

Commercial Sector Initiative: BetterBricks Training and Advising Services

Market Progress Evaluation Report

prepared by

Research Into Action, Inc.

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Final Report

**MARKET PROGRESS EVALUATION REPORT:
COMMERCIAL SECTOR INITIATIVE
BETTERBRICKS TRAINING AND ADVISING SERVICES**

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EXECUTIVE SUMMARY

The Northwest Energy Efficiency Alliance (the Alliance) is a non-profit corporation supported by Bonneville Power Administration, electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services the market norm.¹

This document is the first market progress evaluation report (MPER) on the Commercial Sector Initiative BetterBricks Training and Advising Services and covers the period from January 2003 to August 2004. The Commercial Sector Initiative (CSI) includes a variety of activities: BetterBricks marketing and communication, the training and advising services discussed in this report, a variety of tools and services being developed for the commercial market, and several services for targeted market sectors.

The BetterBricks Training and Advising Services (BetterBricks Technical Services) include the training and technical support services offered under the umbrella of the CSI and the BetterBricks label. These services are targeted to architects and engineers involved in designing new commercial buildings in the states of Idaho, Montana, Oregon and Washington. There are six different organizations that offer these services; each has its own contract and statement of work. The six organizations and the services they provide are:

- The Lighting Design Lab – *Training and Advice*
- The Seattle Daylighting Lab – *Advice and Training*
- The Eugene/Portland Daylighting Lab – *Advice and Training*
- The Idaho Daylighting Lab – *Advice and Training*
- Putnam-Price Group – *BetterBricks Training*
- BetterBricks Advisors – *Advice*

¹ See website at www.nwalliance.org.

Executive Summary

This MPER provides an assessment of the degree to which the BetterBricks Technical Services are meeting the goals and objectives set forth for them by the Alliance as part of the CSI Strategy. Two specific objectives of the MPER are:

1. To assess the overall progress of the program towards stated goals and to provide recommendations for program improvement.
2. To provide information on changes in the market indicative of market transformation related to program influences.

In order to address these objectives, we conducted interviews with each of the BetterBricks Technical Services contractors. We found all of the contractors to be enthusiastic about the work they are doing for the Alliance and to feel confident that they understand the goals and objectives of their efforts. They all also feel uncertain about the Alliance's goals and objectives for BetterBricks, for CSI and for the manner in which the contractors should work together.

To better understand response to the program services, we surveyed 115 participants in BetterBricks training and workshops and found that, generally, training participants were highly satisfied with their experiences, with more than 80% rating the trainings a four or five on a five-point scale.

We also surveyed 70 recipients of BetterBricks advising services, the majority of whom were architects. Fully 71% of respondents stated that the advice provided to them *did* have an effect on the project, with Daylighting Lab respondents reporting the greatest incidence of such influence (83%). Overall satisfaction with program services was high, with 95% of respondents rating the services they received as either a four or a five on a five-point scale.

We also reviewed the BetterBricks Advisors database and reviewed in detail a sample of 20 completed projects to determine whether those who received advice changed their designs or design practices and whether there were measurable energy savings associated with these projects. The findings from this research strongly support the premise that the BetterBricks Advising and Training Services are effective. They are well received by the target audience and the participants report that the training and advising services have influenced their design practice. For the reviewed sample of fifteen BetterBricks completed projects, we found evidence that 60% of the projects have been affected by the recommendations provided by the advisors; energy savings can potentially be estimated for 40% of the sampled projects.

The degree of market transformation achieved by these services was not examined at this time. No effort was made to contact nonparticipants and it was not possible to ascertain the exact number of people influenced by the BetterBricks Technical Services due to irregularities in the way information is tracked in the BetterBricks Advisors database.

The following conclusions and recommendations result from these findings:

Conclusion 1: The BetterBricks Technical Services are providing desired and useful services to the Pacific Northwest design community, resulting in real changes to building designs.

Eighty-two percent of participants say that training affected their practice and 53% say they applied the information they received to specific projects. Based on the experience of the trainers, advisors and participants, there can be little doubt that these services are desired and useful to the design community; this is further corroborated in the evaluability assessment interviews with people who have completed projects .

Recommendation 1: Continue to support the BetterBricks Technical Services and to refine and clarify the its vision.

Conclusion 2: The Alliance contractors feel that the Alliance treats them each as a provider of a single service that is not integrated with CSI, BetterBricks marketing, or the other Technical Services.

The contractors have no consistent contact at the Alliance, they do not know what each other is doing, they would like consistency in technical terms and applications across the different services, and they feel that the marketing efforts of the Alliance are not integrated with their activities.

Recommendation 2: The Alliance should assign a single staff person to oversee and manage the Technical Services contracts and activities and to closely coordinate the Technical Services with other CSI activities such as marketing, BetterBricks tools and products, and market segments. Also, technical service contracts should specify and

provide funding for the level and type of coordination expected with other contractors.

Conclusion 3: Even with the addition of a staff person to oversee the Technical Services, there are three questions that remain to be addressed:

A. What is the vision for BetterBricks Technical Services in CSI?

Recommendation 3A: The Alliance should clearly articulate the role the Technical Service contractors are expected to play in CSI. In particular, it should clarify whether the contractors are part of the CSI team, involved with the design and development of the program, or if they are acting purely as service contractors working on a project-by-project basis using Alliance funds.

B. What is the role of energy efficiency and conservation in the messages communicated by BetterBricks Technical Services?

C. What is the role of energy efficiency and conservation in the desired outcomes from the BetterBricks Technical Services?

These two other issues are connected by topic but very distinct in application.

Recommendation 3B/C: The Alliance should clearly separate its expectations for these two topics. Despite the fact that the Alliance's organizational goals require it to seek energy savings, the Technical Service's contractors have never been contractually required or even strongly urged to ensure that their projects result in direct energy savings. Adding to this lack of emphasis on savings is that many of the marketing messages that the Alliance has developed for the contractors have emphasized non-energy benefits. While there is strong evidence from other research that non-energy benefits can be used to attract people to do projects that result in energy savings, **it is important to make sure the contractors know**

that energy savings are the desired outcome and to make it a contractual goal.

Conclusion 4: The purpose of the BetterBricks Advisors database has never been fully determined by the Alliance; consequently, the Alliance has never been able to communicate its importance to the contractors.

Not surprisingly, this has resulted in it not being accepted equally by all of the BetterBricks Technical Services contractors. All of the contractors are now putting some data into the BetterBricks Advisors database; however, it is incomplete and does not appear to be updated on a consistent basis. At the same time, some of the contractors' own databases are not maintained well, suggesting a general discomfort with databases. Conversations with the contractors confirm this and also suggest that for those that do use it, the BetterBricks Advisors database is effective for their own purposes. If the Alliance wishes to use the database to track progress in the market and to potentially estimate savings generated, the database needs to be a reliable data-capturing tool.

***Recommendation 4:* The Alliance must decide what purposes the database should serve, ensure that its functionality supports those purposes, and then require all contractors to use the database for all projects.** Contractors should be involved in the development process to ensure that their concerns are addressed and that they feel committed to using the database.

Conclusion 5: Energy savings are occurring for a substantial percentage of projects.

The evaluability assessment of 15 projects in the BetterBricks Advisors database found that nine had likely effects and that savings could likely be measured for 6 of the 9. These savings can be estimated for many of the projects with minimal changes to the current program or database.

Recommendation 5: The evaluability assessment results should be used to help modify the database and should be addressed in contract revisions to ensure that necessary information to estimate energy savings is captured.

Conclusion 6: The BetterBricks Advisors' clients indicated somewhat lower satisfaction than the training and other advisors' clients.

The evaluability review and the review of responses to the questions about BetterBricks Advising Services lead us to believe that the BetterBricks Advisors have lower satisfaction results, not because of any problems with their skills or approach, but largely because their services have been intentionally limited by the Alliance. The Daylighting Labs are able to provide advising services for as long as a client desires, clear through to project completion. The BetterBricks Advisors, on the other hand, are contractually limited in how much they can offer. The evaluability study found that the lack of long-term involvement by the BetterBricks Advisors appears to lead to lower up-take of recommendations as compared to the Daylighting Lab advisors.

Recommendation 6: There should be consistency in what BetterBricks Advisors offer. To have the most impact, consider permitting both advisor categories—BetterBricks Advisors and those for the Daylighting Labs—to provide services from early pre-design through construction in order to facilitate greater adoption of their recommendations.

Conclusion 7: The BetterBricks Technical Service providers are concerned that since their services are primarily targeted to architects, there will be limited opportunities for these services to reach the mechanical engineers so important to some of the target markets.

There are significant opportunities for energy savings in hospitals, health care, grocery stores and offices that can best be addressed by mechanical engineers. Engineers are not participating in the BetterBricks training at the same rate as architects, nor are there any training courses specifically

targeted to mechanical engineers. Additionally, prior evaluation research of the Seattle BetterBricks Daylighting Lab found that information given to project architects was not being passed on to project engineers.

Recommendation 7: Develop more training and advising services that specifically target mechanical engineers.

1. INTRODUCTION

The Northwest Energy Efficiency Alliance (the Alliance) is a non-profit corporation supported by Bonneville Power Administration, electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services the market norm.²

This document is the first market progress evaluation report (MPER) on the Commercial Sector Initiative BetterBricks Training and Advising Services (BetterBricks Technical Services). The report covers the period from January 2003 to August 2004. The Commercial Sector Initiative (CSI) includes a variety of activities: BetterBricks marketing and communication, the training and advising services discussed in this report, a variety of tools and services being developed for the commercial market (such as Building Performance Services and Commercial Windows Initiative), and services for targeted market sectors such as hospitals, grocery stores and schools.

PROGRAM DESCRIPTION

The BetterBricks Training and Advising Services (BetterBricks Technical Services) include the training and technical support services offered under the umbrella of the CSI and the BetterBricks label. These services are targeted to architects and engineers involved in designing new commercial buildings in the states of Idaho, Montana, Oregon and Washington. There are six different organizations that offer these services; each has its own contract and statement of work. The six organizations and the services they provide are:

- The Lighting Design Lab – *Training and Advice*
- The Seattle Daylighting Lab – *Advice and Training*
- The Eugene/Portland Daylighting Lab – *Advice and Training*

² See website at www.nwalliance.org.

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- The Idaho Daylighting Lab – *Advice and Training*
- Putnam-Price Group – *BetterBricks Training*
- BetterBricks Advisors – *Advice*

This MPER provides an assessment of the degree to which the BetterBricks Technical Services are meeting the goals and objectives set forth for them by the Alliance in the CSI strategy.³ The strategy document envisions the BetterBricks Technical Services as building the skills and capabilities in the market of those who seek to design and construct facilities consistent with the BetterBricks concept of high performance buildings; they are promoted by the betterbricks.com website and BetterBricks collateral materials.

A Brief Discussion of Terms

As noted above, the BetterBricks Technical Services provide building designers, owners, architects and builders with training or advice that can improve the energy efficiency of their building projects.

Training is typically offered in a classroom or auditorium type of setting with participants listening to presentations from experts. The training workshops offered by the Lighting Design Lab and the BetterBricks Training Services often have a fully articulated curriculum associated with the workshop, along with handouts or workbooks for the participants to take with them.

Advice and consultations offered by the Lighting Design Lab and the daylighting labs are called advice in this report and are offered by advisors. Advice typically addresses some combination of lighting systems, mechanical systems and glazing. Retrofits, remodels and new construction projects qualify for the BetterBricks Technical Services advice. Experienced professionals give the advice without charge. The program provides these services to persons in Oregon, Washington, Idaho and Montana.

The BetterBricks Advisors, when referred to specifically, are designated with a capital *Advisors*; when referring to daylighting advisors or to all advisors collectively, a lower case *advisors* is used.

³ The CSI strategy was approved by the Board of Directors in October 2003.

MPER METHODOLOGY

The MPER documents the evaluation research conducted to assess the BetterBricks Technical Services. The objectives of the research conducted are:

1. To provide timely, reliable and actionable information to support the Alliance's adaptive management approach;
2. To assess the overall progress of the program toward stated goals and to provide recommendations for program improvement; and
3. To provide information on changes in the market indicative of market transformation related to program influences.

To address these objectives, this evaluation was conducted using a multi-faceted methodology. This included interviews with Alliance CSI staff, interviews with the BetterBricks Technical Services contractors, surveys of recipients of BetterBricks Technical Services, an assessment of the BetterBricks Technical Services database, and an assessment of the impact evaluability of a sample of projects that received BetterBricks Technical Services advice.

Interviews and Surveys

The purpose of our interviews with Alliance and BetterBricks Technical Services contract staff is both to assess the progress of the program and to identify how the program is influencing the market.

Table 1-1 provides a summary of the interviews planned and completed for the MPER. We did not conduct interviews with Putnam-Price Group consultants or with additional staff at the Seattle Lighting Design Lab when it became apparent that they have little involvement in the BetterBricks Technical Services design or implementation. Four BetterBricks Advisors and one Seattle Lighting Design Lab staff member were interviewed as part of the evaluability assessment.

The interview data were largely qualitative and thus were analyzed by comparing and contrasting points of view to develop a consensual perspective of the BetterBricks Technical Services and market response. The survey data were both qualitative and quantitative. Where possible, counts and frequencies were developed and comparisons made across different types of participants.

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Table 1-1
PROGRAM STAFF INTERVIEWS

PROGRAM	POPULATION	PLANNED	COMPLETED	APPROACH
Seattle Lighting Design Lab	5 Staff	4	2	In-Person
Daylighting Labs	3 Staff	3	2	In-Person
BetterBricks Advisors	1 Manager	1	1	In-Person
BetterBricks Advisors	12 Consultants	6	4	Phone or In-Person
Putnam-Price Group	2 Managers	2	2	In-Person
Putnam-Price Group	8 Consultants	4	0	
TOTAL	33	21	11	

The purpose of the interviews with program participants was to assess their response to the program services and also to understand how the market is using these services and whether they are influencing practices in the market. Table 1-2 displays the population and sampling results for the BetterBricks Technical Services participant interviews after a review of the BetterBricks Advisors database.

We developed interview guides and survey instruments for each of these groups. The guides were reviewed by the Alliance and comments were incorporated into the final versions. Copies of these guides are provided in Appendix A.

Table 1-2
POPULATION ASSUMPTIONS FOR PROGRAM PARTICIPANTS

SERVICE	TIME PERIOD COVERED	POPULATION	SAMPLE FOR 2004	APPROACH
Projects Database - Daylighting	January 2003- January 2004	94	30	Phone Interview
BetterBricks Advisors	January 2002- January 2004	42	16	Phone Interview
LDL Projects (Consultations)	January 2003- January 2004	97	20	Phone Interview
LDL Training	January 2003- January 2004	294	50	Phone Survey
BetterBricks Training	January 2003- January 2004	Workshops: 522 Roundtables: 378	Workshops: 45 Roundtables: 20	Phone Survey
TOTAL		1,427	181	

Database Analysis and Evaluability Assessment

The database analysis was used to address questions of program progress. The analysis sought to sort projects into categories by type of service provided, by type of recipient and by location, and to use these data to describe the accomplishments of the BetterBricks Technical Services.

An evaluability assessment is used to determine whether sufficient data are present and whether the data are robust enough for an evaluation to be warranted. In this case, the evaluability assessment focused on whether sufficient data were present or could readily be obtained to conduct an impact evaluation of BetterBricks Advice Services. In the long run, an impact evaluation, if feasible, could be used to estimate a range for the energy savings resulting from the market changes generated by the program services.

To conduct the evaluability assessment, we began with the database assessment. We identified all projects noted as completed as of August 2004. Completed in this case refers to the provision of advice services, not the completed construction of a project. Sixty projects met this criterion, of which 50 included technical solutions. From these 50 projects, we selected 20 for

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detailed review. The chapter on the database assessment and evaluability assessment details the approach taken in the analysis.

REPORT CONTENT

This MPER includes six chapters following this introduction. Chapter 2 discusses the history of BetterBricks Technical Services and reviews the findings from a previous MPER that addressed a portion of these services. Chapter 3 presents the results of interviews with Alliance and BetterBricks Technical Services contract staff about implementation of the services. Chapter 4 presents the results of the database analysis and the results of the evaluability assessment, and Chapters 5 and 6 present the results of the surveys with participants. Chapter 7 provides a summary of the findings from the evaluation efforts, as well as our conclusions and recommendations.

2. BETTERBRICKS TECHNICAL SERVICES

This chapter presents a history of the BetterBricks Technical Services, provides an assessment of accomplishments to date based on an analysis of the database and reviews the findings from the MPER for the daylighting labs.

BETTERBRICKS TECHNICAL SERVICES PROJECT HISTORY

The BetterBricks Technical Services project emerged from a history of experience with market transformation efforts in the commercial sector. The first efforts were launched in 1996 and 1997; the Commercial Buildings Initiative and then the Commercial Sector Initiative followed these efforts.

Early Commercial Sector Market Transformation Efforts

The Alliance initiated its first projects in 1996 and 1997. Among these first projects were a variety of commercial initiatives including: EZ-Sim, Northwest Lighting On-Line, Lighting Design Lab, Energy Ideas Clearinghouse, Building Operator Certification, Architecture + Energy, Commissioning In Public Buildings and the Building Commissioning Association. Together, these projects expended approximately \$13 million between 1996 and 1999, the first three years of Alliance funding.

Efficient Building Practices Initiative (EBPI)

The most ambitious commercial sector effort in the first five years of the Alliance was the Efficient Building Practices Initiative (EBPI). The EBPI's origins lie in the Alliance's early work in energy codes. In 1997, some members of the Alliance Board of Directors were frustrated with the rate of adoption of efficiency practices in the new commercial sector. The Alliance contracted with Heshong-Mahone Group⁴ to develop a long-term strategy for energy codes in

⁴ Heshong-Mahone Group. (1998) *Long Term Strategy for Energy Code Support in the Northwest*. E98-009. Northwest Energy Efficiency Alliance. Portland, OR.

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order to have a more comprehensive policy. Out of this strategy emerged the basic elements that became the EBPI in 1999.

With a budget of \$5 million in 1999 and \$2.7 million in 2000, the EPBI's dual objectives were to support and enhance energy codes in the region, as well as to create demand in the market for efficient buildings. In order to accomplish these goals, The EBPI included multiple elements:

1. A baseline measurement of construction practices across the region (to be repeated periodically as a progress measurement);
2. Transition of state code support programs from previous BPA funding to new market models;
3. Seed funding for self-sustaining code support activities;
4. A state-specific special code support project fund;
5. An advisory committee of market participants; and
6. A regional public information campaign to promote the benefits of efficient buildings.

This last element led to the launch of the BetterBricks.com project, a marketing campaign designed to build demand for more efficient buildings by promoting these facilities as highly desirable and productive places to work. The BetterBricks marketing effort was targeted at a mass media audience and relied on television advertising to direct people to the BetterBricks.com website.

Alliance staff reporting directly to a steering committee made up of Alliance Board members managed the EBPI project. Project development and funding decisions were approved by the steering committee and staff worked with the contractors hired to implement the strategy.

Commercial Buildings Initiative Planning Process

The original EBPI project was funded through July of 2001, thus requiring a decision by the Board sometime in the spring of 2001 on whether to continue operating the project. In the fall of 2000, the steering committee for the EBPI project began planning for this renewal process by starting work on what was called the Commercial Buildings Initiative (CBI). In the meantime, a number of

the other Alliance commercial sector projects were also facing renewal and Board approval for continued operations through 2004.

Largely due to these other project renewals, it became apparent that it did not make sense to address each of these projects on a case-by-case basis. Hence, the EBPI steering committee began to think in terms of a strategy that would encompass the entire commercial sector. Because of this change in scope, the EBPI Committee began holding joint meetings with the Alliance Board Portfolio Committee beginning January of 2001.

The purpose of this joint planning effort was to establish a long-term strategy for Alliance market transformation activities in commercial sector markets. The goals of this strategy were to:

- Provide a framework for planning, development and implementation of new activities, as well as providing direction for existing projects;
- Capture the synergies from coordination across individual projects and program elements, resulting in greater market impact than the simple sum of the individual projects; and
- Assist in allocation of Alliance financial and staffing resources for the commercial sector project.

Commercial Sector Market Research

The CBI planning process drew from the experience gained from the EBPI, as well as market research that was available either from other sources or as a result of Alliance research efforts. These included:

- **Long-Term Code Strategy for Energy Codes in the Northwest** – This is the document that launched EBPI. As part of the work to develop a long-term code strategy, interviews were conducted with market actors across four states, with emphasis on code enforcement, compliance and interactions with the design and construction community.
- **Baseline New Construction Survey** – As part of the EBPI, a survey was conducted with a statistically valid sample of the primary elements affecting energy use in new commercial and residential buildings in each of the four states.

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- **Market Actor Focus Groups** – As part of the BetterBricks project, the marketing contractor conducted a series of focus groups with market actors to determine the market understanding/appeal of a variety of messages related to energy efficiency.
- **Daylighting Impact Studies** – Completed in California, these studies found significant, statistically defensible, positive impacts on the rates of learning for schools and on sales volume for retail spaces of buildings incorporating daylighting in their designs.
- **Market Transformation Potential in the Commercial Office Sector** – This study, jointly funded in California and the Northwest, helped to further understanding of the interactions between market actors in this sector and developed some key theories about how this market works.
- **Market Progress Evaluation Report for the EBPI** – This effort evaluated both the progress of individual pieces of the EBPI and the interactions between the elements. In the course of this effort, the evaluators interviewed large numbers of actors on both the supply and demand side (as defined by the EBPI).

Taken together, these studies provided the key principles to guide the development of the new commercial strategy:

- **Efficiency must be connected to market values.** Energy efficiency by itself generates very little interest in the market. Hence, if efficiency is to be marketed successfully to this sector, it must be embedded in products and services that deliver other benefits that the market intrinsically values.
- **Distinguishing market actors as “demand” or “supply” side is not useful or relevant.** The EBPI MPER found that the use of a classical economic model of “supply-side” and “demand-side” was not appropriate in this market. Depending on the particular project and decision being made, individual market actors may be on either side of the fence, as exemplified by architects who supply design services while at the same time are representing the owners’ interests to vendors and contractors.

- **Market actors often deal with both new and existing buildings; there is a need to look at interventions across the entire building life-cycle.**
- **Relationship-based marketing is more effective than general advertising.** A key component of the original BetterBricks.com effort was an assumption that a marketing effort targeted at general users of buildings could influence the decision-makers in this sector. The evaluation findings brought this assumption into question, indicating that most decision-makers rely almost solely on trusted relationships for obtaining advice and information when considering new projects or changes to existing processes.
- **The commercial buildings market is complex, requiring an approach to intervention that matches that complexity.** This sector is made up of many different actors that are linked together in many different ways, depending on the specific building project or property involved. Previous approaches to this market have tended to shy away from this complexity and instead focused on one or two approaches such as prescriptive upgrades. This left significant efficiency opportunities in areas that required integration of efficient design or retrofit into the standard business process. To capture this large opportunity requires reaching all of the actors that have influence over a particular project decision.
- **To create sustained change, efficiency must become part of the standard processes for development/operation in commercial buildings.** Commercial buildings are ultimately viewed as investments and must therefore provide a return on the investment made by the developers of the buildings. To reduce risk for the investors, commercial buildings are constructed and operated using a set of standardized processes for design, construction and management. While some innovation is allowed on individual projects, for changes such as energy efficiency upgrades to be sustained, they must ultimately become part of the market's standard business practices.
- **Market decision-makers must develop an institutionalized demand for efficiency.** In theory, this should be the logical response to connecting efficiency to market values. However, market transformation theory, as well as program experience, suggests that there are specific steps that need to be targeted to specific actors to make this a reality. These steps move market actors toward

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permanent adoption of a practice by taking them from awareness, to interest, to exploration, to commitment to institutionalization.

Based on the above guiding principles, four goals were developed for the commercial sector:

1. Increase the awareness of, and build demand for energy efficiency in terms the market understands and values.
2. Develop and disseminate information to market decision-makers that is credible, reliable and useful.
3. Standardize energy efficiency as part of the normal practices within the market.
4. Build and maintain the capability to deliver efficient products and services in the marketplace.

Implementation Model

Given the difficulty in easily comprehending the complex relationships that are associated with the comprehensive approach developed under CBI, Alliance staff developed the following conceptual model (see Figure 2-1), based on a classic Greek temple, as a tool for describing the implementation elements and the relationships between them.

Figure 2-1
IMPLEMENTATION MODEL



The temple model includes cross-market horizontal components as well as vertical components that target specific market segments in the commercial sector. The description below explains the role of each of these components in the program implementation.

Marketing and Communications

In the analogy of the Greek temple, the “roof” that covers the entire Alliance commercial sector is an overarching marketing and communications effort. This element provides the messages to the market that tie the overall effort together with a comprehensive and consistent message. The CBI program continued to use the message originally developed under the BetterBricks effort about creating or maintaining highly productive buildings through the

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implementation of businesses or technologies that have energy efficiency benefits.⁵

Market Connections

The “lintel” or “header” element, serves the vital role of connecting the overarching structural integrity of the roof elements with the supportive structural elements of the pillars. This element works in close contact with the Marketing and Communications element to address key barriers that prevent market actors from successfully acting on a desire or demand created through the marketing effort.

Codes and Standards

The entire weight of any building rests upon the foundation, which creates a level base of support that determines whether the whole structure is both plumb and level. The foundation consists of codes and standards and reflects the importance of these elements to the marketplace.

Efficient Business and Technology Solutions

In between the roof and the foundation of any Greek temple are a series of steps that take the visitor up to the interior or functional area of the temple. The first of these steps is the suite of efficient businesses or technologies that answer the question “What do I do to get one of these buildings?” This element forms the basis for providing business or technology solutions that simultaneously deliver the productivity benefits that are key to the marketing message and the efficiency that is the ultimate goal of the program.

Education, Training and Technical Assistance

To address the increased demand for products and services that would be created by the marketing campaign, there is a need to develop and enhance the

⁵ Productivity is defined here to mean a higher level of output for whatever purpose the building is constructed (e.g., higher net operating income for leased offices, higher rates of learning in schools, and lower handling errors in warehouses, etc.).

supply of these resources in a way that would not initially be supported by the marketplace.

Target Markets

In the traditional temple, the pillars connect the foundational elements and the roof. This is the area that constitutes the markets on which the services are all focused. The temple analogy reflects the principle that the main activity in the program will be focused around selected specific market segments. According to the research, change in this market is very much driven by market leaders taking risks and their success being replicated by market followers. This change occurs primarily within the context of two critical factors. First, the market leaders must be convinced that the innovation will improve their market situation. The research indicates that this convincing is most often successful within the context of trusted relationships with existing market actors. Second, for market followers to act, they must be following an example that is within the context of their market specifics (i.e., office developers look to other office developers for trends, not to grocery stores and vice versa).

Approval of the Commercial Buildings Initiative

In July 2001, the Alliance Board approved funding through 2002 of \$5.825 million for a comprehensive Commercial Buildings Initiative. Several previously approved projects (such as the Lighting Design Lab and Energy Ideas Clearinghouse) were incorporated into the CBI to improve management and coordination of commercial building-related projects and the Alliance Board explicitly recognized that additional projects would be developed and added. Total funding for CBI through 2004 was estimated at \$30 million.

The plan approved in 2001 was largely conceptual and most of the first two years were spent putting individual pieces in place that would later be merged or operated in conjunction with other elements to provide the comprehensive approach proposed by staff. The major hurdle that arose was that some elements of the plan required more development than anticipated, forcing choices that delayed implementation of other budgeted activities. A quick summary of accomplishments relevant to BetterBricks in the first year (2002) included:

- Expansion of daylighting services in Seattle and creation of daylighting labs in Portland and Eugene.

2. BetterBricks Technical Services

- Establishment of a more substantial BetterBricks Advisors service.
- Complete re-working of the BetterBricks.com website.
- Development of a new BetterBricks marketing strategy.

The activities for 2003 built upon the base created in 2002, with increased emphasis on improving market impacts, improving relationships with key allies, and building credibility for BetterBricks activities and services. The Board approved a 2003 operations budget of \$4,637,400.

Commercial Sector Initiative (CSI)

In mid-2003, to acknowledge the wide scope of Alliance commercial sector activities, the Commercial Buildings Initiative was renamed the Commercial Sector Initiative (CSI). In October 2003, the Board approved a third round of funding, this time covering the two-year period of 2004-2005. The plan presented by staff for this period contained a new framework, re-organizing the many pieces of CSI into three areas, which matched the evolving initiative better than the Greek temple model used the first year. Underlying the need for the new framework were several factors:

- The extent of development activities included in commercial sector efforts needed to be explicitly recognized. A large portion of CSI staff time and financial resources must be expended in new product and service development activities, which are critical to laying the groundwork for a full program rollout.
- The impending rollout of “Target Market” activities reshapes and strengthens overall CSI implementation activity. CSI resources needed to be reoriented to serve these strategic objectives.
- Two years of CSI implementation clearly documented the success of some strategies, while also showing that a tighter focus of activities would be beneficial. For example, daylighting support for architects is extremely successful in terms of the number of projects completed, but to move to market transformation success, daylighting has to be better integrated with other early design activities to improve energy efficiency.

The framework for CSI in 2004 and 2005 consists of four areas: target markets; product and service development; market support services; and codes and standards. All of BetterBricks, including the marketing efforts and the training and advisory services which are the focus of this MPER, are contained in the market support services area.

- **Target Markets** – The Alliance Board approved funding for outreach into three target markets: new schools, retail grocery, and hospitals and healthcare. Continued research will identify additional target markets.
- **Product and Service Development** – These activities are focused on developing new products and services. The intention is that the rollout for the new products and services will be, in part, through target market activities. Included are major multi-year development projects funded by the Board (such as Small HVAC, Building Performance Services and Commercial Windows) and a variety of other tasks, including the development of market-specific business rationales and technical tools and services.
- **BetterBricks Market Support Services** – The market support services try to achieve market impacts through behavior changes, ultimately resulting in electrical energy savings. Included in this area are all of the crosscutting market activities that also support the ultimate goals in each of the targeted markets. A portion of the support services, such as the Lighting Design Lab and daylighting advisors, focus on serving the target markets, but BetterBricks support services also continue to advance design practices across the full range of markets. Support services for all markets are identified by the brand BetterBricks. They include activities such as marketing and communication, education and training, and technical assistance.
- **Codes and Standards** – These activities include on-going support and training for state code development. Improving codes is a major market transformation strategy for the commercial sector. Codes successfully “raise the bar” and can eventually incorporate technologies and approaches pursued by the market transformation efforts.

The Alliance is currently planning a CSI renewal proposal for 2006-2008.

PREVIOUS BETTERBRICKS TECHNICAL SERVICES MPERS

This MPER is the first for the BetterBricks Training and Advising Services; however, it follows four MPERS on the Lighting Design Lab. The fourth MPER for the Lighting Design Lab included an assessment of the Seattle Daylighting Lab. It was completed in April 2003.⁶

That MPER found a high degree of satisfaction with the Lighting Design Lab and the Seattle Daylighting Lab. From the inception of the Design Lab in 1998, service usage had shown steady growth, especially in daylighting consultations after the Seattle Daylighting Lab received targeted support from the Alliance.

In 2003, the Lighting Design Lab was completing a new database to replace the original; this was expected to provide a much more effective tool for tracking project activities. The Daylighting Lab was using peer-to-peer marketing and had shown great success with this approach.

Energy savings resulting from electric lighting and daylighting consultations were assumed, but in the case of daylighting, difficult to estimate and in the case of electric lighting, frequently associated with utility contacts or with end-users, so it was difficult to assess the market effects.

The following are the recommendations made by the fourth MPER:

- The Alliance should work with the Labs to develop a Strategic Marketing Plan for the Lighting Design Lab and daylighting labs. The strategic marketing plan should include:
 - Refine the definition of services offered
 - Define a way to screen projects
 - Expand proactive marketing
 - Pursue more customer follow-up
 - Target electrical contractors and engineers

⁶ Energy Market Innovations. (2003) *Lighting Design lab Market Progress Evaluation Report, No. 4*. Report #E03-113. Northwest Energy Efficiency Alliance, Portland, OR.

2. BetterBricks Technical Services

- Develop a truly integrated approach to energy-efficient design to ensure that daylighting, electric lighting and HVAC are integrated.
- Improve information management to integrate the Lighting Design Lab and the Daylighting Lab with other CSI activities.

3. IMPLEMENTATION EXPERIENCE

We conducted interviews with the lead for each of the BetterBricks Technical Services in September and October 2004. A follow-up call to the lead for the BetterBricks Advisor Services in January 2005 (who was recently tasked with coordination for all BetterBricks Technical Services), confirmed that while changes had occurred in the Alliance's organization of CSI and BetterBricks Technical Services, the specific concerns, challenges and successes for each of the services were relatively unchanged since October.

HISTORY AND DESIGN

The BetterBricks Technical Services began as services offered by independent organizations. The Lighting Design Lab had existed for several years before the Alliance was formed and thus had a well-established program before the CBI or CSI were conceived. The daylighting labs began as a part of the Lighting Design Lab, with advising available to the region, but a physical location in Seattle. In 2002, the Alliance contracted with the University of Oregon to provide daylighting consultations in Oregon with physical locations in Portland and Eugene. Then in 2004, the Alliance contracted with the University of Idaho to provide daylighting consultations in Idaho with a location in Boise. In 2003, the Alliance contracted with Putnam-Price Group to develop and conduct training sessions for BetterBricks.

Each of these service providers has their own contract with the Alliance. Each contract specifies certain goals and objectives for the service provider and in the last few years has included the requirement that the services provided be labeled BetterBricks and that they coordinate with other BetterBricks activities.

Perceptions of Goals and Objectives

In talking with the BetterBricks Technical Services providers, it became clear that each of them have a clear sense of what their contract goals and objectives are; however, they all indicated that there is much less certainty about the goals and objectives for BetterBricks Technical Services or for the CSI effort of the Alliance in general and their role as trainers and advisors within the CSI. Their perceptions are discussed in more detail in the following section.

At a general level, all could agree that they are attempting to transform the market for energy efficiency or for the specific issues they advise on. However, there are subtle differences in what this means. Some of the leads believe they are trying to transform design practice to include more daylighting, more natural ventilation and more high quality lighting; others believe they are trying to transform designers' practices to be more energy-efficient and to conserve more energy, not specifically to include daylighting, or natural ventilation, or high quality lighting.⁷ What the contractors report as the goal of BetterBricks indicates that the goals are poorly defined. For some contractors, the Alliance staff has indicated that the health and quality of buildings are the issue, not the energy savings; other contractors clearly feel that energy savings are always the goal, irrespective of other benefits gained.

The BetterBricks Technical Services leads also commented that they are uncertain about the goals and objectives of BetterBricks, generally because the BetterBricks marketing campaign and website do not feel integrated with their activities. The individual services are not mentioned in the marketing materials; the collateral is provided to the BetterBricks Technical Services leads, yet as one commented, "Marketing stuff goes out, but we don't even know what was sent."

Essentially, the contractors mainly understand the requirements of their contract. Asked if the Alliance could do anything to improve their understanding of the goals, one noted, "Not my goals, but I could help them understand their goals." Another noted about the Alliance goals and objectives, "I have yet to see a plan."

This focus on individual contracts led one contractor to feel that there is no need for coordination: "Our focus is on what we need to do to do our job." Yet others note that coordination, communication and having a common purpose with CSI or BetterBricks would help them to clarify what they need to do to better fulfill their individual goals and objectives. Specifically, all of the leads noted that they had concern about what other advisors or educators were doing as part of BetterBricks in order to ensure that they all have a similar message. All but one of the contractors has very serious concerns about this

⁷ The subtlety occurs in the fact that daylighting and high quality lighting can result in increased energy use in some applications, while a focus primarily on energy efficiency would mean that increased energy use might not be an acceptable outcome for the advisor or training activity except in rare situations.

3. Implementation Experience

issue, while the fifth lead has a little bit of concern, but still believes it is important to coordinate.

Recent Accomplishments

When asked about their accomplishments, all of the service leads felt they had accomplished a lot in the past two years. There were specific projects for the daylighting labs and specific firms that had shown changes in their practice and were enthusiastically using advice on projects. Both training leads had succeeded in meeting or exceeding their goals for educating professionals and both envision opportunities to expand their training and workshop programs. Yet, there was uncertainty about whether there was support from the Alliance for the vision and, with limited coordination occurring, no certainty about how to gain support except at the individual contract level.

Specific accomplishments or challenges in 2003:

- The Lighting Design Lab had completed a remodel with support from the Alliance, but at the same time had lost the staffing needed to conduct mock-ups. This reduction in their staffing support led the Lighting Design Lab to be concerned that the Alliance and Lighting Design Lab did not fully understand each other. The Lighting Design Lab also wanted to include integrated design services as part of their offerings.
- The Seattle Daylighting Lab dealt with a major remodel of the Lighting Design Lab, which limited their ability to provide services for seven months, yet they were able to meet all metrics.
- The BetterBricks Advisors had an exciting opportunity to work at very early project stages—pre-design meetings—but they remained reactive due to a limitation from the Alliance to not market services.
- The Oregon Daylighting Lab was effective in working with several firms on very comprehensive design solutions for a variety of energy problems, from lighting to mechanical systems. But they wanted to see more effort on developing products to really help the market solve energy problems: heat exchangers, shade control, etc.

- BetterBricks Training was able to develop courses and expand services, and wanted to see more effort toward offering training to engineers.

ADMINISTRATION AND COMMUNICATION

Program administration (i.e., contractual agreements, determination of metrics and coordination with the Alliance for direction on specific contractual requirements) is going very well for all of the BetterBricks Technical Services contractors. They appreciate the adaptive management approach of the Alliance and feel that they are given the support and the freedom to do their work efforts in a professional manner. As one said, “I think the Alliance gets two to five times what they require from us because of the [flexible] way they manage us.”

As noted above, all of BetterBricks Technical Services contractors find very few problems relative to their contract. However, when asked about direction from the Alliance about BetterBricks or coordination with other BetterBricks Technical Services and with marketing activities, they express the opinion that there is no communication or coordination. At times, the marketing effort is felt to get in front of their efforts to develop the program; and at times, the marketing effort seems to make statements that have not been communicated to them as the service providers. The contractors indicate that they have had limited opportunities to get together and they see courses or workshops being developed by one another that do not seem to use their expertise and they wonder why they were not consulted or included in the process.

The marketing team at the Alliance has experienced a similar lack of coordination, though the marketing lead indicates that efforts have been made to facilitate coordination, with limited effect—the CSI lead either would not support the coordination process, or there was no one to work with to coordinate for the Technical Services, or the Technical Services providers would be unresponsive to efforts to coordinate.

It is not as if coordination and communication are nonexistent. The daylighting labs and the Lighting Design Lab tend to be in touch with each other about projects and activities that might affect each other. For the daylighting labs, this is important because many of the larger firms have offices in multiple locations. There are differences in the approaches taken by the daylighting labs, but they discuss their views and have over time found ways to minimize

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the differences. It is this type of coordination that seems to be lacking in an organized way.

A few examples were noted: one concerned natural ventilation. The Alliance contracted with one contractor to develop a guidebook on natural ventilation, which was subsequently printed and distributed as a BetterBricks resource. Another contractor hired a design firm to develop and teach a course on natural ventilation. Yet these two efforts were not coordinated and this concerned the contractor who had developed the book. The Alliance requested to review the course when it was nearly completed and this concerned the contractor who had developed the class. Neither contractor was aware of a common theme to the design requirements for natural ventilation in BetterBricks buildings; each believes that the approach they took independently should be acceptable to the Alliance, but the Alliance has not established a way to determine if there are differences that need to be resolved and to ensure that terminology and approach is consistent or even similar.

The Advisors on the other hand are reactive and only get involved in projects when called in; thus they experience few conflicts, but the Advisors suspect that this situation means that there are likely many opportunities that never reach them. There is curiosity as to how often the Lighting Design Lab or the BetterBricks training activities lead to advice opportunities. The BetterBricks Advisor lead suspects that their services are not promoted much or that the promotion that does exist is not effective, since their services are not sought very often.

The question the Alliance does not appear to have addressed is whether the BetterBricks Service providers are part of a team or are independent providers who share a common umbrella: BetterBricks.

Most of the BetterBricks Service providers would like to participate in a day-long coordination meeting at least once or twice a year. There is a consensual view among the contractors that at least one meeting a year should be used for the contractors to communicate with one another, not as a vehicle for the Alliance to explain the program to the contractors. The contractors feel a need to discuss what they are doing—to learn what each other is doing and to provide each other with input based on their experience. A couple also suggested a team website that would allow them to understand more about what is going on across all the services.

The contractors each noted that they feel the Alliance has a vision for CSI and BetterBricks but that the vision has not been articulated to them, that they have not been included in the process of developing and expanding the vision, and that the professional expertise of the contractors has been isolated to their contractual activities instead of being integrated into the design, planning and execution of the BetterBricks and CSI vision.

PROGRAM DELIVERY

We talked with the contractors about three specific areas of program delivery: the concepts and changes in practice they are promoting, the resources at their disposal to do their work, and their perceptions of the effect the BetterBricks Technical Services efforts are having on the market.⁸

BetterBricks Technical Services

There are a variety of concepts and practices being promoted by BetterBricks Technical Services; these include integrated design, lighting controls and natural ventilation. Concepts or practices we did not ask about include daylighting, high performance buildings, and energy-efficient lighting and mechanical systems. It was the more recently introduced concepts that the Alliance asked us to probe to determine whether there was confusion or general agreement about their meaning and application in the contractors' services.

To a certain extent, each of the contractors felt they knew the meaning of the concept and specific practices that they felt would be conveyed in their advising services or training courses. Yet, it was also apparent that the contractors did not hold a consistent view that there should be a common meaning. One of the contractors expressed concern that the Alliance should not try to define the terms of natural ventilation and integrated design too much, while two others thought these terms should be commonly understood by the Alliance and the BetterBricks Technical Services contractors and should be discussed and presented by all BetterBricks Technical Services contractors in similar ways.

⁸ The questions included a variety of concepts of markets: the target markets the Alliance has identified and the market for design and construction services for new and existing commercial buildings.

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Lighting controls was only perceived to be an important component of BetterBricks Technical Services when lighting systems were directly addressed and was not considered a primary focus for BetterBricks by most of the contractors unless they addressed lighting. This, in their view, would include training courses not specifically about lighting or controls, or advising situations where the lighting was not targeted by the person asking for advice.

This speaks to the coordination issue discussed above. If the Alliance has a common theme or approach relative to specific technologies or practices, it is not generally being conveyed to the contractors. And to the extent that such a common approach could be developed, the contractors would like to be involved in the development of the approach so that they have comfort that the artfulness of the practices are not lost in the pursuit of specific definitions.

BetterBricks Resources

The contractors all note that they have the minimum resources necessary to fulfill their contracts, yet all see more opportunity. The BetterBricks Advisors would need more resources if their services were actually promoted. The labs are seeing more volume and they can service only a limited number; they wonder how their services should be allocated in the future if they do not have more resources to work with.

The Alliance has mentioned that services should be allocated to three specific target markets—schools, hospitals and grocery stores—and made less readily available to other types of businesses. Yet the contractors see that the strength of the approach to date has been to work with designers on projects where there is an interest and then to then see those designers apply the principles to projects more generally, potentially to target market projects. In general, the contractors believe that their efforts are reaching the target markets, but that reaching the design market for new and existing buildings is how they can be most effective.

Resources from the Alliance have seemed more limited than those available for the BetterBricks Technical Services to accomplish their tasks—no one to coordinate, no one to facilitate interactions, and sometimes no one readily available to answer questions. In at least one instance in 2004, the contractors were all asked to be present at a training event, but the Alliance would not reimburse them fully for their costs to attend.

If the market is to be influenced as rapidly as possible, specific opportunities for expanding resources are easy for the contractors to identify. Some examples include:

- A wind tunnel is viewed as necessary to help the labs address natural ventilation in much the same way the daylighting labs deal with daylighting.
- There is a need for more services for engineers. This includes new courses, such as financial engineering analysis (where the Alliance effort still seems to the contractors to be only introductory), and also more in-depth training for ventilation, mechanical and electrical engineers.
- The labs, as noted, see a need to hire more assistants to deal with the increased volume.
- Two contractors noted there should be someone to coordinate integrated design and eco-charettes around the region.

Marketing and Implementation

All of the contractors generally felt the resources being expended for marketing were excessive, with a need for more direct implementation dollars in order to serve the interest that exists and to continue to develop more in-depth capability to work with the market. One noted that they use only about 10% of what they receive from the BetterBricks marketing and communication team.

None of the contractors felt that the marketing collateral had led to a substantial increase in interest in their advising services. Training services, on the other hand, were felt to be facilitated by the marketing effort, in that the website lists the training schedule and because the Alliance uses push emails to get people to the website to sign up for courses.

Several commented on the lack of a phone number for people to call if they want to find out more.⁹ The website is seen as leaving people struggling to understand what the courses offer and what an advisor would do. Most

⁹ There in fact is a phone number on the website for those who wish to use the Advisor services.

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advising projects are believed by the contractors to come through the utilities or from the Alliance (which may mean the website and the phone number, but that is not clear).¹⁰

Market Response

All of the contractors feel that their efforts are leading to changes in the market. Each has anecdotal evidence of projects that have resulted in changed design practice or in design firms that have found the training services valuable. None have any research results of their own to support their view.¹¹ Those providing advice to designers recommend that the Alliance track the effect of the services by taking a pre and post sample of designs developed by the firms that receive advice. Those doing training suggest asking those who received training about its effect.

A couple of the contractors commented that an actual measurement of savings has never been their expectation for the projects that emerge from the BetterBricks Technical Services. They believe the savings are there, but they seem to feel the specific engagement with the BetterBricks Technical Services is what is important.

We also asked each of the contractors what they understood about the goals and objectives for the three target markets: schools, hospitals and grocery stores. All of the contractors said that, except for schools, the target markets were not well defined and that it was difficult for them to know what the Alliance was targeting in each market or what they expected from the BetterBricks Technical Services contractors. In the case of schools, while better defined, only two of the contractors felt this was defined well. The following are some specific thoughts on each of the three target markets:

- **Schools** – A lot of work is being done in this sector by all contractors and they feel they are being effective. The contractors conclude the Alliance will probably be most effective in the schools market. One contractor expressed some concern however that the lighting controls

¹⁰ As will be shown in the results from the interviews with participants, the Lighting Design Lab is the source for the largest percent of projects for all advisors.

¹¹ The Lighting Design Lab was designing a survey for follow-up with their customers at the time of this study. It was to be completed in spring 2005.

necessary to make daylighting work in schools are still evolving, which could lead to a less satisfactory end result.

- **Hospitals** – This is considered to be the least likely segment to be affected by the BetterBricks Technical Services. There is not much architectural interest; some of the contractors are doing work with hospitals, but they find limited interest and thus believe the segment will be very difficult to influence. There are lots of mechanical issues and related rules and regulations, but the BetterBricks Technical Services do not offer many mechanical engineering services.
- **Grocery Stores** – The contractors have not seen much interest in the market generally, but mechanical solutions could be important. There are projects going on with two chains and there is interest at these chains. The technical issues are more easily dealt with than for hospitals.

As noted previously, there have been requests from the Alliance to target services to these sectors. For the BetterBricks Advisors, this is particularly difficult since they cannot market their services and must just react. For the other contractors, the lack of a clear message from the Alliance that defines what to say to these markets means that all services tend to be reactive. Some efforts have already begun with a firm or two that specialize in hospitals, but that is the extent of the focused effort.

As noted earlier in this discussion, the contractors are aware that there is the potential for more demand for their services than they can meet, given their current resources. If resources do not increase, then some screening may be required in order to allocate services; however, the contractors all are concerned that this will have a negative impact on the overall market, so they are not enthusiastic about the idea of having to limit the services for some people through some sort of screening process.

LOOKING FORWARD

Since October 2004, the lead staff for the CSI effort has changed. In September and October 2004, three of four key Alliance staff involved in CSI implementation left the Alliance. The current lead was hired in December 2004; contract staff have been hired to operate some CSI activities. This includes contracting with the BetterBricks Advisor lead contractor to oversee all BetterBricks Technical Services.

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Between October 2004 and January 1, 2005, the BetterBricks Technical Services have continued in the same manner as described above, with some increased one-on-one communication by the lead BetterBricks Advisor contractor with the other contractors. In addition, on January 10, 2005, a BetterBricks Advisors and Training Services all-day coordination meeting was conducted; this meeting is the first effort within the new organizational structure to coordinate the BetterBricks Training and Advisor Services.

The following are additional thoughts provided by the contractors regarding the future direction for BetterBricks Technical Services:

- The contractors believe that a vision needs to be articulated by the Alliance and needs to be communicated to all the contractors and to the public. They would also like to be involved in the development and refinement of that vision and believe they have much to contribute to that process.
- Contractor coordination meetings are needed to review their approaches so they are consistent with the vision. What is most important to the contractors is a need to coordinate together so that they are consistent in their articulation of the message.
- The proposed firm-focused approach is considered by all of the contractors to generally be a good idea, especially if done with sensitivity to the firms, not as a one-size-fits-all effort. Some of the contractors have already taken the firm-focused idea to heart and are offering services or training to entire firms.
- The contractors would like to see someone be assigned to coordinate all the different contractors involved in BetterBricks. The staff turnover at the Alliance left the contractors uncertain as to the direction the Alliance was taking.
- BetterBricks should continue to work closely with universities; involvement by universities brings a noncommercial entity to BetterBricks, which adds credibility. This approach has been effective and can grow to include additional universities and capabilities. Most of the contractors view the inclusion of university programs in the BetterBricks Technical Services to be an asset.

SUMMARY

The BetterBricks Technical Services contractors are all enthusiastic about the work they are doing for the Alliance. They all feel confident that they understand the goals and objectives of their efforts. They all also feel that there is uncertainty about the Alliance's goals and objectives for BetterBricks, for CSI and for the manner in which the contractors should work together. Of particular concern is the need to clarify the importance of energy efficiency and conservation in the message and in the end result of the services provided, and to clarify whether the BetterBricks Technical Services are working with the Alliance as part of a team or as individual organizations under a common umbrella.

The contractors express a consistent view that there is a need for coordination among the contractors and with the Alliance, particularly with regard to technical offerings, marketing and the database. They also feel that the Alliance is not using their professional expertise effectively to develop and refine the vision and the technical offerings. A daylong meeting twice a year that permits the contractors to discuss their activities, to share their insights and to review each other's work would be welcome. Such a meeting would not be top down from the Alliance, but bottom up from the contractors. Contractors want to be involved in clarifying the terminology, the practice and the concepts used to promote CSI and BetterBricks.

Resources appear to be sufficient at the moment, but that is before there has been a push to market advising services and before the majority of the target market efforts have begun. The Alliance is constrained in terms of resources: no one person is assigned to coordinate the contractors' work and there are apparent limitations on how the contractors can get together.

The two resources the Alliance has provided are marketing materials and the BetterBricks Advisors database: the contractors consider both unsatisfactory. The marketing materials are not coordinated with the service providers; the collateral does not seem to represent what they do and generally does not seem useful to their needs. The database is used by only two of the contractors and is viewed as unwieldy and with limited value by the others.

All of the contractors have examples of positive market response to their services, whether advising or training. They are aware of the target market segments for CSI and have already begun some work in these segments as part of their activities. They anticipate being most effective with schools and least

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effective with hospitals. This is largely because the issues for schools tend to be more architectural, while those for hospitals are more mechanical engineering, for which BetterBricks Technical Services has limited offerings.

Looking forward, the contractors see a lot of opportunity and hope that the Alliance will increase its commitment to the BetterBricks Technical Services by expanding resources, by supporting active coordination of their efforts, and by including the BetterBricks Service contractors in the design, development and refinement of the BetterBricks and CSI activities.

4. DATABASE AND EVALUABILITY ASSESSMENTS

This chapter presents an assessment of the databases used to track BetterBricks Technical Services and follows with an evaluability assessment using a sample of projects drawn from the BetterBricks Advisors database.

ASSESSMENT OF BETTERBRICKS DATABASES

This section reviews the databases used to track program activities. We include a broad overview of program activities as captured through these databases, as well as a detailed assessment of the overall completeness and quality of data contained within the BetterBricks Advisors database.

BetterBricks Advisors Database Overview

The BetterBricks Advisors database began development in 2002 and was launched in 2003. The database is intended to capture project-related information for three purposes: 1) to assist the advisors in coordinating their project consulting activities; 2) to provide the Alliance and the advisors with a means of tracking project activity; and 3) to provide the Alliance with key evaluation-related information for each project in which advisors are involved.

In addition to the BetterBricks Advisors *Access* database, there are three “legacy” databases that continue to be used by the various advisor organizations under CSI. Therefore, there are four databases currently in operation:

- **Lighting Design Lab** – an *Access* database that is used to track the activities of the Lighting Design Lab, including consultations and class offerings.
- **Seattle Daylighting Lab** – an *Excel* spreadsheet that is used to track projects and contact information.

4. Database and Evaluability Assessments

- **Portland Daylighting Lab**¹² – a database that is used to track lab services, projects and training.
- **BetterBricks Advisors** – a comprehensive Access database that is accessible to all advisors via a web interface.

Two contractors actively use the BetterBricks Advisors database: the BetterBricks training contractor and the BetterBricks Advisors. The daylighting labs and Lighting Design Lab have their own databases and do not find the BetterBricks Advisors database effective for their tracking needs. It was not really possible to tease out whether this is just resistance because it is imposed on them, or whether the database itself is just not structured in a useful manner.

In the cases of those that have their own databases or spreadsheets, the resistance to the BetterBricks Advisors database, according to the contractors, stems from a combination of databases already being in existence and there being no way to easily link the existing databases to the BetterBricks Advisors database and get the same information out of the BetterBricks Advisors database that is obtained from the preexisting databases.

Those who use the BetterBricks Advisors database currently do not want the database to be eliminated. Those who do not use it, feel that the database is just too unwieldy to be worthwhile to begin to use and, as will be evident, that it is not currently viable as a program-tracking mechanism.

Effective January 1, 2004, all advisor consultations were required to be included in the BetterBricks Advisors database and were expected to use the database manual defining the fields and appropriate procedures for data entry.¹³ As noted below in more detail, a total of 359 projects were included in the database as of October 2004. However, for several reasons, it is apparent that not all BetterBricks activity is represented within the BetterBricks Advisors database. These include the existence of projects in the other three databases that are not in the Advisors database, as well as the lack of records for all of the training classes for the daylighting labs.

¹² Note that, although this database exists, only a summary of the results were provided to the evaluation team.

¹³ Northwest Energy Efficiency Alliance. (2004) *Draft BetterBricks Database Manual*. Portland, OR. February 11, 2004.

Tracking of Projects and Consultations

As shown in Table 4-1, below, a significant portion of activities undertaken by the Lighting Design Lab is not being entered into the BetterBricks Advisors database. According to Lighting Design Lab staff, the Lighting Design Lab database is very effective for their needs and they are reluctant to transfer all of their tracking activities to the BetterBricks Advisors database. What they indicate they do track in the BetterBricks Advisors database are those projects they consider to be BetterBricks-initiated projects, as compared to those initiated by the Lighting Design Lab.¹⁴

**Table 4-1
PROGRAM ACTIVITY SHOWN IN DATABASES: CONSULTATIONS**

SOURCE OF DATA ON PROJECT CONSULTATIONS	NUMBER OF PROJECTS (2003)	NUMBER OF PROJECTS (2004)	TOTAL	NUMBER OF PROJECTS SHOWN IN ADVISORS DATABASE
Seattle Daylighting Lab Database	112	76	188	210
Lighting Design Lab Database	326	174	500	13
Portland Daylighting Lab Database	—	109	109	75
BetterBricks Advisors Database	—	—	49	49
TOTAL			846	347

Tracking of Workshop, Roundtables and Classes

A summary of BetterBricks training activity, as logged in the BetterBricks Advisors database, is provided in Table 4-2.

¹⁴ The Lighting Design Lab differentiates between those projects that are required to fulfill the requirements of their contract to operate the Lighting Design Lab and those that are suggested to the LDL as important as part of a BetterBricks high performance building design. Some classes clearly fall into both categories, others are primarily electric high-quality-lighting focused and others are high-performance-building focused.

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Table 4-2
SUMMARY OF BETTERBRICKS TRAINING SESSIONS

TYPE	CATEGORY	SESSION TOPIC	NUMBER OF PARTICIPANTS	PERCENT
BetterBricks Workshops	Design-Related	Integrated Design Strategies for High Performance Buildings	218	42%
		LEED and Energy Performance	69	13%
		Life-Cycle Cost Analysis: Balancing First Cost and Long-Term Performance Goals	51	10%
		Design Team Communication: Linking Intent w/Results for HP Buildings	44	8%
		<i>SUBTOTAL</i>	<i>382</i>	<i>73%</i>
	Ventilation / HVAC	Integrated Design Process and High Performance Buildings	32	6%
		Climate Responsive Design Workshop	108	21%
		<i>SUBTOTAL</i>	<i>140</i>	<i>27%</i>
		TOTAL	522	100%
	BetterBricks Roundtable	Design-Related	Navigating the Energy Points in LEED (TM)	109
Roundtable Discussion: Making Decisions on Idaho High Performance Schools			46	10%
Energy Saving Design in Server Rooms and Data Centers			38	8%
Design-Build Project Delivery and Integrated Design			30	6%
Eastern Idaho High Performance Schools			25	5%
Energy Savings in Server Room Design			16	3%
<i>SUBTOTAL</i>			<i>264</i>	<i>56%</i>
				Continued

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TYPE	CATEGORY	SESSION TOPIC	NUMBER OF PARTICIPANTS	PERCENT
BetterBricks Roundtable (cont.)	Ventilation / HVAC	Natural Ventilation: Strategies and Pitfalls	45	12%
		Displacement Ventilation Systems: Effectiveness & Limitations	37	10%
		Subtotal Participation Ventilation/HVAC Workshops	82	22%
		Roundtable Discussion: <i>The Art and Practice of Selling High Performance Buildings</i>	32	9%
		<i>SUBTOTAL</i>	<i>196</i>	<i>43%</i>
		TOTAL	460	100%
LDL Workshops		Energy Effective Light Sources	130	44%
		Fixtures, Buildings and Light	78	27%
		Lighting Retrofits	39	13%
		Energy Effective Lighting Controls	33	11%
		Fixtures, Buildings, and Light	14	5%
		TOTAL	294	100%

A summary of training activities undertaken by the Lighting Design Lab and recorded in the Lighting Design Lab database, is provided in Appendix D. The workshops and roundtables offered by Putnam-Price are only recorded in the BetterBricks Advisors database, thus the database appears to be capturing 100% of their activities. The Lighting Design Lab training activities noted in the BetterBricks Advisors database indicate fewer classes and fewer participants than are noted in the Lighting Design Lab database. For instance, Energy Effective Light Sources in the Lighting Design Lab database in Appendix D shows 178 participants, while in the BetterBricks Advisors database, the same class title shows 130 participants.

The Lighting Design Lab does not consider all of their activities to be BetterBricks activities; some are Lighting Design Lab-initiated activities that they only enter in the Lighting Design Lab database. A comparison of listings in

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the Lighting Design Lab and the BetterBricks Advisors databases suggests that Lighting Design Lab staff have identified those classes they consider to be BetterBricks classes from their total set of classes; these are summarized in the BetterBricks Advisors database, rather than provided in class-specific detail, as in the Lighting Design Lab database. The Lighting Design Lab database indicates 2,629 class participants for 2003 and 2004 combined, while the BetterBricks Advisors database indicates 294 class participants.

Assessment of Project Data in the BetterBricks Advisors Database

To assess the completeness of the BetterBricks Advisors database, we focused on a discrete set of key fields we consider particularly useful for assessing the levels and types of project and training activities. This assessment was undertaken in October 2004 and expands upon a similar assessment conducted by EMI in April 2004. Seven key fields were selected as indicators of project activity and overall program performance in both this assessment and that done in April 2004. These fields are:

- *Space Type*
- *Project Type*
- *Project Size*
- *Utility Name*
- *Project Status*
- *Technology/Project Solutions*
- *Overview*

Overall Completeness of Project Data

We began with a copy of the database that was current through September 2004, which included a total of 359 projects. Of these, 109 projects contain very little data. Upon further investigation, we determined that these partial records are from a backlog of projects carried out by the Seattle Daylighting Lab that were entered in bulk in July 2004. The bulk entry was to permit later data being added, but as of September 2004, this had not been done. Given the fact that the inclusion of these projects distorts any assessment of the overall

completeness of projects, we did not include these project records in our analysis. Instead, we focused on the 250 remaining project records that contain relatively more data.

Table 4-3 below presents the number of completed key fields. Additional discussion of the database by key field follows.

Table 4-3
PERCENT COMPLETION OF KEY FIELDS (N = 250)

KEY PROGRAM FIELD	NUMBER COMPLETED	PERCENT COMPLETED
Space Type	238	95%
Project Type	232	93%
Project Size	209	84%
Utility Name	202	81%
Project Status	172	69%
Technology/Project Solutions	167	67%
Overview	148	59%

Space Type

The *Space Type* field is the most complete of any of the key fields. When entering data in this field, the advisor chooses from a fixed menu of 20 space types, including an *Other* category. Table 4-4 summarizes projects according to space type. The database does not include a description field for the *Other* category, which was selected for 21 of the projects.

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Table 4-4
COMPLETION OF SPACE TYPE FIELD

SPACE TYPE	NUMBER COMPLETED	PERCENT COMPLETED
School (K-12)	52	22%
Office	49	21%
Other	21	9%
College/University	22	9%
Hospital Health Care	13	6%
Assembly	19	8%
Multi-Family	5	2%
Library	11	5%
Community Center	9	4%
Mixed-Use Development	4	2%
Grocery	5	2%
Child Care facility	6	3%
Retail	6	3%
Warehouse	3	1%
Manufacturing	3	1%
Restaurant	5	2%
Station-Train Airport Bus Rail	1	0%
Hotel/Motel	1	0%
Recycling Facility	2	1%
Assisted Living	1	0%
<i>SUBTOTAL *</i>	<i>238</i>	<i>101%</i>
<i>Incomplete Fields</i>	12	
TOTAL	250	

* Total does not equal 100% due to rounding.

Project Type

As shown in Table 4-5, below, *Project Type* information is provided for 93% of the records. To complete the *Project Type* category, advisors and advisor staff select from four choices covering the universe of project types: *New Construction*, *Renovation or Replacement of Building Systems*, *Tenant Improvements* and *Other*. An additional description field is available for entry of brief descriptions of project types. Eight of the ten records with *Project Type* listed as *Other* also include data in the description field.

Table 4-5
COMPLETION OF PROJECT TYPE FIELDS

PROJECT TYPE ID	NUMBER COMPLETED	PERCENT COMPLETED
New Construction	166	72%
Renovation or Replacement of Building Systems	41	18%
Tenant improvements	15	7%
Other	10	4%
<i>SUBTOTAL*</i>	<i>232</i>	<i>101%</i>
<i>Incomplete Fields</i>	<i>18</i>	
TOTAL	250	

* Total does not equal 100% due to rounding.

Project Size

Data on *Project Size* was provided for 84% of all projects (see Table 4-6). The range of square footage varies substantially between and within building type categories, with the widest ranges in the *Office*, *Manufacturing* and *Hospital/Health Care* categories. The differences may reflect actual differences in building size. Given that most of the entries are to the nearest thousand, it is likely that these are approximations, not actual measured data.

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**Table 4-6
SIZE BY BUILDING CATEGORY**

SPACE TYPE	NUMBER	MINIMUM SQ.FT'	MAXIMUM SQ.FT.	AVERAGE SQ.FT.
Assembly	19	3,000	100,000	21,211
Assisted Living	1	14,000	14,000	14,000
Child Care facility	6	5,000	15,000	9,200
College/University	22	10,000	300,000	86,765
Community Center	9	6,000	120,000	29,250
Grocery	5	10,000	10,000	10,000
Hospital / Health Care	13	1,500	350,000	123,350
Hotel/Motel	1	32,000	64,674	48,337
Library	11	10,000	100,000	36,333
Manufacturing	3	22,000	600,000	311,000
Mixed-Use Development	4	10,000	125,000	72,629
Multi-Family	5	4,000	200,000	78,125
Office	49	75	1,000,000	99,133
Other	21	750	275,000	37,294
Recycling Facility	2	60,000	105,000	82,500
Restaurant	5	44,000	125,000	77,250
Retail	6	20,000	200,000	82,500
School (K-12)	52	4,800	200,000	75,433
Station-Train Airport Bus Rail	1	215,000	215,000	215,000
Warehouse	3	3,000	15,000	9,600

The entry variability may also reflect differing interpretations of *Building Size* by those entering the data. While referred to in the database as *Project Size*, this may not be how it is always interpreted. The *BetterBricks Database Manual*

refers to the field as *Building Size* (not project size) and defines the variable as square feet of building space. The BetterBricksAdvisors.com website also refers to the variable as *Building Size*.

Utility Name

The *Utility Name* field was populated 81% of the time, with 48 records either incomplete or clearly inaccurate. Table 4-7 indicates the correct entries made for this field and their frequency. Providing complete data for the *Utility* field could significantly shift the proportions assumed for each utility territory. Given the relatively small number of projects identified in several of the utility territories, one or two additional projects would likely be significant.

**Table 4-7
PROJECT DISTRIBUTION BY SERVICE TERRITORY**

PROJECT UTILITY	NUMBER CORRECT	PERCENT CORRECT
Seattle City Light	58	29%
Puget Sound Energy	35	18%
Idaho Power	25	13%
Portland General Electric	17	9%
Tacoma Power	14	7%
Avista Utilities	12	6%
NorthWestern Energy	12	6%
PacifiCorp	10	5%
Snohomish County PUD	2	1%
Clallam County PUD	2	1%
Clark Public Utilities	1	<1%
Cooperative, Inc.	1	<1%
SCH-DFO	1	<1%
Continued		

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PROJECT UTILITY	NUMBER CORRECT	PERCENT CORRECT
Grant County PUD	1	<1%
Salmon River Electric Cooperative	1	<1%
Salem Electric	1	<1%
Springfield Utility Board	1	<1%
Out of Northwest Region Utility	5	3%
SUBTOTAL*	199	100%
<i>Incomplete Fields</i>	51	
TOTAL	250	

Project Status

Sixty-nine percent of projects include information on *Project Status* (see Table 4-8).

Table 4-8
PROJECT STATUS

PROJECT STATUS	NUMBER	PERCENT
Active	86	51%
Completed	52	31%
Inactive	33	18%
Prospect	1	>1%
SUBTOTAL	172	100%
<i>Incomplete Fields</i>	78	
TOTAL	250	

However, the information in this field is time sensitive, as projects transition from active to complete (or inactive) over time. Lags in data entry can affect the accuracy of data in this field. What is fairly certain, based on conversations with the different advisors, is that in some cases the data are regularly updated and in other cases they are not, which means that the project status field is unreliable.

Technical Project Solutions

Technical Project Solutions are identified in 67% of project records (see Table 4-9). The field *Technical Project Solutions* is defined in the *BetterBricks Database Manual* as specific technologies considered for a given project. A review of the database indicates that a given project can have multiple technical project solutions.

Table 4-9
COMPLETENESS OF TECHNICAL PROJECT SOLUTIONS FIELD

PROJECTS LISTING TECHNICAL PROJECT SOLUTIONS	NUMBER	PERCENT
Projects Listing Technical Project Solutions	167	67%
Projects not Listing Technical Project Solutions	83	33%
TOTAL	250	100%

Table 4-10 presents responses for all projects where one or more technical project solutions were suggested. The average number of technical solutions per project is approximately two. While this list appears to provide some degree of specificity, as discussed in the evaluability assessment later in this chapter, the terms used for project solutions do not provide sufficient specificity to understand what actually was recommended, nor to derive any sense of the energy savings potential from the project information in the database.

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Table 4-10
SUMMARY OF TECHNICAL PROJECT SOLUTIONS

TECHNICAL PROJECT SOLUTION	NUMBER	PERCENT
Daylighting (side-lighting)	122	23%
Daylighting (top-lighting)	121	23%
Glazing	90	17%
Lighting Controls	73	14%
Lighting	32	6%
Integrated Design	13	3%
Natural Ventilation	13	3%
Heat Recovery	13	3%
HVAC (small, rooftop)	9	2%
Energy Modeling	8	2%
Other	8	2%
Controls - Mechanical	6	<1%
Insulation	5	<1%
HVAC (large central plant)	4	<1%
Indoor Air Quality	4	<1%
Shading	3	<1%
Guidelines	2	0%
Commissioning	1	0%
Mechanical Control	1	0%
TOTAL	528	100%

Project Overview

Of the 250 project records in the database, 60% had data entered in the *Overview* category (see Table 4-11). As defined in the *BetterBricks Database*

User's Manual, the field is intended to provide information on the: 1) project site, 2) project technical issues, and 3) advisor role.

Table 4-11
SCORES FOR PROJECTS WITH OVERVIEW DESCRIPTIONS

OVERVIEW SCORE - ALL PROJECTS	NUMBER	PERCENT
3	14	10%
2	38	26%
1	76	51%
0	20	14%
SUBTOTAL	148	101%
<i>Incomplete Fields</i>	102	
TOTAL	250	

* Total does not equal 100% due to rounding.

A three-point scoring system was applied to examine the quality of the 148 completed entries. The scoring system ranged from a “3” indicating that the *Overview* entry contained all three elements, to a “0” indicating that the entry had none of the three elements.

Of the records with an *Overview* entry, only 9% had information for all three categories. The category of *BetterBricks Advisor Role* was omitted most frequently, followed by *Project Technical Issues*.

We also examined the scores to determine whether projects with *Active* or *Completed* status provided more complete *Overview* information than those that were *Inactive*, *Prospects*, or for which project status was undefined. This examination indicated there was no systematic difference in completion scores between the various *Project Status* groups.

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Assessment of Training Data in the BetterBricks Advisors Database

Review of the training data records focused on the completeness of fields related to type, volume and distribution of training activities. Table 4-12 presents a general overview of the 2,299 participant records entered between May 28, 2003, and August 10, 2004. As this table indicates, five of the ten field categories had a 100% completion rate.

Table 4-12
PARTICIPANT DATA OVERVIEW (N=2,299)

KEY TRAINING FIELDS	NUMBER COMPLETED	PERCENT COMPLETED
Participant ID	2,299	100%
classPerson	2,299	100%
eventID	2,299	100%
eventName	2,299	100%
startDate	2,299	100%
classPersonOrg	2,050	89%
endDate	1,393	61%
timespan	1,393	61%
personState	1,305	57%
utilityID	302	13%

Participant ID and Class Person

The *Participant ID* and *Class Person* fields can be useful in identifying the participation patterns of individuals, such as the number and frequency of BetterBricks events attended. *Participant ID* is the more valuable of the two fields for evaluation, as this field links to the participant name as recorded by BetterBricks and to all events attended by a participant.

The *Class Person* field is derived from lists of class attendees and is less reliable than the *Participant ID* for tracking participation. This is because the *Class Person* field may not have a one-to-one relationship to a specific individual. Multiple attendees may have the same name or an individual attendee may use variations of his or her name in registering for a class.

All of the records include *Participant ID*, enabling analysis of participation across BetterBricks events. All but five records have complete information in the *Class Person* field (see Table 4-13). However, the information missing in these five records can be found in the BetterBricks Advisors database, linked to the *Participant ID* number.

Table 4-13
DISCREPANCY BETWEEN PARTICIPANT ID AND CLASS PERSON FIELDS

ITEM	NUMBER
Unique Records: participantID	1,829
Unique Records: classPerson	1,816
Difference	13

There are 13 fewer unique *Class Person* names than there are unique *Participant ID* numbers. As discussed above, discrepancies between these two fields are likely to result from a variation in whether and how names are entered by class participants. This suggests that in evaluating participation patterns, the unique *Participant ID* code should be used. Also, the database should be designed to automatically enter a participant’s name when the *Participant ID* number is entered.

Class Person Organization

Class Person Organization is the name of the participant’s sponsoring organization. This field was complete for 90% of the records. The variable enables analysis of participation by institution. However, organization name does not always reveal the sponsoring organization’s interests or purpose and there is no field in the database that does so.

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Event End Date

The *Event End Date* field is incomplete for 45% of the records. This is a field that could be used to assess event duration. However, based on the types of events offered, it is highly likely that virtually all events are single-day events. Eighty five percent of the events are brown bags or workshops/classes, which are almost always single-day events (see Table 4-14).

Table 4-14
TOTAL NUMBER OF EVENTS

KEY TRAINING FIELDS	NUMBER	PERCENT
Brown Bag	124	54%
Workshop/Class	72	31%
Undefined	20	9%
Roundtable	6	3%
Exhibit	3	1%
Presenter	3	1%
Idaho School Stakeholder Meeting	1	0%
LDL Open House	1	0%
TOTAL*	230	99%

* Total does not equal 100% due to rounding.

Participant State

The *Participant State* field is also contained in 45% of the records. As with *Utility ID*, this field could be important in assessing geographical reach and distribution. Completion of *Participant State* data would be a simple, but somewhat tedious case of completing the state field based on the *City* field.

Utility ID

Utility ID, which provides a numeric code for the electrical utility serving a given participant, is contained in 13% of the records (see Table 4-15). While the *City* field (which is 100% complete) can be used to infer representation by utility service territory, in some cases cities are served by more than one utility, making attribution difficult.

Table 4-15
TRAINING EVENTS LISTING UTILITY ID

TRAINING EVENTS LISTING UTILITY ID	NUMBER	PERCENT
Complete Fields	302	13%
Incomplete fields	1,997	87%
TOTAL	2,299	100%

Summary of Database Assessment

Based upon this review, there are five key findings from this analysis:

1. **The BetterBricks Advisor Database does not, at this point, provide a complete accounting of consulting and training activities undertaken within the CSI.** In particular, details about the activities undertaken by the Lighting Design Lab have not been entered into the BetterBricks Advisors database and information about Lighting Design Lab consultancy services, as well as the daylighting labs, appears to be incomplete in the BetterBricks Advisors database. Furthermore, it is not clear what criteria have been used by each organization to determine which projects are included in this database and which are not.
2. **Training data within the BetterBricks Advisors database are relatively complete.**
3. **The project data contained within the BetterBricks Advisor Database is very incomplete and, where data do exist, overall**

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- quality and usefulness is significantly less than desired.** More on the value of these data is presented later in this chapter.
4. **Some fields should be dropped or replaced with fields that are more valuable.** At a minimum, the *Event End Date* field should be dropped; also the *State* and *City* fields can be dropped and the *Zip Code* field used to automatically fill the *Utility*, *State* and *City* fields. The *Participant Id* field can be used to automatically fill the *Class Person* field.
 5. **Finally the database does not have some data fields that might be of interest to the Alliance.** There is no field to capture the profession of the person receiving training or advice. There is no way to differentiate the owner from the designer, from a tenant. While the type of building is a field for the projects, it is not included as a field for the training, so it is not possible to determine what market segments are participating in the training.

If the BetterBricks Advisor Database is going to be useful to the Alliance in tracking and coordinating project activity, as well as for supporting evaluation efforts, significant attention needs to be directed in these areas. Most important, for the fields included within the database, data quality standards need to be developed, implemented and followed-up on.

EVALUABILITY ASSESSMENT

The purpose of the evaluability assessment was to examine a set of projects that have completed their consultations and determine whether an impact evaluation could be conducted, given the information available. The three questions to be addressed were:

1. Is the information in the BetterBricks Technical Services databases and project reports adequate to evaluate the impact of BetterBricks advice upon project design and project energy savings?
2. Did BetterBricks Technical Services customers incorporate the BetterBricks advice into final designs, whether the advice was confirmation of existing ideas, a choice between alternatives or a new concept?

3. Did the BetterBricks advice given to customers result in, or will it result in energy savings?

Evaluability Assessment Methodology

The primary source of BetterBricks Technical Services available information is the BetterBricks Advisors database organized by project; there are also project reports. The assessment collected information about the project sample using the following steps:

1. Choose a sampling frame for projects.
2. Select a sample of projects for interviews.
3. Interview program participants associated with the selected projects. (These participants included principal BetterBricks Advisors, project architects, project clients and other advisors besides the principle advisor.)
4. Assess the quality of data available from other sources, including project reports.
5. Assess the quality of BetterBricks Advisors database information.

Sample Selection

We began with a copy of the Alliance BetterBricks Advisors database, which we examined for completeness and accuracy. Our assessment attempted to identify the data fields in the database that are relevant to the impact of BetterBricks advice on the final project design and relevant to the evaluation of kWh savings from advice given by the advisor.

The sample was chosen to include at least four projects that had BetterBricks advice about mechanical systems, at least four projects that had advice about lighting systems and up to four projects that had advice about glazing. It was possible to find projects that included BetterBricks advice about all three types. From the 60 projects noted as complete in the database, we selected a sample of 20 projects for which an advisor had finished providing advice.

Table 4-16 shows a summary of the types of measures recommended for the 20 projects. In all cases, it was necessary to obtain additional information about these

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projects from advisors and implementers using telephone interviews in order to understand what effect BetterBricks advice had on the project and to determine its current status.

Table 4-16
SUMMARY OF MEASURES RECOMMENDED FOR TWENTY PROJECTS

MEASURE TYPES RECOMMENDED BY ADVISORS	FOR 15 PROJECTS IN SAMPLE	FOR 5 PROJECTS DROPPED FROM SAMPLE
Daylighting	10	
Glazing	10	4
Lighting	4	1
Lighting Controls	7	1
Mechanical	2	
Natural Ventilation	5	
Heat Recovery	2	
Other: Integrated Design, Mechanical Controls, Insulation	3	

Project Reports

The database listed a project report for most of the sample. If no report was shown, we interviewed the advisors to determine whether a report was available. If a report was available, we obtained a copy. When we did not find a report, we relied on interviews for information about BetterBricks recommendations. One conclusion from this review is that there is no template for project reports or even any consistency in the type or level of detail of information provided.

Nonetheless, these reports can often satisfy an evaluation function. They sometimes provide information about BetterBricks advice on a measure-by-measure basis. They sometimes provide estimates of energy savings for measures and they sometimes explain the pros and cons of adopting measures

recommended by the advisors. The more complete text reports indicate the Advisor's energy savings rationale for each measure. Occasionally they provide a good start for the estimate of energy savings.

In the case of the daylighting projects, the reports were typically photographic records lacking explanatory text, however the engineering calculations of lighting energy savings can often be used along with the photographs to infer the measures recommended for a project.

Project Interviews

We conducted telephone interviews with the advisors, building architects and facility staff for 15 projects, although we did not interview each type of participant for every project.¹⁵ The multiple interviews for each project helped to validate the responses from the perspectives of advisors, implementers' operators and owners. We relied on the list of names in the database to initiate the process; occasionally other names of persons involved in projects were identified during the interviews.

We developed two slightly different interview protocols: one for the advisor and the other for those who received the advice—project clients, architects and facility staff. (See Appendix B for the text of the interview guides.) Beginning with the information in the database and project reports, we asked respondents about each measure recommended by the advisors to determine whether any were included in the project's final design and, if a measure was not included, to find out why it had been rejected. The interviews were terminated early if it became apparent that BetterBricks advice had no impact on the final design or the project's as-built features.

The most important contacts were typically the advisor and the project architect. In some cases, the project owner also provided essential information.

We asked respondents three questions about the recommendations from advisors:

- Did the advice include new alternative designs for the project?

¹⁵ For the five that could not be assessed, no data could be found for one project in the on-line database and four others were rejected because the Advisor was not working within the BetterBricks program.

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- Did the advice consist of recommending one of several alternative proposed designs?
- Did the Advisor critically review a proposed design, providing greater detail or analysis?

The purpose of distinguishing between these types of advice was to assure that interview respondents would answer positively if the advisor had given at least one type of advice. We further asked which of the measures included in the BetterBricks advice for the project were ultimately adopted.

Our definition of a measure in this study covered a wide range of design changes—from changes to large systems, such as radiant floor heating, to small adjustments to system components, such as the orientation of fixtures.

Assessment of Feasibility of Calculating Energy Savings

We asked those respondents who knew about the BetterBricks role in the project and who also knew about the final as-built design, whether the advisor's contributions to the as-built design reduced energy use as compared to the original design. If they responded with a clear “no,” we did not ask any more questions about the energy savings benefits from BetterBricks advice. However, we were careful to probe for a clear reason for this negative judgment until we were satisfied that the BetterBricks advice did not have an energy impact.

When respondents indicated that BetterBricks advice would reduce energy use, we probed to find out which specific measures recommended by BetterBricks led to the reduction. Then we asked respondents whether there were energy studies of the project already completed or energy studies under way, and whether we could get copies. We evaluated the energy studies we could obtain for their relevance to BetterBricks-recommended measures and for their accuracy. The few energy studies we found did not accurately estimate the benefits of BetterBricks recommendations in our sample because the studies did not accurately define the BetterBricks measures that could have reduced energy use.

For those where there was no energy study, we reviewed the respondents' lists of BetterBricks measures that were adopted for the final design to see whether these measures were sufficiently well defined to permit an energy analysis. Three BetterBricks projects that used the Daylighting Lab were generally found

to have poorly defined measures that could not be evaluated for energy savings, based upon respondents' responses. In these cases, BetterBricks advice consisted of making small changes to each of several measures or simply reviewing proposed designs.

Finally, having identified the projects with well-defined, accepted energy saving measures, we asked the respondents if they had associated well-defined baseline measures. If this condition was also satisfied, we examined potential models or sector-specific data sets that would support estimation of energy savings.

Evaluability Assessment results

The following provides a step-by-step assessment of the 20 projects and addresses each of the three questions.

Review of Database Content and Structure

The original sampling process produced 20 projects, yet we found that five could not be assessed further, leaving 15 for the detailed assessment.

The interviews with Alliance and BetterBricks Technical Services contractors had indicated that energy savings estimates were not initially expected as part of the program services. It was therefore not surprising that we did not find any information in the database concerning the impact of BetterBricks advice on the final design of projects. Estimates of energy savings due to BetterBricks advice also were not available in the BetterBricks Advisor database, nor did we find any fields in the database for such information. There are standard descriptions of measures such as "glazing," but they do not include any quantitative data or details about the significance of the measure for the project.

We found "reports" for 13 of the 15 projects. We defined a report to be any documentation of BetterBricks advice, including photographs of building models in the Daylighting Lab.

The written reports for six projects involving mechanical systems were consistently quite thorough. These reports contained information that facilitated the telephone interviews and in some cases included sufficient information for energy savings estimates from BetterBricks advice.

4. Database and Evaluability Assessments

A single lighting retrofit project was very well documented, including a detailed spreadsheet of the existing and future lighting inventory and the associated annual kWh savings from the project.

Six of the daylighting projects had reports in the form of photographs of the building modeling at the Daylighting Lab. The other two day-lighting projects had no pictures or other documentation. Further information about sample projects involving the Daylighting Lab was gained from telephone interviews with the project architects.

We discovered during the course of the interviews that there were a number of existing energy simulations and modeling exercises produced by firms outside the BetterBricks Technical Services for both lighting and mechanical systems projects. We reviewed these reports and found they did not offer a sound basis for estimates of energy savings.

Question 1: Is the information in the BetterBricks Technical Services databases and project reports adequate to evaluate the impact of BetterBricks advice upon project design and project energy savings?

The answer is “Mostly No.” The information currently recorded about each BetterBricks project in the database is not sufficient to determine either the impact of BetterBricks advice on subsequent project design or the energy savings attributable to that advice. However, the project reports, which are supposed to be linked to the project database, in some cases did provide enough additional information to be useful.

The database has several problems. The descriptions of the measures for each project in the BetterBricks Advisor database is not specific enough, nor are there fields in the database that would permit the advisor to enter information on savings if it were available. Additionally, there are projects in the BetterBricks Advisors database that should not be there—specifically “glazing” projects that are part of the Commercial Windows Initiative and projects that Advisors have worked on that lack potential to provide energy savings to the region.¹⁶

¹⁶ The CSI lead withdrew the Commercial Windows Initiative projects from this evaluability study, as he did not consider them to be part of the BetterBricks Technical Services activities.

Review of the Impact of BetterBricks Advice on Project Design

The extent to which BetterBricks advice had an impact on project design depends on what is considered to be “BetterBricks advice.” We took a broad view and included measures that were originally suggested by the advisor, measures that were tweaked by the advisor and measures that were vetted by the advisor.

Daylighting measures were adopted eight times out of the ten they were recommended and include many “sub-measures.” There were also a variety of lighting measures recommended for projects. These included: fixture location (1 time), low solar heat gain glazing (1), Sola-tubes (1), building orientation (1), interior partition heights (1), translucent roof monitor (1), de-lamping (1) and photocells (1).

There were a number of projects in which some of the major recommendations were rejected, but others were accepted, with the result that BetterBricks advice did affect the project energy savings, although not very much.

By far the most common reason given for not adopting BetterBricks advice about measures was high cost. Respondents cited this reason for nine measures. Three measures were rejected for a remodel project because they were not compatible with the existing building structure or architecture. Two measures proposed by an advisor for a new construction project in a rural area were rejected because the local contractor did not approve of them and was not comfortable installing the relatively new technologies.

Often, however, the advisor did not know which of his measures had finally been included in the building since there is no follow-up included in their services.

Question 2: Did BetterBricks Technical Services customers incorporate the BetterBricks advice into final designs, whether the advice was confirmation of existing ideas, a choice between alternatives or a new concept?

The answer is “Yes.” The interviews show that BetterBricks advice did affect design in 13 of 15 projects. Advisors suggested new alternatives to design for ten projects. Advisors recommended one alternative among several for nine projects. In nine projects, advisors also critically reviewed an existing design. In three projects, the advisors only fine-tuned an existing design. Modeling by the

4. Database and Evaluability Assessments

Daylighting Lab stimulated the architects for one project to find a solution to excessive lighting at certain times of the day. Mechanical measures proposed by BetterBricks and adopted included natural convective cooling (3 times), passive solar heating (1), de-stratification fans (1), automated controls for HVAC systems (1), operable clerestory windows (3) and radiant heating (1).

Additionally, there appear to be long-term effects from the advice as well. A number of respondents said they had used advisors before, or that they planned to use them again, or they had recommended BetterBricks to potential clients. On the other hand, several architects told us that they now incorporate many of the advisors' techniques, thus reducing their dependence on BetterBricks advice.

Table 4-17 summarizes the results for the 15 projects that proceeded through the detailed assessment. Thirteen of the 15 showed evidence of effects from the advisors' recommendations. Of these 15, six met all the requirements and could provide sufficient information for an energy savings assessment. Detailed information on the projects and this review are also provided in Appendix C.

Table 4-17
SUMMARY OF 15 SAMPLE PROJECTS

	PROJECT ID #	DID BETTERBRICKS ADVICE HAVE AN ENERGY IMPACT?	WERE BETTERBRICKS MEASURES WELL ENOUGH DEFINED TO ESTIMATE SAVINGS?	IS A BASELINE CONDITION DEFINABLE OR IS A COMPARABLE BUILDING AVAILABLE?	CAN AN ADEQUATE METHODOLOGY TO ESTIMATE SAVINGS BE ENVISIONED?	MEASURE TYPES RECOMMENDED BY ADVISORS
1	18	No				Mechanical
2	66	No				Mechanical
3	102	No				Daylighting
4	116	No				Daylighting
5	159	No				Daylighting
6	268	No				Daylighting
7	162	Yes	No			Daylighting
8	246	Yes	No			Mechanical Daylighting

	PROJECT ID #	DID BETTERBRICKS ADVICE HAVE AN ENERGY IMPACT?	WERE BETTERBRICKS MEASURES WELL ENOUGH DEFINED TO ESTIMATE SAVINGS?	IS A BASELINE CONDITION DEFINABLE OR IS A COMPARABLE BUILDING AVAILABLE?	CAN AN ADEQUATE METHODOLOGY TO ESTIMATE SAVINGS BE ENVISIONED?	MEASURE TYPES RECOMMENDED BY ADVISORS
9	249	Yes	No			Daylighting
10	8	Yes	Yes	Yes	Yes	Mechanical Lighting
11	21*	Yes	Yes	Yes	Yes	Lighting
12	35	Yes	Yes	Yes	Yes	Mechanical Lighting
13	64	Yes	Yes	Too Soon To Know	Yes	Mechanical
14	99	Yes	Yes	No	Yes	Daylighting
15	133	Yes	Yes	Yes	Yes	Daylighting

* Lighting retrofit project.

Determination of Energy Savings

Eight of the 15 sample projects had services from a Daylighting Lab.¹⁷ There were no written project reports for the projects in our sample, but there were *PowerPoint* presentations and photographs for most of the cases. During an interview, the lab director provided information for determining whether these projects had resulted in energy savings.

The lab director noted that the Daylighting Lab has been viewed as a market transformation program and that there has been no expectation of estimating or documenting energy savings for projects. He estimates electricity savings for a typical daylighting project could be as high as 60%. This is based on an assumption that 30-40 foot candles are required to light a space, and the following reasoning:

¹⁷ All of these projects were from the Seattle Daylighting lab as the Eugene-Portland Lab had not entered any projects for the time period studied.

4. Database and Evaluability Assessments

1. The goal is to achieve daylighting illumination equal to 50% of the light needed on an overcast day at noon in December.
2. There is no direct sunlight in workspaces.
3. There are no line-of-sight views from the space.

Daylighting recommendations include one or more of the following tools:

- Placement of windows
- Use of one of the following:
 - Photocells
 - Timers
 - Manual switches to switch off perimeter lighting

The impact of the Daylighting Lab depends in part on whom advisors meet with during the course of the project. The least effective situation is one in which they only meet with architects and do no modeling. Better results are achieved when they meet with architects and when a modeling exercise is carried out. Modeling also helps persuade clients who are concerned with additional cost that the results of good daylighting are worth the cost. The most effective projects are those in which the BetterBricks daylighting advisors meet with the project electricians to explain what electrical circuitry is needed to accomplish daylighting.

Question 3: Did the BetterBricks advice given to customers result in, or will it result in, energy savings?

This is also “Yes.” Based on interview responses, it is apparent that BetterBricks advice either has saved energy or will save energy in 9 of the 15 projects. Of the six projects not likely to save energy, two projects never implemented any measures suggested by BetterBricks. The remaining four either received no measure recommendations from the advisors, or the recommendations were merely fine-tuning and had little effect on energy user. In one case, the BetterBricks advice primarily served to support one of the pre-existing alternatives.

The Feasibility of Calculating Energy Savings

There is, however, a sub-question regarding how feasible it is to actually calculate the energy savings for any of the nine projects, based on the information obtained from the reports and interviews.

An energy savings estimate cannot be made unless clear descriptions of the baseline condition and the actual measures are available. The energy impacts of BetterBricks advice were sufficiently well defined and large enough to measure in six of the 15 projects. Of the six projects that had clearly defined BetterBricks measures judged to save energy, one—a lighting retrofit—had energy savings calculated on a utility rebate program spreadsheet.

For the remaining five, we conclude that there are sufficient baseline data for two more projects and that savings can be estimated using a simulation program like *DOE-2*. The energy savings for a fourth BetterBricks project is “theoretically amenable” to engineering estimation of savings, - if a suitably sophisticated model can be found. One project, however, did not have clearly defined measures attributed to BetterBricks advice and resulted in very minor changes that were judged to be too small to calculate.

We conclude that it would be possible to investigate the energy savings from projects that report an effect from the BetterBricks advice and are judged to have significant energy reductions due to that advice.

Summary of Evaluability Assessment

The findings from this evaluability assessment clearly indicate that energy savings can be estimated for a portion of projects that receive BetterBricks Advice services. The assessment indicates that the effect of BetterBricks advice on energy use can be estimated for about 30% of the projects in our sample. Beginning with the project reports and interviews with project architects and owners, it is possible to determine whether energy savings have occurred. The quantitative estimates of energy savings can then be done using *DOE-2* or another simulation methodology.

Steps can also be taken to increase the total number of projects for which this will be possible. These recommendations are intended to apply to all BetterBricks projects, including those from the Daylighting Lab. Such information can be added to the BetterBricks Advisor database, or it could be

4. Database and Evaluability Assessments

kept as a paper trail separate from the database, as the project reports are currently kept.

A first step is to determine what CSI projects should be considered a BetterBricks project and to then review the BetterBricks Advisor database to ensure that only BetterBricks projects are in the database. This will ensure that the database accurately reflects the number, type and status of BetterBricks projects.

A second step is to consider adding fields to the database to document the advice provided. The database does not contain quantitative information about project measures, although it does reference written reports that sometimes contain quantitative information. It does not indicate which measures recommended by advisors have been adopted or if the measures recommended are likely to save energy. Nor does it contain information about available energy studies relevant to energy savings from BetterBricks advice.

A third step is to ensure that written reports are required for all projects. Along with this, it would be important to set a standard that all project reports facilitate subsequent estimates of energy savings. That standard would include:

- A clear description of each measure in the final set of recommendations, including its location in the building and its size, rated capacity and other information related to energy use.
- A clear description of the baseline condition for each recommended measure. For instance, if code is the baseline condition, this should be clearly noted. If baseline is other than code, a description should be provided.
- As an optional item, a clear explanation of the energy calculations used to support each recommendation.

A fourth step is to reconsider the level and length of involvement the advisors should have in projects. Thirteen of 15 sample projects were reported as being affected by BetterBricks advice. In some projects, the effect was a significant change in the design; and in some projects, the BetterBricks advice resulted in very minor changes to the design. There were also measures that the contacts reported as having rejected. A task yet to be included in evaluating the BetterBricks Technical Services is to review a sample of constructed BetterBricks projects in order to understand the reason why some measures are not accepted by the project staff. Some comments pointed to cost of

measures and another pointed to measures not fitting into a project; another could be the increasing sophistication of architects, designers and builders.

If BetterBricks advisors continue to work with the project architects and builders as the project is constructed, they can encourage adoption of recommended measures and they can adapt their recommendations to the specific circumstances that evolve as the project develops. By being involved in the project throughout its design and construction, it would also be possible for the advisor to subsequently document the ultimate impact of the advice on the final project design.

A Note on Daylighting Lab Projects

Daylighting projects were the most frequent type in our sample. The Daylighting Lab BetterBricks projects reviewed in this study generally included a power point presentation with photographs. Most of the technical advice was provided verbally to the client during the presentation. Because of this, it was more difficult to estimate savings for daylighting projects. We believe that the Seattle Daylighting Lab can develop a strategy for evaluating energy savings for all projects where follow-up by the advisor indicates energy savings due to BetterBricks advice are large enough to estimate.

The steps described above—as specifically applied to daylighting projects—suggest the following questions should be addressed:

- What daylighting measures were recommended? Which daylighting measures did the clients adopt? Has the project been completed?
- Did the BetterBricks Daylighting Lab provide modeling? If so, did the clients use this to sell the project? If not, why not?
- Did anyone involved in the project do an energy study that could be used to estimate energy savings due to daylighting?
- Has the client or architect used the BetterBricks Daylighting Lab on other projects? If so, has the architect already incorporated measures in the design that he/she learned from previous contact with the BetterBricks Daylighting Lab?

4. Database and Evaluability Assessments

5. SURVEY OF TRAINING AND WORKSHOP PARTICIPANTS

INTRODUCTION

The Commercial Sector Initiative (CSI) currently includes four different training services:

- Lighting Design Lab workshops on topics related to lighting efficiency and lighting design.
- BetterBricks workshops on broad issues of building design and building operations.
- BetterBricks roundtables that bring together a panel of experts to discuss cutting-edge, design-related issues.
- Hour-long brown-bag sessions offered during the lunch hour as an introduction to key BetterBricks design concepts.

The Lighting Design Lab provides the lighting-related workshops. The Putnam Price Group coordinates the design and execution of the BetterBricks workshops and roundtables. Both organizations sponsor brown bags.

METHODOLOGY

The purpose of the survey was to assess participant satisfaction with the training activities and to gain an assessment of what effects result from the information conveyed. Because the brown-bag sessions tend to be more introductory, they were not included in this investigation.

Questions on these surveys were structured to explore the following issues:

- Professional Background of the Attendees
- Sources of Awareness of the Training
- Reasons for Attending the Training
- Familiarity with Terms Presented in the Training

5. Survey of Training and Workshop Participants

- Influence of Training on Practices
- Satisfaction with Training
- Additional Comments from Participants Regarding the Program

Three sample frames were developed using the BetterBricks Advisors database:

1. **BetterBricks Roundtables** –The sample was drawn from the population of 376 individuals who attended various roundtables between October 2003 and August 2004. Surveys were completed with a total of 20 roundtable participants.
2. **BetterBricks Workshops** – The sample was drawn from the population of 522 individuals who participated in workshops between October 2003 and August 2004. Surveys were completed with a total of 45 participants.
3. **Lighting Design Lab Trainings** – The sample was drawn from the population of 294 individuals attending Lighting Design Lab training events between January and August 2004. Surveys were completed with a total of 50 of these participants.

Individuals were randomly selected from each of the three population groups. In total, 115 surveys were completed. The disposition for each group is shown in Table 5-1, below. Fully 98% of those contacted recalled the specific training event and 95% of those contacted agreed to participate in the survey. Many of those surveyed indicated an interest or obligation to participate in the survey process as a way of supporting the BetterBricks' training efforts.

Table 5-1
SAMPLE DISTRIBUTION FOR THE POPULATION OF PARTICIPANTS

DISPOSITION	TRAINING ATTENDED			TOTAL
	BETTERBRICKS ROUNDTABLE	BETTERBRICKS WORKSHOP	LIGHTING DESIGN WORKSHOP	
Total Listed in Database	378	522	294	1194
Disqualified: Not Eligible-Presenter/Facilitator	9	0	0	9
Total Contacted	87	162	156	405
Disqualified: Did not Attend or Recall Attending	7	10	3	20
Disqualified: Bad Phone Number or Participant Left Firm	10	11	15	36
Qualified for Current Study (Estimate)	265	454	260	979
Refused	2	1	3	6
Interviewed	20	45	50	115
Interviewed as a Percent of Qualified	8%	10%	19%	12%
Sample Confidence Level/ ± Precision	85%/15%	85%/10%	90%/10%	90%/8%

FINDINGS

Profession of Survey Respondents

Table 5-2, below, highlights the distribution of professions represented by survey respondents. As shown in this distribution, individuals who are very likely to be directly involved in the design of buildings and building systems are attending the training sessions. Overall, architects and engineers are equally represented in these trainings, at 31% each. However, there is quite a bit of variation in this statistic across the various trainings; the percentage of architects and engineers attending the BetterBricks Workshops is greatest, (approximately 80%) and Lighting Design Lab workshops had substantially fewer from these professions attending (32%).

5. Survey of Training and Workshop Participants

Table 5-2
DISTRIBUTION OF RESPONDENTS BY PROFESSION

PROFESSION	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Architect	6	30%	18	40%	12	24%	36	31%
Engineer	10	50%	17	38%	9	18%	36	31%
Other	3	15%	7	16%	23	46%	33	29%
Utility Employee	0	0%	0	0%	6	12%	6	5%
Consultant	1	5%	3	7%	0	0%	4	4%
TOTAL*	20	100%	45	101%	50	100%	115	100%

* Totals may not equal 100% due to rounding.

Lighting Design Lab workshop attendees tended to have the greatest diversity of background. While attendees were most likely to be architects or engineers (24% and 18%, respectively), the 23 “other” participants reflected a spectrum of people involved with the design and delivery of lighting, including seven in lighting sales, five utility or government energy conservation program managers, two construction managers, two in facility maintenance, two energy consultants, two students, one exhibit designer, one electrical contractor and one project lead.

Sources of Information about Trainings

The source of information for these trainings varied, as shown in Table 5-3. Overall, participants most often learned of the training opportunities through an email announcement from BetterBricks (47%). This is skewed somewhat by the Lighting Design Lab workshops, for which 74% of respondents indicated that they learned about the training via email. The next most common method of course awareness, overall, was through a business colleague (32%). This method was especially important for the BetterBricks Workshops. The Lighting Lab workshops, for which 74% of participants heard of the workshop through a BetterBricks email, has been in existence for over a decade and publicizes its events through an extensive email network, a website and a newsletter, as well

as through its advisors. The BetterBricks workshops and roundtables were publicized through the same sources, but the majority of participants responded more to recommendations from colleagues and other indirect means.

Table 5-3
SOURCE OF INFORMATION ABOUT TRAININGS

HOW DID YOU HEAR ABOUT THE TRAINING?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
BetterBricks Email Announcement of Class	6	30%	11	24%	37	74%	54	47%
Recommended by a Friend or Colleague	3	15%	23	51%	11	22%	37	32%
Other	5	25%	11	24%	2	4%	18	16%
Cascadia Chapter of the USGBC	3	15%	0	0%	0	0%	3	3%
Don't Know	2	10%	0	0%	0	0%	2	1%
Internet	1	5%	0	0%	0	0%	1	<1%
TOTAL	20	100%	45	100%	50	100%	115	100%

Table 5-4 shows respondents' reasons for attending the trainings. The majority of respondents indicate that they attended out of general interest. This includes 38% who said they attended because they wanted to learn more about energy efficiency in general and 14% who said they were interested in the general topic for the workshops they attended. An additional 20% of the respondents indicated they attended the training because it was applicable to their work. Participants attending the BetterBricks and Lighting Design Lab workshops were eligible for LEED certification credit and other continuing credits. Twenty one percent of workshop participants cited this as a reason for attending and 9% cited this as the only reason for attending. Continuing education credits were not available for roundtable sessions.

5. Survey of Training and Workshop Participants

Notably, less than 1% of participants attended as a result of either a client request or a specific problem they wanted to solve.

Table 5-4
REASON FOR ATTENDING TRAINING

WHY DID YOU ATTEND TRAINING?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Wanted to Learn More	7	35%	20	44%	17	34%	44	38%
Applicable to My Work	6	30%	5	11%	12	24%	23	20%
Interested in topic	5	25%	7	16%	4	7%	16	14%
Continuing Education Only	0	0%	5	11%	4	7%	9	8%
Other	1	5%	0	0%	7	18%	8	7%
Continuing Education and Wanted to Learn More	0	0%	2	4%	4	7%	6	5%
Continuing Education and Interested in Topic	0	0%	3	7%	2	4%	5	4%
Had a Specific Problem We Wanted to Solve	1	5%	0	0%	0	0%	1	1%
Clients Interested in Topic	0	0%	1	2%	0	0%	1	1%
Conference Workshop	0	0%	1	2%	0	0%	1	1%
Learn More/Wanted to Network with Other Professionals	0	0%	1	2%	0	0%	1	1%
TOTAL*	20	100%	45	99%	50	101 %	115	100%

* Total does not equal 100% due to rounding.

Overall Knowledge and Source of Awareness for Key Concepts

Training participants were exposed to a variety of potentially new concepts related to energy efficiency. In this survey, we sought to assess retention of these concepts and whether or not such awareness was attributable to the training. Results from these questions are provided in Table 5-5, below.

Table 5-5
OVERALL KNOWLEDGE AND SOURCE OF AWARENESS FOR KEY CONCEPTS

TERM AWARENESS	AWARE OF TERM	PERCENT AWARENESS	AWARE FROM TRAINING	PERCENT AWARENESS FROM TRAINING
Staged Lighting Controls	80	70%	23	20%
Climate Responsive Design	78	68%	22	19%
Integrated Design	109	95%	22	19%
LEED Energy Points	99	86%	21	18%
Energy Modeling	106	92%	16	14%
Building Commissioning	107	93%	8	7%
Lighting Occupancy Sensors	106	92%	7	6%
Natural Ventilation	107	93%	7	6%
Dimming Ballasts	105	91%	5	4%
Life-Cycle Cost Analysis	115	100%	5	4%

The results indicate widespread familiarity with various key concepts, though not necessarily due to the training. Eighty percent of participants knew nine or more of the ten terms and 90% knew six or more of the ten terms. Fully 95% of respondents reported knowing the terms *integrated design* and *life-cycle cost analysis*. Conversely, relatively new terms were less well known, though still recognized by over 65% of respondents, with *climate responsive design* known to the fewest participants, followed by the phrases *staged lighting controls* and *LEED energy points*.

5. Survey of Training and Workshop Participants

In assessing whether or not the trainings played a role in these awareness levels, survey results indicate that less than 20% were exposed to several of these terms for the first time at the trainings, including the terms *LEED energy points*, *integrated design*, *climate responsive design* and *staged lighting controls*.

Table 5-6 shows that participants are extremely likely to recall terms that were used in the workshops they participated in, with three of the ten terms recalled by 100% of participants attending workshops where the terms were featured and eight of ten terms recalled by 90%. Recall was least for the phrase *climate responsive design*, which was recalled by 78% of people attending training sessions in which the phrase was used.

Table 5-6
AWARENESS OF TERMS PRESENTED IN WORKSHOPS

TERM AWARENESS	BETTERBRICKS ROUNDTABLE			BETTERBRICKS WORKSHOP			LIGHTING DESIGN WORKSHOP		
	EVENTS WITH TERM USED	TERM RECALLED	PERCENT RECALLED	EVENTS WITH TERM USED	TERM RECALLED	PERCENT RECALLED	EVENTS WITH TERM USED	TERM RECALLED	PERCENT RECALLED
Staged Lighting Controls	N/A	N/A	N/A	N/A	N/A	N/A	50	44	88%
Climate Responsive Design	4	3	75%	14	11	79%	N/A	N/A	N/A
Integrated Design	12	12	100%	35	35	100%	N/A	N/A	N/A
LEED Energy Points	14	14	100%	30	27	90%	N/A	N/A	N/A
Energy Modeling	3	3	100%	9	8	89%	N/A	N/A	N/A
Building Commissioning	1	1	100%	28	26	93%	N/A	N/A	N/A
Lighting Occupancy Sensors	N/A	N/A	N/A	N/A	N/A	N/A	50	49	98%
Natural Ventilation	8	7	88%	39	38	97%	N/A	N/A	N/A
Dimming Ballasts	N/A	N/A	N/A	N/A	N/A	N/A	50	50	100%
Life Cycle Cost Analysis	12	12	100%	23	23	100%	N/A	N/A	N/A

Effects of Training on Design Practices

In order to assess potential impacts from the training, survey respondents were asked a series of questions to assess the effect of training upon their design practices. Participants who were engineers or architects were asked whether the event had such an effect. Results shown in Table 5-7 indicate that, while the majority of the participants had previously responded that they attended out of general interest in the topic, a majority (82%) also responded that it had affected their practices. The percentage was particularly high for the Lighting Design Lab trainings in which 97% (all but one participant) responded *yes* when queried if the training had affected their designs.

Table 5-7
EFFECTS OF TRAINING ON DESIGN PRACTICES

HAS THE TRAINING HAD ANY EFFECT ON DESIGN?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	12	75%	28	74%	29	97%	69	82%
No	4	25%	10	26%	1	3%	15	18%
Not Sure	0	0%	0	0%	0	0%	0	0%
TOTAL	16	100%	38	100%	30	100%	84	100%

When asked to explain what is different regarding their design practice since the training session (Table 5-8), most responses were not specific, only indicating a general impact on their approach to design. Responses also indicate that practitioners have familiarity with energy-efficient design concepts, with over half indicating that the trainings either reinforced concepts or added to existing knowledge.

5. Survey of Training and Workshop Participants

Table 5-8
SPECIFIC WAYS TRAINING AFFECTED DESIGN PRACTICES

HOW DID THE TRAINING AFFECT HOW YOU THINK ABOUT OR DO DESIGN?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
More Awareness / Increased Knowledge	9	69%	9	28%	17	59%	35	47%
Reinforcement of Concepts	0	0%	9	28%	6	21%	15	20%
Current Design Considerations	1	8%	3	9%	4	14%	8	11%
Other	2	15%	5	16%	1	3%	8	11%
More Upfront Design Considerations	0	0%	6	19%	0	0%	6	8%
Don't Know / Not Sure	1	8%	0	0%	1	3%	2	3%
TOTAL	13	100%	32	100%	29	100%	74	100%

Illustrative comments on this topic from BetterBricks roundtable participants are as follows:

- *“I wanted to bring energy modeling 'in-house.' In the past, I have usually delegated that to a mechanical engineer. I wanted to find out whether architects can do it, if architects were doing it, and what was required. I discovered that I could and I am now doing it as a service. The panel was free-wheeling, provided a lot of good information, and answered a lot of my questions.”*
- *“I deal with efficiency, particularly with not so much building structure, but the HVAC system, and design of computer servers, I've learned some interesting information about how to get the air to the servers to keep them cool. I also learned about efficiency of servers themselves, and some of the trade-offs that are made between efficiency and harmonics reduction and power quality.”*
- *“The main thing is optimism, that the fellow who was the developer, was the most passionate about green design, and his company has taken*

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some core principals to heart. That was very exciting, that a developer would be so enlightened, and that folks in my area are really interested in this type of thing. I got encouragement to be LEED certified/accredited—the roundtable was a good boost to get this accomplished. Also, networking introduced me to interesting people.”

One workshop participant summarized the value of reinforcing existing concepts this way:

- *“It was more of a review, and it is good to see [climate responsive design] is being looked at again.”*

Another spoke to the value of building on existing knowledge:

- *“Every little bit I learn has me more aware of the lighting aspects of design.”*

As shown in Table 5-9, below, a slight majority of participants indicated that they had applied what they learned to one or more specific projects. Responses differed somewhat between the various training offerings, ranging from 42% of BetterBricks workshop participants indicating they had applied what was learned, to 64% of Lighting Design Lab participants doing so.

Table 5-9
APPLYING TRAINING TO SPECIFIC PROJECTS

HAVE YOU APPLIED WHAT YOU LEARNED TO ANY SPECIFIC PROJECT?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	10	50%	19	42%	32	64%	61	53%
No	10	50%	26	58%	16	32%	52	45%
Not Sure	0	0%	0	0%	2	4%	2	2%
TOTAL	20	100%	45	100%	50	100%	115	100%

Table 5-10 provides a summary of how respondents report having applied their training in specific projects. Application of the training fell predominantly into

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three categories: “applied specific measures” (32%), “applied concepts” (32%) and “increased awareness” (18%).

Table 5-10
WAYS TRAINING IS APPLIED TO SPECIFIC PROJECTS

WHAT DID YOU DO AND HOW IS THAT DIFFERENT THAN WHAT YOU WOULD HAVE DONE BEFORE?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Applied Specific Measures	0	0%	5	31%	15	42%	20	32%
Applied Concepts	6	54%	5	31%	9	25%	20	32%
Increased Awareness	1	9%	3	19%	7	19%	11	18%
Reinforced Ideas	1	9%	2	12%	4	11%	7	11%
Other	3	27%	1	6%	1	3%	5	8%
TOTAL	11	99%	16	99%	36	100%	63	101%

* Total does not equal 100% due to rounding.

Two responses that are indicative of this category are:

- *“I have a better understanding of the balance between step lighting and daylighting controls. I also know where to look for the payback value.”*
- *“What was being discussed in the course was how to sell/pitch energy efficiency, and this was an encouragement to bring it up in the next project; to identify some basis to justify introducing energy efficiency.”*

Fifty-two of the 115 participants (45%) indicated that they had not applied information from the trainings they attended. When asked why they had not been able to apply information learned in trainings (Table 5-11), the most frequently reported reason for workshop attendees was: “I am not working on anything that is appropriate” (56%). The next most common response was related to “not learning anything new” or “already had solid knowledge on the topic” (19%). Based upon this small sample, BetterBricks roundtable

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participants appear to be much more likely to report that the roundtables did not provide them with new information.

Table 5-11
REASONS FOR NOT APPLYING TRAINING LESSONS

WHAT BEST DESCRIBES THE REASON YOU HAVE NOT APPLIED WHAT YOU LEARNED TO A SPECIFIC PROJECT?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
I Am Not Working on Anything That Is Appropriate	4	40%	18	69%	7	44%	29	56%
I Have Not Had Time, But Will In The Future	1	10%	2	8%	3	19%	6	12%
I Don't Think These Ideas Really Work	0	0%	0	0%	0	0%	0	0%
I Don't Feel I Know Enough Yet	0	0%	0	0%	0	0%	0	0%
Did Not Learn Anything New / Already Had Solid Knowledge of Topic	4	40%	4	15%	2	12%	10	19%
Not Applicable to My Profession / My Work	1	10%	1	4%	3	19%	5	10%
Other	0	0%	1	4%	1	6%	2	4%
TOTAL	10	100%	26	100%	16	100%	52	101%

* Total does not equal 100% due to rounding.

One of the ways in which the trainings may have spillover into the broader marketplace is through discussions with colleagues. As shown in Table 5-12, information presented in the trainings does tend to disseminate from participants to colleagues. This is a strong indication of the perceived value of the information provided.

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Table 5-12
DISCUSS TRAINING WITH COLLEAGUES

DID YOU DISCUSS THE TRAINING WITH COLLEAGUES?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	13	65%	33	73%	36	72%	82	71%
No	7	35%	11	24%	13	26%	31	27%
Not Sure	0	0%	1	2%	1	2%	2	2%
TOTAL	20	100%	45	100%	50	100%	115	100%

Further, as Table 5-13 indicates, nearly half of their colleagues are known to have applied the information that was passed on from the training. For this question, “colleagues” can include peers who also participated in the training session, as well as those who did not. Looking at Table 5-12, it is apparent that there was uniformity in the perceived value of training by those who participated, with 65% to 72% of these participants saying they discussed the training with colleagues. However, in Table 5-13, it appears that the BetterBricks workshop information was perceived to be more useful to colleagues.

Table 5-13
COLLEAGUES APPLYING KNOWLEDGE TO OTHER PROJECTS

DID YOUR COLLEAGUES USE THE TRAINING INFORMATION ON OTHER PROJECTS?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	5	39%	20	61%	13	36%	38	46%
No	5	39%	11	33%	8	22%	24	29%
Not Sure	3	23%	2	6%	15	42%	20	24%
TOTAL	13	101%	33	100%	36	100%	82	100%

* Total does not equal 100% due to rounding.

Satisfaction with Training

Table 5-14 shows overall participant satisfaction with the trainings. Participants were asked to rate their overall satisfaction with the training using a one-to-five rating scale, in which one indicates “very dissatisfied” and five indicates “very satisfied.” A strong majority (83%) gave a score of four or five, while less than 4% provided a rating of one or two. A score of four was the most frequently selected by participants. Lighting Design Lab participants were most likely to give a score of five for the event they attended, although there were also more Lighting Design Lab participants likely to indicate lower satisfaction.

Table 5-14
OVERALL SATISFACTION WITH TRAINING

SATISFACTION WITH TRAINING (5 IS VERY SATISFIED)	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
5	5	25%	11	24%	22	44%	38	33%
4	13	65%	24	53%	21	42%	58	50%
3	2	10%	8	18%	5	10%	15	13%
2	0	0%	1	2%	2	4%	3	3%
1	0	0%	1	2%	0	0%	1	1%
TOTAL	20	100%	45	100%	50	100%	115	100%

The survey also explored participant satisfaction with specific elements of the training, again using a one-to-five rating scale. As shown in Table 5-15, across all training programs, participants were the most satisfied by the “Knowledge level of presenter,” with 110 of 115 respondents (96%) rating this element with either a four or a five. This was followed by “The presenter’s answer to questions,” with 102 (86%) rating this element a four or five.

Participants were less favorable regarding elements related to implementation, with 72 (63%) rating “The depth of information on how to execute the design

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ideas” as a four or five, and 52 (45%) rating “The depth of information on effect on cost” as a four or five.

Table 5-15
SATISFACTION WITH TRAINING ELEMENTS

SATISFACTION WITH:	BETTERBRICKS ROUNDTABLE			BETTERBRICKS WORKSHOP			LIGHTING DESIGN WORKSHOP		
	1 - 2	4 - 5	MODE	1 - 2	4 - 5	MODE	1 - 2	4 - 5	MODE
Knowledge Level of Presenter	0%	95%	4	0%	93%	5	0%	98%	5
The Depth of Information on How to Execute the Design Ideas	15%	40%	3	13%	58%	4	8%	76%	4
The Depth of Information on Effect on Cost	20%	30%	3	11%	53%	4	12%	44%	3
The Location of the Training	0%	80%	5	2%	87%	5	4%	80%	5
The Applicability of the Information In My Daily Work	10%	85%	4	15.6%	60%	5	6%	74%	4
The Examples that Demonstrated the Application of the Concepts	20%	55%	4	4%	78%	4	0%	84%	4
The Presenters' Answers to Questions	0%	90%	4	2%	82%	4	2%	94%	5

Perhaps not surprisingly, the training event types most likely to provide the most specific information received the highest ratings for elements related to the level of detail. Lighting Design Workshop participants were most likely to give a four or five rating for examples demonstrating concepts (84%) and depth of information on executing design ideas (76%). Roundtable participants gave significantly lower scores for these same elements, with 55% giving a four or five for examples demonstrating concepts and 40% giving a four or five for information on executing design ideas.

Training location received almost uniform ratings of four or five, with only three participants giving a one or two rating and 90 giving a four or five rating.

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As an indicator of the level of satisfaction, all but one respondent said that they would recommend the training session that they attended. As shown in Table 5-16, specifically these respondents felt that the sessions were informative (30%) and provided a good overview of basic information (23%).

Table 5-16
REASONS TO RECOMMEND COLLEAGUES ATTEND TRAINING

WHAT WOULD YOU TELL COLLEAGUES REGARDING TRAININGS?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Other Response	9	45%	15	33%	15	29%	39	34%
Informative	4	20%	7	16%	24	47%	35	30%
It's A Basic Overview of Information	5	25%	14	31%	8	16%	27	23%
Just Go To It If Given the Opportunity	1	5%	3	7%	3	6%	7	6%
Need To "Get On Board" For Sustainable Design Issues	0	0%	4	9%	1	2%	5	4%
Relates to My Work	1	5%	0	0%	0	0%	1	1%
Valuable Lessons	0	0%	1	2%	0	0%	1	1%
Don't Know	0	0%	1	2%	0	0%	1	1%
TOTAL	20	100%	45	100%	51	100%	116	100%

Awareness of Other BetterBricks Technical Services

Training events such as these provide an opportunity to promote the advisors' services. Attendees were asked if they were aware of other services offered by BetterBricks. The responses, shown in Table 5-17, indicate that, while the majority of participants are aware of other services, there is a significant opportunity to inform knowledgeable and interested participants about additional services.

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Table 5-17

AWARENESS OF OTHER BETTERBRICKS TECHNICAL SERVICES

ARE YOU AWARE OF OTHER BETTERBRICKS TECHNICAL SERVICES?	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	18	90%	29	64%	37	74%	84	73%
No	2	10%	16	36%	13	26%	31	27%
Not Sure	0	0%	0	0%	0	0%	0	0%
TOTAL	20	100%	45	100%	50	100%	115	100%

Table 5-18 indicates that of the 73% of participants that reported being aware of BetterBricks Technical Services, the majority has a relatively incomplete knowledge of those services. As an example, less than one-third indicated awareness of additional training and seminars, and about one-fifth indicated awareness of the Lighting Design Lab. None mentioned energy analysis and modeling as a BetterBricks service. Fewer than 6% were familiar with the BetterBricks Advisor services.

Table 5-18
NAMES OF KNOWN SERVICES GIVEN BY PARTICIPANTS
 (Multiple Mentions Permitted)

NAME OF SERVICES	BETTERBRICKS ROUNDTABLE		BETTERBRICKS WORKSHOP		LIGHTING DESIGN WORKSHOP		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Training and Seminars	11	39%	13	33%	16	28%	40	32%
Lighting Design Lab	2	7%	9	22%	16	28%	27	21%
Communication Conduit	4	14%	8	20%	10	17%	22	18%
Design Team	3	11%	0	0%	10	17%	13	10%
Other	3	11%	4	10%	3	5%	10	8%
BetterBricks Advisors	3	11%	4	10%	0	0%	7	6%
Daylighting	2	7%	1	3%	1	2%	4	3%
No Specific Service Given	0	0%	0	0%	2	3%	2	2%
Case Studies	0	0%	1	3%	0	0%	1	1%
TOTAL	28	100%	40	101%	58	100%	126	101%

* Total does not equal 100% due to rounding.

Participant Comments and Recommendations

The final question asked to BetterBricks training participants solicited additional comments regarding the training. While comments were diverse in content, survey responses can be grouped into two categories. The first is an overall appreciation of the training; the second is a desire that the training would have been more in-depth, with greater technical information provided.

Representative quotes from respondents who thought the training was good overall include:

- *“I think it’s valuable and I hope they keep it up.”*

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- *“It was great, and I think we’ve got some other opportunities for a similar training, and we’ll definitely be taking those as well.”*
- *“She was an excellent presenter.”*

Representative quotes from those respondents that would like to have seen greater information depth and detail include:

- *“I wish they would have intermediate and advanced lighting classes; I need to be at the next level.”*
- *“It would be good to have two levels of training, and advertise it that way (e.g., introductory vs. in-depth) for those who are already well-versed.”*
- *“To stay in the AIA, we are supposed to get training credits, but I don’t think this training gave any really good information to that regard. Maybe something that is more in-depth would be helpful; much of this is the same stuff we did back in the 70s in college.”*

SUMMARY

Architects and engineers—those professions directly targeted by the BetterBricks program because of their influence in the design process—were the largest proportion of professionals attending BetterBricks trainings. Word of mouth was particularly important for the BetterBricks workshops, while email solicitations were especially important for the Lighting Design Lab workshops. The Lighting Design Lab has an extensive email database that is regularly tapped for their promotions and this avenue will likely also be very effective for the other trainings as targeted contact databases are developed. Motivations to attend the trainings varied, with the desire to learn more and to apply this information to attendees’ work being the primary influences.

One measure of the effectiveness of the program is the degree to which attendees attribute familiarity with key terms to the workshops attended. Survey results indicate that attendees have a widespread familiarity with terms related to energy efficiency. The trainings were also cited as having a positive effect on design, especially the daylighting workshops. Approximately 50% of those surveyed report that they have applied what they learned to specific projects, with Lighting Design Lab workshops showing the highest response in this regard. Another important indicator of program effectiveness is the fact

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that attendees discussed these workshops with their professional colleagues and a large percentage of these report that their colleagues have applied the information passed on to them.

Generally, training participants were highly satisfied with their experiences, with more than 80% rating the trainings a four or five on a five-point scale. These attendees were most satisfied with the knowledge of the presenter, indicating that the Alliance has brought together a very credible group of instructors. Roundtable attendees were less satisfied with the depth of information provided, indicating that the examples provided during roundtables were not useful. In contrast, Lighting Design Lab workshop attendees were found to be most satisfied with their experiences.

Reported awareness of BetterBricks Technical Services was high, overall, and highest for the roundtable participants. However, when queried more deeply, it was found that there were significant gaps in this awareness. Less than one-third of respondents indicated awareness of other training and seminars; approximately one-fifth indicated familiarity with the Lighting Design Lab as a BetterBricks service; none mentioned energy analysis and modeling as a BetterBricks service; and, fewer than 6% were familiar with the BetterBricks Advisor Service.

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6. SURVEY OF BETTERBRICKS ADVICE RECIPIENTS

INTRODUCTION

CSI provides advisory services to “help architects, developers, engineers, and facility managers incorporate energy efficiency into their building designs, construction plans and day-to-day maintenance operations.” Advisory services specific to lighting are provided by the Lighting Design Lab, while advisory services specific to a broad range of other design-related topics are provided by BetterBricks Daylighting Labs and BetterBricks Advisors, including services specific to daylighting and mechanical systems.

We surveyed participants in the advisory services in order to assess participant satisfaction with the advisor activities and to understand the impact of these services. Questions on these surveys were designed to explore the following issues:

- Role of the Participant in the Project
- Source of Awareness of the Advisor Services
- Reasons for Obtaining Advisor Services
- Influence of Advisor Services on Decisions
- Satisfaction with Advisor Services
- Awareness of Other Services Offered As Part of the BetterBricks Program
- Comments and Suggestions Regarding Services Received

METHODOLOGY

In total, 70 surveys were completed with advisory service participants, including 20 surveys with participants receiving advisory services from the Lighting Design Lab and 50 surveys with participants receiving services from the BetterBricks Daylighting Labs and Advisors, who were divided into those

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receiving daylighting advisory services and those receiving all other advisor services. Three sample frames were developed for this survey, the disposition of which is shown in Table 6-1.

1. **Lighting Design Lab Participants** – For the sample of participants receiving services from the Lighting Design Lab, the population contained 97 project clients listed in the BetterBricks Advisors database for projects having activity between October 2002 and July 2004. Note that this total does not reflect the total population of *individuals* receiving advisory services; rather, these are the individuals who are listed as the primary client contact for the *project*. Further, the advisory services were required to be complete, defined as the respondent not expecting additional assistance from the advisor for that specific project. A sample was randomly drawn from this group, with 50 people contacted in order to complete 20 surveys.
2. **Daylighting Participants** – The sample of daylighting participants included 94 projects that were advised by one of the three Daylighting consultants—Joel Loveland, Charlie Brown or Kevin van den Wymelenberg. A quota of 30 completed interviews was met for the Daylighting Advisors.
3. **BetterBricks Advisors Participants** – The sample of participants receiving services from the BetterBricks Advisors was drawn from the population of 42 clients receiving services between April 2003 and July 2004. As with the Lighting Design Lab sample, these clients are the primary client contact for the advisor services. The sample was designated as participants for whom the advisor process was complete for a specific project. However, many records in the BetterBricks Advisors database had missing or outdated information on project status. To ensure sample accuracy, interviewees were screened to confirm that the advisory services provided by the advisors were complete. While we endeavored to complete a quota of 20 surveys with this group, only 16 completes were possible given the small size of the population.

While conducting the surveys with the Daylighting Lab and BetterBricks Advisors advisory service, it became apparent that the project classifications shown in the database were not always accurate. In two instances, projects marked as not involving daylighting turned out to be *exclusively* daylighting. These two surveys were reclassified as daylighting in the final tally. Also, two

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surveys were redirected to the other advisory services when it became apparent that the client had received multiple services.

The surveys were structured with both closed and open-ended questions. The closed-ended questions allowed a tabulation of information primarily related to the program’s influence and participants’ satisfaction with program features. The open-ended questions allowed the respondent to tell their story about why they answered a question a certain way without having to fit their response to a pre-determined answer. These responses were later compared and grouped into similar categories for presentation in the evaluation. In some instances, the individual responses might contain information that could place them in multiple categories. Except for the awareness of other BetterBricks Technical Services, the responses were assigned a category based on the major theme of the response.

Sample disposition for each of the three groups is presented in Table 6-1, below.

Table 6-1
SAMPLE DISPOSITION FOR THE POPULATION OF PARTICIPANTS

DISPOSITION	ADVISORY SERVICES			TOTAL
	LIGHTING DESIGN LAB	DAYLIGHTING LAB	BETTERBRICKS	
Total Participants	97	94	42	233
Disqualified: Not eligible-- Project Not Complete	0	2	3	5
Contacts Called	50	47	28	125
Disqualified: Did Not Participate or Did Not Recall Participating	2	0	0	2
Disqualified: Bad Phone Number or Participant Left Firm	7	1	3	11
Qualified for Current Study (Estimate)	88	93	39	220
Refused	0	0	0	0

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Interviewed	20	30	16	66
Interviewed as a Percent of Qualified	23%	32%	41%	30%

To better understand who is using the advisor services, respondents were asked to describe their relationship to the project. The results are shown in Table 6-2, below. Most frequently, the participant was a project architect. There were significant differences between the three groups, with architects being the predominant occupation group for BetterBricks Daylighting Services, yet comprising about half of those receiving non-daylighting services and fewer than one-third of those receiving services from Lighting Design Lab services.

Table 6-2
RESPONDENT DISTRIBUTION BY PARTICIPANT'S ROLE

ROLE	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Architect	6	30%	27	90%	8	50%	41	62%
Building Manager	5	25%	1	3%	2	13%	8	12%
Building Owner	2	10%	0	0%	3	19%	5	8%
Utility Representative	3	15%	0	0%	2	13%	5	8%
Other	1	5%	1	3%	1	6%	3	4%
Engineer	2	10%	0	0%	0	0%	2	3%
Lighting Design	1	5%	1	3%	0	0%	2	3%
Building Tenant	0	0%	0	0%	0	0%	0	0%
TOTAL	20	100%	30	100%	16	101%	66	100%

* Total does not equal 100% due to rounding.

FINDINGS

Interest in Advisory Services

Table 6-3 summarizes how participants heard about the program. Overall, respondents were most likely to attribute their awareness of the advisory service through contact by either the Lighting Design Lab or through BetterBricks. Not surprisingly, the Lighting Design Lab was the most frequently referenced source of awareness for both the Lighting Design Lab advisor services and for BetterBricks Daylighting services. Note that interviewers observed confusion among respondents regarding the distinction between the Lighting Design Lab and the Seattle Daylighting Lab. Regarding BetterBricks non-daylighting services; BetterBricks and the Lighting Design Lab were equally likely to be the source of awareness of advisor services. Very few respondents (three percent) learned of the service through any formal advertising.

**Table 6-3
AWARENESS OF SERVICE**

HOW DID YOU HEAR ABOUT THE SERVICE?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Through LDL Contact	9	45%	17	57%	5	31%	31	47%
Through Utility	5	25%	2	7%	2	12%	9	14%
Through BetterBricks Contact	0	0%	4	13%	5	31%	9	14%
Through A Business Colleague	2	10%	6	20%	0	0%	8	12%
Through Other Method	3	15%	1	3%	0	0%	4	6%
Through Contractor/ Architect/Engineer Network	1	5%	0	0%	2	12%	3	4%
Through Formal Advertising	0	0%	0	0%	2	12%	2	3%
TOTAL	20	100%	30	100%	16	98%	66	100%

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* Total does not equal 100% due to rounding.

Awareness of services because of the Lighting Design Lab came in many forms as evidenced in the following comments:

- *“LDL came through and did a seminar on lighting and I talked to Shaun at one of these”*
- *“I have known about it for years and have been on a tour of the lab”*
- *“I had worked with Shaun on another project”*

It was apparent in two cases that participants were not necessarily familiar with the fact that the services provided were affiliated with BetterBricks. In these cases, it appears that the consultant arranged directly for the BetterBricks Advisor services to be available to the participant.

Participants were asked why they decided to use the advisor service (Table 6-4). While reasons for participation were diverse, “need for technical expertise related to design” was the most common response. This response was driven, in large part, by the respondents receiving BetterBricks daylighting services. This group seemed particularly interested in tapping into available technical expertise.

Table 6-4
REASON FOR USING SERVICE

WHAT WAS THE REASON YOU SOUGHT ADVICE?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Needed Technical Expertise Related to Design	3	15%	15	50%	3	19%	21	32%
Concerned with Energy Efficiency	5	25%	0	0%	2	12%	7	11%
Project Needed LEED Certification	2	10%	4	13%	1	6%	7	11%

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Optimize Building Performance	0	0%	4	13%	3	19%	7	11%
Interested In Energy Modeling	0	0%	5	17%	1	6%	6	9%
Desired State-of-the Art Technology	4	20%	0	0%	1	6%	5	7%
Other Reason	2	10%	0	0%	3	19%	5	7%
Improve Lighting Quality	4	20%	0	0%	0	0%	4	6%
BetterBricks Goals Align With Our Goals	0	0%	2	7%	2	12%	4	6%
TOTAL	20	100%	30	100%	16	99%	66	100%

* Total does not equal 100% due to rounding.

Illustrative comments from participants pertaining to the reason they sought advice include:

- *“Our project was at a crossroads as to how to best serve the expansion on the campus related to services outside of the central utility plant; we could not serve new load through the existing plant.”*
- *“The BetterBricks philosophy is in line with our client’s philosophy and with our philosophy. We wanted to see how BetterBricks could make the building more energy-efficient and environmentally friendly.”*
- *“I was interested in energy modeling using the EQuest program. I wanted to look at energy modeling in terms of the building design and being more efficient; to save money and energy.”*
- *“It was for a client and they wanted to evaluate some sustainability ideas and they did not have a big budget to pay for a consultant.”*

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Effect of Advisory Services on Project

Overall, 71% of the advisory service respondents indicated that the services had an impact upon their particular project, with the majority for each of the three types of services stating that the advice had changed their project (Table 6-5).

Table 6-5
EFFECT OF SERVICE ON PROJECT

DID THE ADVICE CHANGE THE PROJECT?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	11	55%	25	93%	11	58%	47	71%
No, But Confirmed Existing Design Concept	5	25%	1	4%	4	21%	10	15%
No (Other)	4	20%	1	4%	4	21%	9	14%
Not Sure	0	0%	0	0%	0	0%	0	0%
TOTAL	20	100%	27	101%	19	100%	66	100%

* Total does not equal 100% due to rounding.

Recipients of services under the Lighting Design Lab indicated the least level of impact. However, many of these respondents gave credit to the service in that it confirmed that their design approach was correct. The daylighting advisory service had 83% responding in the affirmative. The BetterBricks' other advisory service had 69% responding in the affirmative.

For three of the Lighting Design Lab projects, the advice was not followed due to budget constraints. In the fourth case, the owner decided not to follow the advice.

The respondent for the one Daylighting Lab project that did not use the advice to enhance or confirm their design said that the recommendations were

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incompatible with design needs of a 12-story building and with the developer’s concern that prospective tenants might not like some of the design ideas.

Of the four BetterBricks Advisor projects not applying the advice, three of the projects did not move into the construction phase and one project did not incorporate the advice because the project “was budget constrained and energy efficiency was not a focus.”

As with the Lighting Design Lab advisory service, BetterBricks non-daylighting participants who responded that the service had not changed their project felt that the service had nevertheless been valuable in that it had confirmed their design approach.

Participants that did change their project were asked how the advice had been applied. As shown in Table 6-6, nearly half of these participants indicated that they had directly incorporated more energy-efficient technologies or energy efficiency into the project. Another 30% indicated that the services helped more generally by refining or improving the project design.

Table 6-6
SPECIFIC WAYS SERVICE AFFECTED THE PROJECT

HOW DID THE ADVICE CHANGE THE PROJECT?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Incorporated More Energy-efficient Technologies or Energy Efficiency Into the Project	8	73%	10	40%	4	36%	22	47%
Helped Refine or Improve the Design of the Project	0	0%	12	48%	2	18%	14	30%
Helped Convince Decision-Maker to Use More Efficient Technology	2	18%	1	4%	2	18%	5	11%
Incorporated BetterBricks Recommendations Into Project	1	9%	2	8%	1	9%	4	8%

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Lent Credibility to the Project	0	0%	0	0%	1	9%	1	2%
Other Changes	0	0%	0	0%	1	9%	1	2%
TOTAL	11	100%	25	100%	11	99%	47	100%

* Total does not equal 100% due to rounding.

Specific comments that illustrate these categories include:

- *“The advice helped confirm lighting design and provided additional information on how to bring natural lighting into the space—the modeling helped with the design.”*
- *“The advice changed the shape and profile of some of the daylighting monitors on the roof. We also made changes to glazing types and the overall size and location of windows.”*

Respondents were asked if the advice they received resulted in energy savings. While the majority of respondents claimed energy savings, responses differ between the types of advisor services provided, with recipients of Daylighting Labs advisors’ advice being most likely to indicate that the advice resulted in energy savings (Table 6-7).

Table 6-7
ENERGY SAVINGS WITHIN PROJECT

DID THE ADVICE RESULT IN ENERGY SAVINGS?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	9	45%	27	90%	11	69%	47	71%
No	9	45%	2	7%	5	31%	16	24%
Not Sure	2	10%	1	3%	0	0%	3	4%
TOTAL	20	100%	30	100%	16	100%	66	99%

* Total does not equal 100% due to rounding.

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Respondents were also asked to state how they know that they were achieving energy savings as a result of the consultations. As Table 6-8 indicates, about one-third said that they knew of energy savings based on modeling data or other secondary information. This is most prevalent for non-daylighting consultations undertaken by the Better Bricks Advisors. The remaining responses indicate that participants infer energy savings based upon the characteristics of the installation, such as a lower number of installed units and higher efficiency specified per unit, or both.

Table 6-8
CONFIRMATION OF ENERGY SAVINGS

HOW DID THE ADVICE SAVE ENERGY?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Modeling or Other Secondary Information Indicated Savings	2	22%	9	33%	4	36%	15	34%
Lower Number of Units Installed or Less Demand on Building Systems	2	22%	7	26%	1	9%	10	21%
Higher Efficiency In Technology Used	2	22%	5	19%	3	27%	10	21%
Both Lower Number and Higher Efficiency	2	22%	3	11%	1	9%	6	13%
Personal Opinion that It Saved Energy, But Not Sure Why	1	11%	2	7%	1	9%	4	8%
Other Reasons Given	0	0%	1	4%	1	9%	2	4%
TOTAL	9	100%	27	100%	11	100%	47	101%

* Total does not equal 100% due to rounding.

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Effect of Advisory Services on Other Projects

The 46 respondents classified as either architects or engineers were asked additional questions regarding the effect of advisor services on other projects. As Table 6-9 shows, two-thirds indicated that the advice had resulted in changes in other projects as well, with those receiving daylighting services most likely to report such effects.

Table 6-9
CHANGES IN OTHER PROJECTS

DID THE ADVICE CHANGE OTHER PROJECTS?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	6	60%	20	71%	4	50%	30	65%
No	4	40%	7	25%	4	50%	15	33%
Not Sure	0	0%	1	4%	0	0%	1	2%
TOTAL	10	100%	28	100%	8	100%	46	100%

Respondents who indicated changes in other projects were also asked to specify what was different. The most frequent responses fell into the more general category of “gaining a better understanding of [the] technology” and the fewest in the category indicating direct application, “using more efficient technology and/or less units” (Table 6-10).

Table 6-10
SPECIFIC WAYS OTHER PROJECTS CHANGED

HOW DID THE ADVICE CHANGE OTHER PROJECTS?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Gained a Better Understanding of Technology to Apply on Other Projects	3	50%	7	35%	3	75%	13	43%
More Confidence in Utilizing BetterBricks Concepts on Other Projects	1	17%	7	35%	1	25%	9	30%
Using More Efficient Technology and/or Less Units	2	33%	6	30%	0	0%	8	27%
TOTAL	6	100%	20	100%	4	100%	30	100%

None of the four respondents receiving BetterBricks non-daylighting services indicated specific ways in which they had used this advice on other projects. These four respondents were more likely to indicate that the advice had improved their general understanding of technologies that could then be applied to other projects.

“Better understanding of technology to apply to other projects” was the answer most frequently given by Lighting Design Lab advisees. An indicative response states:

- *“I am more competent in my recommendations—my proposals are better thought out now.”*

Verbatim responses reflective of the Daylighting advisory service include:

- *“I worked with the Lighting Design Lab and Joel for a number of years and either engage them directly or apply the lessons learned to the next project.”*

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- *“My awareness and exposure to daylighting has increased. My experience with one project gives me confidence to use daylighting in other projects.”*

Dissemination of Knowledge to Colleagues

As Table 6-11 indicates, the majority of architects and engineers reported that they had discussed the advice they received with other colleagues, and also indicated that this advice is being transferred to other design professionals. This was particularly the case with those receiving advice on daylighting.

Table 6-11
DISSEMINATION OF KNOWLEDGE TO COLLEAGUES

DID YOU DISCUSS THE ADVICE WITH COLLEAGUES?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	6	60%	26	93%	4	50%	36	78%
No	4	40%	2	7%	4	50%	10	22%
Not Sure	0	0%	0	0%	0	0%	0	0%
TOTAL	10	100%	28	100%	8	100%	46	100%

The previous four questions provide information about the dissemination path for design efficiency, with dissemination occurring to different degrees. Dissemination is influenced by various factors, including the interest of the participant in sharing the information and the perceived value of the information to others in terms of applicability versus perceived value. Ideas initiated through the daylighting advisor services appear to have the broadest dissemination, with the highest percentage for applying the advice, passing advice on to colleagues and for use of the advice by colleagues (see Table 6-12).

Table 6-12
COLLEAGUES USE OF ADVICE IN PROJECTS

DID YOUR COLLEAGUES USE THE ADVICE ON OTHER PROJECTS?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	2	33%	19	73%	1	25%	22	61%
No	1	17%	4	15%	2	50%	7	19%
Not Sure	3	50%	3	12%	1	25%	7	19%
TOTAL	6	100%	26	100%	4	100%	36	99%

* Total does not equal 100% due to rounding.

Satisfaction with Advisory Services

Overall satisfaction with the advisory services is high (Table 6-13). Using a five-point scale, with one indicating “very dissatisfied” and five indicating “very satisfied,” 95% of participants rate their satisfaction with these services as a four or a five.

Table 6-13
OVERALL SATISFACTION WITH SERVICE

SATISFACTION WITH SERVICES (5 IS VERY SATISFIED)	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
5	16	80%	22	73%	11	69%	49	74%
4	3	15%	8	27%	3	19%	14	21%
3	1	5%	0	0%	1	6%	2	3%
2	0	0%	0	0%	1	6%	1	2%
1	0	0%	0	0%	0	0%	0	0%
TOTAL	20	100%	30	100%	16	100%	66	100%

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Only one person rated the service below a three and that was for the BetterBricks non-daylighting advisory service. In that particular case, the advisory service was requested after the respondent had already received advice related to daylighting. This person's expectations were quite high and the respondent did not believe the advice lived up to this expectation.

Participants were asked to rate elements of the service they received. These elements are shown in Table 6-14 below. Due to the specific nature of the ratings to each service, there is not a total presented for these ratings. In all services, the vast majority of respondents were highly satisfied with each element, rating it at least a four out of five.

The advisor's knowledge level and time spent with the participant received consistent high marks for all but one case in which the participant was not satisfied with the overall service they received for the BetterBricks other advisory service. The one element that was consistently scored the lowest was the ability to apply the concepts after the advisor had left the project. It was unclear whether this was due to the advisor's inability to leave good instructions or whether the person rated their own ability to follow through lower than the service received.

Table 6-14
SATISFACTION WITH SERVICE ELEMENTS

SATISFACTION WITH:	LIGHTING DESIGN LAB			DAYLIGHTING LAB			BETTERBRICKS		
	1 - 2	4 - 5	MODE	1 - 2	4 - 5	MODE	1 - 2	4 - 5	MODE
The Amount of Time the Advisor Spent on My Project	0%	95%	5	0%	100%	5	6%	94%	5
The Level of Detail in the Advice the Advisor Provided	0%	90%	5	0%	97%	5	6%	94%	5
The Knowledge Level of the Advisor	0%	100%	5	0%	100%	5	0%	100%	5
Your Ability to Follow Through and Apply the Concepts	0%	65%	5	0%	90%	4	6%	69%	4
The Availability of Follow-Up Support from the Advisor	0%	80%	5	0%	97%	5	6%	81%	5

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All but one participant indicated that they would recommend this service to other colleagues. The one dissenting opinion was for the BetterBricks non-daylighting advisory service. This participant stated that the service had not provided the energy modeling and payback analysis she had hoped for.

Respondents who indicated that they would recommend the service were also asked what they would tell colleagues about it (see Table 6-15). The question was open-ended and responses varied by advisory service type, with “expert energy efficiency advice” being mentioned twice as frequently by those receiving BetterBricks non-daylighting services as by Lighting Design Lab advisees, and three times more frequently than by daylighting advisees.

Table 6-15
REASONS TO USE SERVICES

WHAT WOULD YOU TELL COLLEAGUES REGARDING BETTERBRICKS?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Provide Expert Advice Related to Energy Efficiency	5	25%	4	13%	7	47%	16	25%
Free Professional Resource	7	35%	5	17%	1	7%	13	20%
Very Knowledgeable and Helpful People	6	30%	2	7%	3	20%	11	17%
Consult with BetterBricks Early on in Design Phase	0	0%	8	27%	1	7%	9	15%
Great Modeling Support to Test Design Assumptions	1	5%	5	17%	0	0%	6	9%
Recommend Because We Have Been Very Satisfied with Service	0	0%	3	10%	2	13%	5	7%
Provide an Objective Opinion for Project	0	0%	2	7%	1	7%	3	5%
Other Comment	1	5%	1	3%	0	0%	2	3%
TOTAL*	20	100%	30	101%	15	101%	65	101%

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* Total does not equal 100% due to rounding.

Illustrative participant comments include:

- *“It is a free service and you receive a professional lighting consultant to help with the project.”*
- *“Very knowledgeable and they will get answers to you if they don't know the answers off the top of their heads.”*
- *“They provide expert advice. It is non-biased and can help you with your project.”*
- *“Receiving the advice is most effective at schematic design level. [It] informs the design process and is harder to incorporate later on in the project.”*

Providing expert advice related to energy efficiency was by far the most common reason for recommending the BetterBricks non-daylighting advisory service.

Awareness of BetterBricks

The respondents were asked if they were familiar with other BetterBricks Technical Services. The overall majority indicated yes to this question (71%). Across the individual services, the awareness of other services was fairly consistent (Table 6-16).

Table 6-16
AWARENESS OF OTHER SERVICES

ARE YOU AWARE OF OTHER BETTERBRICKS TECHNICAL SERVICES?	LIGHTING DESIGN LAB		DAYLIGHTING LAB		BETTERBRICKS		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Yes	12	60%	24	80%	11	69%	47	71%
No	8	40%	6	20%	5	31%	19	29%

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Not Sure	0	0%	0	0%	0	0%	0	0%
TOTAL	20	100%	30	100%	16	100%	66	100%

Participants were limited in their ability to name additional services, but tended to name ones with significant impact and visibility. These are training and seminars (28%), daylighting services (16%), and the Lighting Design Lab (15%). While several other services were mentioned, most of these can be subsumed under these top three categories.

Additional Comments from Participants

The final question asked participants to add their feedback regarding their experiences and to provide recommendations to improve the advisory service. Insightful comments from participants are grouped below into five categories: overall value, challenges to implementing recommendations, complexity of working with the BetterBricks services, BetterBricks identity and outreach.

Overall Value

- *“It is great to have a resource that is not just in Seattle (more regional presence is appreciated by the people using the services).”*
- *“The BetterBricks service is especially valuable for smaller projects in which a professional consultant is too expensive to hire. These types of projects include non-profit firms, smaller commercial buildings and some government installations (smaller municipalities). Sustainable design would be much harder to implement without the assistance from BetterBricks. “*

Challenges to Implementing Recommendations

- There is a gap between the service provided and the ability to implement the recommended measures. For example, *“I had a problem answering the [advisors] questions with the contractors and other*

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professionals involved with the project [present] because the advisory service is not on the hook to make it work. There was also a challenge finding the recommended fixture types because when we tried to place an order the fixture type was not available yet in the marketplace.”

- *“BetterBricks staff should be more cognizant of the costs involved on the more expensive items they recommend. The advisory staff should also know their product catalogue better with respect to aesthetics (e.g., recommend appropriate fixtures as far as looks for a particular job).”*

Complexities of Working with the Advisor Service

- *“Great service, but a rather complicated process involved with BetterBricks. Can it be streamlined? There is a tremendous amount of work to get results (e.g., to actually have the measures installed and working as planned). Customers don’t care that much about all of the technical explanations on how to get results; they would rather have a short list of what they should or shouldn’t do with regards to their project that includes showing the payback.”*
- *“It would be helpful if the service could include a translation of knowledge to the LEED scoring cards.”*
- *“A clear final product is needed. However, the process is not clear on exactly what BetterBricks can do for these smaller projects; budgets aren’t clear, no mechanism is in place to ‘close’ the project (e.g., a report or specs that can be delivered to the client)”*

BetterBricks Identity

- The message of what BetterBricks is does not appear to be clear to many of the respondents, and consequently expectations are not clear. *“It would be clearer if there could be a better picture of the relationship among LDL, BetterBricks and other services.”*
- One respondent added that he was *“aware of the name, but not really aware of what BetterBricks does.”* Another respondent added that they were *“looking for support from BetterBricks that included energy analysis of the building for the mechanical and building envelope that*

showed payback and savings and this never really happened. We are unclear on what services BetterBricks was really offering.”

Outreach

- *“To reach engineers BetterBricks staff should promote their services more aggressively to the electrical engineers. It would be helpful if they had a better understanding of the lighting options available in the marketplace.”*
- *“Develop more opportunities for communities to learn about BetterBricks and more ways to integrate BetterBricks in early design phase. Ensuring that people realize BetterBricks is a free service will help community projects incorporate sustainability because they typically do not have much funding to acquire BetterBricks type services for projects.”*

SUMMARY

The majority of the different BetterBricks advisory services were provided to architects; fully 62% of the survey respondents were architects. Professional representation varied considerably across the three services, however, with approximately 30% of Lighting Design Lab participants being architects, to a high of 90% for the Daylighting Lab. Other significant professions from which participants came were building managers and owners, and utility representatives. The Lighting Design Lab was cited as a primary source of awareness for all of the services; utility contacts were also important for the Lighting Design Lab, while business colleagues were especially important for the Daylighting Lab. Reasons for participating included needing additional expertise. A desire for “state-of-the-art” technologies was also expressed as being a particularly important motivator for participating in Lighting Design Lab services by 20% who used the service.

Fully 71% of respondents stated that the advice provided to them *did* have an effect on the project, with Daylighting Lab respondents reporting the greatest incidence of such influence (83%). Results that were cited primarily included “incorporating more energy-efficient technologies within a project,” especially for the Lighting Design Lab (72%). Advice from the Daylighting Lab most often helped to “improve or refine a project.” Seventy-one percent of respondents reported that energy savings resulted from these consultations, with the

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Daylighting Lab the highest (90%), followed by BetterBricks Advisors (69%), and by the Lighting Design Lab (45%). An additional 65% of respondents felt that the consultation also had an effect on other projects they worked on, with Daylighting recipients reporting this most frequently and the BetterBricks recipients somewhat less so. Seventy-eight percent of respondents discussed this knowledge with colleagues, especially Daylighting Lab participants (93%). In many cases and, again, especially for the Daylighting Lab, respondents felt that this advice was utilized by their colleagues.

Overall satisfaction with program services was high, with 95% of respondents rating the services they received as either a four or a five on a five-point scale. This rating was somewhat lower for the BetterBricks Advisor services. As with the trainings, overall awareness of additional BetterBricks Technical Services was quite high, but specific awareness was very low. This indicates that there remains tremendous untapped potential for cross-selling these services.

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7. CONCLUSIONS AND RECOMMENDATIONS

The BetterBricks Training and Advising Services (BetterBricks Technical Services) include the training and technical support services offered under the umbrella of BetterBricks. These services are targeted to architects and engineers involved in designing new commercial buildings in the states of Idaho, Montana, Oregon and Washington. There are six different organizations that offer these services; each has its own contract and statement of work. The six organizations and the service type they provide are:

- The Lighting Design Lab – *Training and Advice*
- The Seattle Daylighting Lab – *Advice and Training*
- The Eugene/Portland Daylighting Lab – *Advice and Training*
- The Idaho Daylighting Lab – *Advice and Training*
- Putnam-Price Group – *BetterBricks Training*
- BetterBricks Advisors – *Advice*

This MPER provides an assessment of the degree to which the BetterBricks Technical Services are meeting the goals and objectives set forth for them by the Alliance as part of the Commercial Sector Initiative Strategy.

METRICS FOR BETTERBRICKS TECHNICAL SERVICES

The targeted objectives for the BetterBricks Technical Services organizations are shown in Table 7-1. Comparing these objectives with the summarized information from the BetterBricks Advisors and Lighting Design Lab databases, as provided in Chapter 4, suggests that there are problems using the BetterBricks Advisors database as a basis for assessing progress. Our interviews with BetterBricks Technical Services contractors indicated that all of them had achieved or exceeded their metrics by October 2004. However, using the database as a source, as of June 2004, the contractors were ahead on some metrics, behind on others, and for some metrics it was impossible to determine the contractors' status given the quality of data in the database.

Table 7-1
TARGETED OBJECTIVES ACHIEVEMENTS

ORGANIZATION AND ACTIVITY	TARGET FOR 2004	ACHIEVED BY JUNE 2004
Lighting Design Lab – Training and Education	60	54
Lighting Design Lab – Advisors	250	174
Daylighting Labs – Formal Classes or Visits	80	4
Daylighting Labs – Advisors	150	76
BetterBricks Training – Workshops	15	6
BetterBricks Training – Brown Bags	70	92
BetterBricks Training – Roundtables	10	10
BetterBricks Advisors – Specialty Consulting	25	49
BetterBricks Advisors – Charettes	15	ND

ND = Not Determinable from a review of the database

ASSESSMENT OF BETTERBRICKS TECHNICAL SERVICES PROCESS

The BetterBricks Technical Services contractors are all enthusiastic about their role in the CSI. They each believe that they are achieving success in influencing design practice and are enjoying the challenge of providing services to the design community.

There is also evidence from the participants in trainings and the advisor contacts that the BetterBricks Technical Services provide expertise that is otherwise not available in the market. There is a high degree of satisfaction with the training and advising. Additionally, the evaluability conversations, as well as self-reports during interviews with participants, suggest that design practices are being influenced and changed by these services.

CONCLUSIONS AND RECOMMENDATIONS

While the program is working well, there remain a variety of infrastructure and policy issues that are unresolved. These lead to potential inconsistencies in service delivery, place limits on the BetterBricks experience for the design community and make it difficult to know what is happening in the field as a result of the BetterBricks Technical Services. To address these issues, we offer the following conclusions and recommendations.

Conclusion 1: The BetterBricks Technical Services are providing desired and useful services to the Pacific Northwest design community, resulting in real changes to building designs.

Eighty-two percent of participants say that training affected their practice and 53% say they applied the information they received to specific projects. Based on the experience of the trainers, advisors and participants, there can be little doubt that these services are desired and useful to the design community; this further is corroborated in the interviews as part of the evaluability assessment with people who have completed projects.

Recommendation 1: Continue to support the BetterBricks Technical Services and to refine and clarify the its vision.

Conclusion 2: The Alliance contractors feel that the Alliance treats them each as a provider of a single service that is not integrated with CSI, BetterBricks marketing, or the other Technical Services.

The contractors have no consistent contact at the Alliance, they do not know what each other is doing, they would like consistency in technical terms and applications across the different services, and they feel that the marketing efforts of the Alliance are not integrated with their activities.

Recommendation 2: The Alliance should assign a single staff person to oversee and manage the Technical Services contracts and activities and to closely coordinate the Technical Services with other CSI activities such as marketing, BetterBricks tools and products, and market

segments. Also, technical service contracts should specify and provide funding for the level and type of coordination expected with other contractors.

Conclusion 3: Even with the addition of a staff person to oversee the Technical Services, there are three questions that remain to be addressed:

A. What is the vision for BetterBricks Technical Services in CSI?

Recommendation 3A: The Alliance should clearly articulate the role the Technical Service contractors are expected to play in CSI. In particular, it should clarify whether the contractors are part of the CSI team, involved with the design and development of the program, or if they are acting purely as service contractors working on a project-by-project basis using Alliance funds.

B. What is the role of energy efficiency and conservation in the messages communicated by BetterBricks Technical Services?

C. What is the role of energy efficiency and conservation in the desired outcomes from the BetterBricks Technical Services?

These two other issues are connected by topic but very distinct in application.

Recommendation 3B/C: The Alliance should clearly separate its expectations for these two topics. Despite the fact that the Alliance's organizational goals require it to seek energy savings, the Technical Service's contractors have never been contractually required or even strongly urged to ensure that their projects result in direct energy savings. Adding to this lack of emphasis on savings is that many of the marketing messages that the Alliance has developed for the contractors have emphasized non-energy benefits. While there is strong evidence from other research that non-energy benefits can be used to attract people to do projects that result in energy savings, **it is important to make sure the contractors know**

7. Conclusions and Recommendations

that energy savings are the desired outcome and to make it a contractual goal.

Conclusion 4: The purpose of the BetterBricks Advisors database has never been fully determined by the Alliance; consequently, the Alliance has never been able to communicate its importance to the contractors.

Not surprisingly, this has resulted in it not being accepted equally by all of the BetterBricks Technical Services contractors. All of the contractors are now putting some data into the BetterBricks Advisors database; however, it is incomplete and does not appear to be updated on a consistent basis. At the same time, some of the contractors' own databases are not maintained well, suggesting a general discomfort with databases. Conversations with the contractors confirm this and also suggest that for those that do use it, the BetterBricks Advisors database is effective for their own purposes. If the Alliance wishes to use the database to track progress in the market and to potentially estimate savings generated, the database needs to be a reliable data-capturing tool.

***Recommendation 4:* The Alliance must decide what purposes the database should serve, ensure that its functionality supports those purposes, and then require all contractors to use the database for all projects.** Contractors should be involved in the development process to ensure that their concerns are addressed and that they feel committed to using the database.

Conclusion 5: Energy savings are occurring for a substantial percentage of projects.

The evaluability assessment of 15 projects in the BetterBricks Advisors database found that nine had likely effects and that savings could likely be measured for 6 of the 9. These savings can be estimated for many of the projects with minimal changes to the current program or database.

Recommendation 5: The evaluability assessment results should be used to help modify the database and should be addressed in contract revisions to ensure that necessary information to estimate energy savings is captured.

Conclusion 6: The BetterBricks Advisors' clients indicated somewhat lower satisfaction than the training and other advisors' clients.

The evaluability review and the review of responses to the questions about BetterBricks Advising Services lead us to believe that the BetterBricks Advisors have lower satisfaction results, not because of any problems with their skills or approach, but largely because their services have been intentionally limited by the Alliance. The Daylighting Labs are able to provide advising services for as long as a client desires, clear through to project completion. The BetterBricks Advisors, on the other hand, are contractually limited in how much they can offer. The evaluability study found that the lack of long-term involvement by the BetterBricks Advisors appears to lead to lower up-take of recommendations as compared to the Daylighting Lab advisors.

Recommendation 6: There should be consistency in what BetterBricks Advisors offer. To have the most impact, consider permitting both advisor categories—BetterBricks Advisors and those for the Daylighting Labs—to provide services from early pre-design through construction in order to facilitate greater adoption of their recommendations.

Conclusion 7: The BetterBricks Technical Service providers are concerned that since their services are primarily targeted to architects, there will be limited opportunities for these services to reach the mechanical engineers so important to some of the target markets.

There are significant opportunities for energy savings in hospitals, health care, grocery stores and offices that can best be addressed by mechanical engineers. Engineers are not participating in the BetterBricks training at the same rate as architects, nor are there any training courses specifically

7. Conclusions and Recommendations

targeted to mechanical engineers. Additionally, prior evaluation research of the Seattle BetterBricks Daylighting Lab found that information given to project architects was not being passed on to project engineers.

Recommendation 7: Develop more training and advising services that specifically target mechanical engineers.

APPENDICES

Appendices

APPENDIX A

Survey Instruments

Appendix A

INTERVIEW GUIDE
BETTERBRICKS ADVICE PARTICIPANTS

Date: _____

Name: _____

Company: _____

Phone: _____ Email : _____

My name is _____. I am with (RIA or EMI) a research firm in (Portland/Seattle). In _____(date or year) you received some advice from a BetterBricks advisor __(name)___ for your building. I would like to ask you some questions about your experience.

1. Were you the person who talked to _____?

1. Yes

2. No (If not find out who was and their phone number)

2. Which of these best describe your relationship to this project?

1. Architect

2. Engineer

3. Building owners

4. Building manager

5. Building manager

6. Building tenant

7. Other (specify)_____

Appendix A

3. How did you hear about the advisory service? (*Code later*)
 1. Internet
 2. Recommended by a friend or colleague
 3. News article about service
 4. Attended a workshop or class and heard about it
 5. BetterBricks person came to our office and explained services
 6. Other

 4. What was the reason you sought advice? (*Obtain specific information and then code later*)
 1. Had a problem we wanted to solve.
 2. Wanted to learn some new design ideas
 3. Planning a remodel or equipment upgrade and wanted to make it more energy-efficient
 4. Planning a new building and wanted to make it more energy-efficient
 5. Other

 5. Did the advice change your project?
 1. Yes
 2. No

 6. If 6=yes, How did the advice change your project?

 7. Do you think that the advice helped you to save or reduce the amount of energy used by your project?
 1. Yes
 2. No
-

8. If 8=yes, How do you know that the advice reduced the amount of energy used by your project? *(Code later)*
1. Advisor estimated the savings.
 2. I estimated energy savings using hand calculations
 3. I estimated energy savings using spreadsheet
 4. I estimated energy savings using simulation model or other computer program
 5. I have another similar project and this one uses less energy
 6. I just believe it
 7. Other

For designers and engineers only ask 10-11.

9. Has the advice had any effect on other projects you've worked on than the one ____ discussed with you?
1. Yes
 2. No
10. If 10=yes, Explain what is different about the project as a result of the advice
-
11. Have you discussed the advice you received with any colleagues?
1. Yes
 2. No
12. Did your colleagues apply the knowledge in any projects?
1. Yes
 2. No
 3. DK

Appendix A

Ask all

Using a scale of 1-5 with one being very dissatisfied, 3 neither satisfied nor dissatisfied and 5 very satisfied. Tell me how satisfied you are with the following features of the training you took.

12. The amount of time the advisor spent on my project
1 2 3 4 5
13. The level of detail in the advice the advisor provided
1 2 3 4 5
14. The knowledge level of the advisor
1 2 3 4 5
15. Your ability to follow through and apply the concepts after the advisor had left.
1 2 3 4 5
16. The availability of follow-up support from the advisor when you had questions.
1 2 3 4 5
17. Would you recommend this service to others like yourself?
1. Yes (Go to 17)
 2. No (Go to 16 and then 18)
16. If no, why not?
17. If yes, what would you tell them?

18. Are you aware of any other services that BetterBricks provides?
 1. Yes (Go to 19)
 2. No (Go to 20)

19. *(If yes)* What other services have you heard of? *(Code later)*
 1. Training at Seattle Lighting Design Lab
 2. BB Professional Education - Workshop
 3. BB Professional Education - Roundtable
 4. BB Professional Education - Brown Bag
 5. Daylighting advisors/Daylighting lab
 6. Website
 7. Displays at Lighting Design Lab
 8. BB Awards
 9. BetterBricks advisors
 10. Training at daylighting lab
 11. Lighting Lab Brown Bag

20. On a scale of 1-5 with 1 being very dissatisfied 3 as neither satisfied or dissatisfied and 5 being very satisfied, how satisfied are you with the advice you received for your project?
1 2 3 4 5

21. Is there any thing else you would like to say about the advisor service you received?

Thank you for your time.

Appendix A

QUARTERLY ADVISOR AND TRAINING FEEDBACK SURVEY BETTERBRICKS ALLIANCE CONTRACTORS

Date: _____

Name: _____

Organization: _____

Title: _____

Overview

In an effort to provide program management with on-going feedback, periodic interviews are being conducted to track perceptions among BetterBricks program staff and contractors. All responses will be treated as confidential. I will be asking you some very open ended questions but also will be asking you to rate some aspects of the program.

1. History and Design

- 1.1 What is your understanding of the goals and objectives for the advisor and training portions of BB you are involved in? (Probe: do you think the goals and objectives for the advisor and advisor and training portion to be the same or different than the website and marketing campaign for BetterBricks?)
 - 1.2 Is there anything the Alliance could do to improve your understanding of the goals and objectives?
 - 1.3 Over the course of the past two years – 2003 and 2004 -- what have been your major accomplishments? (by year if possible)
-

Appendix A

- 1.4 What, if anything, did you want to accomplish in 2003 and 2004 that you did not accomplish? (Probe: How they might or hope to accomplish it)

2. Administration: Communication and Development

- 2.1 How clearly has your role and responsibilities within the program been communicated to you?
- 2.2 Have the lines of communication between the Alliance and you been clearly established?
- 2.3 Have you found that there is any lack of consistency in what the Alliance staff says about the BB advisor and training effort's goals and objectives? (If so, what have you experienced?)
- 2.4 How about changes in the program as it moves from discussion phase to implementation phase? How clear has communication been about those changes ?

3. Administration: Coordination with other BB Contractors

- 3.2 What type of coordination occurs among BB contractors at this time? (Probe by each contracted group and whether it has changed in the past year, if so how?)

Seattle Daylighting Lab

Portland Daylighting Lab

Seattle Lighting Lab

BetterBricks Advisors (Jeff Cole's group)

BetterBricks Training (Stan Price and Cynthia Putnam)

3.1 How do you think your role is the same or different than other BB Contractors?

3.2 How about communication (as versus Coordination) how has the Alliance encouraged communication between the BetterBricks contractors? (Probe has this been formal or informal?)

3.3 How often, if at all, have you recommended that clients/customers use other BetterBricks advisors or training opportunities?

Yes

No

- If yes, How do you make these recommendations? Do you let other program contractors know?
- If not, why do you think you haven't found opportunities to recommend other services?

- 3.4 For you, what would most improve communication and coordination among BB contractors? (Probe: role of Alliance, role of contractors.)

4. Program Delivery: Services

Integrated design and lighting controls have been discussed as areas where BetterBricks can help move the market.

- 4.1 How do you define integrated design for your advisor or training services?
- 4.2 Do you feel you understand what type of advisor services, or training and education services your program should provide on integrated design? (If not what would you like to know, if yes, what do you understand to be required.)
- 4.3 What will it take to come to a common agreement among all those involved in BetterBricks on how integrated design should be defined and how it should be delivered to clients?
- 4.4 How about lighting controls? Do you feel you understand what type of advisor services, or training and education services your program should provide on integrated design? (If not what would you like to know, if yes, what do you understand to be required.)
- 4.5 The architects baseline study found that 70% of the architects report that an electric engineer usually develops the lighting control strategy on their projects. Given BetterBricks focus on architects and relatively

minor interactions with engineers, how do you think BetterBricks can best change industry practice on lighting controls?

- 4.6 How do you define natural ventilation?
- 4.7. Do you feel you understand what type of advisor services, or training and education services your program should provide on natural ventilation? (If not what would you like to know, if yes, what do you understand to be required.)
- 4.3 What will it take to come to a common agreement among all those involved in BetterBricks on how natural ventilation design should be defined and how it should be delivered to clients?
- 4.9 Are there any other technologies or practices that you consider important to include in your advisor services/training services because of BetterBricks? What are they?
- 4.10 Do any of these have technical or definitional issues that need to be resolved in order to effectively change or influence industry practice?

5. Program Delivery: Resources

- 5.1 Do you feel that the staffing resources available to you in relation to what you are being asked to accomplish are sufficient? (why do you say that?)
- 5.2 How about the budget resources available to you? (why do you say that?)

Appendix A

5.3 Do you feel that the staffing resources available to the overall BB advisor and training program are adequate in relation to the goals and objectives it is trying to accomplish? (why do you say that?)

5.4 How about the budget resources available to the overall BB advisor and training program? (Why do you say that?)

6. Program Delivery: Implementation and Designer Response

6.1 Are the program marketing materials effective in supporting the implementation of the BB advisor and training program? (Why do you say that?)

6.2. Is the BetterBricks.com website effective in supporting program implementation? (Why do you say that?)

6.3 Is the BetterBricks Advisors program database effective in supporting program implementation? (Why do you say that?)

6.4 Do you have your own means for tracking projects or training participants?

1. Yes

2. No

6.5 If yes, Tell me about your tracking system. How long have you used it, can you see any way to integrate the information you have in your system with the projects tracking system?

6.6 For the following target markets, do you feel the goals and objectives for the advisor services and the training and education services are defined well enough to allow them to be effective? If no, what is missing from the goals and objectives? [what would improve them? Needs to be added?

	<u>MARKET</u>	<u>WELL ENOUGH DEFINED?</u>
a.	Schools	Yes/No
b.	Hospitals	Yes/No
c.	Grocery Stores	Yes/No
d.	New Construction	Yes/No

6.7 For each of these target markets, given the type of advisor and training and education you are offering, for which of these target market do you feel that you are:

A, Most likely to be effective? Why do you draw that conclusion?

B. Least likely to be effective? Why do you draw that conclusion?

6.8 What kind of screening, if any, do you do with projects or participants, to see if they fit your services? Do you screen projects or participants for receipt of your services? (Describe what you do, when, and why that approach is used?)

Appendix A

- Have there been any problems with the screening process or have you made any significant changes to it over time?
- 6.9 Since the target markets were approved, have you made any changes in how you offer your BB services? If yes, what?
- Do you allocate services among the target markets?
- 6.10 Now thinking more broadly about the participants in your advisor and training and education efforts, what do you think is generating the most enthusiasm?
- 6.11 How do you suggest the Alliance assess whether the participating designers have changed the way they do design [based at least in part on program services?]? What do you think will be the most effective way to assess whether the participant designers have changed the way they do design? (Probe deeply says David)

7. Program Implementation: Recent Changes

- 7.1 What is the most positive development that you have seen with the program over the past year?
- 7.2 What is the least positive development, if any, that you have seen with the program during the past year?
- 7.3 Over the past year, there was some discussion of offering BB training and advisory services on a firm focused basis. Where the Alliance would target some opinion leading firms and try and train all the designers in

the firm in BB principles and provide consulting to these firms to get them to really implement BB principles in their practice. What do you think of this idea?

8. Looking Forward

- 8.1 What recommendations, if any, do you have for the following?
 - a. The roles/responsibilities of a new BB contract manager? (Amy's replacement)
 - b. BB program design?

- 8.2 Do you have any additional comments or observations that you would like to mention about the future of BB advising and education and training?

Appendix A

INTERVIEW GUIDE BETTERBRICKS TRAINING PARTICIPANTS

Date: _____

Name: _____

Company: _____

Phone: _____ Email : _____

My name is _____. I am with (RIA or EMI) a research firm in (Portland/Seattle).
In __(date or year)_ you attended a training/workshop/roundtable with
__(name)_____.

- A. Do you recall attending that event?
1. Yes
 2. No
- If not, thank and terminate*

I would like to ask you some questions about your experience.

1. Were you the person who attended the training?
 1. Yes
 2. No (If not find out who was and their phone number)

Appendix A

2. Which of these best describe your profession?
 1. Architect
 2. Engineer
 3. Building owner
 4. Building manager
 5. Building manager
 6. Building tenant
 7. Lighting designer
 8. Other (specify)_____

 3. How did you hear about the training/workshop/roundtable? (*Code later*)
 1. Internet
 2. Recommended by a friend or colleague
 3. News article about class
 4. BB email announcement of class
 5. Attended a workshop or class and heard about it
 6. BetterBricks person came to our office and explained services
 7. Other

 4. What was the reason you wanted to attend the training/workshop/roundtable? (*Code later*)
 1. Had a specific problem we wanted to solve
 2. Generally curious or wanted to learn some new design ideas
 3. Planning a remodel or equipment upgrade and wanted to make it more energy-efficient
 4. Planning a new building and wanted to make it more energy-efficient
 5. Company offered the training to staff
 6. Company wants all staff to take this green buildings stuff
 7. Other
-

5. I want to read a list of terms. For each one I am going to ask you if you have heard of the term before. Then if you heard about it first from the – brown bag, course, or roundtable, workshop - if not how you heard about it

<i>Chose the issues that are most closely related to training activity of person</i>	A. Aware of Term		B. Source of awareness: BB training		C. Source: Other
<i>Design Related Courses</i>					
5. Integrated design	Yes	No	Yes	No	
6. Energy Modeling	Yes	No	Yes	No	
7. Energy Points in LEED	Yes	No	Yes	No	
8. Life Cycle Cost Analysis	Yes	No	Yes	No	
9. Building Commissioning	Yes	No	Yes	No	
<i>Lighting and Daylighting Courses</i>					
10. Lighting occupancy sensors	Yes	No	Yes	No	
11. Staged lighting controls	Yes	No	Yes	No	
12. Dimming ballasts	Yes	No	Yes	No	
Building Commissioning	Yes	No	Yes	No	
<i>Ventilation/HVAC</i>					
13. Natural ventilation	Yes	No	Yes	No	
14. Climate Responsive Design	Yes	No	Yes	No	
15. Building Commissioning	Yes	No	Yes	No	

For engineers, architects, and lighting designers: ask 5 and 7

16. Has the training had any effect on how you do or think about design?

1. Yes

2. No

17. If 16= yes, Explain what is different.

Appendix A

Ask All

18. Have you actually applied what you learned to any specific project?
 1. Yes
 2. No

19. If 18= yes, what did you do and how is that different than what you would have done before?

20. If 18= no, What best describes the reason you have not applied what you learned to a specific project? (read list, rotate if possible)
 1. I am not working on anything that is appropriate
 2. I have not had time, but will in the future
 3. I don't think these ideas really work
 4. I don't feel I know enough yet
 5. Some other reason

21. Have you discussed the training with any colleagues?
 1. Yes
 2. No

22. Did your colleagues apply the knowledge in any projects?
 1. Yes
 2. No
 3. DK

Using a scale of 1-5 with one being very dissatisfied, 3 neither satisfied nor dissatisfied and 5 very satisfied. Tell me how satisfied you are with the following features of the training you took.

23. The knowledge level of the presenter(s)
1 2 3 4 5
24. The depth of information on how to execute the design ideas
1 2 3 4 5
25. The depth of information on effect on cost
1 2 3 4 5
26. The location of the training
1 2 3 4 5
27. The applicability of the information in my daily work
1 2 3 4 5
28. The examples that demonstrated the application of the concepts
1 2 3 4 5
29. The presenters' answers to questions
30. Would you recommend this training to others like yourself?
1. Yes (Go to 32)
2. No (Go to 31 and then 33)
31. If no, why not?
32. If yes, what would you tell them?

Appendix A

33. Are you aware of any other services that BetterBricks provides?
1. Yes *(Go to 34)*
 2. No *(Go to 35)*
34. If yes, What other services have you heard of? *(Code later)*
1. Training at Seattle Lighting Design Lab
 2. BB Professional Education - Workshop
 3. BB Professional Education - Roundtable
 4. BB Professional Education - Brown Bag
 5. Daylighting advisors/Daylighting lab
 6. Website
 7. Displays at Lighting Design Lab
 8. BB Awards
 9. BetterBricks advisors
 10. Training at daylighting lab
 11. Lighting Lab Brown Bag
35. On a scale of 1-5 with 1 being very dissatisfied 3 as neither satisfied or dissatisfied and 5 being very satisfied, how satisfied were you with the training you attended?
- 1 2 3 4 5
36. Is there any thing else you would like to say about the training you attended?

Thank you for your time.

APPENDIX B

Sample Interview Form

Appendix B

SAMPLE INTERVIEW FORM
EVALUABILTY ASSESSMENT OF BETTER BRICKS PROGRAM:
INTERVIEWS WITH BB ADVISORS

INTRODUCTION: Hello. My name is Tim Newcomb, and I'm calling from SBW Consulting. We are working for the Northwest Energy Efficiency Alliance on a study of The Better Bricks Advisors Program.

I am calling about the _____ project. Can I have about 15 minutes of your time now? If not, when is a good time?_____.

BB Database ID Number: _____ Interview Date: _____

BB Database ID Project Name: _____

Interviewee: _____

Interviewee Position: _____

Name of BetterBricks Advisor: _____

Phone: _____ Email : _____

What measures did the BB advisors give regarding this project?

Part A. Role BB played in the final design and construction of the building

1. When were you invited to offer advice for this project?
 1. During the conceptual design stage?
 2. During the preliminary design
 3. After the preliminary design process was completed *(Please explain answer if yes to iii.)*
-

Appendix B

2. What did you add to the project design process?
 1. Suggest new design alternatives?
 2. Recommend one of a number of existing design alternatives?
 3. Critically review a design we had developed?
 4. Other? (*Specify*)
3. With whom did you meet for this project?
4. Did you do any model studies for this project?
5. Did you have a meeting with the design team?
6. What was the outcome of the advice on the design? Please describe this in specific terms:
 1. It aided an alternative design, which was adopted. Nature of alternative design.

Nature of baseline design:
 2. It was decisive in the decision to accept one design among several under consideration. What was the nature of the alternative selected?

What would the baseline have been?
 3. It affirmed the pre-existing design. Was that considered a baseline design or not?

If not, what would the baseline design have been?

4. The advice had no effect upon the design.
5. Other Comments? Please be specific.
7. Why were the rejected measures discarded?
 - a. Measure_____
 - b. Measure_____
 - c. Measure_____
 - d. Measure_____
8. (If BB advice did effect change) Please describe the changes resulting from the advice that affected the energy efficiency of the building? How can they be evaluated, with what baseline?
 - a. Measure_____
 - b. Measure_____
 - c. Measure_____
 - d. Measure_____
7. (If BB advice did effect change) Please describe the changes resulting from the advice that affected the energy efficiency of the building?
 - a. Measure_____.
 - b. Measure_____
 - c. Measure_____
8. Is the building now fully built and occupied?

**(If every indication is that no change resulted from the BB advice – STOP
HERE)**

**Part B. Data required to estimate energy savings for the affected space
in building**

8. Are construction drawings available for the as-built condition for the project area? If so, can we get a copy, or visit your office to examine them?

Whom should we contact to get a copy?

9. The following are pieces of information that we would like to have access to in order to estimate energy impacts. Which of the following are available?

- a. Area of space affected by the project?
- b. Types of uses for affected space?
- c. Whether the building was built to the local energy code standards, or was built to exceed the code?

If it was built to exceed the energy code, by how much?

NOTE: Be sure to ask questions about both lighting and mechanical projects if both were involved

10. For changes resulting from the advice, which affected lighting:
- a. Baseline: Can you determine the number of fixtures that would have been installed before you received the advice?
 - b. Baseline: Can you determine the wattages of these fixtures that would have been installed? By fixture type?
 - c. Baseline: Can you determine expected hours for lighting that would have occurred before the advice was received?
 - d. As-built: Do you know number of fixtures for area as built?

- e. As-built: Do you know wattages of these fixtures? By fixture type installed?
 - f. As-built: Do you know hours of operation for the area as built?
11. For changes affecting glazing
- a. Baseline: Can you determine which of the following types of glazing would have been without the BB advice? *(Read list)*
 - b. Baseline: Can you determine how many square feet of glazing were planned for this area?
 - c. Are construction drawings available for the as-built condition for the area? If so, we would like to get copies
 - d. As-built: Which of the following types of glazing were installed in the building area? *(Read list)*
 - e. As-built: How many square feet of glazing were installed for this area?
12. Whom else should I contact about this project:
- For As-Built condition
- .
 - .
- For Baseline condition
- .
 - .

NOTE: THE INTERVIEW FORM FOR ARCHITECTS, CLIENTS AND FACILITY STAFF IS ESSENTIALLY THE SAME AS THE ABOVE EXAMPLE.

Appendix B

APPENDIX C

Detailed Project Data

Appendix C

DETAILED PROJECT DATA

DB ID #66: Non-resident healthcare service.

Interviewed BB advisor and building owner. The latter stated clearly that none of the BB recommendations had been incorporated in the final design. She also made some interesting statements about the difficulty of getting local contractors to implement suggestions from urban designers. She also noted that some recommended measures were too expensive to install.

Disposition: No impact from BB Program. No energy savings from program.

DB ID # 64: Church sanctuary.

Interviewed the client. The plans for this building may be ready in October.

The architect commented favorably on the contributions of the BB advisor regarding options for natural cooling in the church sanctuary. This project involved:

- Ceiling de-stratification fans
- Quantity and positioning of window glazing
- Evaluation of natural cooling during hottest parts of year
- Evaluation of using existing ventilation fans to move the air (without operable clerestory windows) (This proved impossible)
- Operable clerestory windows

BB advice was essential in the detailed evaluation of the natural cooling option and all the components thereof. The decision to use natural ventilation in the sanctuary rather than traditional HVAC systems for cooling has been made.

This building has not been built yet, and before plans can be drawn up there will be meetings with subcontractors and contractors to firm up plans for implementing natural cooling in the sanctuary.

Appendix C

I talked at some length with the architect about how one might quantify the energy reduction due to replacement of traditional air conditioning with natural ventilation. He is not comfortable trying to do this now, because the process of ironing out the mechanical details has not yet begun.

Disposition: Assuming no further changes in the natural ventilation plans, an estimate of energy can be made later on.

DB ID # 269: Building type unknown.

Interviewed Lighting Design Lab consultant. He says this was not really a “project” and does not qualify for the sample. It is located back East, and I have no contact names because there is no report.

Disposition: This case does not belong in the database.

DB ID # 102: Library.

Interviewed the architect. He said that the Daylighting lab’s role was solely to confirm measures which Johnston had planned on. They did a little bit of fine tuning only. Impacts on energy very small.

The impact of the Daylighting lab was a confirmatory one, and no significant changes in energy use can be assigned to BB advice.

Disposition: BB provided advice but energy impacts too small to measure..

DB ID #35: Childcare center.

Interviews so far: BB advisor, Architect, BB coordinator and facility staff.

The architect reports that the following measures were adopted due to BB advice:

- Daylighting measures. These were already under consideration and were supported by BB, which helped evaluate them.
- Operable clerestory windows. A BB contribution
- Supported radiant heating in the design. BB supported this idea but did not originate the idea.

- Supported connection to campus-wide control system for HVAC in this building. BB did not originate this idea.
- Lighting controls (light sensors). These were already under consideration and not a BB idea. BB helped evaluate them.

The BB recommendation to use ventilation heat recovery was rejected because the use of radiant floor heating removed necessity for traditional HVAC with ducts, and therefore made ventilation heat recovery very expensive.

The architect has as-built drawings. The facilities staff has bid sets. The BB advisor suggested estimating value of HVAC automated controls by assuming thermostat setback as the baseline.

Disposition: DOE-2 could be used to model the energy savings from radiant heating and from the daylighting measures. BB advice helped save energy for this project, and the energy savings could be documented.

DB ID #08: Office building.

Interviews so far: First project manager. Second project manager. BB advisor. The second project manager is the most reliable respondent regarding which BB measures were actually installed:

- Natural ventilation in the form of operable clerestory windows and operable windows at the desk level. The latter are in regular use during the summer.
- Daylighting from clerestory windows with perimeter photocells and occupancy sensors. Both photocells and occupancy sensors are required by Seattle Energy code, so these two items are not an improvement over code requirements.
- Lighting wattages were downsized also,

The source of cooling for this building is chilled water from a central campus plant. The area of the building included in this remodel is about 20% of the total.

Estimating savings in chilling energy cannot be done using utility bills, because the utility data will be specific only for the building and not for the remodeled

Appendix C

space, and the impact of opening windows in 20% of the building offices for a part of the year is not going to show up statistically speaking.

Since the older part of the building probably does not have photocells in the perimeter offices, the daylighting savings from clerestory windows and photocells may be significant. This could not be measured from utility bills given the small percentage of the building that was remodeled. However, it could probably be estimated by other means.

BB recommended that the Digital Arts server be located in the attic and that economizers be installed to supply ventilation to the attic room. BB further advised that the UW's list of environmental conditions necessary for servers was unnecessarily strict and that the program's server could probably be installed without a refrigeration system. This was not done because there were fire safety issues associated with locating the server in the attic.

BB also advised to install automatic thermostatic regulators on the radiators in the offices. This was not done, though the reason is unknown.

BB also advised to paint the ceiling white and install a light shelf to direct daylight deeper into the space. This was not done because the architect found that it conflicted with aesthetic considerations.

Disposition: There is an opportunity to estimate the reduction in lighting due to daylighting, compared with the older remaining part of the building.

DB ID # 246: Office building.

Interviews so far: First BB advisor, second BB advisor, and Owner / architect.

The most reliable judge of which measures suggested by BB were adopted was the owner / architect. He noted the following impacts of BB:

- BB reviewed the plans for daylighting, reviewed assumptions and design, and critiqued window sizes and placements. BB provided suggestions for lighting control
- BB offered suggestions for passive solar heating and building cooling from which we developed our building HVAC plans.

BB advisor's comments on BB suggestions:

- Put shades over windows on south side and vent air between shade and windows during summer
- Ceiling fans to de-stratify air during winter time
- Reposition glazing in south facing halls

Radiant heating was not a good idea given the choice of passive solar and traditional HVAC. BB advisor described the process of BB advice-giving as being of all three types, but they were called in after the preliminary design had been arrived at.

BB advisor would like to get feedback on all projects he works on – otherwise he can't learn from previous projects.

The conventional forced air HVAC system is smaller than would otherwise be the

case and this will save energy. The daylighting analysis has helped us achieve nearly complete natural lighting during day light hours, which also produces energy savings.

The owner / architect expressed the hope that BB could analyze the utility bills from the building once it is in use and compare those bills to bills from office buildings of a similar size from the same area. I think this is a good suggestion, because he apparently used BB as a source of ideas, which he then integrated with his own ideas. Thus it would be very difficult to tease out the impact of BB. But a whole building energy analysis or a EUI approach *would be very likely to demonstrate that the mixture of BB ideas and Insight Architects ideas produced a very efficient building.*

Disposition: It would be possible to estimate energy savings from the building using electric utility bills because the expected level of daylighting is so high.

DB ID # 18: Restaurant.

Interviews so far: BB coordinator, architect, and BB advisor. The following BB suggestions were listed by the latter BB advisor:

- HVAC: Exhaust hood air used to create inflow from dining area to kitchen; Rooftop AC needs enlargement, or addition of an economizer.

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- Heat recovery from the walk-in coolers
- Heat recovery from the ovens
- Dining room perimeter heaters of some sort.

The original request for BB assistance came from the architect, after the restaurant owner asked her to emulate a similar heat recovery project in another restaurant.

The BB advisor thinks that none of these were done for the following reasons:

- Walk-in coolers are too small to provide much heat
- There was insufficient space in the kitchen to implement the heat recovery from the ovens, although that appeared cost-effective.

BB was called in sometime during the preliminary design to evaluate some ideas from the owner. The BB coordinator handed the work off to the BB advisor right away. There was no lighting component to this BB project.

The architect indicated that none of the BB measures and plans for the measures were implemented because the cost of relocating and installing new equipment for heat recovery was too great. For example, the cost required to move the walk-in cooler coils to the roof and exchange their heat with the HVAC system was very expensive.

Disposition: No BB measures installed, and no energy savings.

DB ID # 268: Educational facility.

Interviews so far: Daylighting Lab staff, WSU project manager and architect staff. The project manager is the last of several project managers for that building. His only contact with BB was a short meeting with the Daylighting lab staff during which the lab staff suggested reorienting the classroom light fixtures and changing the model of the lamps. Both these suggestions were adopted. Neither change involved a reduction in installed wattage.

The architect staff supported the WSU project manager's conclusion that no BB suggestions were adopted which affected energy use. I talked for a few minutes with the Daylighting lab staff about this project and he indicated that there was no significant energy saving suggestions made by BB in this case.

The Project manager said that his staff are now routinely consulting the BB LDL staff during the new building design process.

Disposition: BB advice was taken, but it was minimal and did not involve energy savings.

DB ID # 162: School.

Interviewed the architect. He has worked with the Daylighting Lab before. According to him BB did not add any design alternatives, but did make refinements and adjustments. The building modeling at the Lab was critical to this process. He listed the following features of the new building:

- The North-South orientation of the building which made the best use of daylighting
- Sola-tubes
- Skylights
- Light shelves/light shades on windows in classrooms
- Clerestory windows
- Large Kalwall roof panel in the library
- Glazing to optimize solar heat gain and reduce glare
- Glass doors to admit more light

The architect was responsible for asking the Daylighting lab to help out. He has worked with them for years. He got the Lab involved during the conceptual phase of design. In general the Lab critically reviewed the BOORA design and added improvements. He stated that the school would have been built with a lot of daylighting even if the Lab had not been included in the design process, but that the modeling showed glitches which needed to be ironed out and would not have been found otherwise.

Disposition: A pre-construction simulation of this building compared to a baseline case was made. This is an adequate energy savings estimate.

DB ID UNKNOWN: School.

I can find no data or references for this case.

Disposition: This case does not belong in the database.

DB ID # 249: School.

Interviewed architect. There were no reports or modeling pictures for this project. The architect called in the daylighting lab after drawings were drawn up. The following BB suggestions were adopted:

- Suggested sloping the ceiling of classrooms to accommodate clerestory windows
- Provided sizes and layouts for skylights in the gym
- Reviewed other skylights in the building
- Reviewed the light shelves, exterior sun shades and glazing types in the classrooms
- Suggested improvements in the selection of lighting fixtures

One reason for the adoption of many of the BB recommendations may be that BB met with the project architects, construction people and electrical engineers, which often increases the chances of adoption of relatively new measures.

BB suggested skylights in the classrooms, but this was rejected because of high cost.

There was no modeling of this building in the daylighting lab, because the project had a compressed timeline.

The architect can make building plans available if we wish.

It appears that estimating energy savings will be difficult for the following reasons:

- ***These architects had worked with the Daylighting Lab on two other projects and were already familiar with the Lab's approach. So they were already a proponent of daylighting methods and***

techniques. That means that the baseline for an energy savings estimate is already well above code.

- The building is not completed.
- Much of BB's contribution was to review existing plans and add detail, such as specific lamps, or specific glazing specs. These have minimal energy impact and probably would be hard to identify exactly.

Disposition: Too difficult to estimate electricity savings due to BB involvement.

DB ID # 159: Church.

This interview is based mainly upon an interview with the project's principal architect.

This was the architect's firm's first use of the daylighting lab. The firms' staff had attended some seminars put on by the lab.

The BB advice consisted of modeling the church. The firm already had a good grasp of daylighting design principles, but the demonstration of lighting at different seasons and different times of the day showed them that certain locations would receive too much sun most of the time. The modeling also helped to convince the client of the importance of daylighting measures.

The architects themselves provided a solution to the excess lighting problem in the form of fritted glass that reduced the amount of penetrating light. The architect does not believe that the lab's modeling had an effect upon lighting energy use.

Disposition: BB advice helped sell the project and correct deficiencies in the plan, but did not contribute energy savings.

DB ID # 116: School.

Interviewed architect responsible for the classroom shown in the modeling pictures for this school. The lab was contacted after a rough preliminary design had been drawn up for these classrooms. The lab suggested:

- Moving the skylights to the opposite side of the room from the exterior windows to balance the daylighting.

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- Sloping the ceiling to improve light distribution
- Moving the exterior windows to the headwall to bring light to the corner

The first and third of these suggestions were adopted.

The role of the model was to help convince the school board that these modifications were worth the cost, which it did. This particular board does not have a record of being progressive on construction design and does not have extra money.

The architect and we do not see a good way of estimating energy savings from the two adopted daylighting measures. First of all, there are no photocells or occupancy sensors or timers for the lighting in the room. So there is no assurance that lights are shut off – that would depend on teacher behavior. Second, there are no good comparison classrooms on site. The other classrooms have different orientations, and no energy modeling was done for this classroom. Short of visiting the school and leaving lighting loggers this energy impact probably cannot be measured.

Disposition: BB advice used, but assessment of energy savings not feasible

DB ID # 99: Office building.

The architect identified the following items as BB contributions (from the Daylighting Lab):

- First floor light shelves and exterior overhangs
- Projecting offices
- Translucent Roof Monitor
- First floor painted white ceiling
- Evaluation of interior partition height options

The involvement of the Daylighting lab began with consulting prior to the finalization of the plans, and continued with daylighting modeling after the model was built. The architect said that the Lab suggested each of the items listed above and all of them were adopted. Some suggestions were modified to reduce the costs. Some of the Lab's recommendations involved choosing one of several design options.

The architects had worked with the lighting design lab before on other projects.

The architect argued that the inclusion of the translucent roof monitor was the measure, which reduced lighting energy costs. He was not certain that it affected mechanical energy costs. ***The building had been modeled to estimate energy use before the translucent roof monitor was selected as an option. He said it would not be too hard for someone else to tweak the old model to account for the translucent monitor,*** and that photocells were already part of the plan before the BB people gave advice and suggestions.

Disposition: It would be possible to evaluate this energy savings given enough cash to run the same model including the monitor.

DB ID # 133: Grocery store.

The architect provided information about this project. His company became involved in the construction of this building very late in the process, because the client did not sign the lease until the building was half complete. The architect recognized the need to reduce the solar gain entering the space through the south wall and worked with the Daylighting Lab. The upshot was a late change in the glazing along the south wall from glass with a solar heat gain coefficient of 0.89 to a solar heat gain of 0.4 (50% drop). In addition, the owner agreed to construct a shading canopy on the South side to reduce solar heat gain further.

These two changes had several important effects on the interior of the store. First, an engineering estimate indicated that electric energy used for the HVAC dropped by \$200 per month due to reduced solar gain. Second, there was a decrease in sun glare, which interfered with shoppers' activities. SBW reviewed the modeling printouts and concluded that their validity could not be ascertained. Modeling requires a careful analysis of the complex refrigeration system along with the HVAC system to determine the net impact of the lower solar heat gain windows.

The two glare reducing measures were the joint contribution of the architect and the Daylighting Lab. Adequate modeling is possible however.

Another big contribution of the Daylighting Lab was the sophisticated presentation of the modeling results, which went a long way toward convincing the owners to make the recommended changes. ***The owners are planning to***

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use the Lab in the design of a new store elsewhere in the region, and this time the Lab will be in from the start.

A mechanical engineer at a different firm calculated the electricity savings from these two measures.

Disposition: While it is not clear that the energy savings from substitution of 0.4 SHGC windows were properly modeled there is no reason why they could not be modeled correctly.

DB ID # 21: School.

Interviews were obtained from the BB advisor. This project was a PGE small building lighting project as part of a remodel. The BB advisor did an audit and made recommendations.

The adopted measures included:

- Dimmable ballasts in 3 rooms controlled by photosensors
- Shift from T-12 to T-8 with electronic ballasts controlled by photocells

The BB advice provided an alternative design, which was adopted. Several measures recommended by BB were not adopted:

- Putting existing T-8 lights under dimmable ballasts with controllers (too expensive)
- Several classrooms were not retrofitted because of cost

The adopted measures do reduce electricity consumption. The BB advisor completed a PGE Program spreadsheet with baseline and retrofitted electricity consumption. So the energy savings for this measure have been calculated. The school facility staff intend to review electric utility bills soon for an estimate of energy savings also.

Disposition: Energy savings have been calculated for this project.

APPENDIX D

Training Activities of the Lighting Design Lab

Appendix D

TRAINING ACTIVITIES OF THE LIGHTING DESIGN LAB

The following two tables provide a summary of training activities undertaken by the Lighting Design Lab, and recorded in the Lighting Design Lab database.

**Table D-1
SUMMARY OF LIGHTING DESIGN LAB TRAINING ACTIVITIES: 2003**

DESCRIPTION	NUMBER OF CLASSES HELD	TOTAL HEADCOUNT
UW Architecture 435	29	275
What's New in Lighting 2003	3	191
Building Efficiency Program - Lighting Training (6 Oregon Cities)	6	165
Human Interaction with Light	9	153
Design Considerations for Energy Effective Lighting	10	130
Powerful Business	1	45
Controls Summit	1	44
Lunch & Learn	3	42
Presentation on Quality lighting	1	40
Retail Lighting Design Workshop	2	37
Light in Architecture	4	36
Advanced Fluorescent Systems	1	35
Sustainability Class	1	35
Office Workshop	2	30
Powerful Business Distributed Controls	1	30
Retrofit Ltg & Exterior Ltg for MT Dept of Environmental Quality	3	26
Continued		

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DESCRIPTION	NUMBER OF CLASSES HELD	TOTAL HEADCOUNT
LEED Exterior Lighting Training - Preparation and class	1	25
Energy-efficient Lighting	1	20
Controls	2	19
Office Lighting Workshop	2	19
LDL Overview to Idaho Power and ZGA Architects	2	18
IES Lamps and Ballasts	1	16
IES Luminaires	1	16
AIA Energy Code Class	1	14
Industrial Lighting Class	1	14
Light Sources – MithUniversity	1	14
UW Architecture 433 Color and Light	1	14
MithUniversity Luminaires	1	13
CFL Performance Update to Idaho Power	1	12
Class for Marylhurst College	1	10
Contractor Lighting Controls Training	1	10
Gallatin Architects Association Noon Class	1	10
Noon presentation on Mock-Ups to Don Carlson Architects	1	10
Office Workshop + travel	2	9
AIA Controls Class	1	9
Intro to Lighting	1	7
Light in Architecture + Travel	1	7
Lighting Design Workshop	1	7
Retail Site Visit: Pacific Place Shopping Center	1	7
Light in Architecture + Travel	1	4
Daylighting 102 - Physical Modeling - CM/UW	1	1
TOTAL	106	1,619

Table D-2
SUMMARY OF LIGHTING DESIGN LAB TRAINING ACTIVITIES: 2004

DESCRIPTION	NUMBER OF CLASSES HELD	TOTAL HEADCOUNT
Energy Effective Light Sources	9	178
AIA Lunch Lighting Roundtable	1	100
Fixtures, Buildings and Light	7	83
Oregon Energy Trust Training (5 Oregon Cities)	4	62
Controls Summit facilitation	1	51
AIA Integrated Lighting	1	50
Energy-efficient Lighting Training	1	50
Retrofits	6	49
Luminaires	2	47
UW Architecture 498	3	42
Sustainable Building Advisor Class	1	40
LEED & ASHRAE outdoor lighting	1	30
School Lighting - Better Bricks High Performance Schools Roundtable, Pocatello, ID	1	30
Lighting Controls	2	24
Light in Architecture - ALSC Architects	1	19
Pacific Power, Energy efficiency training	2	18
What's New in Lighting	1	16
"1 Watt Per Sq Foot"	1	15
Energy-efficient Lighting Training-	1	15
Industrial Lighting	1	15
Lighting Q & A Session	1	15
Spokane Falls Community College Guest Lecture	1	15
		Continued

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DESCRIPTION	NUMBER OF CLASSES HELD	TOTAL HEADCOUNT
IES ED150 Optics	1	13
UW Color and Light Guest Lecture	1	12
Lighting Controls	1	10
Office- High Performance Lighting presentation w/ Chris Meek	1	7
Live from the LRC - Light & Health	1	4
TOTAL	54	1,010



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