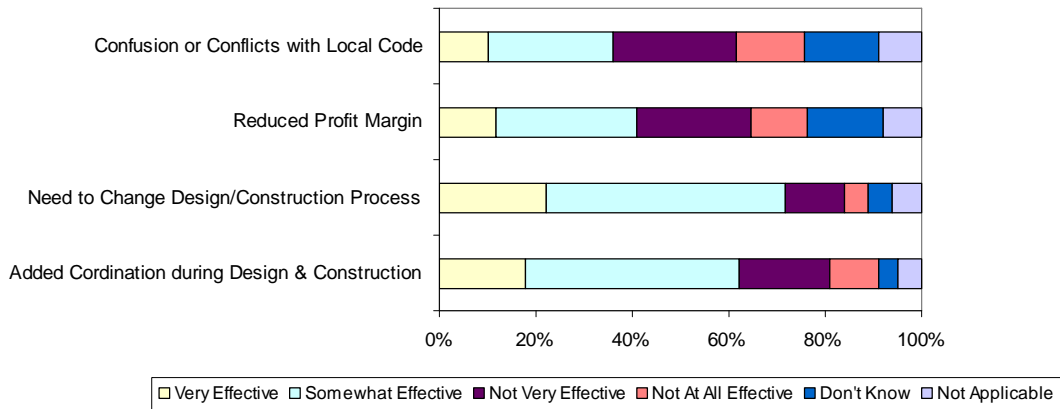
Figure 16. Effect of Tour on Green Barriers—Homebuyers



The suppliers who participated were asked similar questions about barriers of particular importance to them. Figure 17 shows that the tour was most effective at allaying concerns about the need to change the design/construction process and the amount of coordination required. These responses suggested that the attending builders and designers likely took advantage of the

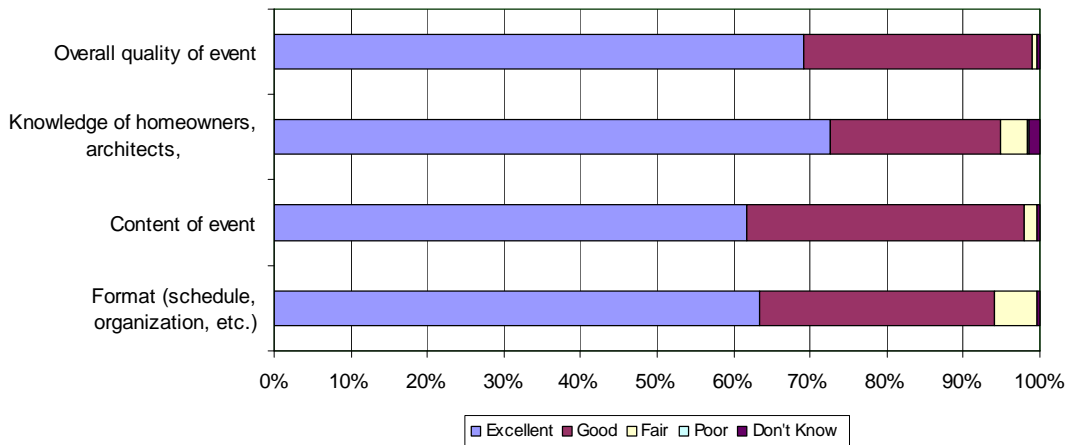
tour to talk to the owners and suppliers and got a better understanding of their experience. From the suppliers' perspective, the tour was least effective at addressing concerns about the effect of local codes.

Figure 17. Effect of Tour on Green Barriers—Suppliers



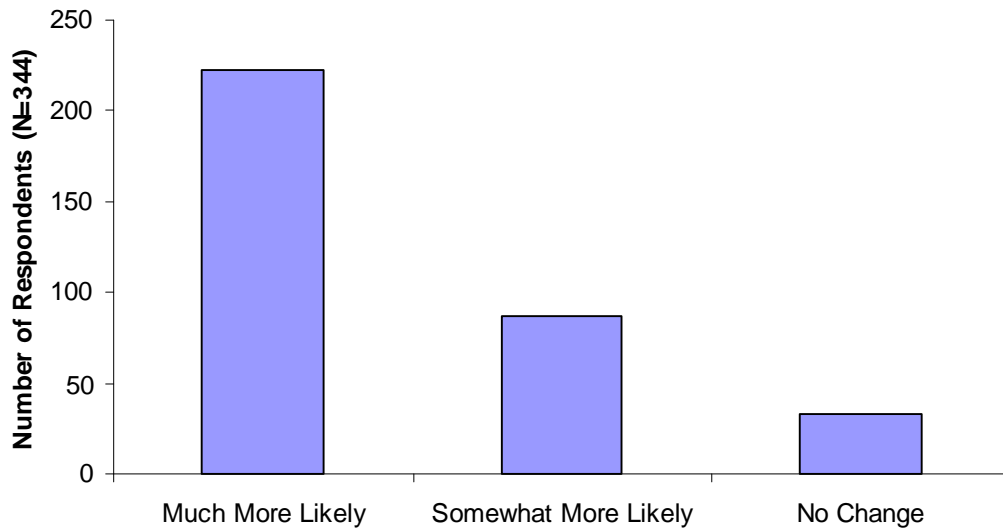
The participants were asked how they would rate different aspects of the tour. As Figure 18 shows, the tour received high marks in the four categories. Nearly 100% rated the overall quality as either “excellent” or “good.” At least 93% of the responses were either “good” or “excellent” for each of the four aspects. The lowest ratings were for the format of the tour, but only about 5% of the respondents rated the format as less than “good.”

Figure 18. Ratings of Different Aspects of the Tour



Finally, the respondents were asked how the tour affected the likelihood they would use green building products or practices in the future. As shown in Figure 19, most respondents (64%) indicated that they would be “much more likely” and another 25% said that they would be “somewhat more likely.” Only 9.5% of the respondents said that there was no change in the likelihood that they would use such products or practices.

Figure 19. How Did the Tour Affect Likelihood of Using Green Building Products/Practices?



All indications from the responses to the questionnaire suggested that the tour had been quite successful as a way to increase awareness and alleviate some of the concerns that the participants had about building green. In addition, the results suggested that the participants were likely to change behavior as a result of joining the tour. A third home tour was scheduled for June 4, 2006.

11. Review of Case Studies and Fact Sheets

We reviewed two case studies and five fact sheets that were prepared for the Program. One of the case studies was available during the first phase of our evaluation and it was reviewed then. The remaining case study and the fact sheets were reviewed during the second phase of our study.

Case Studies

Folsom/Dore Apartments Case Study

The Folsom/Dore Apartments case study prepared by the Green Affordable Housing Coalition (GAHC) was reviewed for the following attributes:

- Format and graphic presentation
- Clarity and completeness of information
- Usability by targeted audiences
- Data acquisition for case study
- Effectiveness of distribution

We reviewed the case study from a project professional's perspective, with interviews of GAHC staff; the Project Manager for Citizens Housing, the project developer; and a non-profit housing developer from another organization as an objective third party.

The target audience is affordable housing project developers and design professionals. The purpose of the case study is to inform the audience that green affordable housing can be accomplished within tight budgets and schedules, thereby helping to remove the information and resource barrier. The GAHC is one of the most established "go to" entities within Northern California and is a logical location for this information.

Information for the case study was gathered and assembled by GAHC using a project documentation form, site visits, and interviews with the project developer and design team. As this documentation process could be an extra burden to project developers, GAHC endeavored to make this process as easy as possible for the development team, thereby removing one of the data gathering barriers.

Distribution of the case study is generally electronic by website link on the GAHC Web site <http://www.greenaffordablehousing.org>, through email announcements by other organizations, and sometimes by hard copy.

Review Results

Format and Graphic Presentation

We found that the information presented was logical, clear, and concise. The graphics are generally pleasing, using color and photos with a balance of text and tables. The information is easily navigable and well presented. The document loads quickly on the website and is in the universally accepted Acrobat Reader PDF format. Contents include:

- Project Summary
- Project Description
- Planning, Design, and Development Process
- By the Numbers
- Sustainability Goals
- Green Building Features at a Glance (table)
- Lessons Learned
- For More Information About the Green Affordable Housing Coalition
- Disclaimer

Clarity and Completeness of Information

Information presented is very useful, clearly presented, and thorough. (We noted a very minor typographical error and brought it to staff's attention). It answers logical questions a typical user would have without being exhaustive. In case study format, it is often tempting to explore every possible angle, which can become too tedious and present an unusable document. We find that this case study achieves a good balance of information for its targeted audiences.

One area that should be considered as an additional section of the "For More Information" section is Financial and Technical Resources. Currently, the case study lists the project team and their websites. This project took advantage of the City of San Francisco's Generation Solar Program and this was clearly stated in the Planning, Design, and Development Process section. It would be useful to developers and others to have an expanded discussion of financing and technical resources.

Other valuable resources are cited throughout. To make it easier for case study users to glean this information, it would be useful to include a listing of the resources with website addresses, culled from the text, appearing in the "For More Information" section below the project team. This effort would also help GAHC update the resource listing they maintain on their website, apart from case studies.

Usability by Targeted Audiences

The level of information presented is adequate for reaching the project developer audience. In this industry, people like to talk to each other to gain information and insight about project experiences and lessons learned and would not expect a case study to have all of the information they require for decision-making. Consequently, we believe that the project team contact information provided in the case study will be highly valuable, particularly for project developers.

The technical information provided should be very useful for technical members of project teams as a resource for further investigation. However, since it is not possible to expound on all technical aspects, it would be useful to expand the list of project team contacts to include the mechanical engineer. Energy design and modeling issues can be complex and innovative with affordable housing projects, and this is an important area on which to focus the case studies. It would be useful also to include whether energy modeling (beyond Title 24 requirements) was performed, and whether the project took advantage of the Savings by Design program.

The Lessons Learned section is quite valuable in that it shares difficulties experienced by the team in a constructive fashion, providing practical advice for other teams. It encourages dialogue between an experienced project team and other project teams new to the subject.

Case Study Data Acquisition

Data acquisition is the most difficult aspect of preparing these case studies. The information resides primarily with the Project Manager for the project developer, and he or she is typically heavily burdened with project tasks. The Citizens Housing Project Manager clearly stated that GAHC did an excellent job obtaining information from her, and that they made it as easy as it could have been by doing the legwork. She points out that the case studies would not happen if it was left to project developers or project team members, and that the role GAHC is fulfilling is essential to gathering this information.

We find that the financial information is readily available through the project managers and they are very willing to share it. Financing, particularly green funds and incentives, are a key component as to whether an affordable housing project can pursue green goals and this information directly benefits other project teams. However, performance metrics are quite difficult to obtain, though they may also provide convincing arguments to persuade other project teams. If it exists, the hard project data related to energy modeling and sustainability performance metrics resides with the project team and consultants. This information is difficult to obtain for several reasons:

- It entails going back into files, chasing down specific information that can be difficult to access, may not have been prepared, or may have changed during construction
- Calculation of some performance metrics generally goes beyond the consultant's scope of work
- Some areas of resource use are not typically measured or modeled

- There are no consistent performance standards in use, though there are a few relevant to this field in pilot phase

While we think GAHC is doing an excellent job of acquiring data in a reasonable, timely and professional fashion, we recognize the general unavailability of key performance information as an industry practice.

A suggestion to help data acquisition, which we discussed with GAHC, is the use of the Multi-Family Green Building pilot checklist early in the development of the case study. This checklist is based on Alameda County Waste Management Authority's (ACWMA) Multi-Family Green Affordable Housing Guidelines and provides a comprehensive view of various attributes of green affordable housing. It would provide a consistent basis of items to consider in data gathering and could focus the Project Manager on specific items for measuring performance, such as energy use or water use. Some of the attributes assessed in this system require metrics and these could be used in the case studies. The ACWMA checklist is currently being vetted by users, and we recommend allowing that process to be completed before the checklist is used extensively in future case studies.

Effectiveness of Distribution

Currently, the case study is available on the GAHC website. A limited number of the case study were printed by GAHC for Citizens Housing, and GAHC also designed and provided 50 postcards for a project tour sponsored by Citizens Housing. While GAHC is well known within the affordable housing field as a resource, we think that the distribution network could be expanded much further through announcements and/or website links. The Project Manager has distributed 50 postcards, and 12 of the 8.5" x 11" case studies, and is ordering a larger printing. GAHC is currently in the process of determining hits to the case study page of the website, and has not distributed any hard copies. Potential distribution partners include:

- ADPSR (Architects, Designers and Planners for Social Responsibility) weekly email list
- NPH (Non-Profit Housing) newsletter
- LISC (Local Initiative Support Corporation)
- EBHO (East Bay Housing Organizations)
- Rebuild America, Strategic Energy Innovations Program
- Northern California Chapter of the USGBC (US Green Building Council)
- Green Resource Center
- ACWMA (Alameda County Waste Management Authority) Multi-Family Green Building Guidelines
- Global Green USA
- San Francisco Department of the Environment
- Other regional public agencies directly engaged with affordable housing

GAHC might also consider direct outreach to project developers and design teams. This could be accomplished by outreach meetings with project developers and their teams, special events focusing on greening of affordable housing, and tours of green affordable housing projects, either completed or in construction. Citizens Housing hosted a very successful tour of the Folsom/Dore project in construction in December 2004. The tour had 45 participants including project developers, architects, funders, engineers, and contractors. This effort could be supported by more print media of the case studies or a general information brochure about GAHC. We expect that this level of focused outreach will happen over time as the GAHC program develops and as more projects come on-line.

Additionally, GAHC is planning to do a trend analysis of hits to the case study page on its website. This analysis will be valuable in determining how many visitors come to this page, and it would be even more useful if there could be some analysis of the types of visitors. We recommend doing this analysis periodically and especially when new case studies are released, or major outreach campaign occurs.

Summary and Recommendations

Overall, the quality, depth, professionalism, and relevance of this GAHC case study are excellent. Based on our review, we provide below a few recommendations for ways to increase the effectiveness of future case studies even more:

- Add Financial and Technical Resources section to include name of the resource and a website link.
- Add Mechanical Engineer to the list of project team members.
- Encourage the development of performance metrics, especially in the areas of energy use, life cycle costing, and water consumption, to the extent possible. Support the inclusion of metrics through the use of a vetted green affordable housing checklist.
- Expand the distribution network for the case studies to affiliated organizations and consider targeted outreach efforts.
- Monitor hits on the case study page periodically, and track sources to the extent possible.
- Increase direct outreach to project developers and teams.
- Consider print media of the case studies, or a general information sheet about the GAHC, to be located in planning and building departments, the Pacific Energy Center, public agencies, housing organizations, and other affiliated organizations. Other programs have taken advantage of similar media and venues.

La Casa Bonita Apartments Case Study

We reviewed the La Casa Bonita Apartment case study during the second phase of our evaluation. This review was less extensive than the review of the first case study since the presentation and format of the two case studies were essentially the same. This review was conducted by Quantec staff without feedback from potential case study users.

We received the case study directly from the Frontier Program Manager and, unlike the other case study, were unable to find it at the GAHC website link. This is likely because the project was not slated for completion until mid-2006.

Review Results

As with the first case study, the information presented was logical, clear, and concise. The graphics are fairly limited, but the balance between photos and tabular information is good. It would have been informative to include estimated utility costs as the Folsom/Dore case study does in the “By the Numbers” table.

We found the discussion of the role played by the Low Income Housing Tax Credit program, administered by the California Tax Credit Allocation Committee (TCAC), to be especially useful. How this program was reflected in the planning and design process should be of interest to other developers. As noted for the other case study, an additional listing in the “For More Information” section on Financial and Technical Resources would be useful. STC (Sound Transmission Class) ratings are given, but the term is never defined.

The level of information presented appears to be appropriate for the target audience. The technical information also should be very useful for technical members of project teams as a resource for further investigation. As with the other case study, it would be useful to expand the list of project team contacts to include the mechanical engineer for readers who might want more of the engineering details. The “Green Building Features at a Glance” table was very informative about the features that were incorporated and their benefits.

The “Lessons Learned” section is valuable and presents the unique challenges of this project, how they were addressed, and the effects on the green characteristics of the project. Though the issues were somewhat unique, the general lessons of taking an integrated design approach and striking the balance that must be achieved when the unanticipated happens will be applicable to almost all other projects.

Summary and Recommendations

Overall, the quality, depth, professionalism, and relevance of this case study were as good as those of the Folsom/Dore case study. Our recommendations for that case study apply to this one as well and to the general approach used to present these case studies.

Fact Sheets

The Program has developed a set of green building fact sheets. They are available through the Build It Green website (<http://www.builditgreen.org/resource/index.cfm?fuseaction=factsheet>) and the GAHC website (<http://www.frontierassoc.net/greenaffordablehousing/FactSheets/Main-FactSheets.shtml>). We reviewed the following five sheets:

- Wall Systems, No. 16
- Water Management Construction Details, No. 20
- HVAC Systems, No. 21

- Daylighting for Homes, No. 23
- Water Conservation Strategies, No. 27

Our review addressed the format, content, accuracy, and usefulness. Our comments here are generic, rather than focused on individual sheets; we provided comments directly to the Program Manager on the separate sheets.

Appearance and Format

The overall appearance of the fact sheets was similar. Each was identified with the Green Affordable Housing Coalition logo and the fact sheet number. The topic title is presented very clearly in each one and the page layout is similar. Most, but not all, sheets start with a section labeled “Introduction.”

The sections in the fact sheets vary considerably. Most present a section on benefits or advantages of the specific measures or processes discussed, but this is not done consistently. Several discuss design and installation issues.

Some of the fact sheets present information visually as well as in text; others present almost no information visually. The most appealing and effective ones present the information using a mix of styles including tabular, text, drawings, etc. One of the five inserted quotes in boxes that provided some humor and special insights into the topic.

Purpose and Content

From the fact sheets we reviewed, they appear to serve a range of purposes. Some are an overview of different technologies (e.g., “Wall Systems”) that provides an introduction to the options and a guide to factors to take into account. Others provide guidance on green design or construction practices (such as “Water Management Construction Details” or “Daylighting for Homes”) starting with general principles and then how they get applied to specific situations. Others are more oriented to providing a menu of good practices (e.g., “Water Conservation Strategies”).

The content varies considerably depending on the topic and apparent purpose of the fact sheet. In general, the content is not highly technical or detailed and provides primarily an introduction to the topic. All the fact sheets reviewed contain a section “For more information” that refers the reader to sources that provided more in-depth information about the topic. The sources vary from quite general ones to some very specific and academic ones; some fact sheets provide a range of source types, while others reference sources that are likely to be of a similar type, such as links to websites that are portals to other links.

As noted above, most fact sheets present a summary of the benefits or advantages of the green measure or process discussed. Beyond that, however, there is little consistency in the contents of the sheets. Some discuss disadvantages; some discuss costs. This lack of consistency is due in part to the variety of purposes served by the sheets. Those that are primarily instructional, such as the “Water Management Construction Details” fact sheet, present best practices and, thus,

would not discuss disadvantages of the practice. However, they could highlight difficulties of implementing the practices or measures and discuss the costs.

Accuracy and Objectivity

Overall, we found the information in the fact sheets to be accurate. In a few cases, however, the information appeared to be incomplete or to misplace some of the emphasis. For example, “Wall Systems” did not point out the lack of experienced builders as a disadvantage of using structural insulated panel (SIP) construction. From our knowledge of this construction technology, only a few builders are experienced constructing with SIPs and many conventional builders are reluctant to change to an unfamiliar technology.

By and large we found the information to be presented objectively. There were a few cases, however, where the text appeared to editorialize or sound like industry advocacy. Of the sheets reviewed, we found this to occur most frequently in the “Wall Systems” fact sheet, perhaps because it was the only one that explicitly compared different technologies.

Usefulness

The usefulness of the fact sheets varied. As noted above, most provided introductory material rather than very technical or detailed information. From our review, we believe the fact sheets would be most useful to users who wanted to obtain basic information about a technology or process and either stop there or identify sources that would provide more details. The sheets generally do a good job of identifying additional information sources.

We believe that the lack of a consistent format, purpose, and type of contents, however, limits the usefulness of the sheets. Presenting cost information in each fact sheet would be useful to users who wanted to make initial assessments of the cost implications of different green building approaches. These differences among the sheets make it difficult for the user to know in advance whether a specific fact sheet would be useful to meet their needs.

Recommendations

Based on our review of these five fact sheets, we offer several recommendations for improving them and increasing their usefulness.

The sheets should be more standardized in terms of format and content. For fact sheets that provide information on different green and standard building practices and products, the relative advantages and disadvantages of each should be presented. Although not applicable to all topics, most fact sheets should provide relevant cost information since costs are a significant concern to both the demand and supply side of the green building market.

It would be useful to organize the fact sheets by category so that users would have a better idea about the focus of the sheets. Categories could be defined in different ways; for example, they might be based on the function of the sheet such as educational, design practices, performance characteristics, or comparative. Another categorization scheme might be by building component

or practice; another might be by building impact area such as energy, water, air quality, etc. Another useful way to categorize the fact sheets would be in terms of the expertise required or type of audience for which it is designed.

We believe the fact sheets could benefit from more extensive use of formats other than standard text. Those with drawings illustrating construction practices or equipment types can be very effective at conveying information that words alone do not communicate well.

Finally, the section “For more information” should be designed in all cases to ensure that the reader will be able to find more detail and technical information, if desired, by pursuing the sources listed.

12. Ask an Expert Consultations

The Green Resource Center (GRC), one of the Program partners, provides technical assistance and training on a variety of green building topics, with the mission of building the market for green products and services. A key aspect of these technical support efforts is the GRC's Ask an Expert Program, which provides free telephone, e-mail, or in-person consultations to building professionals and the general public in the nine-county San Francisco Bay Area.

Quantec designed a web-based survey to gauge user satisfaction with Ask an Expert, including quality and thoroughness of information and timeliness of responses. Additionally, respondents were asked to rate their pre-existing level of green building knowledge, their perceptions of various barriers to adoption of green building products and practices, and how effective Ask an Expert was in overcoming the barriers.

This chapter summarizes the results of online surveys conducted with a sample of people who have received Ask an Expert consultations. Beginning on October 29, 2004, recipients of Ask an Expert consultations were sent a follow-up email asking for their feedback via the online survey. These email survey requests were sent out on a rolling basis, approximately every three weeks. People who had used Ask an Expert up to 60 days prior to October 29, 2004, were also sent a follow-up email if they had provided email contact information. There were approximately 296 such prior users, most of whom had attended large Bay Area events.

Through November 2005, 2,521 total Ask an Expert consultations had taken place. Since the survey went online, approximately 1,639 consultations have taken place and, to date, 280 surveys have been completed.

Results

When asked to describe themselves, survey respondents placed themselves in the following categories:

- Homeowner/renter²⁶ 150
- Building professional²⁷ 81
- Other²⁸ 49

Knowledge of Green Products and Practices

Ask an Expert users were asked to rate their pre-existing knowledge and understanding of green products and practices. Their ratings were on a 1 to 5 scale, with 1 being "None at all" and 5 being "Extensive." Users of this service tended to be fairly knowledgeable about green buildings.

²⁶ Category includes single family home and duplex owners.

²⁷ Building professionals include building/design professionals, contractors, product suppliers, and product manufacturers.

²⁸ Other" includes students, government employees, non-profit employees, and "other."

Most respondents (68%) rated their knowledge as “Extensive” or “Better than average.” Only 24 (8%) rated their knowledge as “Below average” or “None at all.” The overall average rating was 3.77. Among homeowners/renters, the average rating was 3.66 and the building professionals’ average was a little higher at 3.79. Table 12 shows the distribution of the responses.²⁹

Table 12. Pre-Existing Knowledge of Green Building by Ask an Expert Users

Rating	Respondents	Percent
5 Extensive	52	19%
4 Better than average	134	49%
3 About average	64	24%
2 Below average	21	7%
1 None at all	3	1%
Average rating = 3.77		

When asked how much Ask an Expert expanded their knowledge and understanding of green products and practices, 81% of respondents answered either “Significantly” or “Somewhat,” with only 10% saying “A little” and 4% saying “Not at all.” On this 1 to 4 scale, the overall average rating was 3.25 out of a possible 4.0, with the homeowner/renter average being 3.34 and the building professional average being 3.01. Table 13 shows the breakdown of these responses.

Table 13. Green Building Knowledge Enhancement as a Result of Using Ask an Expert

Rating	Respondents	Percent
4 Yes, Significantly	116	42%
3 Yes, Somewhat	107	39%
2 Yes, A little	27	10%
1 Not at all	12	4%
Not applicable	12	4%
Average rating = 3.25		

Effectiveness of Ask an Expert

Users of Ask an Expert were asked to rate the effectiveness of the service in three areas. Their ratings were on a 1 to 4 scale, with 1 being “Not at all effective” and 4 being “Very effective.” The average ratings appear in Table 14.

²⁹ Some respondents did not answer every survey question; average ratings are provided based on given responses.

Table 14. Effectiveness of Ask an Expert

	Overall*	Homeowners/Renters	Building Professionals
How effective was Ask an Expert at...			
Providing the requested information?	3.72	3.75	3.68
Answering your question in a timely manner?	3.74	3.81	3.64
Thoroughness of information?	3.69	3.74	3.56
*Overall average rating includes "other" respondents, which are not shown in table. Note: Ratings are based on a 4-point scale with 1="Not at all effective" and 4="Very effective."			

On the whole, users gave the effectiveness of Ask an Expert high ratings, with the overall average ratings falling between "Very effective" and "Somewhat effective" in all three categories. When asked about future use, 260 people said they would use the service again, two (2) respondents (one homeowner and one building professional) said they would not, and 11 respondents did not know. Seven people did not provide a response. When asked about recommending the service to a friend or colleague, 260 said that they would, 12 people did not know if they would, two (2) said that they would not recommend the service, and six (6) did not respond.

Perceptions of Barriers

Users were asked about their perceptions of market barriers to adoption of green building products and services and the effects of Ask an Expert. On a 4-point scale, respondents rated the significance of various barriers and the effectiveness of Ask an Expert in overcoming them. Average ratings are displayed in Table 15. Ratings are broken down to display overall perceptions as well as the perceptions of building professionals and homeowners/renters.

The results show that, for the combined group of Ask an Expert users, the most significant barriers to adoption of green products and practices are "Lack of awareness and knowledge about green products or practices" (3.65) and "Uncertainty about performance, cost, or time required to apply green products or practices" (3.57). Ratings of these barriers did not differ significantly between homeowners and building professionals.

Homeowners/renters gave "Difficulty finding green products or experienced practitioners" a relatively high average rating of 3.49. The homeowners/renters felt that Ask an Expert was most effective at addressing the "Difficulty finding green products" and "Lack of awareness and knowledge about green products or practices" barriers, giving them an average rating of 3.33 and 3.25, respectively. Homeowners/renters gave Ask an Expert a relatively high rating for significance and effectiveness at addressing the barrier for "Lack of unbiased information about green products or services"(3.29, 3.20). The rating for this category suggests that homeowners/renters see the service as an objective, unbiased source of information. Homeowners saw "Cost of green products and practices" as a somewhat significant barrier, but gave Ask an Expert a relatively low effectiveness rating for this barrier (2.53).

Table 15. Perceptions of Market Barriers to Adoption of Green Building Practices/Products and Effectiveness of Ask an Expert

Market Barriers	All Respondents		Homeowners		Building Professionals	
	Average Significance Rating	Average Effectiveness Rating	Average Significance Rating	Average Effectiveness Rating	Average Significance Rating	Average Effectiveness Rating
Lack of awareness and knowledge about green products or practices	3.65	3.18	3.64	3.25	3.64	2.95
Difficulty finding green products or experienced practitioners	3.43	3.22	3.49	3.33	3.34	3.02
Uncertainty about performance, cost, or time required to apply green products or practices	3.57	2.89	3.55	2.96	3.56	2.60
Cost of green products and practices	3.32	2.56	3.34	2.53	3.27	2.45
<i>For building professionals only</i>						
Added coordination required during design and construction	--	--	--	--	3.18	2.58
Need to change how design/construction are done	--	--	--	--	3.06	2.62
Reduced profit margin	--	--	--	--	2.69	2.16
Confusion or conflicts with local codes	--	--	--	--	2.67	2.13
<i>For homebuyers, homeowners, renters only</i>						
Lack of knowledge about possible health, comfort, environmental, and other benefits	--	--	3.41	3.15	--	--
Lack of unbiased information about green products or services	--	--	3.29	3.20	--	--
Note: All ratings are based on a 1 to 4 point scale. Higher ratings on barrier significance indicate the barrier was perceived to be more significant. Higher ratings on Ask an Expert effectiveness indicate the service was considered to be more effective at reducing the barrier.						

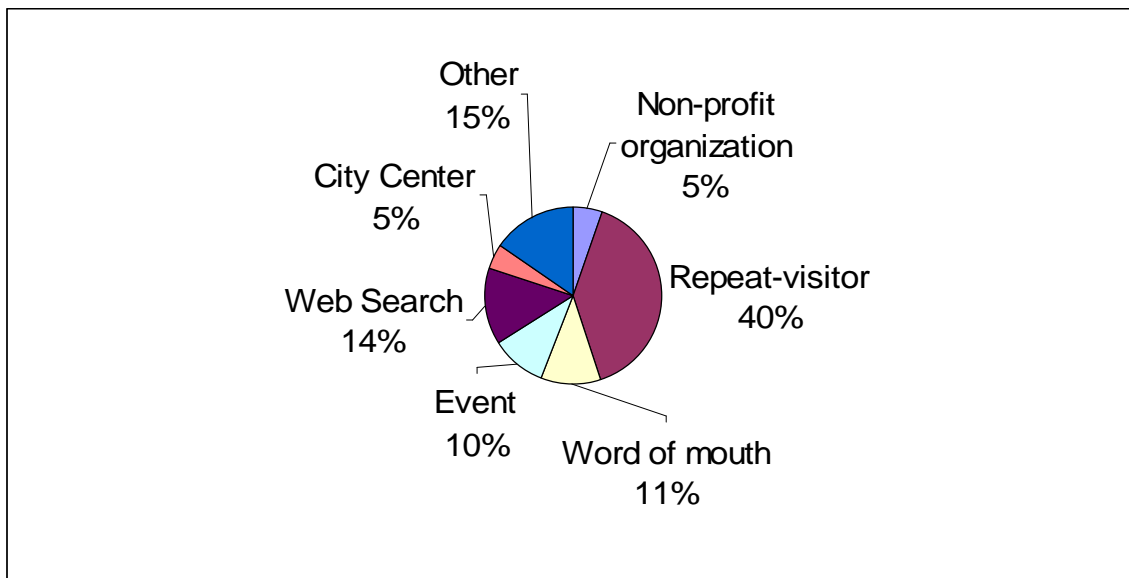
Building professionals rated the significance of most barriers about the same that the homeowners/renters did. This group felt that Ask an Expert was most effective in overcoming the barriers “Difficulty finding green products” (3.02) and “Lack of awareness” (2.95). Of the barriers building professionals alone were asked to assess, “Added coordination required during design and construction” (3.18) and “Need to change how design/construction are done” (3.06) were rated as the most significant. Ask an Expert received average ratings for effectiveness at

addressing both of these barriers (2.58, 2.62). Of all the barriers they were asked to rate, building professionals gave “Confusion or conflicts with building code” (2.67) and “Reduced profit margin” (2.69) the lowest average significance ratings and gave Ask an Expert a low average effectiveness rating for overcoming these barriers (2.13, 2.16).

How Users Heard about Ask an Expert

Figure 20 shows the breakdown of how users heard about Ask an Expert, showing that most people are either repeat-visitors (40%) or found the service through either a web search (14%) or word-of-mouth (11%). The remaining respondents learned of Ask an Expert through various sources such as non-profit organizations, their city center permit office, attending an event, and other (newspaper, brochures and friends).

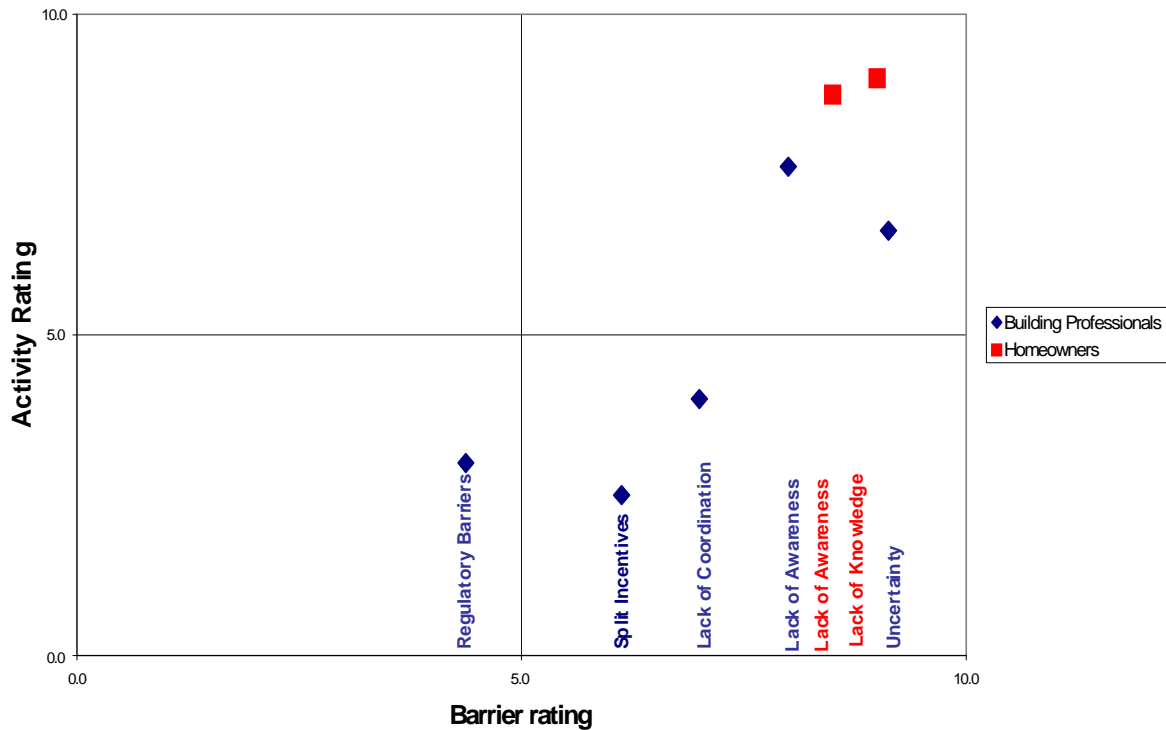
Figure 20. How Users Heard About Ask an Expert



Comparison with Implementers’ Assessment

During the initial phase of our overall evaluation, Program implementers were asked for their ratings of the significance of market barriers to building professionals and homeowners, and how effective they thought Ask an Expert would be at addressing these barriers. Figure 21 illustrates the ratings that Program implementers gave during this exercise using a 0 to 10 scale. “Barrier Rating” corresponds to the average rating of the barrier’s significance to the given market group, and “Activity Rating” represents the implementers’ average rating of how effective they thought Ask an Expert would be at addressing each barrier for the two groups.

Figure 21. Implementers’ Significance Ratings of Barriers for Builders/Developers and Homeowners and Effect of Ask an Expert Consultations



As Figure 21 shows, Program implementers were asked to comment on Ask an Expert’s effect in addressing five market barriers facing building professionals and two market barriers for homeowners. These initial ratings show that the implementers thought “Lack of awareness” and “Lack of knowledge” would both be significant barriers for homeowners, and “Lack of awareness” and “Uncertainty about performance” would be the major barriers for building professionals. The results from our analysis of Ask an Expert feedback are largely consistent with the implementers’ initial expectations.

The initial rating exercise did not ask the implementers to rate Ask an Expert’s expected effect on the homeowner “Uncertainty” barrier, which also received a high significance rating from the homeowners in our survey. The homeowners’ ratings indicated that Ask an Expert has been somewhat effective at overcoming this barrier.

This figure shows that the implementers thought that Ask an Expert would be more effective at reducing the major barriers faced by homeowners than building professionals. This is consistent with the survey results presented in Table 15. The barriers that the implementers considered to be less significant for building professionals are consistent with the ratings from our survey.

Summary and Implications

Overall, Ask an Expert received high ratings for providing the requested information in a timely and thorough manner. Average ratings across all respondents fell between 4 (“Very effective”) and 3 (“Somewhat effective”) in the three effectiveness categories. While most (81%) of the respondents felt that Ask an Expert expanded their knowledge of green building “Significantly”

or “Somewhat,” the average homeowner/renter’s rating was higher than the average professional’s rating, at 3.23 and 2.70, respectively, on a 4-point scale. This slight difference in perception may be attributable to a higher level of pre-existing green building knowledge the building professionals had.

Both building professionals and homeowners/renters consider “Lack of awareness/knowledge” and “Uncertainty about performance, cost or time” to be the most significant barriers to the more widespread adoption of green building practices. While homeowners/renters felt that Ask an Expert effectively helps to overcome the “Lack of awareness/knowledge” barrier, they rated the service as less effective at overcoming the “Uncertainty” and “Cost” barriers. This finding suggests that one way the service could be improved to meet a key user need would be to explore ways in which the information provided about the cost, performance, and time to implement green building products and practices could be enhanced.

The results indicate that Ask an Expert is particularly effective at providing technical support and expanding the green building knowledge of homeowners. Both homeowners and building professionals were very satisfied with the quality and timeliness of the information provided by Ask an Expert. With the exception of “Uncertainty” and “Cost of green products,” users see the service as very effective at addressing those market barriers perceived to be most significant. Given the relatively high significance rating homeowners/renters gave the “Lack of knowledge about possible health and other benefits” barrier, it could be useful to enhance this component of the information provided by Ask an Expert.

Ask an Expert was seen as an unbiased source of information by homeowners responding to this survey. This suggests that the service is effectively helping to overcome this homeowner market barrier and, therefore, should work to maintain its objectivity.

Our comparison of the implementers’ initial rating results and the user ratings suggested that the implementers’ perceptions were quite accurate. In addition, it appears that Ask an Expert is doing a good job overall at matching its focus on those market barriers that are of most concern to its users.

In conclusion, the survey results indicate that Ask an Expert is an effective service, with strong overall effectiveness ratings. Ninety-three percent of respondents said they would recommend the service to friends or colleagues and the same percent said they would use it again. The support services provided by Ask an Expert appear to be very useful to homeowners/renters, and only slightly less useful to building professionals in expanding their knowledge of green building products and services.

13. Implementer Interview

This chapter presents the information collected from an interview we conducted with the Program Manager. The purposes of the interview were to discuss the program theory, clarify any issues about Program implementation, obtain his insights about how the Program was implemented and its accomplishment, and get his views about the continuing need for the Program.

Program Theory

The Program Manager saw the underlying theory of the Program as the implementation of a suite of strategies to make homes green. He believed that the key to the Program was the deployment of a package of activities designed to engage building professionals (the supply side) and the public (demand side). The Program was built around the core approach of providing information to change the market; no financial incentives were delivered through the Program. Information was provided through training and education of professionals and buyers. Another cornerstone of the strategy was to identify and utilize leveraging of local governments.

The internal focus of the Program was to build capacity to deliver green building services. Key components of the capacity were the Green Resource Center and Built It Green, the two non-profit organizations integral to the Program.

The underlying precept was that the Program could be most effective by reaching demand-side actors at the time they were making decisions. Trying to reach the public through broadcast messaging was not considered to be a cost effective option, so the objective was to maximize influence by delivering to self-selected professionals the information and knowledge they needed to reach self-selected buyers during decision-making so, in effect, “they come to us” rather than trying to reach buyers through more dispersed general information approaches.

The program theory evolved some from the original Program concept, but the broad strokes had not changed. Over time, it was possible to get a better idea of what worked and what did not. The Program Manager felt that the capacity to deliver green building information, technology, and products increased dramatically over what was available when the Program began.

One aspect that evolved was a shift in focus. Originally, the strategy was to rely heavily on working with local governments to design and implement government programs. Success doing this was mixed, however. Consequently, the focus on local government as change agents declined. The focus shifted to an emphasis placed more directly on informing the contractors and the public. The involvement with local governments shifted more to developing closer collaboration among these entities. In part, this increased the consistency across jurisdictions so that both green building suppliers and buyers found fewer differences when they crossed jurisdictional boundaries.

One outcome of the Program that enhanced collaboration among jurisdictions was the support provided to the Public Agency Council. This group helped develop consistent green building

guidelines that made the process seamless across different geographic areas and exemplified the value of collaboration. One county was able to provide significant funding to the Council and this gave it more clout and influence. Frontier was able to share information among jurisdictions about what kinds of approaches worked and didn't work, and the information their Program provided helped the champions within local governments be more effective advocates for green building policies and programs. Ultimately, about 45 local agencies in the Program area became involved and the degree of leveraging of local government participation was beyond what was predicted. Now, the Program's reliance on local governments has increased once again.

Green Building Barriers

The green building barriers are discussed below. The Program Manager provided his views on each of the barriers and an assessment of the effectiveness of the Program in addressing them. Those on the supply side are discussed first, followed by the demand-side barriers.

Supply-Side Barriers

Lack of information was still considered to be a significant barrier on the supply side. There is an abundance of technical information and data that builders, remodelers, and other suppliers need to understand to be in the green building market. The Program Manager believed that the Ask an Expert service had been very effective at tackling this barrier. The Green Remodelers Guild, which Build It Green helped create, was another channel through which technical information was being provided in conjunction with the Program. About 45 workshops were conducted under the Program to provide green building information to the professional community.

Risk aversion was handled by the Program primarily by providing suppliers examples of how green building could be done successfully. The Program shared information about success stories, including those in the affordable housing sector and in the remodeling market.

Organizational practices continued to be a challenging barrier. These include the tendency for builders and others to want to stick with the way they have been doing things and work with the same subcontractors and suppliers they have traditionally. These practices can get in the way of trying something new such as green building products and approaches. The Program particularly encountered this barrier with production and large builders. One strategy that made some headway with this barrier was identifying and working with green building champions within organizations and providing them the technical support they needed to make the case for green building within their organization.

Regulatory barriers were addressed by the Program through efforts working with local governments. These issues were not as difficult in the affordable housing sector as originally anticipated. The Program Manager observed that there were exogenous changes occurring, such as the use of energy efficient utility allowances in low-income housing, that were helping to expand green building in the affordable housing market.

The Program Manager felt that one of the biggest barriers was *split incentives*, and the Program had started to make major strides to remedy this barrier. This barrier was fully recognized in the

2004-05 Program and led to the incorporation of a plan in the proposed 2006-08 Program to develop a residential green building rating system. In fact, the prototype system was included in building inspector training conducted in 2005 and the implementers also worked with builders to set the stage for the system. It is being designed to be compatible with LEED, but simpler to implement. It will develop a green building brand that builders and others can market that should create market value and allay builders' concerns about potential added costs of green homes. In addition to these efforts, the Build It Green team, in conjunction with the Program, set up a real estate council to work with lenders on how to identify green building and recognize their benefits within their practices.

Demand-Side Barriers

Although *lack of consumer awareness* continued to be a significant barrier, the Program Manager felt there were very strong signs that the Program and other activities were eroding this barrier. Calls to the Ask an Expert hotline were one example of greatly increased awareness about green buildings; calls had increased from about 15/month early in the Program to 150 to 200/month. The Program actively promoted Ask an Expert at public events, through local governments, and in all Program literature. Following the approach of getting to consumers through industry professionals, more than 400 had been reached through Build It Green's efforts. Increasing consumer awareness utilized very little mass marketing, relying instead on "guerilla marketing and free PR."

Inseparability of product features continued to be a barrier, and the Program Manager felt there was little that could be done through the Program to alleviate this barrier.

Asymmetric information was considered initially to be a likely impediment to consumers embracing green building features. However, the Program Manager pointed to the success of the remodelers noting, "I am surprised at how successful remodelers have been [doing green remodeling], but their business depends a lot on word-of-mouth and a green remodeler who does good work benefits from their customer telling others." He also felt that the green remodeler certification, which was already under development by Build It Green when the Program started, had been a help in overcoming the asymmetric information barrier. He also expected the rating system to help when it was in effect.

Program Challenges

In the view of the Program Manager, the biggest challenge the Program faced was somewhat ironic—the momentum of green building had grown quickly and substantially and this created the opportunities for "green washing." As more and more professionals wanted to get on the bandwagon, the problem of developing consistency in defining what was green and maintaining credibility was becoming serious and confronted the Program with difficulties in insulating their efforts from threats of green washing.

Some challenges that faced the Program were internal. These typically involved the large number of players participating in the Program and the difficulties of matching the expertise and capabilities of the team members to the roles they needed to play.

Major Accomplishments

The Program Manager believed that the Program had achieved significant accomplishments. He characterized the major success as building capacity that did not exist before to support the green home market. This was achieved through the efforts described earlier with local governments, real estate agents, remodelers, and especially the Public Agency Council. These accomplishments set the stage for the explicit focus on and support of councils representing different components of the market in the Program beginning in 2006. The Program Manager pointed to the creation of a 12-person staff, 7 councils, a green home rating system, and the existence of 500 trained professionals and over 1,500 people who had attended green home tours as measures of success for the Program on the eve of the start of the 2006 Program.

Another accomplishment was the shifting of resources to address issues that came to be seen as highest priorities. The adaptive management approach used in the Program permitted the implementers to make productive changes when certain components were determined to be especially important or effective and others were discovered to not be working very effectively.

The overall accomplishment has been the creation of a network of partners and partnerships committed to supporting green building. An indirect measure of the Program's accomplishments, the Program Manager noted, were the number of volunteer hours that dedicated supporters put in. In addition, the Program succeeded in leveraging support beyond the funds provided by the CPUC so that, for example, about half the funding for Build It Green is now coming from other sources.

The Program Manager also noted that many measures of the Program's accomplishments were not likely to be recorded through the evaluation design originally planned for this Program. These included the frequency of contacts the Program team received about the Program and green buildings, the types of calls they received, and the extent to which green building outside of the Program area had been influenced by the Program. The Program Manager felt that these types of impacts needed to be documented in future evaluations.

Lessons Learned and Recommendations

Although the Program did make some mid-course adjustments, there were some changes that the Program Manager would have liked to make earlier and some that were not made. As noted earlier, the capabilities of some team members (subcontractors) did not match well what they were required to deliver for the Program. The Program Manager felt the Program could have been more effective if changes had been made in the team. The Point-of-Purchase displays were not as effective as anticipated originally and they were eventually deemphasized. In retrospect, it appeared that they did not do a very good job of bringing the green building suppliers to the Program and that the more effective approach would be to have the materials available to support suppliers when they came to the Program looking for materials to promote green products and practices.

A key recommendation from the Program Manager, based on experience with the Program, is to develop supporting information about the benefits of green buildings that can be used to bring more players to the table. He saw green building as an activity that cuts across the mandates of

many different resource agencies and organizations such as energy, water, and the environment. This makes it especially challenging to get the support to implement an effective green building program because the benefits are so diverse and not well quantified. Even energy benefits are difficult to count completely because many are indirect, for example through the reduced water treatment or water pumping requirements associated with green buildings. In 2006, the Program was at a point where quantification of these other benefits was starting to be feasible; the California Energy Commission, for example, was beginning a study to estimate the energy benefits from reducing water consumption. The Program Manager recommended further efforts to quantify the broader range of green building benefits and use the findings to help secure funding for green building programs and to promote green building to the public and building professionals.

Program Renewal and On-going Need

As suggested earlier, the Program has been renewed in the PG&E service area for the next funding cycle. Changes that are being implemented include more support for the stakeholder councils, reduced production of fact sheets, fewer in-depth workshops, and development of a green product database.

In the Program Manager's view, there is an on-going need for the Program: "We are not anywhere near a sustainable construction industry; the need is as great as ever."

14. Conclusions and Recommendations

This chapter presents the conclusions from our EM&V study of this Program and recommendations for ways the Program could have been or could be improved in the future.

Observations about the Study Approach

Study Challenges

The Program presented significant challenges for this study for several reasons. First, the Program was designed to be multifaceted in terms of the market segments targeted and the types of activities conducted. This required our evaluation approach to consist of many separate data collection and analysis efforts.

Second, the Program evolved over the two years it was implemented. This evolution was intentional because the Program adjusted to the feedback received from its activities and the participants. For our study, this meant that the original study design was a nominal approach that had to be adjusted as the Program evolved.

Third, the Program intentionally leveraged the efforts of many other organizations, individuals, and programs. This was a benefit to the Program because it allowed the Program funding to have a much larger influence than if the Program were conducted in isolation. The consequences for the evaluation were that it was not always possible to identify a clear link between the Program's activities and outcomes, and it was not even possible in many cases to define exactly what contribution the Program made to a specific activity or service that was delivered in conjunction with other programs.

Fourth, the Program did not lend itself well to researching the differences between groups of participants and non-participants. This was in part because, as noted above, the distinction between the Program and other programs and activities was not well defined—recipients of Program services often did not know they were delivered through Frontier's efforts. In addition, many individuals or organizations identified as non-participants with respect to one Program activity were participants in other Program activities or services. These factors all made it difficult to make comparisons between a control group and participants.

Some of these issues were anticipated when the original EM&V plan was developed. It was difficult, however, to anticipate how much the approach would have to evolve over time. In addition, these study challenges taxed our ability to conduct an adequately comprehensive analysis and the funding limit set on the study proved to be a severe constraint that required the authors to expend considerably more resources than were allocated for the project.

Study Adaptation and Innovation

In the interest of meeting the requirements established by the CPUC, Quantec identified a research approach relying on primarily process evaluation techniques to assess the different

Program elements. From the outset, we identified with the implementers the discrete Program activities and services. In all cases, we obtained the perspectives of participants and their assessment of the Program elements. When it was possible, we identified non-participants and characterized their knowledge of the Program, attitudes, and perceptions. We employed written evaluation sheets, telephone interviews, and web-based data collection to compile study data.

The most innovative technique used in this study was an application of simplified pattern-matching. This technique was a cornerstone of our approach for testing the program theory. It also provided the foundation for our data collection approach. Using pattern-matching led us to define from the beginning what the Program implementers saw as the barriers that the Program would tackle and what role each Program activity and service was intended to play in mitigating those barriers.

The simplified pattern-matching approach proved to be a very effective way to assess the expectations of the implementers and provide feedback on the success of the Program. The application in this study was limited by the budget constraints, but we believe the technique demonstrated its usefulness. Even though our application of the technique was limited and was a challenge given the complexity of this Program, we believe it should be considered in future evaluations as a way to clearly assess how closely the program theory was realized in actual implementation.

Study Findings and Conclusions

The findings and conclusions from our study are presented in accordance with the CPUC Policy Manual in terms of evaluation goals (listed earlier in Table 3). Given the nature of this Program, our study focused primarily on accomplishing those goals related to assessing the effectiveness of the Program and its performance.

Market Assessment and Baseline Analysis

Frontier's market assessment conducted for its 2002-'03 Program provided a sound summary of the status of the green building market conditions in California prior to the 2004-'06 Program. Based on our study, we believe Frontier effectively used the information from this assessment to design its Program to address the most critical market needs and target its activities.

Frontier's assessment identified that there had been an explosion of interest in green building in recent years, but that only a limited number of programs had been implemented to address this market need. At the national level, the most effective activities were those conducted by the USGBC and its LEED rating system was gaining visibility and currency as the standard method for rating green buildings. However, there was no residential version of LEED when the 2004 Program started and this led to the involvement of the Program in the development of a local residential rating system. The Program was able to build upon the expertise of key contributors to the Austin Energy Green Building Program who joined the Program team. The Austin program was a national leader in local green building programs.

Frontier drew upon and supplemented existing information on Northern California local green building programs to get a good understanding of the market and market needs. Table 16 summarizes the status of green building programs in 35 cities and counties in the region. Nearly one-fourth of the local jurisdictions had undertaken no activities. About half were in the earliest stages of developing a program and no mature programs were in place.

Table 16. Local Green Building Program Status

	No Activities	Introduction or Concept Stage	Building Support	Program Planning	Tools Development	Program Implementation	Market Outreach	Maturation
No. of Cities or Counties	9	8	9	1	1	3	3	0

Frontier’s assessment identified the clear need for assistance to local jurisdictions seeking to develop a program. It also identified the barriers on both the supply and demand sides of the market and helped Frontier design the activities that the Program could implement to address these barriers.

Ongoing Feedback and Guidance

Throughout this study we maintained close contact with the Program implementers to track Program progress and provide feedback. One step that was instituted to ensure that the implementers received timely feedback was to prepare and submit memoranda summarizing our findings from each of our research activities. These memoranda were the basis for several of the chapters in this report.

We did find it difficult to monitor the changes in the Program as they occurred. This was largely a result of the fact that the Program evolved considerably over time as new elements were added or existing ones were modified. This posed additional requirements for resources that we needed to commit to the study and, given the resource limitations on our effort, this made it challenging to cover all aspects of the Program as comprehensively as we had intended to originally.

Effectiveness and Test of Program Theory

Program Effectiveness

We assessed the effectiveness of the Program by conducting data collection and analysis efforts focused on individual Program components. As noted earlier, we had to adjust these activities as the Program evolved. The following discussions summarize our findings by Program activity.

Point-of-Purchase Displays

Our assessment of the POP displays occurred early in the Program and found that the displays at retail outlets were not as effective as desired. Few of the customers interviewed at the stores had seen the displays.

Several interviewees did offer suggestions for how the POPs could be made more effective including providing actual green product samples in the displays and comparing them directly with conventional products, targeting customers who had the most influence on decisions, and installing the displays at permitting offices instead of stores. The retailers suggested that the Program increase its efforts with them to provide direct education to customers. Partly in response to our findings, the Program reduced the POP effort at retailers and increased the presence at various sites such as permitting offices.

In-Depth Consultations

Builders and developers from organizations receiving in-depth consultation services said the services included job-site walkthroughs, assistance assessing products and process, assistance developing and rating green building goals, and design and financial incentive assistance. Participants who took advantage of these services tended to have some knowledge of green buildings; those who did not use the service were most likely ones who had either no knowledge or a lot of knowledge about green building. Based on the responses of interviewed participants, the Program did a very good job delivering these services. Most respondents said the service significantly increased their green building knowledge. One of the major benefits noted by participants was the networking opportunities that came out of the consultations.

The only area in which the consultations did not receive high ratings was in helping participants identify green products. Our interviews also revealed that, probably in part due to the Program, the availability of green building practitioners improved considerably during the course of the Program.

Half-Day Workshops

The two workshops we assessed attracted primarily supply-side market actors. Most of these participants were already fairly familiar with green building practices. Participants were seeking mostly information on costs, financing, products, and practices; the workshops received high ratings for meeting these needs. Although most of the attendees were already somewhat knowledgeable about green building, most said that the workshops did increase their knowledge of building green.

The most common comment about ways to improve the workshops involved increasing the coverage of the topics either by increasing the depth or expanding the time dedicated to the topic.

Community Events

One of the main way consumers (i.e., the demand side of the market) were reached was through community events. The typical participant was already somewhat familiar with green building. From the participants' survey responses, many came to the events seeking information about specific products or practices.

The events received high ratings for answering questions about specific products. They also did a good job of communicating to participants that green building required careful upfront planning and coordination of the design and building process. The events received very high marks, on the

average, for increasing attendees' knowledge of green buildings. Furthermore, participants reported that the events were very effective at encouraging them to use green practices and products in the future. As with most of the other activities, participants rated the knowledge and professionalism of the implementers very highly.

Inspector Training

Our review of the inspector training materials showed that the materials were well presented, well-targeted, and useful. Given the importance of educating building inspectors, we believe it would be useful to broaden the distribution of these materials beyond training sessions.

Feedback from training participants was consistent with our assessment of the training materials—participants gave the training session high ratings in all areas. One substantive suggestion was to include a project site inspection in the course.

Support to GAHC and Local Governments

Providing assistance to the affordable housing community and local governments was a key objective of the Program. Based on our interviews of GAHC members who had received assistance in conjunction with the Program, it had done a good job of increasing their knowledge of green affordable housing opportunities and increasing their willingness to pursue green options. Similar to the responses from other market actors, several respondents indicated that a benefit of the Program was the networking that occurred. Based on our assessment, it appeared that green building barriers facing the affordable housing developers had diminished somewhat over the course of the Program.

Feedback from local governments receiving Program assistance also demonstrated that the assistance was valued. The Public Agency Council (supported in part by the Program) was cited as an especially beneficial resource. Despite the efforts of the Program, however, some local governments still have not moved ahead on developing green building programs and a need remains to find ways to help such jurisdictions do so with the expenditure of minimum resources.

Green Home Tour

The green home tour appeared to be a very effective way to increase consumer awareness and knowledge of green buildings. Even though most participants said their knowledge of green building was already better than average, the tour also attracted a sizable group of homeowners who had very little knowledge of green building.

Based on survey responses, we believe the opportunity for participants to talk to green building owners and builders is very effective. Overall, the tour appeared to be a very constructive way to inform participants about green building, allay concerns, and get leads on products and practitioners.

Case Studies and Fact Sheets

Case studies are inherently limited by competing constraints to be concise enough to be read by a large audience, but detailed enough to be sufficiently informative. The two case studies reviewed for the Program struck a good balance of meeting these opposing needs. Overall, the quality of the information was good and the presentation was effective. Two additions could make the studies even more effective: an extended project contact list and consistent cost and financial information.

The fact sheets face similar constraints although they have more latitude because they focus on a single topic area. Fact sheets can be very useful if the information they present is sufficiently detailed, technical, and objective. In general, the Program fact sheets meet these criteria. They do vary, however, in their structure and content and we believe this detracts from their usability. Their usefulness also could be improved by consistently presenting direct links to the best resources available on each topic.

Ask an Expert

The Ask-an-Expert consultation service provided in conjunction with the Program is a key resource that assists a wide range of users. Most tend to have at least some knowledge of green building so the service is being used by people who are beyond the need for general knowledge about green building.

The service is doing a very good job of meeting users' needs as evidenced by the ratings it received. The ratings from building professionals were slightly lower than those of homeowners, but they were still quite high. Users perceive the service to be an objective source of information about green buildings so this is a very important aspect that helps overcome some of the potential concerns about the availability of unbiased information in this market.

Test of Program Theory

We used the simplified pattern-matching approach to compare the program theory developed through our initial rating exercise with implementers with findings from our surveys and interviews of various market groups. The scope of our study limited our data collection somewhat so we had to combine our responses for the following groups:

- Builders, developers, remodelers, contractors
- Affordable housing developers
- Homebuyers/renters

Comparison of Barrier Significance Ratings

We compared how significant the implementers thought various green building barriers were to different market actors with how significant those market actors indicated the barriers were.

Figure 22 compares how the implementers and builders, developers, remodelers, and contractors rated the significance of several green building barriers. "Difficulty finding experienced

practitioners” was not rated by the implementers and is not shown; this was the second most significant barrier according to the professionals interviewed. The ratings were similar for the implementers and the industry professionals. One difference was the very high significance of uncertainty as a barrier that the implementers expected compared to the assessment of the professionals.

Figure 22. Significance of Barriers to Builders, Developers, Remodelers, Contractors

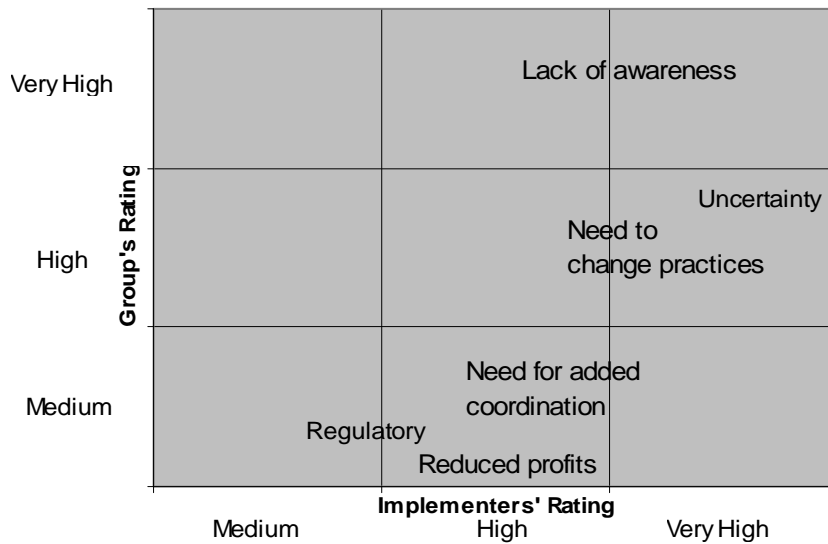


Figure 23 shows the same information for affordable housing developers. Not all the same barriers were rated by the implementers and developers; for the three that were rated by both groups the perceptions of the implementers agreed well with the views of the professionals.

Figure 24 compares how the implementers rated barriers for homebuyers to how the buyers themselves rated these barriers. The figure shows that the implementers’ ratings agreed well with the views of the buyers.

Figure 23. Significance of Barriers to Affordable Housing Developers

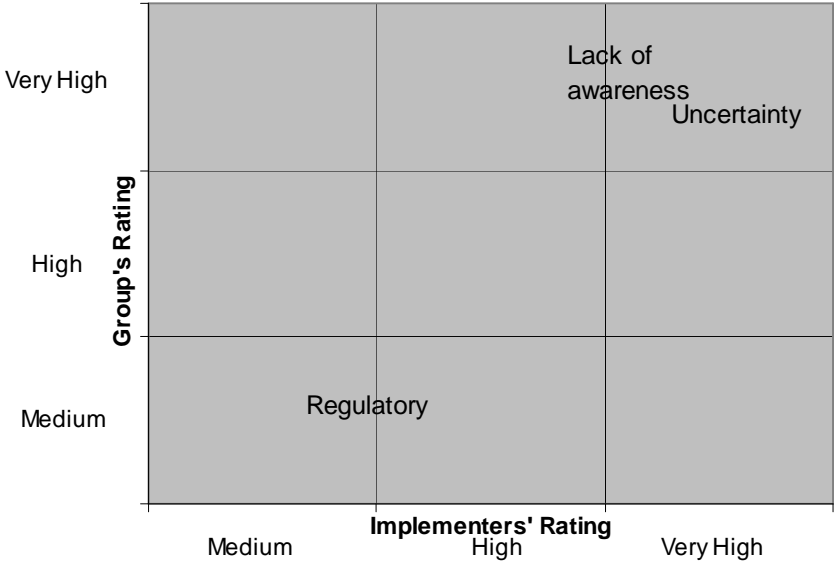
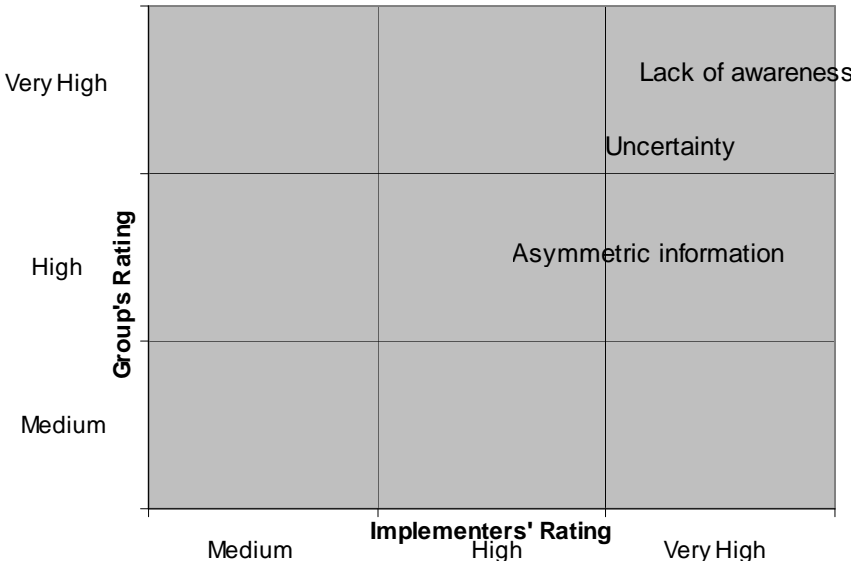


Figure 24. Significance of Barriers to Homebuyers



Comparison of Program Effectiveness

We were able to test the program theory in part by also examining the assessments of how different Program activities affected the barriers faced by different market actors. We were able to compare how the implementers and two broad target groups rated the expected effectiveness of the following Program activities:

- In-depth consultations
- Green home tour
- Ask an Expert

The two groups for which we had sufficient data to compare the implementers' expectations with the observations of the groups were the builders/developers/remodelers/contractors group and homebuyers. Table 17 shows how the implementers' ratings of the effectiveness of three Program activities compared with the ratings of the former group. In all but one case where it was possible to make a comparison, the implementers rated the effectiveness the same as the participants did. The only difference was in how much the green home tour would affect the "lack of coordination" barrier. The implementers felt the tour would have a larger effect on helping overcome this barrier than these professionals said it did.

Table 17. Implementers' Estimate of Effectiveness Compared to Builders, Developers, Remodelers, Contractors

Program Activity	Barrier					
	Uncertainty	Organizational Practices	Lack of Awareness	Lack of Coordination	Split Incentives	Regulatory
In-depth consultations	Same	Same	Same	Same	Same	NC
Green home tour	NC	NC	NC	More	NC	NC
Ask an Expert	Same	Same	Same	Same	NC	Same

Table 18 presents the same type of information for homebuyers. In the case of the home tour and Ask-an-Expert service, the implementers' expectations about the effectiveness of these Program elements matched the ratings given by the homebuyers who participated.

Table 18. Implementers' Estimate of Effectiveness Compared to Homebuyers

Program Activity	Barrier	
	Uncertainty	Lack of Awareness
Green home tour	Same	Same
Ask an Expert	Same	Same

Assessment of Program Theory

Based on these two types of comparisons we have concluded that the program theory proposed by the implementers matched quite closely the actual functioning of the Program. The barriers anticipated by the implementers were basically consistent with those experienced by the various market actors. Similarly, the activities and services delivered by the Program were about as effective at addressing these barriers as the implementers expected when designing the Program.

Our conclusion about how well the program theory matched reality, however, must be tempered somewhat. Data collection, sample sizes, and the scope of the study did not permit a comprehensive review of all the Program activities, barriers, and Program effects. Consequently, there are several gaps in the comparisons presented above. Nevertheless, for those cases where we were able to make direct comparisons, the program theory matched the empirical data from our study and confirmed the theory.

Levels of Performance and Success

The findings presented above showed that most of the Program activities and services performed well in terms of meeting the needs of the targeted market actors. The one Program component that our assessment found was not very effective, the retailer POPs, was identified early in the Program and the implementers scaled it back and redirected the displays to other sites where they were more effective.

The Program did a good job overall of leveraging and building upon other programs. It was able to make effective use of the resources and expertise available through other programs and thus multiply the effects it could achieve with only the funds provided through the Program.

The Program also was successfully modified as new needs were identified. Consequently, opportunities were not missed because of rigidities in the Program design or implementation.

There were two related areas, however, in which we believe the Program suffered from how it was implemented. The Program probably could have been even more successful if the design had been more strategic. The initial pattern-matching exercise conducted with the implementers revealed the underlying program theory and strategy; it was unclear, however, whether all the implementation team members had a consistent view of the overall Program goals and strategy. From our perspective, the Program efforts were diluted somewhat because so many different activities were supported directly or indirectly by the Program. If the design and implementation had been more strategic, the efforts could have been more focused and cohesive.

In a similar way, the contributions of the Program were hard to identify because there was little branding of the Program's services or activities. This posed a challenge for the evaluation since most respondents we interviewed were unaware of Frontier's role and the source of funding. As the Program evolved, the Build It Green name became more associated with the efforts and it became a recognizable product. We believe the Program could have been even more successful

if it had been possible to have a consistent “brand name” from the beginning with which participants could have identified its services and activities.

Continuing Need for the Program

There is considerable evidence that the need for this type of program continues to exist. Those homebuyers, building professionals, and government representatives who took advantage of the various services offered by the Program tended to be those who already had at least some knowledge about green building. There are many more individuals on the supply and, especially, the demand side of the housing market who have only limited awareness of green building.

The market barriers that the Program addressed remain. In addition to the limited awareness and knowledge about green buildings, the uncertainties about the performance and cost of building green are still prevalent in the market. Program fact sheets, case studies, and technical information and consultations helped address these barriers with those individuals who participated in the Program. However, widespread dissemination of this type of information and services is still needed.

The number of green building practitioners and access to green products grew during the course of the Program. One of the most effective things this Program has done is contribute to the infrastructure and networks needed to support green building. Yet, this infrastructure is still in the growth phase and needs continued support to become self sustaining.

Recommendations

We present several recommendations for ways in which this Program could have been modified to increase its effectiveness or future programs could be implemented to increase their success.

As noted above, there were two overarching improvements that we believe could have increased the effectiveness of the Program. In the first area, we recommend that a more strategic approach be implemented from the beginning in which the desired outcomes are identified; all team members are made aware of these desired outcomes and buy into them; and a limited set of activities and services are defined that will be produce these outcomes. The Program did establish objectives and a strategy for accomplishing them, but we believe more concentration on specific activities would have been helpful.

In the second area, we recommend more uniform and visible branding of the Program. As this Program evolved, the linkages to Build It Green increased and this became the recognizable brand for the Program’s activities. We believe that this brought more cohesion to the message and made it easier for consumers and professionals alike to seek out the services provided by the Program. We are not suggesting that the Program should have been branded as “The Frontier Green Building Program,” but that having a clear and consistent identity would benefit similar programs in the future.

Information collected from participants in various Program activities and recipients of Program services indicated that most already had some understanding of green building. To increase overall effectiveness, it is important to reach both consumers and suppliers who have little or no

knowledge and understanding of green building. On the demand side, the home tour we assessed did draw a significant proportion of homebuyers who had very little knowledge of green buildings. Consequently, we recommend that the home tours be continued and that they be publicized as much as possible to encourage the participation of less knowledgeable homebuyers. In addition, it would be productive to provide tour participants with materials describing other services available through the Program, contact names, websites, etc.

On the supply side, efforts also should be increased to inform less knowledgeable professionals about green building and the Program offerings. One way would be to work with retailers who serve primarily contractors and builders to design and implement in-store demonstrations and workshops on green building. Another way would be to widely disseminate case studies about actual projects highlighting the products used, the economics, code issues, and other topics of special interest to suppliers most uncertain about building green.

One of the barriers that numerous respondents identified was the lack of information about green products. We believe it will be useful to increase the availability of this type of information through the Program and provide it through multiple channels.³⁰

The focus on inspector training was important and our review of the training materials and feedback from attendees was positive. To enhance this component of the Program we recommend that the materials be disseminated beyond the course attendees and that a project site inspection be included in future courses.

To improve the case studies we recommend that they include an extended project contact list and provide consistent cost and financial information. We believe the fact sheets could be made more effective by increasing the consistency of their structure and content, and by consistently presenting direct links to the best resources available on each topic.

Because of the important role that local governments have played in the adoption of green building practices, the Program should continue to seek ways to influence additional local governments to adopt green building policies and implement programs. Continued assistance with the development of model ordinances and other tools that can reduce the effort required to implement green building programs is one approach that should be emphasized. Providing assistance to the Public Agency Council has been effective in the past and this organization provides a useful channel for promoting local government involvement.

The Program's efforts with the GAHC were well received. Because of the special needs of affordable housing and the special opportunities in this market sector, we believe it is important to continue such activities, particularly those that promote networking among affordable housing developers and organizations.

³⁰ We note that the Build It Green website now provides a link to a comprehensive product database assembled in conjunction with the Alameda County Waste Management Authority.