



FINAL REPORT

**Process Evaluation of Seattle City Light's Energy
Smart Services for New Commercial Construction**

Prepared for:

Dennis Pearson, Evaluation Project Manager
Seattle City Light
Seattle, Washington

Prepared by:

Linda Dethman
Denise Kivlen

Dethman & Associates

Rick Kunkle

Washington State University Energy Program

Jane Peters

Dulane Moran

Research Into Action, Inc.

Dethman & Associates



Seattle, Washington

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Executive Summary

Introduction and Approach

The City of Seattle and Seattle City Light (SCL) has supported the construction of energy efficient commercial buildings since 1980. In 2002 the SCL launched a new program – Energy Smart Services (ESS) – that unified all commercial and industrial incentive and technical assistance services under one umbrella. The primary goal of ESS new commercial construction services is savings acquisition; market transformation, while important, is a secondary program goal. The program targets all large and medium sized general service customers, focusing on the most energy intensive new commercial buildings in SCL’s service territory.

The SCL conservation manager requested this process evaluation of new commercial conservation services to help develop actionable recommendations to improve the awareness, marketing, and delivery of new construction energy efficiency services. The objectives for this evaluation were to assess:

- The processes used to deliver ESS new construction services
- Participant and non-participant views of program marketing and processes
- Successful elements of new construction programs elsewhere that might be relevant to ESS

To evaluate this program, the consultant team, in concert with SCL’s in-house evaluation project manager:

1. Analyzed the Commercial/Industrial Tracking System and the Department of Planning and Development’s Permit Database.
2. Conducted and analyzed interviews with 14 new construction services managers, Energy Management Analysts (EMAs), and other key City staff that could affect the delivery of new construction efficiency services.
3. Conducted and analyzed interviews with a qualitative sample of 28 owners and design team members who had worked on 17 projects that participated in ESS.
4. Conducted and analyzed interviews with a qualitative sample of 14 non-participant decision-makers who had worked on 11 projects that had not participated in ESS.
5. Reviewed and analyzed literature describing “best practices” for new commercial programs across the country.

This evaluation used both quantitative and qualitative approaches which, in turn, resulted in rich and reliable data across its various sources. While the samples of participants and non-participants are not statistically representative, the results from these in-depth interviews are insightful and consistent. Taken together, the data provide strong support for program planning and decisions.

Synthesis of Findings

Chapters 3 through 6 of this report each contain summaries of key findings. We have used these key findings to develop the following synthesis of findings:

Overall Findings

- Overall, program staff, internal key informants, and participants are positive about the value and effectiveness of ESS new construction services.
- Program strengths noted in internal interviews dovetail with participant views: staff's strong relationships with customers, their expertise in energy efficiency, and their ability to handle complex, custom projects.
- The database analysis shows that the program has affected about 52% of all new commercial and institutional buildings in Seattle built between 1998 and 2004 and approximately 58% of newly constructed space (i.e., square feet).
- While the ESS program is effectively reaching the majority of new office buildings (the second largest proportion of newly constructed space), the database analysis and interviews suggest it has been less successful in reaching a more recent building trend in Seattle – large mixed use buildings.¹
- When asked specifically about the effect of the energy code on participation, some staff and participants said it had pushed up efficiency standards and others said it was inflexible and hard to surpass, making it more difficult to participate in ESS.
- Respondents cited these market trends as being favorable to sustained interest in energy efficiency:
 - An increased interest in sustainability, daylighting, renewable energy and LEEDTM (state and city requirements for LEEDTM), higher energy costs, more stringent energy code requirements, and new technologies such as raised floor HVAC systems, energy efficient lighting, and lighting and HVAC controls. Some saw opportunities for SCL to promote or raise awareness about some of the new technologies.
 - Another trend noted by a few people was the dramatic increase in construction costs; some said this increase could make it more difficult to pay for more energy efficient equipment.

Internal Interview Findings

- Staff report the program process is flexible and they do a lot of “handholding” to help customers meet the program requirements including filling out applications and paperwork.
- Program staff said outreach to new customers, tracking potential projects, and reaching projects early enough in the design process to maximize opportunities were primary program challenges.

¹ SCL's Built Smart residential program has primary responsibility to provide residential conservation services to multifamily and mixed-use multifamily buildings.

- Staff noted that while communication is often effective between the new commercial team and Account Executives and the Department of Planning and Development (DPD), organizational “silos” can decrease the effectiveness of conveying time sensitive information across departmental lines.

Participant Findings

- Most participants were satisfied with their ESS experience, saying the program fit well with their project development process and added value to the design process. Participants particularly praised the good ideas and responsiveness of SCL staff, and some particularly praised the Lighting Design Lab.
- Participants were aware of program features, particularly efficiency measure incentives, although some did not know about commissioning and LEEDTM incentives. Some participants said incentives for commissioning and energy analysis assistance were not worth the effort.
- Financial incentives and long-term cost savings were the primary motivations to participate. Corporate or institutional “values” such as sustainability and community responsibility were sometimes secondary but important considerations.
- Most participants cited few initial barriers to participation, but some said timing and paperwork requirements had concerned them.
- Participants who had used ESS services more than once were generally able to progress through the program efficiently, although many were not aware of the steps involved. New or less experienced participants noted that some program requirements were not clear and that too much documentation was needed.
- Some participants said they would have likely taken similar efficiency steps in their projects even without the program incentives.
- Almost all participants said ESS had influenced subsequent projects. When asked how they had been influenced, about half said they would use the program again, and a few said they had learned things they would use on other projects, although they did not identify specific measures or approaches.
- Findings were mixed about how much the program was influencing market changes.

Non-Participant Findings

- Non-participants identified lack of program awareness and lack of economic benefits as the two key reasons not to take advantage of ESS new construction services.
 - About one-third of non-participants had no awareness of ESS, while another one-third had some, but limited, awareness. The final one-third was quite familiar with ESS, primarily because they had participated in ESS with other projects.
 - Non-participants tended to be most aware of the Lighting Design Lab.
 - Non-participants cited a variety of economic barriers to participating, all associated with the perceived higher costs of energy efficiency improvements, including projects

that offered few savings opportunities, program incentives that were not large enough, and owners with no motivation to go beyond the energy code.

Conclusions and Recommendations

The flexibility of the program, the variety of clients served, the limited but expert staff, and the demands of new construction projects create a set of interrelated program issues and challenges:

- How to reach an even larger segment of target projects, especially among uninitiated owners and designers.
- How to clarify program steps and expectations, and deliver the most streamlined, timely, and robust approaches, given limited staff.
- How to move toward higher value, higher efficiency, and greener buildings and still meet savings acquisitions goals.

The following conclusions and recommendations address these issues and challenges. They are drawn from the program review and database analysis; interviews with staff, participants, and non-participants, the best practices review; and, in the case of a few recommendations, from the experience of the consulting team. Chapter 8, *Synthesis of Findings, Conclusions, and Recommendations*, provides more detail on some of the recommendations.

Program Process Improvements

1. **Conclusion:** Both program staff and participants value program flexibility and the level of customer service and technical expertise that the program provides; these program attributes are consistent with best practices guidelines. Other aspects of best practices related to program process – having clear program steps and streamlined procedures – are less apparent in the program, and lead to inefficiencies for both staff and participants. The ESS manual and website cover all C/I services and do not contain an easily identifiable path for new construction services, which likely increases the need for staff “handholding.”

Providing clear and separate guidance for new construction services would free up staff time for more outreach and relationship building, which in turn should allow them to reach projects earlier in the design process and to maximize potential savings. Reducing process uncertainty would also benefit participants, especially new ones, by clarifying program expectations and making participation more efficient.

Recommendation: Review program steps and procedures and develop accessible, clear, and separate materials to explain ESS new construction services.

- Develop a flow chart of the new construction service.
- Develop separate new construction guidelines.
- Develop a clear path on the website for new construction services.
- Institute scoping meetings as a more formal part of the process for projects reached early in design and for all custom projects.
- For smaller projects, consider ways to streamline the process.

Market Identification and Outreach

2. **Conclusion:** Given program staffing constraints, it has been difficult for staff to reach beyond established relationships and to have a consistent outreach strategy. However, staff wants and has some resources to do more outreach, and customers were open to being contacted through appropriate venues.

Recommendation: Consistent with best practices guidelines, take advantage of existing relationships and networks with owner/developers, A&E firms, within SCL and other city departments, and with other efficiency agencies (e.g., Northwest Energy Efficiency Alliance) and utilities in the region (e.g., Puget Sound Energy). In addition, do targeted outreach to new trade allies to ensure awareness, increase knowledge of efficiency options, and expand program reach. Focus on customer benefits, then energy efficiency, and keep benefits quantifiable in terms of economics.

- Extend and strengthen relationships with existing and new members of key target audiences through meetings, brown bag lunch sessions, or exchanging project plans.
- Develop program promotion materials that clearly and succinctly describe the various program services and their benefits.
- Develop and present successful projects and energy efficient technologies and systems, and show people that it is worth participating.
- Develop links on the website that are targeted to owners and trade allies.
- Consider ways to recognize design teams that produce high efficiency, high performance, and green projects.
- Consider new ways to identify projects early in design, perhaps through the pre-submittal conference with DPD or DPD's on-line Land Use Bulletins.
- Strengthen relationships with internal partners to increase notification of new projects, including residential efficiency staff dealing with mixed-use buildings.
- Participate in targeted professional organizations and presentations at conferences and events to help maintain visibility.
- Take advantage of the commercial sector activities at the Northwest Energy Efficiency Alliance to raise awareness about ESS and energy efficiency. In addition, consider how utilities might work together on whole building efficiency if more than one fuel is used.

Program Theory and Logic

3. **Conclusion:** While the program's design is consistent with its primary goal of acquiring cost-effective energy savings, staff would like to add other indicators to chart program progress and success toward secondary goals. For instance, while most management and staff identified market transformation as a secondary goal, opinions varied as to how important market transformation is for the program, how well it is being achieved, and if it could be measured. In addition, some respondents hoped that the program could be more innovative and cutting edge. If this were another goal, the program might support new technologies and integrated design, whole building, and green building approaches, and track whether these outcomes are achieved.

All of these findings suggest that a more formal process to examine program goals and their implications for program strategies, indicators, and outcomes would be useful for charting the future of the program. Developing a well articulated program theory is consistent with best practices guidelines.

Recommendation: Review and clarify program theory and logic, including a review of program goals and strategies, and measurable outcomes and evaluation approaches with the intent of increasing program value and impact. (For an example of an abbreviated program logic model developed for the New York State Energy Research and Development Authority’s (NYSERDA) New Construction Program, see Appendix C.) Look at ways to increase the overall level of energy savings in participating projects and promote leading edge approaches while reducing free riders. The following approaches, used in other programs and /or consistent with best practices findings, should be considered:

- Adding a whole building path, perhaps through a pilot project, to the program. While whole building approaches present challenges, studies have shown this approach can increase overall energy savings.² A whole building approach could employ incentive approaches that encourage using this path.
- Developing a stronger link between the ESS process and LEED™ to coincide with market trends and to achieve overall “better” buildings.
- Limiting eligibility of and/or incentives for projects that enter late in the design process to encourage early entry and to reduce freeriders.
- If possible, taking advantage of the tax incentives in the Federal Energy Policy Act for buildings that exceed the ASHRAE standard by more than 50%.
- Reviewing the building commissioning and energy analysis services and developing ways to increase the perceived value and use.
- Tapping into the market transformation activities that support integrated design/whole building approaches at the Alliance.
- Reviewing program theory/logic and program strategies and identifying measurable outcomes and evaluation approaches to track progress and improve program performance.

² “The most recent evaluation of California’s Savings by Design shows that Whole Building projects save over twice as much energy per square foot than do systems projects, and they also produce a higher gross realization rate than systems projects.” – From Chapter 7 of this report.

Chapter 1: Introduction

Program Synopsis

Through its Energy Smart Services (ESS) umbrella conservation program for medium and large commercial and industrial customers, Seattle City Light (SCL) encourages developers, design teams, and owners to construct high performance new commercial buildings. A specialized team of Energy Management Analysts (EMAs) offers financial and technical assistance services to help ensure that new commercial buildings, and major renovations of existing commercial buildings³, both meet owner requirements and go beyond the current energy code for the City of Seattle, one of the most stringent commercial efficiency codes in the nation.

Study Purposes and Approach

The SCL conservation manager requested this process evaluation of new commercial conservation services to help develop actionable recommendations that ESS staff and management can use to improve the awareness, marketing, and delivery of new construction energy efficiency services in SCL's service territory. The objectives for this evaluation are to assess:

- The processes used to deliver ESS new construction services, including the targeting of market segments, marketing and outreach, service delivery, and project tracking.
- Participant and non-participant views of program marketing and processes, and the value of SCL's Energy Smart Services to the new construction community.
- Successful elements of new construction programs elsewhere that might be applied to SCL's program.

The consultant team, in concert with SCL's in-house evaluation project manager, conducted these tasks to assess the effectiveness of the implementation of SCL's ESS new construction services:

1. Analyze the Commercial/Industrial Tracking System and the Department of Planning and Development's Permit Data Base.
2. Conduct and analyze interviews with new construction services management, EMAs, and other key City staff that could affect the delivery of new construction efficiency services.
3. Conduct and analyze interviews with a sample of program participants.
4. Conduct and analyze interviews with a sample of non-participants.

³ In this report, we will use the term "new commercial buildings" as inclusive of both newly constructed buildings and major renovations of existing buildings.

5. Review and analyze literature describing “best practices” for new commercial programs across the country

The specific methods used to accomplish each of these tasks will be described in the relevant report sections. The overall evaluation approach, however, used both quantitative and qualitative data; this approach resulted in rich and reliable data across its various sources. While the samples of participants and non-participants are not statistically representative, the results from these in-depth interviews are insightful and consistent. Taken together, the data provide strong support for program planning and decisions.

Report Overview

Following this introduction, this report is organized into the following chapters:

- Chapter 2: Program History and Overview
- Chapter 3: Analysis of the Tracking System and the Permits Database (A more detailed analysis is presented in Appendix A)
- Chapter 4: Views of SCL Staff and Other Key Internal Informants
- Chapter 5: Participant Views
- Chapter 6: Non-Participant Views
- Chapter 7: Analysis of Best Practices Literature for New Commercial Construction Programs
- Chapter 8: Synthesis of Findings, Conclusions, and Recommendations

Chapter 2: Program History and Overview

Program History

According to interviews with new construction services managers and staff, and review of program materials ⁴, the City of Seattle and SCL has supported the construction of energy efficient commercial buildings since 1980, beginning with efforts to adopt an energy code that was more stringent than the state energy code. SCL then launched new construction design assistance services in 1988-1989 as part of the Bonneville Power Administration's (BPA) Energy Smart Design (ESD) program. In the early 1990's, when BPA added incentives for installation of measures that went above code, SCL made use of these incentives for new construction projects in Seattle.

In 2002 the SCL launched a new program that unified all commercial and industrial incentive and technical assistance services under a single program called Energy Smart Services (ESS). This program serves large and medium sized customers with commercial new construction, existing commercial building retrofits, and industrial facilities. This evaluation focuses on the services available to new construction building owners and design teams.

Program Intent

Based upon manager and staff interviews, ESS for new commercial construction intends to accomplish two major objectives:

1. Capture immediate energy savings that will persist over time. Savings acquisition is the primary goal of ESS new construction services.
2. Push design teams beyond standard practice and encourage them to adopt higher efficiency levels in building design. Market transformation, while important, is a secondary program goal.

Current Services

Over time SCL has expanded its menu of efficiency services for new construction and major remodels of commercial buildings, so that its offerings now include:

- Financial incentives for installing lighting and controls
- Financial incentives for installing high efficiency HVAC equipment
- Financial incentives for installing custom efficiency measures
- Energy Analysis Assistance, which provides financial support for professional engineering services to research and evaluate various building system designs in terms of energy efficiency

⁴ Key program materials include the "Energy Smart Services Program Manual," various ESS brochures, and past evaluation reports.

- Building commissioning support and funding
- Lighting Design Lab training and support
- Assistance for LEED™ certification for sustainable new buildings (includes financial grants)

The New Commercial Team

According to the program manual, the goal of the EMAs is to work in partnership with the customer and their normal service providers, such as architecture and engineering firms, to develop a mutually agreed upon set of energy efficiency and other performance specifications that meet the goals of the owner and the requirements of the program.

The new commercial team is made up of an EMA team leader and two full time EMA staff. The team reports to an EMA Supervisor, who supervises programs for both existing and new commercial services, who in turn reports to the Manager of the Commercial/Industrial (C/I) Section. Members of the team seek out and track new commercial projects, and an EMA is assigned to each new construction project at the time the project is initiated and the Application for Service is completed. Other EMAs outside the team may handle new construction projects or may be called upon to provide expertise to the new commercial team. In addition, the new commercial team works with other staff within the City to keep them informed of projects being developed or underway, such as City Light Account Executives who handle large customers, City Light's Sustainable Building Coordinator, and staff within the Department of Planning and Development (DPD).

Target Market

The program targets all large and medium sized general service customers – about 3,000 accounts. However, the prevailing strategy of the new commercial team is to reach and involve the biggest, most energy intensive new commercial buildings in SCL's service territory. Given staff resources, they believe this is the most cost-effective approach to meeting their savings goals, since opportunities for energy efficiency generally increase with the size of the building. Thus, while ESS serves a variety of projects in terms of size and type, its primary goal is to reach and affect all commercial building projects, whether private or public sector, that are 100,000 square feet or larger. They particularly want to involve energy intensive buildings, such as hospitals and labs that operate 24 hours a day, seven days a week and that have significant energy requirements. In addition, they particularly target institutional customers, since these buildings tend to be owner-occupied for the long term; in addition, the City requires that all City-owned new large commercial buildings receive a LEED™ silver certification.

Program Steps

This description of program steps is based upon interviews with ESS staff and the *ESS Program Manual* (2002). The general steps for new and existing buildings are similar under ESS, but some unique services are offered for new commercial buildings. ESS staff emphasized that a

project's specific path through the program can vary. However, projects must take part in those steps that are identified below as "required." They may also take advantage of the "optional" services listed.

1. **Application (required):** All projects file a short application for service. Subsequent to filing this application, an EMA is assigned to the project.
2. **Project Development (required).** The customer may pursue participation by: (1) requesting Energy Analysis Assistance where SCL covers 100% of the costs for professional engineering services to identify and analyze energy efficiency opportunities in the building not covered by ESS standard incentives; or (2) requesting funding for energy efficiency measures they have already developed. In this case, the customer needs to determine if the proposed measures fall under Simple Rebates or Standard incentives, or if a customized analysis is needed.
3. **Estimate of energy savings and measure costs (required).** In this part of the participation process, a Trade Ally and/or an EMA formalizes the paperwork, combining the energy savings estimates and costs for the proposed measures.
4. **SCL Project Review and Contract Execution (required):** Once the savings and funding calculations are prepared, an EMA reviews them and SCL issues a contract.
5. **Building Commissioning (optional).** Commissioning is a systematic process for ensuring that the building systems operate in accordance with design intent, owner requirements, and equipment specifications. Commissioning incentives are only offered for new commercial buildings with construction budgets over \$5 million. Incentives cover the costs of developing a commissioning plan and analyzing the energy impacts of commissioning, but do not cover the costs to implement commissioning.
6. **LEEDTM (Leadership in Energy and Environmental Design) Incentives (optional).** Only new commercial buildings are eligible for these incentives that help defray the costs of incorporating "meaningful" sustainable building ideas into their projects so that a LEEDTM certification can be achieved.
7. **Inspection and payment (required):** Once installation is complete, the customer schedules an inspection. The inspection includes verification of measure installation and operation, which may result in further suggestions on how to improve equipment efficiency. After a successful inspection, the customer submits invoices for payment.

Chapter 3: ESS New Commercial Project Descriptors and Market Reach

Concurrent with this process evaluation, the SCL evaluation project manager analyzed and compared various aspects of the DPD building permit and ESS program databases. This chapter presents a condensed portion of that analysis, including:

1. Key descriptors of the new commercial projects that participated in the ESS new construction services program between 1998 and 2004, and
2. Estimates of the proportion of new commercial construction affected by ESS services during this same seven-year period.

The full results of the database analysis can be found in Appendix A. In addition to more detailed figures, tables, and narrative about the topics listed above, Appendix A includes a cost-benefit analysis of ESS new construction projects and a discussion and recommendations section.

Methods

The analysis uses data from two sources:

- **The Commercial/Industrial Tracking System (CITS)** that SCL maintains for its efficiency projects. This database contains project information for over 4,000 commercial and industrial efficiency projects from 1987 to the present. The current analysis focuses on new commercial construction projects contracted or completed between 1998 and 2004. The majority (66%) of new construction energy savings was acquired during the three-year period from 2002 through 2004 under the ESS program; the remaining third of program savings were acquired from 1998 through 2001 under the predecessor ESD program new construction services.
- **The City of Seattle's Department of Planning and Development (DPD) database** of residential, commercial/institutional, and industrial building construction permits. The evaluation project manager worked extensively with an extract of this large database to develop a database that was a proxy for all the new commercial and institutional construction projects that would have been eligible to participate in the SCL's new construction program between 1998 and 2004. The data used in this analysis contained all completed or active commercial and institutional buildings costing more the \$1 million to construct and all mixed-use multifamily buildings with construction costs greater than \$1 million from 1998 through 2004. This *excludes* all non-multifamily residential structures, and all expired permits.⁵

⁵ The specific steps to develop this database are detailed in Appendix A, along with other methodological considerations.

Key Descriptors of ESS New Commercial Projects

Number and Type of Services Provided

Table 1 reveals that from 1998 through 2004 ESS provided services to a total of 170 new construction projects in 121 unique buildings. Of these 170 projects, 128 included *incentive projects* that had been completed or contracted and not yet completed (active). Energy savings for *all completed and active projects* were 49.5 million kWh, with average project savings of 386,913 kWh per incentive project per year. Of the 49.5 million kWh of energy savings, 38.7 million kWh of savings were acquired in *completed projects*. These ESS projects affected an estimated 22.3 million square feet of building space, or an average of 184,587 square feet per participant building.⁶ Energy savings were 2.22 kWh per square foot of ESS project buildings space.

Table 1 New Construction Projects by Type of Service, 1998 – 2004

ESS Service Provided	Completed Project Count	Active Project Count	Energy Savings – Completed and Active Projects (kWh)	Energy Savings – Completed Projects Only (kWh)	Square Feet ⁷	Contract Amount for Completed Projects ⁸	Payment Amount for Completed Projects
Installation incentives	101	27	49,524,858	38,698,018	-	\$7,123,614	\$6,963,593
Energy Analysis Assistance	16	5	-	-	-	204,911	186,403
Building Commissioning	14	7	-	-	-	197,055	192,584
Total	131	39	49,524,858 (5.7 aMW)	38,698,018 (4.4 aMW)	22,335,078 (184,587/bldg.)	\$7,525,580	\$7,342,580
Completed or active project/building total:			170 Projects in 121 unique buildings				

The program energy savings are tracking system savings and have been adjusted to account for avoided transmission and distribution losses (T&D kWh savings = (tracking system kWh savings) x (1.052)). Total contracted incentives for these 101 completed incentive projects were \$7.5 million and total paid incentives were \$7.3 million. The contracted amount for all projects, both completed and those still active was \$9,586,926.

ESS also offered building commissioning and energy analysis assistance (EAA) to 42 projects in 34 unique buildings between 1998 and 2004, 30 have been completed and 12 were active at the end of 2004. Eighty-eight percent of these 42 commissioning and EAA projects were in

⁶ Separate square footage values are not available for each service type because most Building Commissioning and Energy Analysis Assistance customers also participated in incentive service projects and this would have presented a double or triple counting of square feet if the floor area were repeated in each service category.

⁷ See footnote 1 above. Square feet includes both completed and active ESS project buildings.

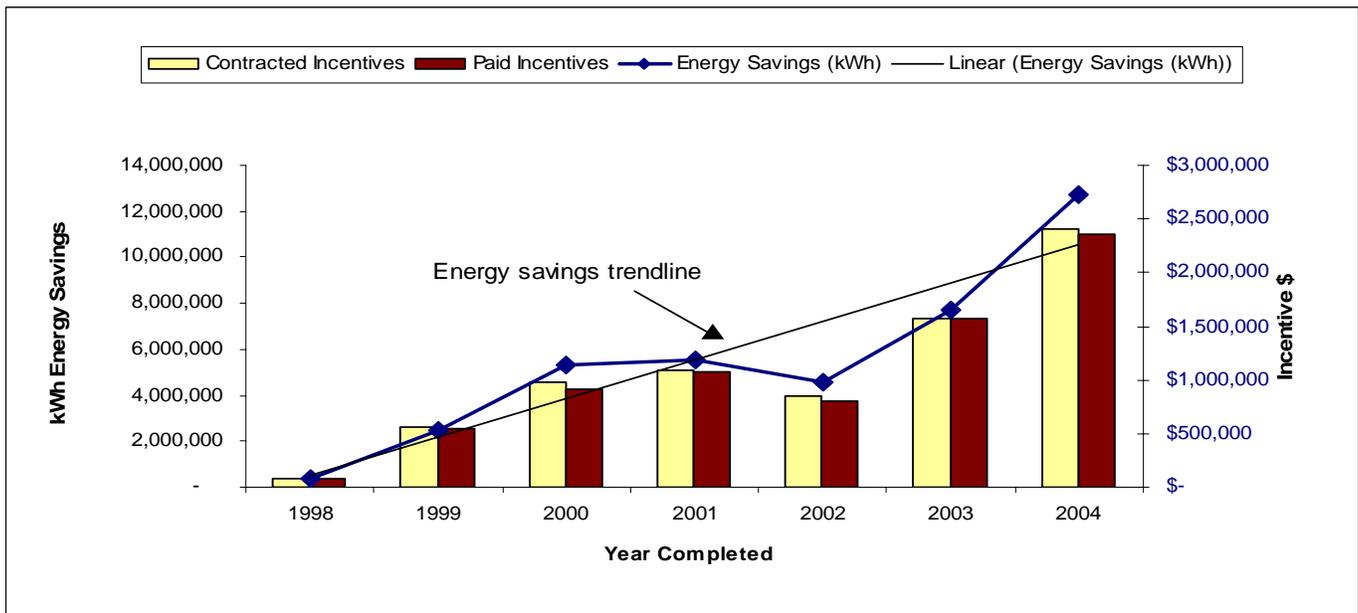
⁸ The contract and payment amount includes only those projects that have been completed. The contracted amount for all projects, both completed and those still active, was \$9,586,926.

buildings that also received ESS incentives for the installation of measures totaling 22.9 million kWh in annual savings.

Energy Savings and Incentives

Figure 1 demonstrates that the new commercial program has seen a substantial increase in the energy savings and contracted and paid incentives over the past seven years, particularly in 2003 and 2004. While contracted incentives and energy savings were fairly steady from 2000 to 2002, they nearly doubled in 2003 and rose to a new high in 2004. This increase was primarily due to the “10 plus 10” incentive bonus, which paid an additional incentive to customers 20% above the standard incentive for both new and existing building owners. To qualify for this bonus offer, projects needed to be contracted by December 15th, 2004 and measures installed and inspected by July 15th, 2005.

Figure 1 ESS New Construction Energy Savings and Incentives by Year - Completed Projects Only⁹



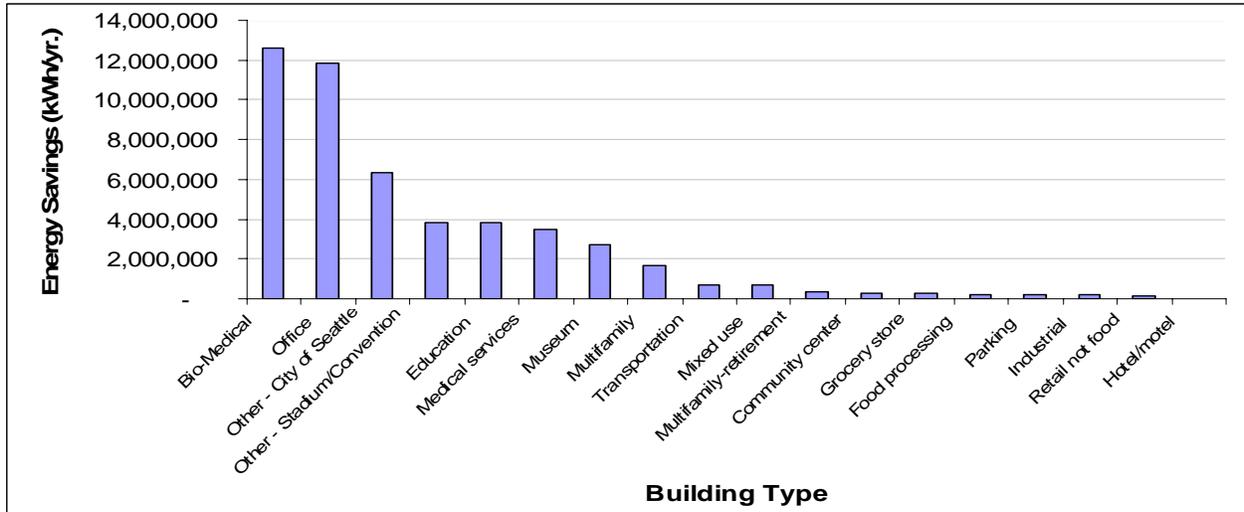
An update of ESS new construction projects revealed that 23 incentive projects were contracted during 2005. This is 25% above the average annual new construction project total during the preceding seven years. However, the average savings per project has decreased substantially. Estimated contracted savings including a transmission and distribution adjustment were 4.1 million kWh in 2005. These 2005 contracted energy savings are 42% below the average of 7.1 million kWh per year during the previous seven-year period. This indicates that while the number of contracted projects continued to rise in 2005, the average savings per project has decreased markedly.

Figure 2 illustrates that ESS new construction services touch a wide range of building types, but the majority (62%) of savings were concentrated in three types – bio-medical, office, and

⁹ The energy savings and incentives in Figure 1 include completed projects only.

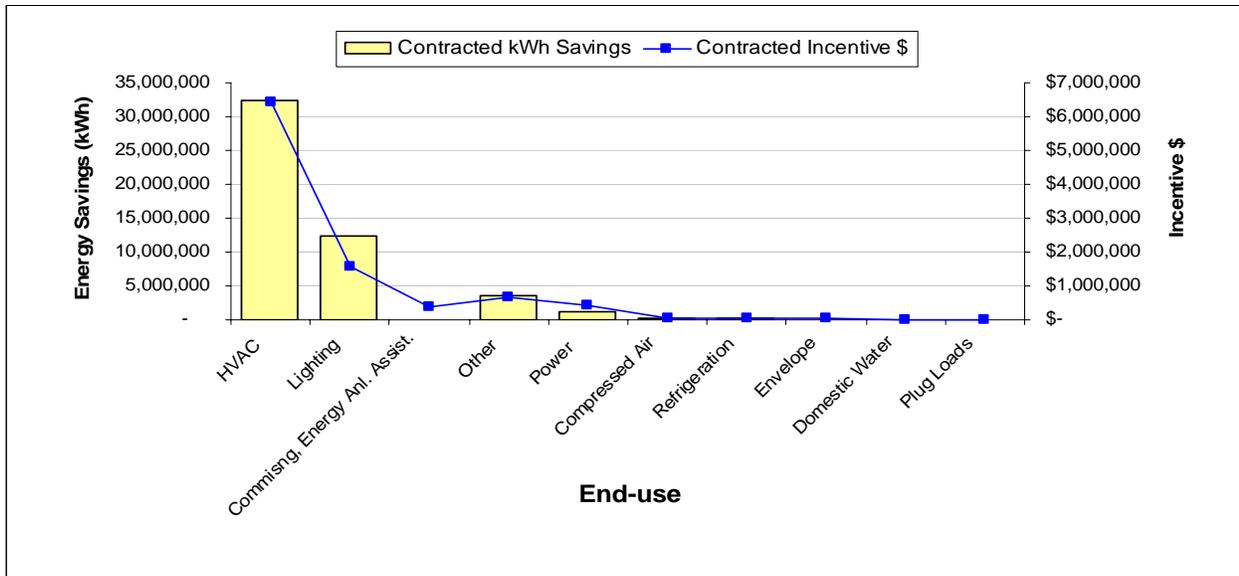
buildings owned and constructed by the City of Seattle. Twenty six percent of all new construction project savings were in bio-medical facilities, 24% in office buildings, and 13% in new buildings owned by the City of Seattle. Taken together, stadiums/convention centers, educational facilities (all educational levels), and medical services (hospitals and clinics) account for another 23% of total energy savings. The remaining 14% are distributed across the other 12 building types.

Figure 2 New Construction Energy Savings by Building Type



Not surprisingly, the majority of energy savings and associated incentive costs in new construction projects reside in heating ventilation and air conditioning (HVAC) equipment and lighting end-uses. Together these two end-use types comprise 89% of all new construction project savings. Figure 3 depicts the contracted energy savings and associated incentives for each major end-use type. The “other” end-use category; typically variable speed drives (VSD), furnace or boilers, and motors, total 7% of all contracted savings. “Power” measures include high efficiency transformers and make up 2.5% of total energy savings. The remaining five measure types (compressed air, refrigeration, envelope, domestic water heat, and plug load devices) comprise the balance of 1.2% of total energy savings by end-use.

Figure 3 Contracted Tracking System Energy Savings and Incentives by End-Use



ESS Program Reach - New Construction Building Permits 1998-2004

Table 2 displays the square footage reflected in the DPD database from 1998 through 2004 for all categories of construction that might be served by the ESS program: new construction, additions/alterations, and tenant improvements. Of these buildings, only new structures and additions to existing buildings are eligible for new construction services; the remainder could apply for retrofit services.

Note: The only “new” floor space is in new buildings and additions to existing buildings. Since many alterations and tenant improvements can occur in new buildings constructed between 1998 and 2004, some unknown fraction of the square footage in those alternation and tenant improvement categories is duplicated in the square footage listed in the new construction category.

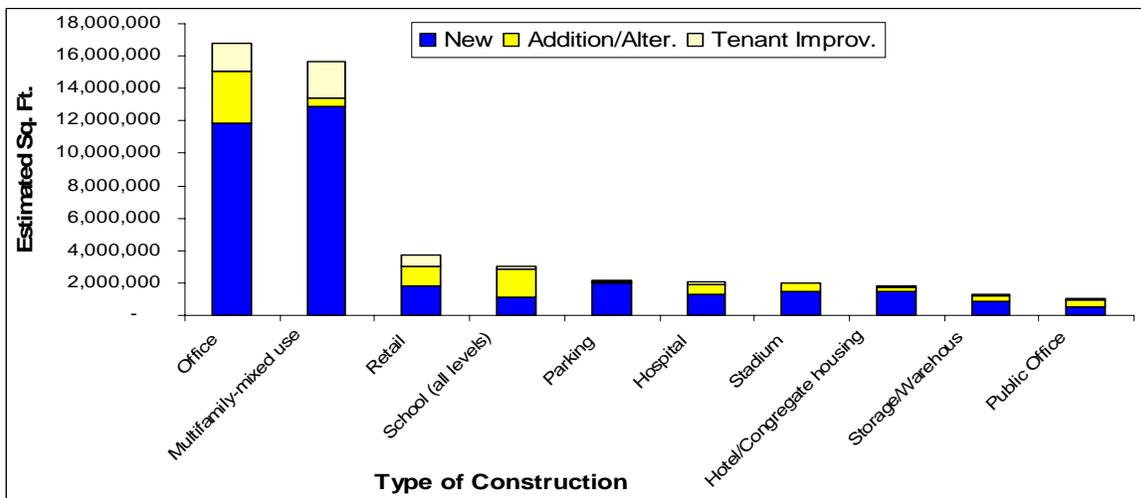
Table 2 Square Footage of New Construction, Additions/Alterations, and Tenant Improvements – DPD Database 1998-2004

Square Footage for Three Types of Construction			
New Construction	Additions/Alterations	Tenant Improvements	Total Sq. Ft.
38,237,686 (68%)	11,635,000 (21%)	6,153,192 (11%)	56,025,878

Overall, just over 56 million square feet fell into these three categories, with approximately two-thirds (68% or 38.2 million square feet) categorized as new building space. It needs to be emphasized the some portion of the addition/alteration and tenant improvement space is area that is also included in the new construction category. In other words, the building area for those altered and tenant improvement permits that were in new buildings constructed over this same seven-year period would have already been counted in the new construction category area, and is therefore duplicated area. The “true” sum of all *unduplicated* space across these three building types is less than the 56 million square feet shown in the last cell of Table 2.

Figure 4 provides a picture of the total square footage of new, addition/alternation, and tenant improvement buildings by type of building for each of the largest ten building types. The top 10 building types comprise 92% of all new construction floor space and 89% of total new, addition/alteration and tenant improvement square feet. The figure shows that new office buildings (31% of new square footage) and multifamily mixed-use buildings (34% of new square footage) comprise the largest proportions of newly constructed space by far.

Figure 4 Square Feet of New, Addition/Alteration and Tenant Improvement DPD Construction Permits – Top Ten Largest Categories Only, 1998-2004¹⁰



To estimate the portion of all new commercial construction projects that ESS new construction services reached between 1998 and 2004, we divided the number of ESS project buildings by the total number of new buildings in the DPD database. Table 3 shows that of the 235 commercial and mixed-use multifamily newly constructed buildings over the seven-year period, 52% were affected by one or more ESS new construction services. These ESS participant buildings constituted 58% of the 38.2 million square feet of new commercial space constructed in Seattle during that same period.

¹⁰ Again, some unknown portion of alterations and tenant improvement affected space occurred in buildings constructed from 1998 – 2004, and that affected area is duplicated in the new construction square footage.

Table 3 ESS Reach in the Commercial New Construction Market

NEW CONSTRUCTION PROJECTS (1998 – 2004)					
ESS project buildings	DPD number of new buildings	% of DPD locations reached by ESS services	ESS project sq. ft.	DPD permit sq. ft.	% of DPD Sq. Ft. reached by ESS services
121 buildings (170 ESS projects)	235 buildings (606 permits)	51%	22.34 million	38.24 million	58%

Summary of Key Findings

See Appendix A for a more detailed presentation of CITS project and DPD permit activity. Key findings of the database analysis presented in this chapter include:

- Between 1998 and 2004, ESS provided new construction services to a total of 170 new construction projects in 121 unique buildings. The reach and results of these services has grown considerably in recent years, however, an update of new construction ESS projects revealed that there was a substantial decrease in ESS contracted energy savings in new buildings during 2005.¹¹
- Of these 170 projects, 128 projects received or will receive incentives for efficiency measures, with tracking system energy savings of 49.5 million kWh and average savings of 386,913 kWh per incentive project. These projects affected an estimated 22.3 million square feet of building space, or an average of 184,587 square feet per building.
- By the end of 2004, \$7.5 million were *contacted* for all completed incentive, Energy Analysis, and Building Commissioning projects and \$7.3 million were paid for *completed* ESS new construction projects. A total of \$9.6 million in incentives were contracted for all projects, both those completed and those still active.
- ESS new construction services reached 52% of all newly constructed commercial and institutional buildings in Seattle, and approximately 58% of newly constructed space.
- While the ESS program is effectively reaching the majority of new office buildings, which accounts for the second largest proportion of newly constructed space in Seattle, it has been less successful at reaching the mixed use multifamily buildings, which constitutes the largest proportion of new square footage. Of the estimated 12.8 million square feet of new mixed-use, multifamily space built over the past seven years, about two million square feet have been affected by ESS projects, or 16% of the total mixed-use multifamily space.

¹¹ Total contracted new construction energy savings in 2005 were 4.1 million kWh, 42% below the previous seven-year average of 7.1 million kWh.

- This lower penetration of the potential new multifamily construction market is a consequence of the fact that City Light's residential Built Smart program has primary responsibility for new multifamily buildings. ESS provides incentives for certain custom incentive measures and measures not provided by Built Smart. Since 1997, the Built Smart residential program has provided a total of 24.6 million kWh (2.8 aMW) of completed project savings in multifamily facilities.

Chapter 4: Views of SCL and Other Key Internal Staff

This chapter describes the results of in-depth qualitative interviews with the managers and staff of the new commercial team and other SCL and City staff that are knowledgeable or influential about new commercial construction within SCL's service territory. Topics covered in these interviews included:

1. History of the ESS new commercial services (see Chapter 2)
2. Respondent background and experience
3. Program design and intent
4. Customer motivations and barriers to participation
5. Program processes including outreach and coordination
6. Program strengths and needed areas of improvement

Some factual data gathered from these interviews have been presented in Chapter 2, while this chapter explores the opinions of the respondents and their implications for the program. Although we developed a single questionnaire for these interviews, we tailored the interviews to the role of the respondents (see Appendix B for the interview guide).

Methods

We conducted fourteen in-person interviews with City staff involved with new commercial projects, including:

- The manager and supervisor of the C/I section (these individuals will be referred to as "managers" in the report)
- Three EMAs that make up the new commercial team
- Two additional EMAs experienced with new commercial construction projects
- One sustainable buildings coordinator
- Three SCL Account Executives who are involved with new commercial projects for key customers
- Three DPD staff, including a codes specialist, and two construction plans administrators

Interviews with SCL C/I staff lasted 1-2 hours, while the other interviews lasted 30 minutes to one hour.

Respondent Background and Experience

All respondents had considerable background in new commercial construction. EMAs tended to have many years of experience with delivering utility based commercial energy efficiency services. Many respondents also had architectural and engineering training.

Program Design and Intent

Program Goals

All respondents (program staff and other key informants) understood that the ESS new construction services primary responsibility was to acquire energy savings – *“the immediate focus is acquisition. Performance culture in C/I is about bottom line energy savings.”* As another person put it, the program’s goal is to *“simply buy conservation as the cheapest form of energy that’s available.”* Most C/I staff also thought that market transformation was a goal of the program: *“We are trying to get everyone transformed to new thinking . . . to look at development differently. The major goal is to be more sustainable and look at the buildings more holistically and get the end-user into the picture.”*

While all agreed that substantial energy savings were being acquired, opinions varied as to how well the program was achieving market transformation. One C/I manager thought the program was pushing customers *“beyond standard practice. . .in part because our code baseline is higher”* and *“we’ve been dragging our customers along. . .for twenty years”* Another respondent said *“I think they are very serious about changing the market and in some ways it’s been successful. They establish the norm, and then raise the code. There’s a continuing effort to raise the bar and codify it.”*

However, a new commercial construction team member said, *“I would love to say we’re doing market transformation, but I don’t think we are.”* In part this was because EMAs are not able to spend much time interacting with Architectural & Engineering (A&E) firms about *“innovative solutions that save energy,”* and in part because decision-makers for new commercial projects *“consider new and innovative strategies risky”* and challenging, especially in the context of the many decisions that must be made quickly for a large new commercial building:

“When they start the design process the pedal is to the metal – meter is running, a lot of pressure to get the design out the door. It’s a typical pattern – if we can get to the owners and architects early in the process – pre-schematic – it’s a lot easier to talk to them. Everybody is newly hired and we sit around and brainstorm and it’s great stuff. . .Then, once it’s past 100% construction design, it’s a new cast of characters.”

Another new commercial team member said the program doesn’t reward innovative thinking or green solutions, such as natural ventilation: *“If I were looking to transform the market I would pay incentives even if there were not as many energy consuming widgets...there is no incentive for putting in smaller systems or right sizing the systems. When we look at new ideas or technologies, we can get analysis paralysis.”* Another EMA working on new construction projects summed up the barriers to market transformation as *“time, money, and risk aversion. The big developers are used to doing it a certain way.”*

A few respondents mentioned program goals that are ancillary to savings acquisition and market transformation. One said an objective of the program was to inform building operators about

how they can operate the building to meet its design intent, and another hoped that sustainable building practices could become a more integrated goal of the program.

Target Market

C/I managers and EMAs agreed that *“bigger is better. . .If I can’t get a building that’s greater than 100,000 square feet, I’m not having a good day.”* They agreed that concentrating program resources on larger buildings with higher energy intensities maximizes savings acquisition. One manager said that the *“implicit goal is to get to all the big projects and see if they [the customer] want to do it.”* Although the program is charged with serving major renovations and tenant improvements, the strategy of going after the biggest projects tends to make these projects less frequent.

The program does not have goals by building type or number of buildings. Program managers expressed some concern about not having a more precise definition of the target market, since this makes it harder to establish goals, track results, and define market penetration. One manager thought that they involve about 40% of commercial new construction, not including large multifamily residential. Another manager worried that the current emphasis may tend to be *“elitist.”*

C/I managers and staff report the program has tended to have more success with certain types of new commercial projects than others – especially *“24/7 buildings”* such as hospitals, labs, and data centers, and also with large office buildings. They also been successful with other large, private *“build and hold”* projects where *“it’s a lot easier to talk with them about energy efficiency than with someone who is going to divest [sell or lease],”* They report they tend to work with established developers and customers *“like Vulcan and the University of Washington.”* The program also attracts publicly owned buildings especially where policies might encourage energy efficiency. For instance, the City of Seattle *“has had a policy since 1998 that their buildings have to be certified LEED™ silver and that makes the job easier.”*

Chains and big box retail stores, schools, libraries, and large mixed-use developments (e.g., retail, office, and condominiums) have been harder to enroll in ESS. Chains and big box retail stores often have a standard approach to their buildings which is less amenable to change. The reasons for not reaching schools are not clear to staff, with one saying *“they’re just tough to crack, which is crazy because they’re paying the bills.”* This same respondent says that *“the absolute worst are condos¹² that are being developed to sell. . .the owner can’t get rid of them soon enough. . .they want to put their money where the customers can see it and energy efficient HVAC is not perceived as in that category.”*

When asked about target market trends, several respondents said that the number of big mixed-use multifamily/commercial projects with retail stores or a hotel on lower floors and condos on upper floors has increased, and that industrial projects have declined. One respondent noted that reaching mixed-use buildings varies depending on whether it’s a *“buy and hold environment.”*

¹² While condos are for a residential market, larger developments can have commercial building systems and equipment.

He acknowledged the program was missing some of these projects and he'd *"like to know what's up with that."* His intuition tells him that the developers regard them *"as okay folks, but I'm not sure we're perceived as adding a lot of value."*

Indicators of Success

Aside from kWh goals, ESS managers and staff had a hard time pinpointing other indicators for program or staff success. Although one manager said they get a lot of repeat customers, he *"always gets the sense that we're the tail and not the dog."* This manager would like to be able to maximize participation but said a better definition and analysis of the market is needed, that they don't know what projects they're missing, that they need to do a better job of assessing SCL's performance, and that it would be helpful to know how ESS stacks up with best practices. Another manager noted that they use energy savings achieved per staff person as an indicator, that they do get a lot of repeat business, that they try to get the most efficiency per square foot, and that what they track is close to what they need. However, he also said that he is *"not happy with our penetration of the market"* and that tracking is *"not perfect because we don't have the time."*

Most staff concurred that the program lacks benchmarks and indicators, saying *"It's really hard to figure out benchmarks,"* and that it's frustrating not to have them since that is *"what you learn from."* A few staff cited the number of kWh saved versus meeting the energy code as a benchmark.

Customer Motivations and Barriers to Participation

Market Motivators

Respondents agree that most participants in the new commercial program are primarily motivated by its financial benefits, both the money from incentives and the better rate of return that results from installing more efficient equipment: *"Money is top – getting that check from Seattle City Light, and then getting lower operating costs for the building. They can charge less or skim more. . ."* Several respondents also noted the highly variable nature of customers in terms of sophistication and motivations, with one saying that *"with some we have to run to catch up, but with others we have to push them and hold their hands."*

Beyond the *"big fat check,"* respondents said that energy efficiency can be congruent with core institutional values. They noted that this value tended to surface with large, complex projects, and that people they perceived as pure *"bottom line"* have surprised them by saying *"that's fine, but I just want to do the right thing."* Increased comfort, productivity, and the benefits of LEEDTM certification may motivate some customers, but respondents say these reasons usually emanate from architects and not owners. Another motivating factor for some customers is working with public utility staff who are *"more credible than sales people."*

Barriers to Participation

When asked about barriers to participation in the program, respondents brought up a number of key issues, both internal and market based, including:

1. **Not finding out about projects early enough to influence design.** All agreed that the best time to reach new construction projects is very early – in the pre-design stage. Notably, the largest projects are usually higher profile and thus are heard about earlier. However, one EMA also noted that you can annoy designers of smaller projects if you are *“too persistent in the early stages.”* Several respondents also said that the “siloed” nature of city government, where communication can be limited across departments, and where each department is focused on its own purposes, contributes to not getting information early enough. Still, respondents noted many instances of very effective communication between C/I staff and Account Executives and DPD.
2. **Perceptions that program participation requires “too much documentation,” is too time consuming, could cause delays, and that there just isn’t enough money to make it worthwhile.** One EMA staff said that he had feedback that even though customers may in the end be very satisfied with the end product, and that they will work with the program again, that at least one customer had told him that *“working with you guys was a . . . nightmare.”* On this project, he thinks *“they were really hassled for details that weren’t reasonable, both on the pre-contract side and the inspection side.”* Another EMA said that the biggest barrier was *“time, paperwork, and frustration with government. They get more frustrated with DPD than with us. They do not want more hassle. . . for many customers, time is more important than money. If they have to slow down, there is resistance.”* One EMA noted that the program has no way to reward projects where savings are more than expected.
3. **Having inadequate staff to market to and serve all eligible projects.** While staff did not complain, several noted their heavy workloads precluded them from doing much outreach.
4. **Perceptions that utility involvement isn’t essential or it doesn’t add value:** *“They [design teams/owners] get busy designing a building, spending big chunks of money, a lot of pressure so that owners can start recouping their investments, and we’re not in the critical path.”*
5. **Different energy modeling approaches and baselines for LEED™ and Green Team requirements than for SCL program requirements, and lack of cooperation between Green Team and new construction staff.**
6. Consistent with comments made about target markets, **the program has experienced difficulties in reaching certain types of buildings:**
 - a. Big box and chain stores because they tend to follow “cookie cutter” approaches.
 - b. Mixed-use buildings. Some suggested that current programs are geared to either residential or commercial buildings, and that these buildings cross programmatic

lines. In addition, if condos are the primary use, condo owners often want to turn over buildings quickly and their focus is on attracting buyers.

- c. Libraries and schools – the reason why these types of buildings have been difficult to reach is not clear to respondents.
 - d. Grocery stores – the barriers in this market segment are not clear.
7. **Difficulties in reaching buildings that are not owner-occupied or where owners/developers do not “build and hold.”** In these cases, the motivation to install high efficiency systems to save money over time is not as compelling.
 8. **Inadequate incentives to design team members, who work for a fixed fee.** Incentives to conduct energy analyses are available under certain conditions, but not for standard measures, and even for custom measures, a very specific scope of work and budget is required.
 9. **Aversion to risk**, including concerns that new technologies may not work as well as more familiar, tried and true ones.

Some respondents also noted that participation is influenced by factors beyond their control, including:

- The fluctuations in the economy that make it more or less conducive to new construction projects.
- Code revisions – *“The Energy code has gotten tighter and tighter—there’s less to work with especially on small projects. . .there’s a narrowing of the gap between code and what’s doable.”*
- The political environment, which can encourage construction in one part of the city or in particular segments (e.g., biotech) where EMAs need to get up to speed quickly with technical knowledge.

Impact of the Energy Code

When asked about the impact of Seattle’s quite stringent energy code on program participation, respondents said changes in it can cause a surge in program applications before the grace period for the old code expires. In general they think the code has raised the bar for energy efficiency: *“It has informed people how to design more efficiently. . .[it] can push them to talk to us because it’s just a minimum.”* Others commented that customers perceive the energy code as inflexible, that its requirements make it difficult to obtain efficiencies beyond code, and that as the code improves program incentives have decreased.. One EMA said that there’s been *“a movement that goes right to the Mayor’s office and city council from key players in the local development community saying it’s so inflexible that it’s hard to do business here.”*

Program Processes

Outreach, Marketing, and Obtaining Leads

The commercial team says it tries to operate in a perpetual “scanning” mode when possible, and listed a wide variety of mechanisms for marketing and outreach and for gathering/tracking potential project leads:

- Road shows and brown bag lunches with A&E firms
- Forming relationships with and keeping in contact with key customers, including developers and owners, and contacts at A&E firms
- Print ads in Puget Sound Business Journal (PSBJ) and the Daily Journal of Commerce (DJC)
- A display about the services near the permitting counter at DPD
- Working with Account Executives – *“they’re good about informing us and telling customers [about ESS]”*-- and electrical service reps to identify projects
- Tracking announcements in newspapers such as the DJC and on websites
- Leads from DPD staff, databases, and websites, including:
 - Review of the DPD permit database
 - Leads from the C/I sector’s liaison who meets regularly with DPD for *“energy code development and mitigation”*
 - Review of the DPD GIS website
 - Review of the online DPD Land Use Bulletins
- Driving around and seeing Master Use Permits

However, respondents also said that some of these activities are either relatively new or sporadic, due to limited staff and time resources, varying workloads throughout the year, and inconsistent feedback loops. Respondents mentioned they have only just received some additional budget to do brown bag lunch presentations for design teams; that the end of the year rush to meet savings goals often preempts their search for leads, and that informal communication with various informants, such as the DPD liaison and Account Executives, can lead to missed information despite everyone’s best efforts. Respondents tended to agree they would like more resources for marketing and lead tracking, perhaps hiring outside staff to do it because they are *“short staffed and don’t have the time.”* One respondent said there is *“certainly a lot of intent in marketing services, but (it) doesn’t always find its target.”*

Since respondents agree that the best time to reach new projects is very early – either pre- design or early design stage – they recognize that program outreach needs to be more proactive earlier in the process. One person said that by the time they hear about a project from DPD it’s already too late.

When asked about the most effective tools for reaching customers, most said that two key approaches are to develop personal relationships with A&E teams and senior staff at large development firms, and holding brown bag lunches as design firms. They agreed that mass marketing is not effective.

Tracking Leads, Savings, and Projects

Energy savings from projects are assigned to each staff person (according to the projects they are working on) and this is one of the key factors used in evaluating their job performance.

Management said this may or may not be a smooth process. There are issues regarding who has been tracking what projects and they count on the supervisors to straighten this out. Managers and C/I staff cited communication problems about this issue. The new commercial team lead uses an Excel™ spreadsheet to track project leads and he coordinates this information with Account Executives. If key customers contact SCL about participating in the program, they are assigned to someone if they don't already have a specified contact.

CITS is the formal system used for recording information about new commercial projects. However, it does not seem to be used as a real-time tracking system, and the new commercial lead's Excel™ project tracking spreadsheet is used to track project progress and milestones that he in turn uses to keep staff up to date.

Participation Processes and Coordination

SCL new commercial managers and staff report that the participation process generally requires a lot of hand holding; EMAs reported that they do the majority of the paperwork for many projects. Several commented that the program manual is poor, and that although a sequence of steps to participate is outlined in the manual, many new commercial projects do not follow that sequence.

Most respondents think that the program process works fairly well, although some noted that getting calculations and cost bids could be time consuming, that multiple review steps could take time and were not consistent from manager to manager, and that inspections can take a long time to accomplish. SCL program management staff do coordinate with other DPD staff and SCL Account Executives in the course of identifying and delivering new construction services. One manager said he attended regular DPD meetings to exchange information. While staff exchange information about projects with Account Executives, they also mentioned that communication between the two departments is sometimes insufficient and inadequate, and that the effectiveness of the coordination can vary widely. They do periodically attend joint meetings. One described his relationship with Account Executives as hit or miss and acknowledged it "*probably should be a stronger relationship.*"

Program Adaptability

Respondent views of the flexibility of new commercial services vary by type of respondent. SCL management thinks "*we are incredibly flexible,*" while SCL staff opinions are mixed, with some saying the program moves slowly and others saying it is adaptable. One DPD respondent thinks that SCL needs to be more proactive in developing a new set of measures if they are to keep up with code revisions: "*They have a pot of ideas. . .when we improve the code, we take things off the table.*"

Program Evaluation

Informal feedback, through the staff's regular contact with participants, is the primary feedback mechanism for how the program is running. About three years ago, the program, in concert with the SCL Evaluation Unit, developed a two-page feedback questionnaire which it sends to all participants; about 30% of participants respond. C/I tallies the results and then produces quarterly reports. It's unclear if the results of these surveys have been regularly communicated to or embraced by staff or if the results have been used to benchmark program performance.

Other evaluations have been infrequent. According to the SCL evaluation project manager, *"With the exception of some persistence of savings impact assessments done in the late 1990's, the last impact evaluation of ESS [when it was Energy Smart Design] was back in the early 1990's."* In addition, Quantec did an overall conservation program review in 2001. The Quantec study found that, *"[t]he ESD and ESP [now ESS] savings are based on relatively old evaluations and need to be updated."*¹³ Increased evaluation efforts, again according to the SCL evaluation project manager, would require both management support and a larger budget for technical consulting services.

Communication of Program changes

Respondents reported that communicating about program changes was effective and that they used a variety of means, including e-mail, newsletters, direct mail, and direct contact, either individually, or in a group setting. For instance, when the program developed a new program manual, three forums were held to discuss it with customers.

Currently, program management and staff are talking about updating the manual and developing a program advisory committee that would ask *"people in the community, in the industry to provide advice."* However, one respondent said that having a meaningful advisory committee was *"kind of tricky"* given the constraints of the BPA resource acquisition contract, and that a committee would need to embrace incremental rather than radical program changes.

Program Strengths and Needed Improvements

Respondents cited the following strengths for ESS new commercial services:

- Staff expertise
- The personal relationships that staff have with leaders in the design community
- Flexibility to handle custom projects, although one person commented that flexibility can work against them since it may be seen as too vague.
- Program incentives
- Good project management
- Bringing new technologies and methods and materials into projects

¹³ Reference for Quantec study

Suggested improvements included:

- The need for more market definition, how well they are meeting market needs, and the best methods for reaching the target market
- Better and more consistent outreach and marketing
- Developing an approach to more integrated design and whole building energy savings, consistent with best practices findings for new commercial programs
- Streamlining paperwork, reducing duplication
- Being more willing to try new and innovative technologies without a “*lot of analysis,*” to push beyond standard practice, to reward innovation,
- Getting better aligned with LEED™ – “*we do not do a good job of connecting the two programs.*” Several sources noted that sometimes friction exists between the C/I section and the Green Building Team, because “*energy modeling approaches are different and that there are different baselines*” and different primary goals (e.g., energy savings versus sustainable buildings where energy efficiency is just one component).
- Making sure project information is communicated to all key internal actors and that communication is consistent among actors
- Overcoming the challenges to high rise, residential/mixed use buildings

Summary of Key Findings

- Experienced managers and staff deliver ESS new commercial construction services, coordinating with other seasoned staff within the utility and DPD.
- All internal players understand that the most important goal of the program is to acquire the most cost-effective energy savings. Market transformation is a desired but secondary goal, with some respondents saying it is being achieved and others saying it is not.
- Program managers and staff believe that the largest, most energy intensive new commercial building projects offer the greatest savings potential and the greatest economies of scale. However, this strategy does not provide much data on what projects are “left on the table.” In addition, program managers and staff think that more could be done to develop benchmarks and indicators to assess the success of their efforts.
- Program managers and staff agree that owners and developers are most motivated by the financial benefits of the program, although organizational values and non-energy benefits may bolster interest in the program.
- Respondents cited many barriers to participation, including not finding out about program offerings early enough in the design process; lack of enough staff to reach all potential projects; problems in reaching certain types of projects; and owner/developer avoidance of risk.
- When asked about the impact of Seattle’s energy code on program participation, respondents said they think the code has raised the bar for energy efficiency, but some commented that it’s perceived as inflexible.

- While program staff engage in a variety of marketing and outreach efforts, internal and external challenges contribute to not being able to reach projects early enough. Staff noted that while communication is often effective between the new commercial team and Account Executives and DPD, organizational “silos” can decrease the effectiveness of conveying time sensitive information across departmental lines. Most thought more attention could be paid to interdepartmental linkages and to offering brown bag lunches to A&E firms.
- Staff think processes work fairly well for participants, in part due to a lot of handholding. Still, some think the manual is confusing and others recounted how projects can get bogged down in paperwork.
- Respondents said the greatest strengths of the program were staff’s strong relationships with key players in the new commercial construction community, substantial energy efficiency expertise, and the flexibility to take on custom projects.
- Key areas for improvement included better definition of the market, improving marketing and outreach, incorporating “best practices” information into program design (such as developing a whole building approach), and making sure there is internal consistency for services provided to new commercial construction projects.

Chapter 5: Participant Views

This chapter summarizes the views of ESS new construction program participants, based upon our in-depth conversations with them. It covers their:

1. Awareness of program services
2. Motivations for utilizing ESS
3. Assessment of the delivery of services
4. Perceptions of benefits they received
5. Views of market trends and opportunities for energy efficiency
6. Suggestions for improving Energy Smart Services

Chapter 6 covers non-participant viewpoints.

Methods for the Participant and Non-Participant Interviews

This section describes the largely qualitative methods that we employed for both the participant and non-participant samples. We wanted to use approaches that would match and reflect the complexity of the new commercial marketplace. Our goal in analyzing the data was to provide a rich and balanced view of opinions, including both majority and minority viewpoints. The participant and non-participant interview guides can be found in Appendix B.

The participant and non-participant samples share similar features and discussing them together allows them to be seen side by side, although they should not be regarded as “comparable.”

- The sample of recent new commercial construction projects (since 2000) reflects the desired overall target market for the program – medium to large commercial buildings. To develop the sample we considered the types of buildings participating in the program, the overall mix of new commercial buildings in Seattle, and future trends. In addition we looked at the owner characteristics of the building such as the owner type (institutional, owner occupied, speculative), volume of development, and whether they were repeat program participants. Using these criteria ESS staff suggested a sample of 17 participating projects most of which had been completed since 2002.
- ESS staff also identified some non-participating projects of which they were aware. We used 14 of these non-participating projects and supplemented this list with seven others drawn from the DPD permit database.

We completed 42 interviews with owner and design team members from 28 participating and non-participating projects. Most of the interviews with representatives from participating projects were conducted in-person, while most of the non-participant interviews were done by telephone. Most interviews were completed between June and September of 2005.

Table 4 shows the mix of interviews for participating and non-participating projects by building type. Our goal was to complete 48 interviews that were closely split between participant and non-participant projects. We had a high level of cooperation from participating project team

members and matched (or exceeded) our interview targets. However, it was much harder to reach non-participating team members and we fell short of our target, particularly for medical and bio-medical buildings. After reviewing the input we received from non-participants, we felt it was unlikely we would obtain new information from additional interviews.

Table 4 Completed Interviews by Building Type

Building Type (N = 28 Projects, 17 Participating; 11 Non-Participating)	Target Number	Completed Interviews	Participant	Non-Participant
Office	8	7	4	3
Bio-Medical	8	5	4	1
Large Mixed Use/Multifamily/Retirement	8	8	4	4
Educational	6	6	4	2
Other – Special Use ¹⁴	6	8	6	2
Medical	6	3	3	0
Retail – Grocery	2	2	1	1
Retail – Non-food (Big Box)	2	1	1	0
Hotel/Motel	2	2	1	1
Total	48	42	28	14

We completed 22 interviews with owner representatives and 20 with design team members (Table 5). They were involved with 17 participating projects and 11 non-participating projects. All of these projects received incentives for installing energy efficiency measures in their buildings. Six projects also received incentives for energy analysis, four for building commissioning, and a few participants mentioned working with the Lighting Design Lab.

Table 5 Completed Interviews by Type of Project Team Member

Type Of Project Team Member	Completed Interviews	Participant	Non-Participant
Owner Representatives	22	15	7
Design Team Members	20	13	7
Total	42	28	14

Most of the people we interviewed were staff and decision-makers responsible for project oversight, management, and coordination. The design team members included project architects, engineers, or project managers that generally had lead responsibility for the projects. The owner representatives were a mix of capital project or construction managers, lead facility or engineering staff, or others responsible for new construction for their organization. These individuals worked for the institutions occupying the buildings or for the developers that developed and in most cases owned the buildings.

¹⁴ Special use includes public assembly/gathering spaces like libraries, convention centers, stadiums, etc.

Awareness

Most participants recognize that SCL is trying to reduce energy consumption through the ESS program by helping developers, owners, and designers to become more conscious of energy use and options, with one participant saying: *“It is an introduction and reward to use other products that are more environmental, sustainable and energy efficient.”* Many participants also recognized that the primary purpose of the program is to avoid costs for new power supply. As one put it, *“They are using demand side management to reduce the need for supply side resources. It is more cost-effective to do that – least cost and better for the environment.”*

The majority of participants interviewed had previous experience with SCL programs. Given this, many participants could not specifically recall how they initially learned about ESS, with one saying *“I have been at this for 20 years. SCL has had programs for as long as I can remember.”* Those who could remember said they generally first learned about the program from SCL staff, contractors (engineers or architects) or peers. Several participants said they learned more about the program at seminars and presentations through peer organizations, and others said they visited the ESS website for program information. Some owners and developers relied on their architects or engineers to know about SCL services.

Participants became more familiar with ESS primarily by using it and working with, and appreciating the skills of SCL staff. One participant said that *“The best part is the assistance we received through (SCL staff) is – he identified what we could qualify for and where opportunities were to be found – it was a person telling us so we didn’t have to do the research ourselves.”*

The financial incentives were the first thing about ESS that caught the attention of the largest share of participants. However, a significant portion also said that long-term energy savings and/or reducing operating costs were important and ESS provided assistance to accomplish these ends. A few said that the program fit in well with their corporate values. Many of the participants were institutions that owned and occupied their buildings or developers that intended to own their buildings and were taking a long-term view. Some participants also cited supportive and helpful ESS staff as a reason they were attracted to the program.

All the participants said they were aware that ESS offered standard incentives for lighting and HVAC efficiency measures. Some of the participants were unclear about incentives for custom efficiency measures or assistance for energy analysis. Only a few had not heard of the Lighting Design Lab and some offered unprompted compliments for the services they received there. About one-third were unaware of the support and incentives available for building commissioning as well as the assistance for LEED™ certification. Most participants felt the service options for ESS were clear, but a few found them a little confusing. One engineer commented that although he and his colleagues find the options understandable, it is still somewhat difficult to convey them to their customers, who are building developers and owners.

Motivations

Project design goals and issues provide an important context for the relevance of energy efficiency for a project. The design goals and issues participants described can be grouped in these three primary categories:

- Programmatic goals
- Site constraints
- Symbolism

Programmatic goals address the functional aspects of participating projects, such as the requirements of a surgery suite, bio-tech lab, library, or museum. Site constraints deal with the characteristics of the building site that influence project design, such as trying to get the most building on the site, the relationship of the project to other nearby buildings, existing master plans, or neighborhood concerns. Symbolism reflects the design aspects that establish a building's image. A number of participating projects were signature buildings, such as a corporate headquarters or an important public facility, or a project where the owners wanted the building to project certain values. Design goals associated with symbolism included architectural distinction, openness and transparency, sustainability, being a landmark, and setting the standard for other buildings in the area.

These broad design goals establish the context for energy efficiency for the participating projects. At a programmatic level, many of these buildings were energy intensive or they had other indoor environmental requirements that were conducive to energy efficient systems. The distinctive nature of these projects reflects an interest in quality, image, performance, or sustainability that also provides opportunities for energy efficiency.

Participants cited two primary motivations for making their buildings more energy efficient: operating cost savings and corporate or institutional values or goals. Although financial reasons were the leading motivator, some respondents intertwined the two. A few individuals mentioned their positive prior experiences with either ESS or another SCL program as a catalyst for their participation.

Many participants were institutions, non-profits, or long-term owners that placed a high value on operating costs: *"We are long term users. We are paying the rates. We are trying to be as frugal as we can."* Some participants explained how the program was congruent with their corporate or organizational value systems: *"We always had the idea of being corporately responsible – design and construct as much efficiency as possible – keeps costs down – seemed to be a good fit for us."* and *"[It was] clearly something we wanted to do. Reduce operating costs for energy. With a triple net lease the tenant gets the savings benefit. As the building owner we have a broad perspective of the benefits from sustainable design. This is a long-term investment. We want a quality product. Create a healthy environment. It gives us a market advantage."*

About half of the participants said they made the decision to use ESS early in project design (conceptual or schematic design). About a quarter said they got involved during design development, two said during development of construction drawings, and the remainder were not sure exactly when they got involved. The owners were always involved in the decision to use

the program. Sometimes one person had the primary project responsibility, but often the decision involved a team of people (public projects usually have some kind of project or advisory committee). In some cases this team included the project designer or engineer.

Most participants told us they did not have any questions or concerns when they considered program participation. Several who had concerns mentioned time requirements: “Can they meet our time schedule?” and “What do we have to go through?” One participant commented that while he initially thought the program was too time-consuming, that barrier had markedly diminished in the intervening time. A few mentioned that incentives are not paid until the project is finished, so the owner has to come up with this money upfront to pay contractors and suppliers.

Participant reactions to the energy code and its influence on energy efficiency and use of ESS were mixed. Most felt the Seattle Energy Code was relatively stringent compared to other jurisdictions. A few felt the energy code was too stringent, but others saw it as setting a minimum that had to be met – *“it causes the engineers to toe the line as far as energy savings”* – and a few thought the code fosters awareness of energy efficiency and helps to raise the bar. Several participants said the energy code had little influence on what they did because of the value energy efficiency provides. One designer said that *“the cost of energy is the bottom line” and that cost, rather than the code itself, drove his clients to exceed code.*

About one-third of the participants thought the Seattle Energy Code reduced the benefit of incentives from ESS and acted as a disincentive for participating: *“It is hard to go beyond the code – more of a barrier to go beyond [it to] this program. Now we’re down to the little stuff where the payback is much longer and achievement is much harder.”* A few participants felt the code worked against more energy efficient design: *“It is good to raise the bar – no complaints about that. But the complexity [of the code] ties your hands from the innovation that Seattle City Light is interested in. System efficiencies are not possible. Make it simple.”*

Service Delivery

The participants were positive about how well the program fit into their development and construction process – *“It fit in seamlessly”, “very smooth”, “fit in great”, “meshes pretty well.”* They complimented SCL staff for being responsive and helpful, saying *“They make it easy;” “They were very responsive and good to work with;” and “They are there when you need them – not pushy – no bureaucratic details – they are smart about what they do and what they don’t need.”* A few said that the ESS process was in alignment with what they would do anyway.

The biggest challenge participants noted was the effort required to document and verify what they did along with the energy savings from their actions. Comments included: *“It’s a lot of work;” “It is an additional load doing the analysis, documentation and proof;”* and *“This was a large burden.”* There were a few participants that said ESS was too complicated or that the documentation requirements were unnecessary: *“It just seemed like they were redundant. When you have a licensed engineer doing it there should be some acceptance – that it is what it is.”*

However, many of the participants accepted the need for the documentation requirements and did not see a better way of doing it: *“It was complicated, but it had to be.”*

Completing an application is the first step in initiating an ESS project. More than half the participants we interviewed had little or no involvement in filling out the ESS application. In many cases, consultants completed the application, either alone or in collaboration with owners; in other cases SCL staff completed or helped to complete the application and the owners signed it. Participants said that the process ranged from very easy to not onerous. One owner that completed the application said, *“It was very unbureaucratic– incredibly easy to fill out.”*

In most cases project consultants put together the energy savings and cost estimates for the proposed energy efficiency measures. They sometimes worked closely with SCL staff on this part of the process. For some of the small, simple projects, SCL staff put together the savings and cost information. Many of the participants who commented about this step in the process were satisfied, had no problems, and thought it was logical. A few said it was a lot of work, cumbersome, tedious, and slowed things down, but recognized it had to be there. One of the engineers described this process in the following way:

“Ultimately they want real numbers. At first we use estimates. In the bid documents ideally you put it [energy efficiency measures] in as alternates so you get hard bid numbers. Often they are buried and [we] cannot get the incremental cost. We end up estimating some of those after the fact.

The gathering of that data can be tedious particularly for a big project. When you get to verification, you are not going to go through the whole building. The scope can be overwhelming. If you get it into the bid documents as an alternate it makes it easier, but it is not something you can force on the owner. Sometimes it slows down the process, but it has to be there. You have to do it.”

Almost all the participants involved with the contract issuance portion of the ESS process were satisfied, commenting that it was easy and painless. One designer said: *“The owner just signed it. It went well. Very smooth, almost transparent. The way it should be for smaller projects.”* One participant mentioned that the organization’s legal department objected to some provisions in the contract and another said it would be helpful if the contract could be signed earlier in the project’s timeline to firm up funding.

Most of the participants were either not involved or were satisfied with the inspection and payment process, saying it was reasonable, no big deal, and totally transparent. One owner even commented about being, *“pleased about the rigorous process we went through and they [SCL] understood what they were paying the money for.”* However, some had mixed opinions or were dissatisfied. One designer commented, *“It works pretty well. There is lots of evidence of flexibility. It can be difficult for us. It is the price you pay.”*

There were a few cases where payments were held up because measures were not performing as expected, one case where the rebate had not been received, and another where they did not receive an incentive they had hoped for. A few found the requirement for receipt submittal as a

condition for payment cumbersome. An owner remarked that the only difficulty for him occurred at the culmination of the project: *“How do I prove to City Light that we did what we did and [it is] doing what we said it would do and where the heck is my money?”* Although he added that the delay might be attributable to a change in personnel. Another said that it, *“seemed like an after the fact experience”* and that it is better to track the requirements as you go through the process – *“in this case we had to chase down the specs.”* Two participants commented that SCL should provide more detail about the inspection and payment process, and incorporate both it and a timeline for payment into the project schedule.

The ESS contract requires customers to operate and maintain systems receiving incentives over the equipment’s useful life. When asked about this requirement, most thought it was reasonable. Others said it is in their own best interest and it is something they are going to do anyway because it fits with their organizational philosophy. Several commented that it was a difficult provision to enforce. Some of these thought SCL should do follow up to see if their investment is delivering the projected savings. One designer noted that as the capabilities of control systems improve, there will be the ability to more easily track system performance.

Energy Analysis Assistance

Six of the 17 sampled participating projects received incentives for Energy Analysis Assistance (EAA). Three of these owners said they were not involved with this process – their consultants managed it for them. One owner said this service was very good. Another felt their consultants missed some opportunities that might have been eligible for incentives from ESS. The sixth owner said they were already doing some energy analysis to meet the energy code requirements and to qualify for LEEDTM. He would like to find ways to do all this analysis more efficiently. The engineer for this project echoed this comment, saying he was unable to apply the energy model for ESS to meet the requirements for LEEDTM. Another engineer that conducted the energy analysis for one of the participating projects described the energy analysis process:

“It generally goes pretty smoothly. We sit down with an SCL analyst and go over assumptions for the model. We have done that enough times that it does not take a whole lot of back and forth. Then we review the base case and review assumptions. Sometimes we use a DOE2 model or spreadsheet. We do internal review and they [SCL] look at to see if makes sense. They often hand it to another consultant to review.”

Most of the other participants we interviewed had never used the EAA incentive or had no comments. A few said they often do this type of analysis anyway and that they do not pursue this incentive: *“We don’t get enough incentive to make much difference – \$10-15,000 – they eat that up pretty quickly. [We are] going to do it anyway – [we] have to document the material for the contract – have to pay for it anyway. The amount is almost not worth it to even ask for design assistance.”*

Commissioning Service

Four of the sampled participating projects received an SCL incentive for building commissioning. They said the incentive was appreciated, but as one designer commented, it was small. *“The building commissioning service itself was useful, but it’s intensive and expensive. I think our contract for commissioning on the project was \$170,000 – our rebate was \$10,000.”* Another participating project tried to obtain an incentive for building commissioning, but found the SCL requirements cost more than the incentive was worth. *“Just to meet their requirements of paperwork [for commissioning] was probably a \$20k effort. To get paid the \$10k. So it was a negative.”*

Participants were generally positive about the value of building commissioning, but as one designer explained, he did not see the ESS commissioning incentive encouraging owners to do anything differently:

“I do not know if this drives owners beyond what they would have done. People do not [build] a lab and not fully commission. The benefits of commissioning in a complex building are so high most owners are going to do it. Nothing SCL does that drives them beyond what they would have done. For other buildings it might drive them to a higher level of commissioning.”

Benefits and Outcomes

Consistent with feedback about their motivations to participate, most participants said the financial incentives and long-term energy savings were the principal benefits from ESS. One owner expressed the importance of energy savings to her institution: *“It is more a struggle to meet the 10% yearly reduction goal of the governor.”* Several said they benefited from heightened energy consciousness and awareness of energy efficient technologies: *“As you’re looking through trade magazines your interest is more piqued on new technologies that you’ve learned about.”* A few mentioned the PR benefit from participating in ESS or having more efficient systems. Some projects in this sample won recognition for their designs. One designer remarked that *“The number one benefit is a better more efficient project with a happy user. It will be an award-winning project. It uses displacement ventilation. It was facilitated by the SCL grant: reduce operating costs, more comfortable, award winning on our resume - Win-win-win. The grant was a significant part of the catalyst to allow this.”*

When participants were probed for additional program benefits, the most commonly named include reduced building operating costs, improved occupant comfort, reduced payback time, the added value of SCL technical assistance, and protection of the environment. *“Anything where you can be saving and conserving –it’s really worthwhile being involved in that – multiple benefits- not only on costs and operations but also the general quality of life.”* Several participants commented that quantifying improved occupant productivity was difficult and thus they couldn’t attribute it as a benefit. One participant said while you could calculate how

enhanced efficiency contributes to reduced operating costs that add value to the building; it is harder to quantify enhanced worker comfort and worker productivity.

About two-thirds of the participants interviewed felt the program added value to the design process for their projects. The largest share of these said SCL staff brought ideas to the table for them to consider:

“We meet with them and they put ideas or options on the table – ‘Have you looked at this – here is something we did in this building.’ It helps in that point of view that you have another pair of eyes looking at the job and offering suggestions. And that is good because they have looked at a whole array of buildings and have a good feel for certain building types where savings could be made.”

Several others said it helped inform the equipment choices they made and one said that it prevented some things from being value engineered out of the building design. A designer said that while they had the ideas on the table already, *“the benefit was to have the incentive and making it easy to do. Knowing the grant money was involved it was an easier sell [to the owner]. The grant helps even if it is only 5-10% of the cost. Knowing SCL is supporting – provides verification to the owner.”*

Almost all the participants said that the program has already influenced subsequent building projects. About half of these said they have participated again or would consider using ESS on future projects: *“We would continue to use Energy Smart [Services]. It is important for Energy Smart [Services] to continue as a resource. It makes a positive difference in decision-making. It is a matter of routine.”* None of the participants identified particular things they would apply in future projects, but a few indicated they did learn things they would use: *“It always happens. We learn something and it feeds forward into the next project. If we are made aware of a new product we analyze it to find out if it is good or not. We promote the good ones in the next project.”*

About a third of the participants credited ESS with positively influencing the design community. This was truer of designers than owners, who often didn't have an opinion. One designer noted that *“It helps us to stay at the top of the game – it is an aspect we can't ignore. We are doing more conceptual studies on the design aspects of projects to reduce energy use.”* Another designer provided this response on whether ESS influences the design community: *“I think so. Knowing that it is there. It pushes the envelope. A lot of developers will just do what they do. The rebates help us to convince them to allow us to consider options.”* One owner said that it had become *“embedded in the thinking of the people doing design work in the community – one of the questions they ask is ‘do you want to participate in the SCL rebates?’”*

About half the participants interviewed had been involved with ESS more than once. They complimented the program's stability and predictability. While a few said there was no difference in their experience with ESS on different projects, others said the program had been streamlined and simplified and was easier to use: *“It has been improving over time – been simplified. The short cut forms are really cool.”*

While only about half the participants responded to the questions regarding the impact of energy efficient or green features to buildings' market value, most of those that did felt, or at least hoped, that these features added to the building's value in the marketplace. A few of these saw energy savings translating into building value: *"Any building that operates more efficiently compared to others is a more valuable asset."* and *"You can calculate the enhanced efficiency in reduced operating costs and that adds value to the building... You can take the energy savings to the bank."* Others believed (or hoped) that energy efficiency or green features contributed to higher building value, *"But the market does not recognize it. It is hard to quantify but an important thing to do."* Some others said that it has a marginal effect or that it is a little bit of a hard sell; the value is not yet clear and well documented but there is a growing awareness of sustainability.

Market Trends and Opportunities

The general market trend most frequently cited by participants (about a quarter) was the growing interest in sustainable design, including advances in technology. They specifically mentioned under floor air distribution systems, natural ventilation systems, direct digital controls, and ground source heat pumps. A few participants also mentioned growing interest in supply-side technologies such as on-site renewable power (wind and photovoltaic systems) and distributed generation and cogeneration. A few participants noted changes in delivery methods for new construction projects, such as more design-build projects. Several noted the increase in large condominium, residential, and mixed use projects and a corresponding decline in office construction.

Participants saw a few trends that could encourage energy efficiency, with energy shortages and the increasing cost of energy playing key roles. About a quarter of the participants also thought that growing interest in sustainable design and LEED™, more available green materials and services, an increase in the number of manufacturers using recycled materials, and an increase in state and local regulations requiring higher efficiency and LEED™ would encourage energy efficiency.

The factors participants identified that discourage energy efficiency can be grouped in two primary areas:

- The higher cost of more energy efficient systems, and
- A lack of interest in energy efficiency

One designer described some developers as having a *"hit and get mentality. [They] could care less about energy efficiency."* This focus on short-term gain can often be due to the fact that tenants usually pay the energy costs and they are not interested in energy efficiency. One participant noted that the Seattle market presently favors net leases (as opposed to gross leases) where the tenant pays the utility costs, resulting in less impetus for the owner to install more efficient systems, unless the owner wishes to attract and retain better tenants. A few other participants described resistance to change as a barrier to energy efficiency, both by designers and tenants: *"people really like what they know – it may not be as efficient and not providing them with the best air quality, but there is comfort in that they knew the old system. People will*

adjust, but it isn't overnight." The energy code can also contribute to a lack of interest in energy efficiency according to a few participants: *"the energy code is so high. It is kind of a moot point. Unless you are intentionally violating the code you cannot be inefficient."*

Opportunities for Improvement

Participants were highly positive about the staff of the ESS program and view them as one of the key program strengths. They cited the staff's knowledge and responsiveness:

- *"The people involved with it. No question. They have good knowledgeable people that know about buildings and building systems and what we do. That is really strength. Like any company you are relying on people to provide a service. The people there know what they are talking about so it is easy to converse with them and exchange ideas."*
- *"They are able to think creatively about how to achieve energy savings – partners in the creative process – they bring energy that contributes to the effort – not dollars – they brought ideas to the table."*
- *"I think the employees [in ESS] are doing a great job – not bureaucratic – very friendly – everyone was doing their best – very collaborative effort and I appreciated that."*

Others mentioned the financial benefits and resources the program provided to help them produce a better building and lower their operating costs as program strengths.

The two most common reasons offered by the participants for owners and design firms not using ESS were:

- The up-front costs
- The paperwork/bureaucracy

Owners need to cover the extra up-front costs of the energy efficiency measures and when they receive the ESS rebate after project completion and inspection, it only covers a portion of the extra cost. A few of owners said this can be more difficult for smaller organizations: *"It's easier to justify on this scale when savings are much larger."* Related to this is the uncertainty about the rebate level at the outset of the project, which can make it hard to plan project budgets and sign contracts. Half-dozen participants said paperwork and bureaucracy can be a disincentive to use ESS: *"When you have a complex project it is just one more thing to do- paperwork."*

Participants offered a wide range of recommendations for improving the value and effectiveness of ESS. A few participants said ESS should be more proactive in outreach and promotion: *"I don't think people know what the heck is available."* The most common suggestion for reaching potential ESS participants was to target engineers, contractors, and the consulting community and allow them to bring the program to owners and developers: *"Go to the design-build firms and the engineers and get them educated and excited. They could be the agents to promote it."* Outreach methods could include presentations or on-site brown bag lunchtime events: *"Take the show on the road. Do brown bags. We have one every Wednesday here. If you just call the*

front desk you could schedule one. Most firms have them.” This should be coupled with information that can be used to encourage owners to participate such as examples of successful projects and simple explanations of the services available and the benefits owners can expect to achieve.

The ESS webpage could be designed to make this information easily accessible. Another participant suggested sending monthly e-mails or an electronic newsletter with program updates. A few participants suggested reaching out to owner and developer peer groups to raise awareness about the program, but some owners specifically said it was best to periodically contact them directly about upcoming projects, as explained by one large owner: *“What might be useful is getting to us in-house. Come at lunchtime once a month to be available to discuss projects and answer questions. Regularly communicate. E-mail and phone are hard to make contact- I get so much.”* Customized approaches may be appropriate to maintain and develop relationships with large ESS clients. Some participants suggested ESS should take advantage of information from the building department about upcoming projects or follow up on new requests for electrical service. There was a small group of participants that felt that *“everyone knows”* about ESS, particularly among building types and institutional clients that often benefit the most.

Some participants suggested further simplifying the process (particularly for smaller projects), making paperwork/documentation requirements less onerous, and providing more detail about program expectations and requirements in order to clarify the process: *“If it was defined better up front some of this could have been written into contracts and collected along the way.”* Another commented: *“Give the details of the process. What is required for energy analysis, format, assumptions, and what is the base case? Have a written standard program so we do not have to pry it out of the representatives. It requires more clarity – better documentation process.”*

A handful of participants also said it would have been valuable to get involved in ESS earlier in the design process so that different efficiency alternatives could have been introduced and considered: *“Honestly a lot of their money does get spent on things that would have been done regardless and the more they come into the project early with ideas that have not been seen before the more they will truly influence the process and get more bang for their incentive dollar.”* They said getting involved early also makes the process go more smoothly.

Other recommendations that were mentioned included: clearly identifying the program contacts, increasing incentives for commissioning; making forms more accessible on-line; providing data on benchmark standards for building performance that can be used in design; providing more information about successful projects that have been completed (what measures work, ideas that can be applied, costs and benefits); and linking the ESS process more closely to LEED™ for projects going through that process. One participant thought higher rebates and incentives, as well as designing a tiered system with bonus rebates based on a system’s efficiency, could further encourage the market.

More than two-thirds of the participants did not think there were gaps in program services or services that should be added or they had no ideas to offer. Those with suggestions had a variety of ideas. One participant mentioned that there was still some uncertainty about the uses and

amount of funds available in the program for certain types of projects: *“How much of this can we use for renovation? We have a few big projects, but a lot are under \$5 million. There is a constant stream. We are doing a billion dollars of projects at a time. Most of those are small.”* Along these lines, one participant thought opportunities existed in the tenant improvement (TI) market. One designer thinks the Lighting Lab is fabulous and that there should be a sustainable development lab: *“Show and demo the technology and specific designs...It is easier to sell more advanced concepts if you know that is being worked on”* and another participant thought ESS should do more to encourage sustainable design. One designer thought SCL should do more to encourage the use of distributed generators and other peak load reduction strategies. An owner suggested making the program more comprehensive, particularly for residential buildings: *“Mixed use is a complicated building type. High rise residential is using more commercial based mechanical systems. The programs do not support this as well. Not as well supported as for office. Low-rise residential is not supported at all. They need to have their own better program. The program could be more comprehensive.”*

We asked participants whether ESS should consider adopting three program options used by some utility new construction efficiency programs: the whole building incentive approach, putting more emphasis on supporting green or LEED™ certified buildings, and design team incentives.

Whole Building Approach

The ‘whole building’ approach provides incentives per square foot or per kWh of whole building energy savings, relative to a baseline. In Seattle, for new construction the baseline would be the energy code. This would differ from the options in the current ESS program where incentives are available for standard and custom energy efficiency measures. Participants were generally positive about the whole building option, finding it interesting and offering more flexibility to both the owner and design team. *“It gives the owner and design team more flexibility. The energy code gives you three approaches for meeting the code. SCL should do the same;”* and *“When you think of the building holistically as a system and you could possibly have innovative solutions that don’t fit into a certain category.”* Another said that it was easy to understand and they were already using it on another project with Puget Sound Energy: *“It is simple, streamlined. Encourages more collaboration. Great program.”*

Several qualified their comments by saying that it sounded promising as long as it wasn’t the only option and some others said it really depended on whether the incentives were as lucrative and on the analysis requirements. This was the one caveat voiced both by those in favor of this approach and those with concerns: *“It really depends on how difficult it is to demonstrate what the requirements are for providing calculations...At least, on a per system basis it can be pretty easy to do the calcs and provide it to them. If it becomes esoteric, could be more trouble than it’s worth.”* One designer said that it implied modeling, which, while good for LEED™ or for meeting code, could be problematic if the ESS model is different. One participant thought that incentives would probably have to be increased to cover additional costs for analysis, while another designer noted that the analysis would fall back on the consulting community so the owner would need to be made aware of the additional time involved.

Encouraging LEED™

SCL currently offers technical support and financial incentives to building owners/ developers to pursue LEED™ certification, but the support is limited. We asked participants if LEED™ certification should receive greater support. A few participants thought SCL should place more emphasis on encouraging LEED™ certified buildings, but most agreed with the current level of emphasis: *“I think they have the appropriate emphasis on that [LEED™]. LEED™ does not translate to electrical energy savings. It is good to take a broad look at LEED™ things, but it is not strongly aligned with their drivers.”* Some participants said SCL should not focus in this area, saying that LEED™ considers many things besides energy: *“The cost of LEED™ is still an investment over and above the energy savings and LEED™ gets in to other things that have only a marginal or very little ROI. If you want to get the biggest bang for your participation you go after the energy savings.”*

While several participants were uniformly positive about LEED™, others expressed mixed feelings: *“The goal to have sustainable buildings is one of my core values, but it [LEED™] is a little cumbersome and the registration process can be a little arbitrary with the point accumulation.”* Another participant remarked: *“I believe in what the LEED™ program is doing. But it needs a lot of help – it is arbitrary and a little capricious. LEED™ is a little black magic and BS. It may not affect electric use. I am not happy with LEED™. Working with them is a pain. I have told them that politely.”* Others commented that the LEED™ process wouldn't work well for some types of buildings; there were too many requirements; and that it was not always cost effective. Yet another participant felt that the state, not SCL, should be funding LEED™ since they have made it mandatory.

A group of participants felt that ESS should continue to provide support for LEED™ certification on a limited basis, such as acting as a referral and educational resource. *“They can be supportive of this to the extent that it helps to facilitate more economic development of projects and operation of projects.”* This can be important because LEED™ is still relatively new and *“It is still a learning area.”* As noted above, some see an opportunity for ESS to more closely align its process and requirements with LEED™ so that its easier to participate in ESS when going through the LEED™ process.

Design Incentives

Some new construction programs offer design incentives to design teams to help cover the extra design costs for developing an energy efficient building. These incentives are often based on exceeding a certain energy performance threshold. We asked participants if they thought SCL should offer a portion of ESS project incentives to design teams if it can be shown that the design improvements resulted in increased energy savings.

Reactions to the proposed design incentive program were split between those in favor and those opposed. Several who favored the idea said it was good as long as the owner was in the loop and supportive: *“Some owners or developers want the rebate but do not want to pay the designer fee to do the work. It is a way for us to get paid. It is not a bad program. It covers our cost. It is an*

incentive for the design team. Then you get the whole team working together on it. You are giving to the team to get better results.” Another designer thought it was a “tremendous idea,” but there needed to be “*mechanisms to prevent gaming of the system.*” One owner that was neutral about design incentives said that it can be very valuable to give some kind of award or recognition to design teams that meet some standard or other benchmark.

Those opposed to the design incentive felt the owner is in the best position to allocate the resources for project development. They noted that “*they’re [designers] getting paid anyhow*” and “*it is fraught with pitfalls – the owner is paying the freight.*” Some others, including this designer, felt “*it would result in a conflict of interest. We are in business to make money. The financial incentive could make it [energy efficiency] more important [than the client interests].*” These participants did not feel a design incentive could easily resolve these concerns.

Summary of Key Findings

- Participants were generally satisfied with their experience with ESS, saying it fit well into the development process. Most program participants said the financial incentives and long-term energy savings were the principal benefits from ESS, but some noted that program goals were consistent with corporate or institutional values. About two-thirds of the participants interviewed felt the program added value to the design process for their projects with many praising the good ideas and responsiveness of SCL staff .
- The biggest challenge participants noted was the effort required to document and verify what they did along with the energy savings from their actions.
- Participants cited growing interest in sustainable design and advances in technology as market trends that could provide opportunities for energy efficiency. They thought higher energy costs encourage energy efficiency while the higher cost of more energy efficient systems, coupled with inertia and lack of financial motivation, discourage energy efficiency.
- The two most common reasons offered by the participants for owners and design firms not using ESS were the up-front costs for more energy efficient systems and the paperwork and bureaucracy.
- Some participants thought ESS should be more proactive in outreach and promotion. They suggested targeting design teams through presentations and on-site “brown bag” lunchtime events. In addition, they suggested providing design teams with information they can use to encourage owners to participate, such as examples of successful projects, simple explanations of the services, program benefits.
- When asked about three program options used in some utility’s new construction efficiency programs, participants favored a whole building incentive path as an option, had mixed feelings about providing design team incentives, and felt the current level of support by ESS for green or LEED™ certified buildings was appropriate and should not be increased.

Chapter 6: Non-Participant Views

We interviewed 14 designers, owners and developers involved with commercial building projects completed in Seattle since 2000 that did not use ESS. Some of these “non-participants” had never used ESS, but others had used ESS on previous projects. We targeted medium and large office, medical, mixed use, public, and retail buildings that typically participate in ESS. Like the participant interviews, most of the people we interviewed were staff and decision-makers responsible for project oversight, management, and coordination, including project architects, engineers, or project managers on the design side, and capital project or construction managers, lead facility, or engineering staff representing the owner. Topics included their awareness of ESS, motivations for developing more energy efficient buildings, reasons for not using ESS on a recent project, and suggestions for improving ESS.

Awareness

Ten of the fourteen non-participants had at least some awareness of ESS, with 5 saying they had limited familiarity and 5 saying they were somewhat or very familiar with the program. Four respondents had no awareness of ESS. Those most familiar with ESS had used the program on previous projects. A few of those who had not heard of the program worked at firms that have used ESS in the past, suggesting that knowledge about ESS may not filter throughout a large firm.

The most familiar service offered by City Light’s Conservation Resource Division was the Lighting Design Lab – eight said they had used the Lab or were aware of it, although not all of these realized the Lab had a connection to Seattle City Light. Seven were aware of program incentives for energy efficient lighting and controls, six for HVAC incentives, five each for energy analysis, commissioning and LEED™ support, and four were aware of the customer measure incentives.

Several who had worked with ESS on other projects could not recall how they first heard about ESS, implying they had known about the program for a while. A few others said they learned about the program from ESS staff, while one each mentioned the City Office for Sustainability, participation in another SCL program, attending an AIA seminar, and hearing about it from engineering consultant. About half said they were aware of other projects that had used ESS, but these projects were mostly ones that they were involved with.

Several non-participants said the thing that attracted them to ESS were the resources offered to look at different energy efficiency options. Three non-participants indicated ESS had influenced their practices. One designer who had used ESS before said *“every time we do one of these we learn something new. A lot of the things we learned on the first buildings in the 90’s we are incorporating into the future buildings. Even though we are not getting the big rebates we were then.”* The other two said they *“look at the return” and implement the efficiency measures that benefit them.*

Motivations

Eight of the fourteen non-participants interviewed said energy efficiency was very important in the design of the buildings they are involved with because it is important to reduce costs: *“The biggest motivation is long term savings for maintenance dollars. These dollars from the state do not grow and can get cut. This is a long-term worry for them. They are struggling with that. Saving energy helps, so it is very, very important. They are designing 50-year buildings. So they do not want to worry about it in the future.”* Another designer felt that the majority of projects are energy efficient: *“It is pretty high - 90th percentile are doing things as efficiently as they can – typically beyond code. Especially with the advent of LEEDTM. Most of the jobs I do are in Seattle. Everybody is pretty energy conscious. If it makes sense energy wise they do it.”*

Others respondents were more neutral, saying the level of energy efficiency depends on the client and building: *“On one hand it’s [energy efficiency] very important, but it has to be balanced with the needs of the client, along with hundreds of other variables. There are only so many things that fit into our heads.”* A few designers went further and said owners that develop buildings to be leased have little motivation to pursue energy efficiency:

“Building developers will develop a project that meets or barely exceeds the market. The tenants pay for energy. This is a key point. There is nothing to prompt the developer or owner to make an energy efficient building unless the tenants demand it. There needs to be demand on the part of the tenants. The owner is not going to give it away. Unless they can realize another buck a square foot in rent.”

We asked the designers and owners who were not past participants why ESS was not used for the non-participating projects they were involved with. The primary reason given was that they did not know about the program or they were not familiar enough to consider it. One designer said they did not understand ESS well enough to explain it to their client. For others, it just was not on their radar screen.

A second reason for not using ESS was the scope of the project was too small to provide savings opportunities. One designer noted that *“the program focuses on bigger buildings”* and for buildings that did not participate *“the scope was just too small.”*

The third reason given by some non-participants that considered ESS was the incentives just were not large enough to motivate them. One designer said they had difficulty convincing the owner it would *“pencil out.”* Another owner that considered ESS said: *“We looked at some to go after, but when the costs came in, it did not make sense. The grant did not make up enough of the additional amount. It is always a cost issue. We always do good sustainable practice. If it happens to line up with SCL fine. If not, we still do it.”* Finally, there were a few cases where the owner simply had no motivation for developing a building that was more efficient than the energy code. These were office spaces being leased and the owners did not see a financial benefit from investing more in energy efficiency when the tenants were paying the energy bill.

These last three reasons for not participating are all related to an inability to recover their costs for participating. These include the costs for designing, purchasing, and installing more energy efficient systems as well as the costs for meeting the program requirements.

We asked the non-participants about the impact of the current Seattle Energy Code on new construction projects and on the willingness of owners and designers to go beyond code and use ESS. Only one felt the Energy Code helped to push people towards using ESS. Others said the Energy Code had little to do with the decision to use ESS. Like the participants, many thought the Energy Code was stringent: *“The general perception on the part of developers is that we are required to meet very stringent regulations. We have done enough already.”* A few thought the energy code was too restrictive, has inequities, stifles innovation, and drives up costs.

Market Trends and Opportunities

Non-participants identified similar general market trends as participants: growing interest in sustainable design and new technologies like under floor air distribution systems and photovoltaic systems. A few mentioned new zoning regulations that allow taller buildings with smaller floor plates. One designer said rising construction costs were a critical trend: *“Construction costs are going out of the roof right now. Mechanical systems are up \$20 /square foot. It was at \$35/square foot and from October to July went to \$55. That can be a \$5 million dollar problem on a project.”* Like participants, some non-participants saw an increase in large residential mixed-use development. A few also said their firms were focusing on large institutional and medical projects.

Most of the non-participants said increasing energy costs are the primary trend encouraging energy efficiency. Several also thought that LEED™ and state requirements for LEED™ certification in state buildings encourage energy efficiency. These views match the participants we interviewed. A few non-participants mentioned technologies they thought encourage energy efficiency: T-5 lighting, more laptop computers in offices (as opposed to less efficient desktop systems), operable windows, daylight controls, and ground source heat pumps.

The higher cost of energy efficient systems was the key factor identified by non-participants for discouraging energy efficiency in the market. One designer said this is particularly true when faced with higher construction costs: *“Energy efficiency is more expensive. Costs are going up and then you just add money to it.”* Another designer pointed to tenants: *“The biggest discouragement towards energy efficiency is that you have tenants that are responsible for the energy costs - to have them not be cognizant of what that means to their bottom line over a lease. Until tenants are educated or it hits them in the pocketbook it will continue on as it is. That is the market forces.”*

Opportunities for Improvement

The two primary suggestions non-participants had for encouraging developers, owners, and designers to use ESS were:

- Raising awareness about the program services, and
- Improving and illustrating the economic benefits of participating.

These suggestions are related to the reasons given for not participating: not knowing about the program and an inability to recover the costs of participating and implementing more energy efficient systems.

The non-participants suggested various ways to improve outreach about the program. Some suggested general approaches such as seminars/workshops, attending peer association events (AIA, Downtown Seattle Association), flyers, advertisements, and improving the ESS website. Others recommended more targeted outreach, including one designer who suggested making presentations at design firms like the “brown bag” lunch presentations suggested by participants: *“Put on a ‘traveling show.’ We have ‘[firm name] University’ at my firm where we have monthly seminars for continuing education credit. We won an award from the AIA for it. So SCL should consider coming here to do a presentation.”*

An owner recommended having one single point of contact and taking advantage of the SCL representative they already work with. Another owner suggested ESS needs to develop more of a sales focus: *“One thing would be to employ people that are less engineering oriented and more sales oriented. When we get in there we are dealing with engineers. This puts us off when we are dealing with someone that does not promote the services, but focuses on regulations. It is not user friendly.”*

Many non-participants said they “need to see the economic benefits from it [ESS].” Several suggested that larger financial incentives would help: *“The amount of money available – people are first motivated by money then by their conscience and [trying to be] friendly to the environment. But money is the number one thing.”* Others talked about the costs of going through the program: *“Improve how much they pay out. I think the benefits do not sometimes outweigh the cost to go through the program. The time to go through all the paperwork. Sometimes they help and sometimes they do not. Small owners do not have design professionals that are attuned to this - it is difficult.”* Another designer noted that *“a lot of costs are process oriented and not efficiency-related costs.”* There were suggestions for streamlining the process, being more flexible (ESS staff can be *“too black and white”*), and lining up ESS requirements with processes they already have to go through (for example, state requirements for high performance schools).

When asked whether SCL should consider some approaches used by other utility new construction energy efficiency programs, the non-participants gave similar responses as the participants. Most of those that responded favored the whole building approach that gives incentives based on whole building performance rather than savings from particular building systems or pieces of equipment. They saw this option providing more flexibility and the ability to *“look at what you are doing in the building as a whole.”* Several said it depended on whether the whole building approach provided benefits for them.

The non-participants tended to be a little more favorable to SCL providing more support for LEED™ than the participants. Some thought this was an *“interesting idea”* and an important

trend that should be supported. But others felt LEED™ was expensive or was not relevant for the projects they were working on. Some did not express an opinion.

Like the participants, the non-participants were mixed on giving design team incentives for meeting certain performance goals. Some said the design team was already being paid. Another said it was important to recognize the design professionals.

Summary of Key Findings

- Awareness of ESS is limited, with two-thirds (of 14) having no or low familiarity with it. Those most familiar with ESS tended to have participated with other projects.
- Non-participants were most familiar with the Lighting Design Lab, but some were aware of the incentives and other program services.
- Aside from experience with prior participating projects, non-participants had learned about the program from SCL staff or peers.
- Over half the non-participants said energy efficiency was important in the projects they were involved with, primarily for reducing building operating costs. Others said that energy efficiency needed to be balanced with the needs of the owner, some of whom may have little interest in energy efficiency.
- The primary reason given for not using ESS on their recent “non-participating project” was that they did not know about the program or they were not familiar enough to consider it. Other reasons were economic: the scope of the project was too small to provide savings opportunities; the incentives just were not large enough to motivate them; and the owner simply had no motivation for developing a building that was more efficient than the energy code.
- Non-participants identified similar market trends as participants: growing interest in sustainable design and new technologies. They saw increasing energy costs as the primary trend encouraging energy efficiency and the higher cost of energy efficient systems as the key factor discouraging energy efficiency.
- The two primary suggestions non-participants had for encouraging developers, owners, and designers to use ESS were raising awareness about program services and improving and illustrating the economic benefits of participating.
- They favored including a whole building option in ESS, but had mixed views about providing more encouragement for LEED™ or design team incentives.

Chapter 7: Commercial New Construction Program Best Practices

As part of this evaluation, SCL requested that the evaluation team conduct a review of relevant literature and similar programs in order to identify areas where SCL's program demonstrates best practices and to identify best practices that might improve SCL's program.

The following sources of information informed this best practices review.

- The *2004 Non-Residential New Construction Best Practices Report*, conducted as part of the National Energy Efficiency Best Practices Study completed in December 2004. This report was part of a large best practices study conducted for the California Public Utilities Commission through a contract with Pacific Gas and Electric and prime contractor, Quantum Consulting.
- Design Briefs, Program Proposals and other information about the Statewide Savings By Design program implemented by four of California's largest IOUs to encourage integrated energy design in new construction projects in California.
- *An Evaluation of the FY 2003 Statewide Savings By Design Program* completed by RLW Analytics in 2005 for Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison.
- The *Program Theory and Logic Model Assessment of the Commercial New Construction Program*, prepared for the New York State Energy Research and Development Authority in June, 2004 by GDS Associates, Inc.
- A *2005 Process Evaluation of the New Construction Program* completed by Dethman and Associates and Research into Action, Inc. for the New York State Energy Research and Development Authority.
- A *2003 Focus on Energy Public Benefits Evaluation Business Programs: Best Practices Report* conducted by PA Consulting Group for the State of Wisconsin Department of Administration.

The professional knowledge and judgment of the evaluation team was also important. The breadth and depth of experience represented in evaluation team members was used to analyze findings and to identify trends.

Best Practices Review

The evaluation team reviewed the findings in the volume of the National Energy Efficiency Best Practices Study focused on non-residential new construction programs. This volume was completed in late 2004 and involved a detailed review of six programs¹⁵ that offered incentives and design assistance to improve the efficiency of non-residential new construction projects undertaken in their territories. Given its relevance and its focus on recent program years, we reference this volume extensively in this chapter, and have used its outline to organize this discussion. The volume cites several other studies and is therefore quite comprehensive; however, information from other sources is incorporated when relevant.

The national best practice study volume identified three key themes or drivers of program success for new commercial construction programs – integrated design and design assistance, relationship building, and long-term commitment to the sector.¹⁶

- *Integrated design and design assistance.* This refers to the practice of active consultation with the design team and the owner early in the design process in order to capture the cost-effective energy savings opportunities available early in a project, but that decline as a project moves through design stages. Integrated design considers the interaction between building components and systems to identify opportunities to optimize energy performance. Design assistance may include program staff, third party design coordinators, or technical assistance contractors. This may also require vigilance to assure that energy efficient features are not eliminated later in the development process because of design changes or value engineering.
- *Relationship building.* Nonresidential new construction projects involve many people, all of whom have important roles in the project. Effective programs require trusting relationships with architects and engineers especially, but also benefit from good relationships with owners.
- *Long-term commitment to the sector.* This theme is related to relationship building, but refers specifically to the value of having a stable program. Given the long timeframes of these projects, program managers must be able to provide some assurance of stable project funding. This theme also reflects the benefits of long-term commitment to the sector generally and to integrated design efforts specifically. Specific members of each design team are involved on multiple projects over multiple years – a good experience this year may provide another project next year, but only if the program continues to exist.

¹⁵ The programs included in this Best Practices Volume are: Energy Conscious Construction, Northeast Utilities; Energy Design Assistance, Xcel; Design 2000 Plus, National Grid; Savings By Design, California IOUs; Construction Solutions, NStar; Commercial & Industrial new Construction Program, Hawaiian Electric Company.

¹⁶ Quantum Consulting, NR8-2.

Comparison on Key Components

The National Best Practices Study sought to reduce every program into seven components and identify key lessons learned for each area. The seven components are: program theory and design; program management; marketing and outreach; program participation process; reporting and tracking; verification, measurement and quality control; and program evaluation.

For each component the program area report compares all six programs to identify the best practices and lessons learned for that component. The discussion below extracted those best practice components most relevant to SCL's Energy Smart Services.¹⁷ The best practices identified in the National Energy Efficiency Best Practices volume are listed in bold, bulleted text.

Program Theory and Design

Program theory and design relates to the overarching and stated goals of the program and whether or not the program's activities are likely to lead to achieving those goals. One key aspect of program theory is whether or not the primary goal of the program is resource acquisition or market transformation. Generally, the national best practice study programs emphasized a whole-building approach and integrated design to maximize the energy performance of new commercial buildings. A related strategy is to leverage the interest in the U.S. Green Building Council's "Leadership in Energy and Environmental Design" (LEED™).

Best Practices:

- **Link program tactics to the stated theory**

The programs reviewed in the national best practice study were described as "largely empirical," meaning that program staff and program designers relied upon their experience and iterative approaches to determine the best implementation strategies. However, it is important for program tactics or strategies to support well-articulated program theories to ensure the program is focused on achieving its goals and can be evaluated. For example, the logic behind New York's New Construction Program (NCP) is to reach owners and their design teams, to get them to think about energy efficiency differently, and to influence them, through a variety of financial incentives, to implement new efficiency measures. All measures that receive incentives through the NCP must be pre-approved. The idea is to "influence owners and design teams once or twice. Then, on subsequent projects, they will say 'We did that last time and it worked out well, let's do it again.'"¹⁸

- **Build feedback loops into the program design and maintain program design flexibility**

Involve stakeholders in program planning and revisions, maintain relationships with stakeholders, and provide opportunities for feedback. This may occur informally through

¹⁷ Not all of the best practices identified in the nonresidential new construction volume are listed here – the research team identified the best practices likely to be most relevant.

¹⁸ Dethman and Associates, Process Evaluation of the New Construction Program, pg 2.1. New York State Research and Development Authority, 2005.

relational networks, stakeholder groups, and communication channels, or more formally through follow up surveys and evaluations. Allow enough flexibility so the program can respond to the feedback it receives and adapt to changing market conditions

- **Emphasize integrated design along with a whole building performance path**

Programs emphasized integrated design as an effective way to capture all cost-effective energy efficiency opportunities, particularly for large, complex projects. This was achieved by offering incentives based on whole building performance, providing design assistance, and encouraging collaborative design approaches.

For California's Savings by Design (SBD), projects using the whole building approach receive incentives ranging from \$0.06/annualized kWh savings to \$0.18/annualized kWh savings depending on the amount of savings relative to Title-24 (California's energy code; projects must achieve at least 10% savings). The maximum incentive available under the whole building approach is twice as much as projects using the systems approach. The most recent evaluation of SBD shows that "Whole Building projects save over twice as much energy per square foot than do systems projects, and they also produce a higher gross realization rate than systems projects."¹⁹ The net realization rate (net evaluation savings divided by program tracking system savings) of all Savings by Design measure categories was 70%, while the whole building net realization rate was 95%.²⁰ In the Puget Sound Region, Puget Sound Energy offers a whole buildings path that offers an incentive on a per square foot basis for savings that are greater than 10% relative to the energy code. If savings exceed the code by 25%, the incentive level increases.

- **Provide a systems- or component-based participation track**

While the best practices programs offered an integrated design or whole-building approach, they also provided a systems or component based track. Having a more prescriptive approach is important for simpler or small projects unlikely to face complex design challenges and less likely to have a full design team involved throughout the process. Measures qualifying for standard incentives do not require extensive analysis. Incentives for these measures are often provided through an application process which requires an estimate of energy savings, an accepted bid, and a drawing or sketch of fixture locations.

- **Offer financial incentives to both the project owner and the design team**

Design team incentives help offset the extra effort that might be required for going through an integrated design process. "It is unfair to expect designers to make the additional effort the integrated design process requires without providing additional compensation, particularly when investments in improved design and engineering can yield enormous benefits over the life of the building."²¹ These incentives are available for projects using a whole building approach. They can be flat fees or more innovative performance bonuses based upon verified benefits in the final building.

¹⁹ RLW Analytics, An Evaluation of the Savings by Design Program, pg 36. Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison. 2005.

²⁰ Ibid. pg 40.

²¹ Energy Design Resources, Design Brief "Integrated Energy Design" pg 7. Southern California Edison. 1998

- **Scrupulously protect program credibility; do not over-promise results**

Utilities are often viewed as credible and trustworthy sources of knowledge and information. It is important to set reasonable expectations at the beginning of a project and use sound, accepted methods for justifying energy savings and program benefits.

Program Management

The structure of program management is less important than the presence of effective communication strategies throughout the program—allowing everyone involved in service delivery to clearly understand and apply the program procedures.

The best practices identified for program management reflect good management principals in general—for example, providing staff with good training, rewarding high performing staff, and assuring that program managers and staff at all levels have decision-making authority commensurate with their responsibilities. However, several best practices warrant consideration for SCL, if only to assure they are considered.

Best Practices:

- **Assure the program has upper management’s buy-in and funding.**

Program stability is important for achieving results, which requires management commitment and support. It may take several years to produce results after program start-up or significant changes. Upper management should have clear expectations and understand how program goals support overall organization goals.

- **Put the process plan in writing**

A clear, written plan is easier to disseminate to participants and other stakeholders, helps set reasonable expectations, and provides a basis for improvement. For example, NCP has a very detailed process description and an initial “scoping” meeting is used to discuss the scope of work for the project. The program evaluation suggested developing simpler descriptive materials to describe the program process and requirements and to “continue to build on the value and importance of the scoping meeting to define project expectations and outcomes and to reduce uncertainty for participants.”²² It is important to consider the burden of program processes on staff and streamline or revise them if needed.

- **Keep management teams small**

Management teams need to be appropriately sized, but smaller management teams can facilitate decision-making. It can be useful to review the function of the management team, clarify manager roles, review communication channels, consider review and approval processes, and look for opportunities to streamline.

- **Assemble the most technically proficient implementation team possible**

²² Dethman & Associates, Process Evaluation of the New Construction Program, pg II. New York State Research and Development Authority, 2005.

An implementation team may include contractors and consultants. All of those involved will need to have the appropriate level of training and in-depth technical expertise. According to the National Best Practices Study, there were differences of opinion among program managers about the proper role of outside contractors and consultants. The best practices programs generally had similar program management structures with in-house staff taking the lead role with support from contractors and consultants, but some relied more heavily on contractors and consultants for implementation and service delivery. Regardless of the approach used it is important for all service providers to be experienced, knowledgeable, able to understand participant needs, and fully aware of program services, requirements, and processes. Regular communication, training, access to tools and resources, adequate compensation, feedback, and recognition and rewards can all be used to develop a proficient implementation team.

Marketing and Outreach

These new construction programs have a similar marketing challenge – reaching a small universe of decision-makers during the brief window of opportunity when choices for a building project can be influenced. They employ similar strategies—focused primarily on relationship building with members of the design community.

Best Practices:

- **Leverage trade ally opportunities, trade association training, annual meetings, etc.**

Mass marketing is not an effective way to reach decision-makers – a more personal approach is needed. The Best Practices Study suggests that relationships with architecture and engineering professionals are an important conduit for identifying potential projects early in design. The best practices programs used a variety of approaches to develop these relationships: direct outreach (phone calls and face-to-face meetings), networking at breakfast meetings and tradeshow, brown bag workshops, training and education, partnerships with professional associations, design award programs, case studies and fact sheets, newsletters, advertising and articles in trade journals, and websites. The Study also notes the potential benefit of connections with local government that can identify projects early through planning and permitting processes. (While not reviewed, the City of Oakland provides an example of tying in to the local government permitting office.)

- **Sell customer benefits first, then energy efficiency; know your customers and their needs.**

The benefits of program participation need to be explained in terms the customer is familiar with. Program staff need to have a good understanding of the benefits energy efficient equipment provides (energy and non-energy benefits).

- **Keep benefits quantifiable in terms of economics. Promote a life-cycle cost perspective of benefits.**

Quantify health and productivity benefits when possible.

Participation Process

Participation processes for new construction programs tend to be very similar and involve an application review process, analysis, assistance, pre-approval, installation, post-installation verification or inspection, and incentive payment. Design assistance and/or incentives for the design team are common for complex projects. Programs typically offer more straightforward participation paths for smaller, simpler projects unlikely to pay for or benefit from more complex design work.

Best Practices:

- **Get involved early in the project design process**

Early involvement provides greater opportunity for energy efficiency options to be considered and incorporated into the building design. This is particularly important for projects using a whole-building approach. While early involvement is touted as being important it a perennial challenge for non-residential new construction programs. NCP encourages early involvement by only allowing projects that are not beyond the schematic design phase to be eligible for custom or whole-building incentives. Incentive levels are highest for whole building projects and are lowest for projects using the pre-qualified (prescriptive) path.

- **Maintain a flexible participation strategy**

Participation paths included the comprehensive and more time consuming whole building approach, a custom or systems approach that allows some flexibility but focuses on particular building systems, and a simple prescriptive path for pre-qualified energy efficiency measures that require little analysis. Providing multiple participation paths can make it more difficult for potential participants to decide which services they should use. Programs need to provide clear guidance to help participants find the path that best meets their needs.

- **Participation Best Practices Related to Technical Issues and Gaming**

Technical issues emerge in new construction program participation processes due to the challenges estimating energy savings or measure costs, which program incentives are based on. Most of the best practices relate to modeling strategies and efforts to control gaming by inflating the expected savings. They involve working closely with the design and project teams to establish clear base cases and assumptions for building models, using the most accurate building and equipment information, ensuring the modeling inputs and cost estimates are in line with industry norms, requiring clear documentation and verification, and trying to facilitate a smooth and timely analysis process that is responsive to participant needs.

Other Participation Best Practices

- **To facilitate participation from the customer's perspective, work with project engineers to obtain design parameters and related technical information**
- **Obtain HVAC and lighting calculation inputs directly from project drawings and plans**
- **For projects involving DOE2 simulations, establish definitive base case and final scenarios**
- **Develop a baseline document that provides guidelines for determining the appropriate benchmark for energy impact and incremental cost calculations**

- **If incentives are performance-based, then incorporate other disincentives to inflate savings via exaggerated operating hour estimates, etc.**
- **If incentives are based on incremental costs, then make sure program managers have access to solid, up-to-date information regarding industry average costs for typical measures**
- **In the field, avoid over-committing to a project before the design parameters are known**

Controlling for free riders is a challenge for all new construction programs. It is difficult not to pay for something a participant would have done anyway if it is an eligible measure. Early involvement in the design process can help program staff assess the likely path of a project, but avoiding free riders will continue to be a challenge given the characteristics of the owners and designers willing to consider energy efficiency program participation. High-end and quality-minded customers are more likely to select high quality energy efficient equipment, but the complex decision making processes involved do not always allow for easy screening of free riders—owners and designers may even disagree about what would have happened in the absence of the program. Relatively high free ridership rates (30-40%) are not uncommon for these programs.

Reporting and Tracking

Reporting and tracking program activities and the resulting energy savings is important for all energy efficiency programs and every program has some way of tracking projects, payments, and applications. The complexity of the system will reflect the needs of staff and the reporting required by management or regulators.

One of the key steps for an effective reporting and tracking system is determining the key information that should be tracked. It is important to periodically review the information that is being tracked, how it is used, and whether it is effectively meeting program needs. For all National Best Practice Study programs, reporting and tracking systems allowed staff to develop reports for upper management and regulators, calculate program impacts, and monitor project status, performance, and quality control. Other features of one or more of the reporting and tracking systems were support of evaluation, monitoring and verification, financial accounting, automated notification of missed milestones, project lead tracking, program priorities, goals, and budgets, load research and forecasting, and staff evaluations.²³

The explosion of data base technology makes it simpler and more important to minimize duplicative data entry, automate routine functions and create web-based interfaces through which customers and other market actors can enter project details. All of these features are identified as best practices related to reporting and tracking in the national best practice study report. Quality control in data entry and in the accuracy of algorithms and assumptions on which savings estimates (and incentive payments) are based are also important.

²³ Quantum Consulting, Inc. NR8-23-25

One of the challenges to an effective reporting and tracking system is keeping it accurate and up-to-date. If this does not occur, the system is not useful and staff and service providers often end up developing their own systems to track their individual projects. This can lead to duplication of effort and an inability to view overall program performance in one place. The best practices in reporting and tracking aim to overcome this problem and fall into two main categories – accuracy and ease of use. In addition to the following practices, our experience suggests that clear processes for data entry and quality control need to be established.

Accuracy

- **Develop accurate algorithms and assumptions on which to base estimates of savings**
- **Build in rigorous quality control screens for data entry**
- **Carefully document the tracking system**

Ease of use

- **Minimize duplicative data entry**
- **Use the Internet to facilitate data entry and reporting for private-sector market actors**
- **Automate routine functions such as monthly reports**

Quality Control and Verification

Quality control and verification assure that program-sponsored projects are resulting in the expected energy savings and that measures are operating as designed. All of the programs reviewed in the National Best Practices Study included pre-project review of construction documents and post-project inspections to verify as-built conditions.²⁴

Best Practices:

- **At the project outset, clearly identify qualifying measures to be included in the project, along with their expected impacts.**

It is important to establish clear expectations about qualifying measures, options to be considered, analysis and documentation requirements, and potential savings levels and incentives. For NCP this occurs during the scoping meeting and the program continues to develop and refine simple analysis tools and resources to improve the quality of information it provides at the beginning of a project.

- **Clearly define post-inspection policies and procedures**

All of the best practices utilities required some type of post-installation inspection. Requirements were more stringent for custom and whole-building projects. Only Northeast Utilities accepted self-certification of prescriptive projects. National Grid and NStar prepare a Minimum Requirements document that spells out the inspections required. SBD includes this as part of the incentive offer.²⁵

²⁴ Quantum Consulting NR8-27

²⁵ Quantum Consulting NR8-27

- **For complex projects, especially those involving controls, consider requiring performance verification**

Several best practices utilities require performance verification or systems commissioning for complicated measures or measures receiving incentives that exceed a certain threshold. These requirements involve on-site measurement or testing of equipment. For example, NStar requires systems commissioning for controls projects over \$40,000 and all projects over \$100,000.

Program Evaluation

According to the Best Practices study, “The depth and scope of evaluation activities varies dramatically across the non-residential new construction programs analyzed, largely in response to varying reporting requirements imposed by management or regulatory agencies.”²⁶ Some utilities had a series of recent evaluation studies conducted by third-party evaluators while one relied on an annual summary drawn largely from their in-house tracking system. Many of the evaluation studies focused on program impacts.

The extended time frames of new construction projects can impede timely completion of impact evaluations and reflect marketing and implementation decisions/practices from earlier years. Given these challenges, programs need to use process evaluations to provide timely feedback and accurate, relevant and useful information to program staff. Ideally a program should have a plan for conducting a mix of impact, process, and market evaluation activities to monitor progress meeting program goals and to provide information to improve program value and effectiveness.

Best Practices:

- **Evaluation metrics must be inline with program goals.**
- **Support program review and assessment at the most comprehensive level possible.**
- **Conduct regular impact evaluations, periodic baseline studies, and process evaluations with short time lags between participation and interviews.**
- **Focus cost-benefit analyses on cohorts of completed projects rather than cohorts of initiated projects (to account for the long delays between initiation and completion... Implementing this shift requires a methodology for disaggregating program costs and assigning them to specific projects).**
- **Market level information about construction practices and energy efficiency measure adoption should be periodically reviewed and updated.**
- **Algorithms for calculating project savings should be periodically reviewed and updated.**

The evaluation recommendations cited in the Best Practices study tend to focus on improving energy savings calculations and developing more accurate baseline models, reflecting the emphasis on program impact evaluations. The evaluation findings from National Grid more broadly suggested focusing on creating lasting market change: “(1) leveraging private sector activities more aggressively; (2) focusing on trade ally education; and (3) coordinating with

²⁶ Quantum Consulting NR8-35

regional market transformation programs to the greatest extent possible.”²⁷ The process evaluation for NCP emphasized developing approaches and materials that increase participant understanding of the program participation process at the beginning of the process, improve communication, consistency, best practices, and feedback among program implementers, and track the value of program design changes.²⁸

Summary of Key Findings

The National Best Practices Study identified three key themes or drivers of program success for new commercial construction programs – integrated design and design assistance, relationship building, and long-term commitment to the sector. Many of the best practices illustrated in this section fit within these themes.

- ***Integrated design and design assistance.*** Programs emphasized integrated design as an effective way to capture all cost-effective energy efficiency opportunities, particularly for large, complex projects. The programs offered incentives based on whole building performance, providing design assistance and design team incentives, getting involved early in the design process, and encouraging collaborative design approaches. Whole building approaches require technically proficient implementation teams and programs to support design teams. Best practices programs also provided a systems or component based track. Having a more prescriptive approach is important for simpler or small projects unlikely to face complex design challenges and less likely to have a full design team involved.
- ***Relationship building.*** New construction programs focused building relationships with members of the design community to reach decision-makers during the brief window when choices for a building project can be influenced. The best practices programs used direct outreach, networking at breakfast meetings and tradeshow, brown bag workshops, training and education, partnering with professional associations, design award programs, case studies and fact sheets, newsletters, advertising and articles in trade journals, and websites. Communication is important throughout the participation process and benefits of program participation need to be explained to customers using familiar terms.
- ***Long-term commitment to the sector.*** Program and funding stability are important for developing relationships and trust and to reflect the long timelines of many new construction projects. This requires upper management support, clear program goals, strategies, and processes, sound management practices for tracking, reporting, and quality assurance, and evaluation and feedback mechanisms.

²⁷ Quantum Consulting NR8-36

²⁸ Dethman & Associates 6-2 to 6-3

Chapter 8: Synthesis of Findings, Conclusions, and Recommendations

Synthesis of Findings

Chapters 3 through 6 each contain summaries of the key findings from that chapter.²⁹ We have looked across these summaries to develop this synthesis of findings.

Overall Findings

- Overall, program staff, internal key informants, and participants are positive about the value and effectiveness of ESS new construction services.
- Program strengths noted in internal interviews dovetail with participant views: staff's strong relationships with customers, their expertise in energy efficiency, and their ability to handle complex, custom projects.
- The database analysis shows that the program has affected about 52% of all new commercial and institutional buildings in Seattle built between 1998 and 2004 and approximately 58% of newly constructed space (i.e., square feet).
- While the ESS program is effectively reaching the majority of new office buildings (the second largest proportion of newly constructed space), the database analysis and interviews suggest it has been less successful in reaching a more recent building trend in Seattle – large mixed use buildings.³⁰
- When asked specifically about the effect of the energy code on participation, some staff and participants said it had pushed up efficiency standards and others said it was inflexible and hard to surpass, making it more difficult to participate in ESS.
- Respondents cited these market trends as being favorable to sustained interest in energy efficiency:
 - An increased interest in sustainability, daylighting, renewable energy and LEEDTM (state and city requirements for LEEDTM), higher energy costs, more stringent energy code requirements, and new technologies such as raised floor HVAC systems, energy efficient lighting, and lighting and HVAC controls. Some saw opportunities for SCL to promote or raise awareness about some of the new technologies.
 - Another trend noted by a few people was the dramatic increase in construction costs; some said this increase could make it more difficult to pay for more energy efficient equipment.

²⁹ See chapter summaries for further key findings and Appendix A for further conclusions and recommendations from the analysis of the commercial and DPD databases.

³⁰ SCL's Built Smart residential program has primary responsibility to provide residential conservation services to multifamily and mixed-used multifamily buildings.

Internal Interview Findings

- Staff report the program process is flexible and they do a lot of “handholding” to help customers meet the program requirements including filling out applications and paperwork.
- Program staff said outreach to new customers, tracking potential projects, and reaching projects early enough in the design process to maximize opportunities were primary program challenges.
- Staff noted that while communication is often effective between the new commercial team and Account Executives and DPD, organizational “silos” can decrease the effectiveness of conveying time sensitive information across departmental lines.

Participant Findings

- Most participants were satisfied with their ESS experience, saying the program fit well with their project development process and added value to the design process. Participants particularly praised the good ideas and responsiveness of SCL staff, and some particularly praised the Lighting Design Lab.
- Participants were aware of program features, particularly efficiency measure incentives, although some did not know about commissioning and LEEDTM incentives. Some participants said incentives for commissioning and energy analysis assistance were not worth the effort.
- Financial incentives and long-term cost savings were the primary motivations to participate. Corporate or institutional “values” such as sustainability and community responsibility were sometimes secondary but important considerations.
- Most participants cited few initial barriers to participation, but some said timing and paperwork requirements had concerned them.
- Participants who had used ESS services more than once were generally able to progress through the program efficiently, although many were not aware of the steps involved. New or less experienced participants noted that some program requirements were not clear and that too much documentation was needed.
- Some participants said they would have likely taken similar efficiency steps in their projects even without the program incentives.
- Almost all participants said ESS had influenced subsequent projects. When asked how they had been influenced, about half said they would use the program again, and a few said they had learned things they would use on other projects, although they did not identify specific measures or approaches.
- Findings were mixed about how much the program was influencing market changes.

Non-Participant Findings

- Non-participants identified lack of program awareness and lack of economic benefits as the two key reasons not to take advantage of ESS new construction services.

- About one-third of non-participants had no awareness of ESS, while another one-third had some, but limited, awareness. The final one-third was quite familiar with ESS, primarily because they had participated in ESS with other projects.
- Non-participants tended to be most aware of the Lighting Design Lab.
- Non-participants cited a variety of economic barriers to participating, all associated with the perceived higher costs of energy efficiency improvements, including projects that offered few savings opportunities, program incentives that were not large enough, and owners with no motivation to go beyond the energy code.

Conclusions and Recommendations

The flexibility of the program, the variety of clients served, the limited but expert staff, and the demands of new construction projects create a set of interrelated program issues and challenges:

- How to reach an even larger segment of target projects, especially among uninitiated owners and designers.
- How to clarify program steps and expectations, and deliver the most streamlined, timely, and robust approaches, given limited staff.
- How to move toward higher value, higher efficiency, and greener buildings and still meet savings acquisitions goals.

The following conclusions and recommendations address these issues and challenges. They are drawn from the program review and database analysis; interviews with staff, participants, and non-participants, the best practices review; and, in the case of a few recommendations, from the experience of the consulting team.

Program Process Improvements

1. ***Conclusion:*** Both program staff and participants value program flexibility and the level of customer service and technical expertise that the program provides; these program attributes are consistent with best practices guidelines. Other aspects of best practices related to program process – having clear program steps and streamlined procedures – are less apparent in the program, and lead to inefficiencies for both staff and participants. The ESS manual and website cover all C/I services and do not contain an easily identifiable path for new construction services, which likely increases the need for staff “handholding.”

Providing clear and separate guidance for new construction services would free up staff time for more outreach and relationship building, which in turn should allow them to reach projects earlier in the design process and to maximize potential savings. Reducing process uncertainty would also benefit participants, especially new ones, by clarifying program expectations and making participation more efficient.

Recommendation: Review program steps and procedures and develop accessible, clear, and separate materials to explain ESS new construction services.

- Develop a flow chart of the new construction service process to see where confusion and redundancy might exist in management, processes, documentation requirements, tracking, communications, and interaction with other city staff. Make appropriate program management and administrative improvements based on this analysis.
- Develop separate new construction guidelines, geared to the needs of owners and trade allies, which describe program steps, services, and documentation requirements.
- Develop a clear path on the website for new construction services, so that trade allies and owners can easily find program steps, calculation worksheets, and other essential participation materials.
- Institute scoping meetings as a more formal part of the process for projects reached early in design and for all custom projects. Scoping meetings gather together key decision-makers and other project/program actors to clearly identify savings opportunities and to outline participant and program expectations. (Scoping meetings are consistent with best practices guidelines.)
- For smaller projects, consider ways to streamline the process. Perhaps develop standard packages of measures targeted to certain types of projects (strip malls, big box retail, small/medium office).

Market Identification and Outreach

2. **Conclusion:** Given staffing constraints, it has been difficult for staff to reach beyond established relationships and to have a consistent outreach strategy. However, staff wants and has some resources to do more outreach, and customers were open to being contacted through appropriate venues.

Recommendation: Consistent with best practices guidelines, take advantage of existing relationships and networks with owner/developers, A&E firms, within SCL and other city departments, and with other efficiency agencies and utilities with conservation programs in the region (for instance, the Northwest Energy Efficiency Alliance and Puget Sound Energy). In addition, do targeted outreach to new trade allies to ensure awareness, increase knowledge of efficiency options, and expand program reach. Focus on customer benefits, then energy efficiency, and keep benefits quantifiable in terms of economics.

- Extend and strengthen relationships with existing and new members of key target audiences through regular meetings, brown bag lunch sessions, or exchanges of information about project plans, to identify potential projects and opportunities.
- Improve and expand program promotion materials that clearly and succinctly describe the various program services and their benefits, and ensure that they are used (e.g., although one-page handouts for each type of new construction service exist, participants tended not to be aware of them). In this process, obtain review and feedback from target audiences.
- Develop and present successful projects and energy efficient technologies and systems, and show people that it is worth participating. Develop materials the design community can use to promote the program to owners.

- Develop links on the website that are targeted to owners and trade allies, so that these groups can easily reach materials of interest to them. Consider other electronic means of communication such as an e-newsletter.
- Consider ways to recognize design teams that produce high efficiency, high performance, and green projects.
- Consider new ways of identifying projects early in their design phase; perhaps through the pre-submittal conference with DPD or use of DPD's on-line Land Use Bulletins.
- Strengthen relationships with internal partners to increase notification of new projects, including residential efficiency staff dealing with mixed-use buildings.³¹
- Although broad promotion activities generally are not very successful, participation in targeted professional organizations and presentations at conferences and events can help maintain visibility.
- Look at ways to link with and take advantage of Northwest Energy Efficiency Alliance activities to raise awareness about ESS and energy efficiency in general. In addition, consider how utilities might work together on whole building efficiency if more than one fuel is used.

Program Theory and Logic

3. **Conclusion:** While the program's design is consistent with its primary goal of acquiring cost-effective energy savings, staff would like to add other indicators to chart program progress and success toward secondary goals. For instance, while most management and staff identified market transformation as a secondary goal, opinions varied as to how important market transformation is for the program, how well it is being achieved, and if it could be measured. In addition, some respondents hoped that the program could be more innovative and cutting edge. If this were another goal, the program might support new technologies and integrated design, whole building, and green building approaches, and track whether these outcomes are achieved.

All of these findings suggest that a more formal process to examine program goals and their implications for program strategies, indicators, and outcomes would be useful for charting the future of the program. Developing a well articulated program theory is consistent with best practices guidelines.

Recommendation: Review and clarify program theory and logic, including a review of program goals and strategies, and measurable outcomes and evaluation approaches with the intent of increasing program value and impact. (For an example of an abbreviated program logic model developed for NYSERDA's New Construction Program, see Appendix C.) Look at ways to increase the overall level of energy savings in participating projects and promote leading edge approaches while reducing free riders. The following approaches, used in other programs and /or consistent with best practices findings, should be considered:

³¹ SCL's Built Smart residential program has primary responsibility to provide residential conservation services to multifamily and mixed-use multifamily buildings.

- Adding a whole building path to the program, While whole building approaches present challenges due to their complexity, dual fuel use, documentation requirements, and other factors, studies have shown this approach can increase overall energy savings.³² A whole building approach could employ incentive approaches that encourage using this path.
 - For instance, NYSERDA’s New Construction Program caps standard/custom incentives at a significantly lower level than whole building incentives and requires that projects enter the program no later than schematic design.
 - Another approach is to have “tiered” incentives, where higher tiers of savings are calculated at higher incentive levels or where there are bonuses for reaching a certain overall level of savings. For instance, Puget Sound Energy offers a whole building path where the incentive is on a per square foot basis; the incentive level at 25% beyond code is higher than the one at 10% beyond code.
- Developing a stronger link between the ESS process and LEED™ to coincide with market trends and to achieve overall “better” buildings. Take advantage of the requirements by the City of Seattle and Washington State to require LEED™ Silver Certification. Likewise, the program could consider how to link with the high performance schools standards adopted by the state. As with the whole building approach, special incentives might be developed to encourage certification.
- Limiting eligibility of and/or incentives for projects that enter late in the design process to encourage early entry and to reduce freeriders.
- If possible, taking advantage of the tax incentives in the Federal Energy Policy Act for buildings that exceed the ASHRAE standard by more than 50%.
- Reviewing the building commissioning and energy analysis services and developing ways to increase the perceived value and use.
- Looking at opportunities to take advantage of Northwest Energy Efficiency Alliance market transformation activities (programs, resources and training) that support integrated design/whole building approaches.
- Consistently reviewing program theory/logic and program strategies and identifying measurable outcomes and evaluation approaches to track progress and improve program performance.

³² “The most recent evaluation of California’s Savings by Design shows that Whole Building projects save over twice as much energy per square foot than do systems projects, and they also produce a higher gross realization rate than systems projects.” – From Chapter 7 of this report.

Appendix A: ESS Project and DPD Permit Database Analysis

This appendix provides insights about ESS new commercial services based upon an analysis of ESS program and the Department of Planning and Development (DPD) building permit databases, including:

1. An overview of ESS new construction services, including incentive projects and Energy Analysis Assistance (EAA) and Commissioning services from 1998 through 2004,
2. A cost-benefit analysis using tracking system cost and energy savings data
3. A analysis of DPD commercial and institutional new construction permits from 1998 through 2004,
4. A comparison of the proportion of new commercial construction that ESS services affected during this same seven year period
5. A discussion of these findings and recommendations

This appendix includes and expands upon information provided in Chapter 3 of this report.

Methods

The SCL evaluation project manager conducted this analysis, using data from two sources:

- ✓ **The Commercial/Industrial Tracking System (CITS)** that SCL maintains for its efficiency projects. This database contains project information for over 4,000 commercial and industrial efficiency projects from 1987 to the present. The current analysis focuses on new commercial construction projects contracted or completed between 1998 and 2004. The majority (66%) of new construction energy savings was acquired during the three-year period from 2002 through 2004 under the ESS program; the remaining third of program savings were captured from 1998 through 2001 under the predecessor ESD program new construction services.
- ✓ **The City of Seattle's (DPD) database** of residential, commercial/institutional, and industrial building construction permits. The evaluation project manager worked extensively with an extract of this large database to develop a database that was a proxy for all the new construction projects that would have been eligible to participate in the SCL's new construction program between 1998 and 2004. The data used in this analysis contained all completed or active commercial, institutional buildings, and mixed-use multifamily buildings costing more the \$1 million to construct from 1998 through 2004. This excludes all non-multifamily residential structures and all expired permits.

Number and Type of Services Provided

Table 6 reveals that from 1998 through 2004 ESS provided services to a total of 170 new construction projects in 121 unique buildings. Of these 170 projects, 128 included *incentive projects* that had been completed or contracted and not yet completed (active). Energy savings

for all completed and active projects were 49.5 million kWh, with average project savings or 386,913 kWh per incentive project per year. Of the 49.5 million kWh of energy savings, 38.7 million kWh of savings were acquired in completed projects. These ESS projects affected an estimated 22.3 million square feet of building space, or an average of 184,687 square feet per participant building.³³ Energy savings were 2.22 kWh per square foot of ESS project buildings space.

Of the 128 incentive projects, 101 had been completed by the end of 2004. These completed projects acquired 38.7 million kWh in energy savings. These program energy savings are tracking system completed project savings and have been adjusted to account for avoided transmission and distribution losses (T&D kWh savings = (tracking system kWh savings) x (1.052)). Total contracted incentives for these 101 completed incentive projects were \$7.5 million and total paid incentives were \$7.3 million.

Table 6 New Construction Projects by Type of Service, 1998 - 2004

ESS Service Provided	Completed Project Count	Active Project Count	Energy Savings – Completed and Active Projects (kWh)	Energy Savings – Completed Projects Only (kWh)	Square Feet ³⁴	Contract Amount for Completed Projects ³⁵	Payment Amount for Completed Projects
Installation incentives	101	27	49,524,858	38,698,018	-	\$7,123,614	\$6,963,593
Energy Analysis Assistance	16	5		-	-	204,911	186,403
Building Commissioning	14	7		-	-	197,055	192,584
Total	131	39	49,524,858 (5.7 aMW)	38,698,018 (4.4 aMW)	22,335,078 (184,587/bl dg.)	\$7,525,580	\$7,342,580
Completed or active project and building total:			170 Projects in 121 unique buildings				

ESS also offered building commissioning and energy analysis assistance (EAA) to 42 projects in 34 unique buildings between 1998 and 2004, 30 have been completed and 12 were active at the end of 2004. Almost all projects receiving these services also receive measure incentives.³⁶ See page 81 for a more detailed presentation of commissioning and EAA services.

³³ Separate square footage values are not shown for each service type because most Building Commissioning and Energy Analysis Assistance customers also participated in incentive service projects and this would have presented a double or triple counting of square feet if the floor area were repeated in each service category.

³⁴ See footnote 1 above. Square feet include both completed and active ESS project buildings.

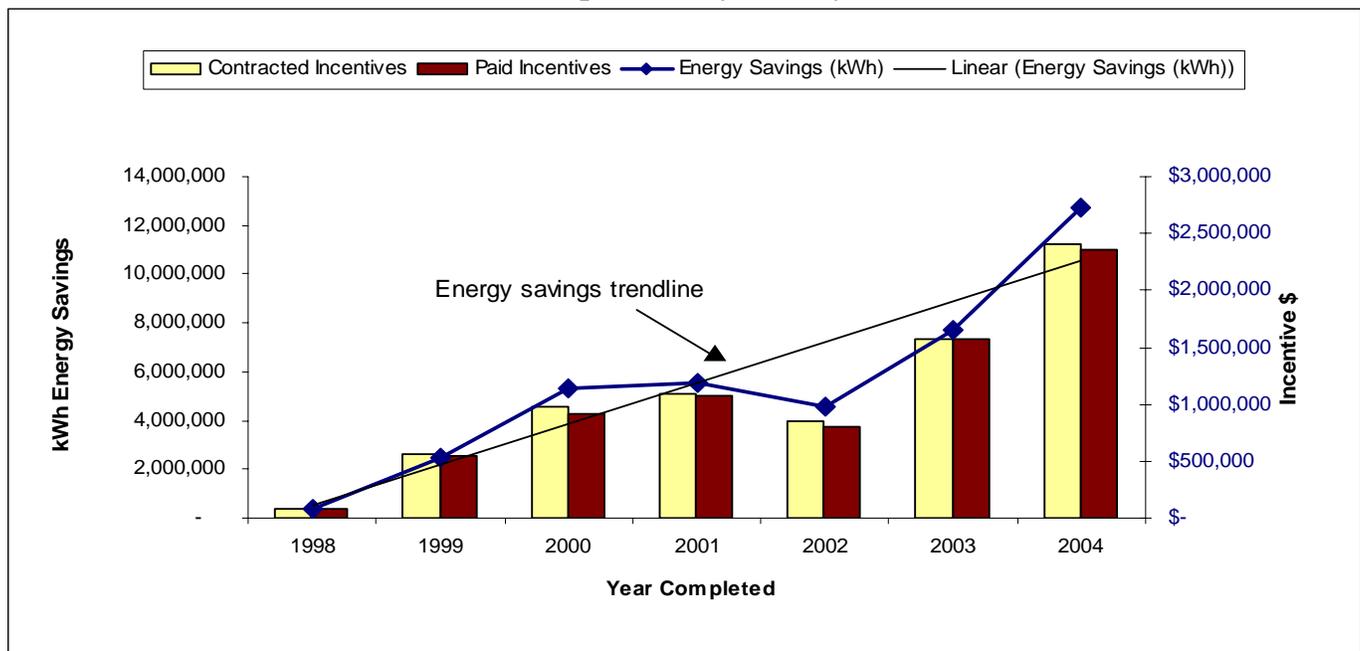
³⁵ The contract and payment amount includes only those projects that have been completed. The contracted amount for all projects, both completed and those still active was \$9,586,926.

³⁶ Of the 42 Commissioning and Energy Analysis projects, 37 (88%) were in buildings that also received incentives for the installation of energy efficient measures. Another four projects (10%) were likely to eventually apply for incentive projects.

New Construction Energy Savings and Incentives by Year

Figure 5 illustrates that the new commercial program has seen a substantial increase in the energy savings and contracted and paid incentives from 1998 through 2004, particularly in 2003 and 2004. The energy savings and incentive amount in Figure 5 include only the 131 completed projects - those still active projects were excluded. While contracted incentives and energy savings were fairly steady from 2000 to 2002; they nearly doubled in 2003 and rose to a new high in 2004. This increase during 2004 was primarily due to the “10 plus 10” incentive bonus, which paid an additional incentive to customers 20% above the standard incentive for both new and existing building owners. To qualify for this bonus offer, projects needed to be contracted by December 15th, 2004 and measures installed and inspected by July 15th, 2005.

Figure 5 ESS New Construction Energy Savings and Incentives by Year - Completed Projects Only³⁷



An update of ESS new construction projects revealed that 23 incentive projects were contracted during 2005. This is 25% above the average annual new construction project total during the preceding seven years. However, the average savings per project have decreased substantially. Estimated contracted savings including a transmission and distribution adjustment were 4.1 million kWh in 2005. These 2005 contracted savings are 42% below the average of 7.1 million kWh of energy savings per year during the previous seven-year period. This indicates that while the number of contracted projects continued to rise in 2005, the average savings per project have decreased markedly.

³⁷ The energy savings and incentives in Figure 5 include completed projects only.

Figure 6 shows that ESS new construction services touch a wide range of building types, but the majority (62%) of savings were concentrated in three types – bio-medical, office, and buildings owned and constructed by the City of Seattle. Twenty six percent of all new construction project savings were in bio-medical facilities, 24% in office buildings, and 13% in new buildings owned by the City of Seattle. Taken together, stadiums/ convention centers, educational facilities (all educational levels), and medical services (hospitals and clinics) account for another 23% of total energy savings. The remaining 14% are distributed across the other 12 building types.

Figure 6 New Consturction Energy Savings by Building Type

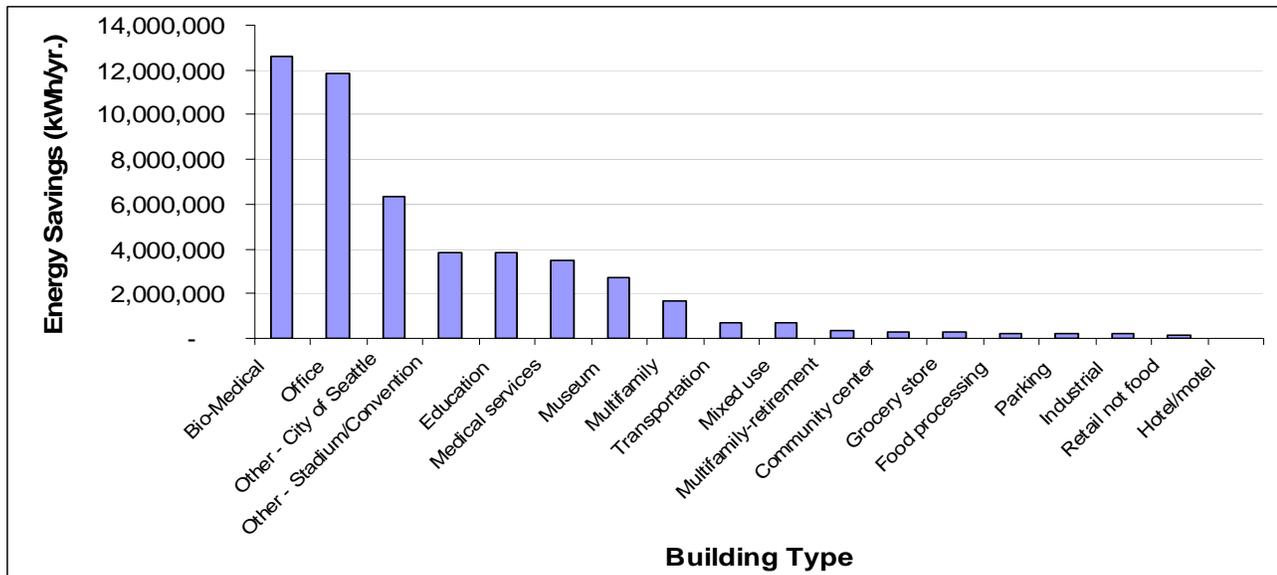


Table 7 reveals that although bio-medical facilities had the greatest share of energy savings, office buildings contributed over twice as much as bio-medical buildings on the basis of ESS program affected square footage. Biomedical facilities contribute a total of 2.9 million sq. ft., while office buildings account for 6.7 million sq. ft. of floor space. The higher energy savings in bio-medical facilities and smaller affected floor space provide a much higher level of program energy savings per square foot – 4.3 kWh savings/sq. ft. This compares to lower savings intensity in office buildings – 1.8 kWh savings/sq. ft. The higher savings rate per square foot in bio-medical buildings is most likely a result of the greater energy intensity of bio-medical laboratories compared to office buildings. Across all incentive projects and building types, the average energy savings are 2.2 kWh/sq. ft.

City of Seattle-owned buildings also contribute a large share of new construction savings over this seven-year period, with 6.3 million kWh of energy savings. Five other facility types contributed one million kWh or more in energy savings. These were, in descending order of savings: stadiums and convention centers, education (all levels), medical services, museums, and multifamily buildings.

**Table 7 Energy Savings and Incentives by Building Type, Sorted by Tracking System
Energy Savings**

Facility Type	Number of Projects – Completed and Active	<u>Contracted</u> ³⁸ Project Energy Savings (kWh)	<u>Completed</u> Project Energy Savings (kWh)	Square Feet – All Projects	Completed Project Contract Amount (\$) ³⁹	Completed Project Payment Amount (\$)
Bio-Medical	16	12,638,957	11,987,034	2,930,459	2,207,977	2,191,555
Office, not medical or educational	37	11,849,477	7,789,036	6,669,766	1,442,519	1,388,988
City of Seattle owned buildings	26	6,338,788	4,918,954	1,401,238	1,159,727	1,141,364
Stadium/Convention	9	3,862,199	3,862,199	2,220,990	715,646	715,646
Education	23	3,814,453	2,509,198	2,540,389	557,035	539,552
Medical services	11	3,452,464	3,183,974	1,225,499	646,750	584,153
Museum	7	2,742,191	1,114,984	531,794	171,902	171,857
Multifamily	7	1,686,905	1,277,734	2,035,910	239,445	237,058
Transportation (manufacturing & transit)	2	708,742	345,203	91,985	10,608	10,608
Mixed use	6	690,327	156,445	155,193	25,475	25,475
Multifamily – retirement	3	367,131	367,131	367,623	74,564	73,570
Community center	6	302,338	302,338	339,949	73,937	73,663
Grocery store	3	299,635	299,635	138,380	49,128	49,128
Food processing	3	240,267	240,601	119,993	11,078	11,078
*Parking	3	203,267	203,267	880,869	46,425	40,383
Industrial	1	187,099	NA – Active	NA	Active	Active
Retail not food	5	117,060	117,060	447,340	88,286	83,424
Hotel/motel	2	23,223	23,223	237,611	5,058	5,078
	170	49,524,858 (2.22 kWh/sf)	38,698,018	22,335,078	\$7,525,580	\$7,342,580

New Construction Energy Savings by End-use

Not surprisingly, the vast majority of energy savings and associated incentive costs in new construction projects reside in heating ventilation and air conditioning (HVAC) equipment and lighting end-uses. Together these two end-use types comprise 89% of all new construction project savings (see Figure 7 and Table 8).

Table 8 displays the number of individual end-use items, energy savings for completed and active projects, energy savings for completed projects only, and the contracted and paid incentives for completed projects. Figure 7 depicts the contracted energy savings and associated incentives for each major end-use type. The “other” end-use category; typically variable speed drives (VSD), furnace or boilers, and motors, total 7% of all contracted savings. “Power” measures are high efficiency transformers and makeup 2.5% of total energy savings. The

³⁸ These contracted savings include savings for both completed projects and those contracted, but not yet completed.

³⁹ The contracted incentive amount in Table 7 only includes completed projects. Total contracted amount including both completed and active projects is \$9,586,926.

remaining five measure types (compressed air, refrigeration, envelope, domestic water heat, and plug load devices) collectively comprise the balance of 1.2% of total energy savings by end-use.

Figure 7 Contracted Tracking System Energy Savings and Incentives by End-Use

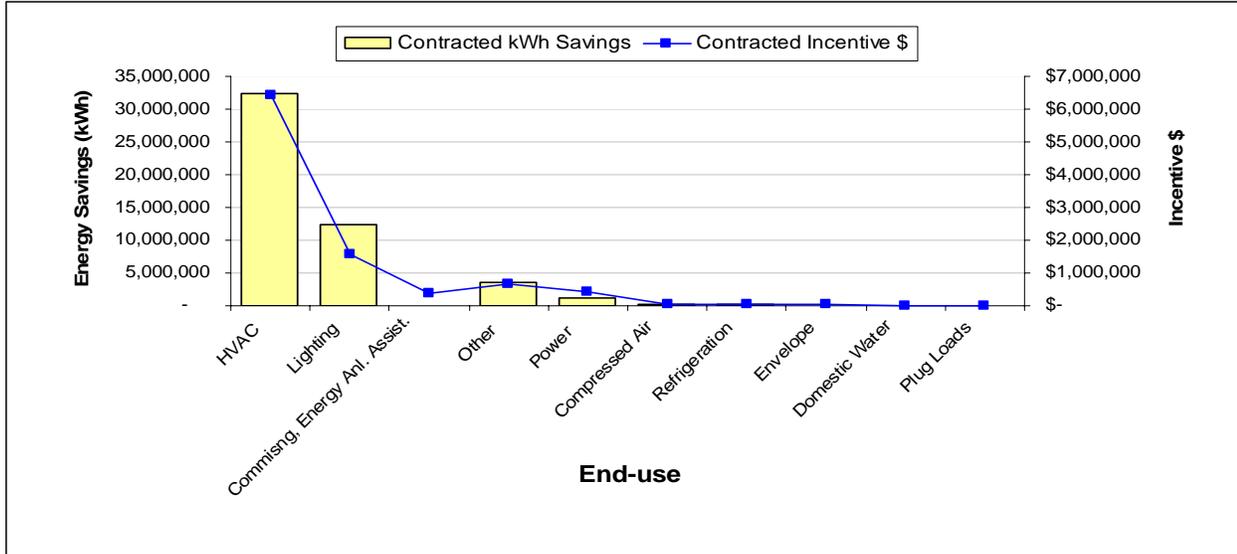


Table 8 Energy Savings and Contracted and Paid Incentives by Enduse

Enduse	# of Individual Enduse Items	Completed and Active Project Energy Savings (kWh) ⁴⁰	Completed Projects Energy Savings (kWh)	Contracted Incentives - Completed Projects ⁴¹	Incentive Payment – Completed Projects
HVAC	5,039	32,380,399	23,172,046	\$4,881,000	\$4,801,145
Lighting	105,690	12,474,267	11,065,468	\$1,385,463	\$1,381,155
Commissioning & Energy Analysis Assistance	-	-	-	\$237,361	\$218,998
Other	414	3,527,258	3,527,258	\$657,233	\$575,983
Power	209	1,254,586	1,254,586	\$277,336	\$277,336
Compressed Air	5	232,584	45,484	\$7,615	\$7,615
Refrigeration	1	219,240	219,240	\$35,220	\$35,220
Envelope	159	106,917	84,327	\$30,975	\$30,975
Domestic Water	1	12,886	12,886	\$2,817	\$2,817
Plug Loads	1	5,804	5,804	\$560	\$560
Unknown	-	-	-	\$10,000	\$10,000
Total	111,519	50,213,940	39,387,100	\$ 7,525,580	\$ 7,341,804

⁴⁰ The sum of detailed contracted savings by measure type does not agree exactly with the total contracted savings in the CITS database. Contracted savings by measure type, extracted from the “Measures” table in the CITS database, are 1.4% greater than contracted project savings at the project total level.

⁴¹ The contracted incentive amounts shown in Table 8 include only contracted incentives for completed projects and exclude incentives for active projects. Total contracted incentives for completed and active projects are \$9,586,926.

Building Commissioning and Energy Analysis Assistance Projects

ESS also provides customers with Building Commissioning (Cx) services to ensure that the energy systems within their facilities perform as they were designed and meet the owner's operational needs. In addition, Energy Analysis Assistance (EAA) provides customers with comprehensive analyses of proposed electrical energy conservation measures not covered by standard incentives.

From 1998 through 2004, 21 new construction Cx and 21 EAA projects were contracted (see Table 9). Of these 42 projects, 30 were completed and 12 remained active at the end of 2004. Although there were 42 commissioning and EAA projects, some buildings participated in both services, which reduces the number of unique participating buildings to 34.

In addition to providing the value of the service itself, both building commissioning and EAA services are used as "gateway" services to customers to encourage them to apply for incentives for the installation of standard or custom incentives. Table 10 indicates the number and percentage of new construction building Cx and EAA projects having associated incentive projects for the installation of energy conservation measures. The table illustrates that the vast majority of the owners and designers of these projects also applied for and received incentives to install conservation measures. Eighty-six percent of the building commissioning projects and 90% of EAA projects had associated incentive projects.

Table 9 New Construction Building Commissioning and Energy Analysis Assistance Services, 1998 - 2004

Service Name	Number of Cx and EAA Projects			Contracted Amount	Paid Amount (if completed)
	Completed (at end of 2004)	Active (at end of 2004)	Total		
Building Commissioning	14	7	21	\$ 262,055	\$ 192,584
Energy Analysis Assistance	16	5	21	\$ 268,600	\$186,403
Total:	30	12	42 (in 34 unique bldgs.)	\$ 530,655	\$ 378,987

Table 10 ESS Incentive Projects Associated with Participation in Building Commissioning and Energy Analysis Assistance Services, 1998 - 2004

Service Name	Number of contracted projects	Number and (%) with associated ESS incentive project(s)	Number and (%) likely to apply for ESS incentive projects (as of end of 2004)	Number and (%) not likely to apply for incentive service
Building Commissioning	21	18 (86%)	2 (10%)	1 (4%)
Energy Analysis Assistance	21	19 (90%)	2 (10%)	0 (0%)
Total:	42 projects in 34 unique bldgs.	37 (88%)	4 (10%)	1 (2%)

Of the 42 building commissioning and energy analysis assistance projects, 37 (88%) had one or more associated incentive projects. Table 11 indicates that these 37 Cx and EAA projects were associated with \$4.0 million of contracted and \$3.6 million of paid incentive projects, and accounted for an estimated 22.9 million kWh of annual savings, or 46% of all ESS new construction tracking system savings from 1998 through 2004.

Table 11 Incentive Project Energy Savings and Costs Associated with Commissioning (Cx) and Energy Analysis Assistance (EAA) Project Buildings

Number of Cx and EAA Projects	Number and (%) of Cx and EAA Projects with Associated Incentive Projects	Incentive Contracted Amount	Incentive Project Paid Amount	Energy Savings (kWh + T&D)
42	37 (88%)	\$ 4,018,795	\$ 3,638,142	22,890,881 ⁴² (46% of all ESS incentive savings)

⁴² One of these EAA projects contracted in 2004 had an associated incentive project (#11124) that was contracted in April of 2005. Although contracted outside the period of this tracking system analysis, the associated incentive costs and energy savings are included in the contracted incentive and energy savings throughout this appendix.

CITS New Construction Incremental Costs and Program Cost-Effectiveness

The purpose of this section is to:

1. Provide an estimate of the levelized cost effectiveness of the ESS new construction incentive projects at the utility, customer, and service area perspectives
2. Determine whether or not there is a disparity in the methods used to estimate incremental costs, relative to those measures where the incremental costs are known. Incremental cost is the difference between the cost of the high efficiency equipment financed through ESS and the cost of equipment that would just meet the new construction Seattle Energy Code requirements. In effect, the incremental cost is the additional cost incurred to achieve higher energy efficiency.

The reason it's important to check the accuracy of the incremental and customer share of overall measure costs is that if these incremental costs are over or underestimated, that will result in proportionately over or underestimation of the true customer, service area and total resource levelized costs. This directly impacts the cost-effectiveness of the ESS program.

Table 12 displays the total costs and energy savings for all new construction projects. Administrative costs for ESS's predecessor program Energy Smart Design (ESD) projects were estimated by multiplying the average administrative cost per ESD incentive project by the number of ESD new construction projects from 1998 through 2001. Administrative cost for ESS projects contracted since 2002 are tracked separately by the Summit financial system for new and retrofit projects under the ESS program. *Incentive costs* are the contracted financial incentives provided to the customer by City Light for the purchase and installation of ESS measures. The *utility cost* is the sum of the administrative cost and the incentive payment to the customer. *Incremental costs* are the additional measure costs incurred to exceed the energy code required efficiency and qualify to receive the ESS incentive. It's important to remember that only 9.3% of total new construction incremental costs are actual costs, the remaining majority are estimated through one of four incremental cost estimation methods (see next paragraph). A portion of the incremental cost is paid through the ESS program (*incentive cost*) to the customer and the customer pays the balance (*customer cost*). The *service area* costs are the sum of the utility and customer costs.

Table 12 Summary of Tracking System Cost and Savings Data, 1998 - 2004

Admin. Cost	Incentive Cost	Utility Cost (Admin. \$ + Incentive \$)	Actual or Estimated Incremental Cost ⁴³	Customer Cost (Incremental \$ minus Incentive \$)	Service Area Cost (Utility + Customer Cost)	Total Tracking System Energy Savings (+ T&D adjustment)
\$2,241,054	\$9,210,876	\$11,451,930	\$50,587,212	\$41,376,335	\$ 52,828,265	50,213,940 kWh

⁴³ Actual incremental costs are known in only a small percentage of new construction incentive projects. The majority of incremental costs are estimated.

The CITS database uses five methods for determining the incremental cost: 1) actual incremental cost, if known, 2) 25% of total measure cost, 3) 50% of material cost, 4) total material cost, and 5) total cost. Obviously, the most accurate method is to use the actual incremental cost; unfortunately actual incremental costs constitute only 9.2% of total incremental costs. The majority (90.8%) of incremental measure costs is calculated based on one of the other four estimation methods. This variation in methods leads to wide range of incremental costs, as shown in Table 13.

Table 13 lists the actual and estimated incremental costs for each of the five estimation methods. The sixth column of this table reveals that the ESS *incentive cost* per first-year kWh is relatively constant – ranging between 15 cents to 20 cents/kWh of energy savings for all five incremental cost estimation methods. However, this similarity in utility costs changes when looking at the *incremental costs* per kWh of savings (last column of Table 13).

The last column of Table 13 reveals that for those measures where the actual incremental costs are known, the average incremental cost is \$0.42 per first-year kWh, but this incremental cost doubles or triples for the other four incremental cost estimation strategies. Those incremental costs range from \$0.82 to as high as \$1.28 per first-year kWh. For those projects where the actual incentive cost is known, the ESS incentive is 35% of the incremental costs and the customer share is 65% of incremental cost. These cost sharing proportions are consistent with the historical ratio of incentive to total or incremental costs under the ESD program. However, for all other estimation categories the incentives are only 15% - 19% of the *estimated* incremental costs. What this means is that the estimated incremental costs, the customer share of estimated incremental cost, and the service area costs are much greater for all ESS projects using an incremental cost estimation method instead of actual incremental costs.

Table 13 ECM Incremental Cost Comparison

Incremental Cost Type	ESS Contract Incentive Cost (# of measure categories)	ESS Actual or Estimated Incremental Cost	ESS Contract Incentive as a % of Incremental Cost	Customer share of Incremental Cost	Incentive Cost Per kWh of First Year Savings	Incremental Cost Per kWh of First Year Savings
Actual Incremental Cost	\$1.6 million (86)	\$4.7 million	35%	65%	\$ 0.15	\$ 0.42
Estimated Incremental Cost:						
25% of Total Cost	\$0.7 million (25)	\$3.7 million	19%	81%	\$ 0.15	\$ 0.82
50% of Material Cost	\$1.1 million (72)	\$5.6 million	19%	81%	\$ 0.20	\$1.06
Material Cost	\$0.8 million (49)	\$4.5 million	17%	83%	\$ 0.19	\$ 1.07
Total Cost	\$5.0 million (262)	\$32.1 million	16%	84%	\$ 0.20	\$ 1.28
Total	\$9.2 million	\$50.6 million	18%	82%	\$ 0.18	\$ 1.01

Levelized cost is the average cost per kWh of savings, where the savings are present-valued over the average 15-year life of the measures, and discounted at a rate of 3% per year. The levelized costs from the *utility perspective* (incentives + administrative cost), *customer cost* (incremental cost minus ESS incentive to the customer), and *the service area perspectives* (sum of utility and customer costs) are shown in Figure 8.

Figure 8 reveals that the *utility levelized costs* vary over a relatively narrow range of \$0.15/kWh to \$0.21/kWh for all five incremental cost estimation methods. This contrasts with the average *customer levelized cost*, which doubles from \$0.23/kWh to \$0.56/kWh and nearly quadruples to \$0.090/kWh when the incremental cost is estimated to be equal to the total measure cost. Likewise, the service area levelized costs are 85% to 185% greater than those based on actual incremental costs.

Figure 9 displays the effect of applying the ratio of incentive to incremental costs for those measures with known incremental costs to all the other estimation methods where the incremental costs are not known. This was done for *illustrative purposes only*, to demonstrate what the customer and service area costs *might be* if all incremental costs were known for all new construction projects.

Figure 8 Levelized Cost by Actual and Estimated Incremental Cost

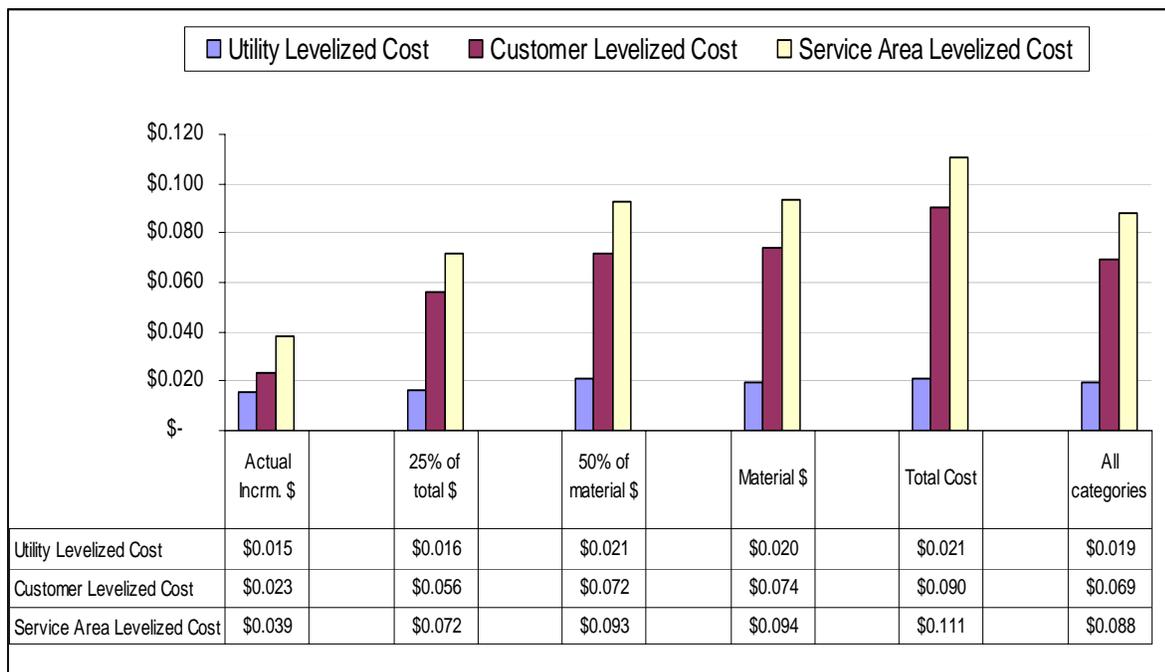
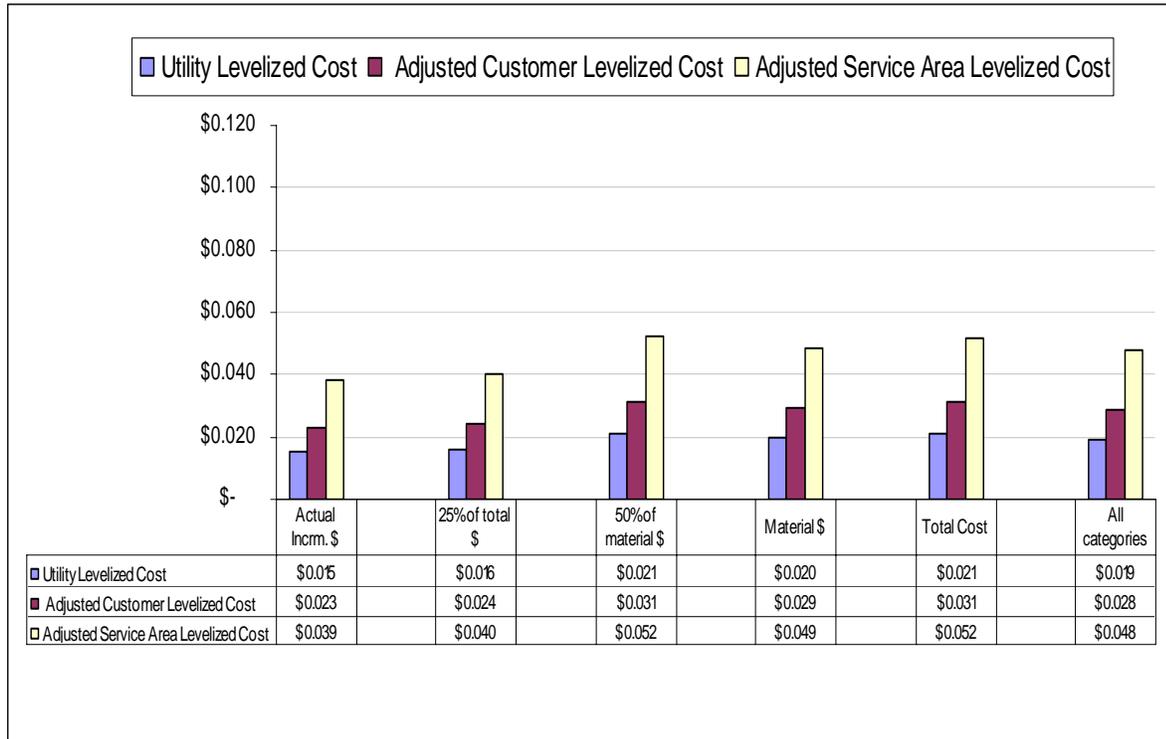


Figure 9 Adjusted Levelized Cost by Actual and Estimated Incremental Cost



To construct Figure 9 the original incentive costs for the four cost categories where the incremental costs were estimated were multiplied by the ratio of incremental-to-incentive costs for measures with known incremental costs (that ratio is: 2.8542). In other words, the incremental cost is 2.8542 times the incentive cost for those measures with actual incremental costs. This value of 2.8542 was multiplied by each incentive cost for those measures where incremental costs were estimated to yield an *adjusted incremental cost*. The effect of this adjustment is to equalize the customer and service area levelized costs for all measure and all projects to more closely resemble the levelized cost for those measures with known incremental costs.⁴⁴

The result of this adjustment reduced the average customer levelized cost from \$0.069/kWh (Fig. 8) to \$0.028/kWh (Fig. 9), and the service area costs dropped from an average of \$0.088/kWh (Fig. 4) to only \$0.048/kWh for all projects (Fig. 9).

⁴⁴ For example: Original *estimated* incremental cost = \$50,000 and the incentive cost = \$10,000. The adjusted incremental cost would be $\$10,000 \times 2.8542 = \$28,542$. The incentive would then be 35% of the adjusted incremental cost and the customer share of the adjusted incremental cost would be $\$28,542 - \$10,000 = \$18,542$, or 65% of the adjusted incremental cost. These adjusted costs now agree with those were the incremental costs are known.

DPD Permit Data – 1998 – 2004 New Construction Permit Data Analyses

This portion of the appendix will:

1. **Describe the range of recent historical new construction building permits in Seattle;** by building type, estimated construction costs, affected square feet, and type of construction (new, addition/alteration, and tenant improvement projects).
2. **Provide a baseline of commercial and institutional new construction in Seattle** to compare with completed or active ESS new construction projects over the same seven-year period (1998-2004). This will provide an indication of the relative portion of the new construction market affected by ESS services.

Methodology

The Department of Planning and Development (DPD) supplied the Evaluation Unit with an Excel™ spreadsheet containing over 25,000 permit records of all residential, commercial, industrial and institutional permits issued over the 10-year period from 1994 through 2004. All permits were deleted if issued prior to 1998 or if the permit had expired and had not been renewed. In addition, all residential permits were deleted, except those for mixed-use multifamily buildings, and all permits whose DPD-estimated construction value was below \$1 million. This latter step was taken to exclude all very small construction projects. Also, deleted from this analysis were excavation or demolition-only permits and those permits for structures outside the target market of ESS; i.e., retaining walls, communication towers, storage tanks, single-level parking lots, etc. Those permits that had expired but had been recorded as receiving a final inspection by DPD were included in the analysis. This editing narrowed the permit file down from over 25,000 permits to 4,223 permits issued from 1998 through 2004. When sorted by address the final DPD permit file contained 4,223 permits, grouped into 849 unique building addresses, or an average of five permits per structure.

Because the DPD database does not contain the new or affected square feet in their database, it was necessary to estimate the square footage from a combination of building type (“occupancy type”) and the type of construction materials used. DPD maintains a matrix of the average cost per square foot for each combination of occupancy and construction type. Once each permit’s occupancy and construction type was determined, the appropriate dollar cost per square foot from the DPD building cost matrix was divided into the DPD estimated total construction cost associated with each building to yield the estimated square feet in each building.

Building Permit Analysis

DPD Permits by Type of Construction

Table 14 lists the number of buildings, the number of permits; DPD estimated construction value, and the estimated new or affected square feet of all relevant building permits from 1998 through 2004. The term “affected square feet” is used as a general term including new building space, new space in additions to existing buildings, and modifications to existing space in remodeled and tenant improvement projects.

Note: The only “new” floor space is in new buildings and additions to existing buildings. Since many alterations and tenant improvements can occur in new buildings constructed between 1998 through 2004, some unknown fraction of the square footage in those alteration and tenant improvement categories is duplicated in the square footage listed in the new construction category.

The largest share of construction costs and floor space was for new buildings, comprising over 38 million estimated square feet over the seven-year period, or 68% total affected square feet and \$4.8 billion in DPD-estimated construction costs. The average size of each newly constructed building was 162,714 square feet and cost an average of \$20.5 million per building, or \$126 per square foot.

Table 14 DPD Commercial/Institutional Construction Value and Square Feet by Type of Construction, 1998 through 2004

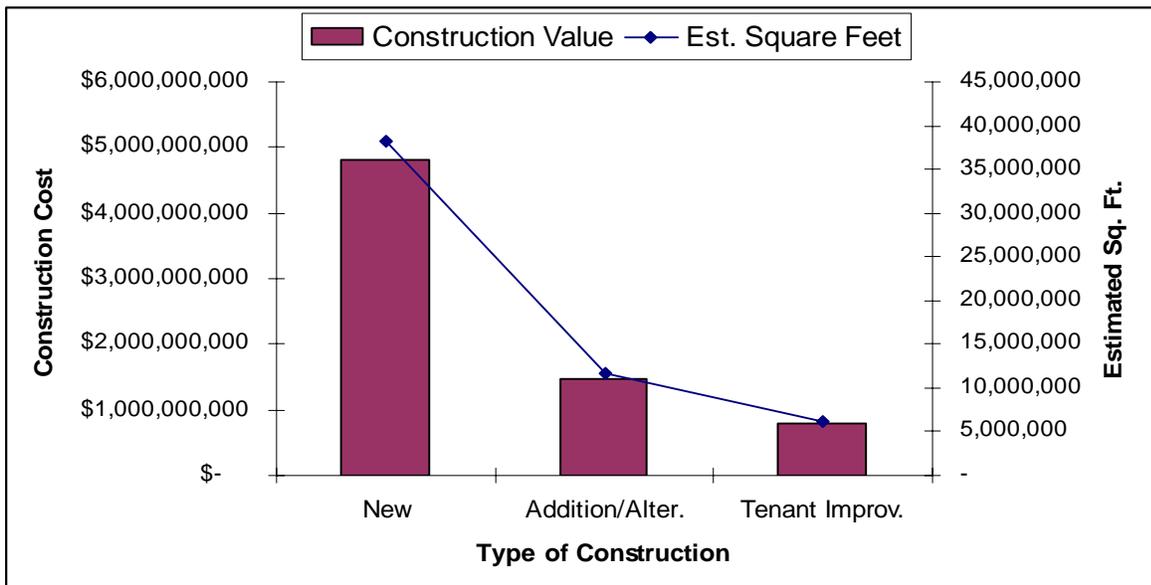
Type of Construction	Number of Buildings	Number of Permits	DPD Estimated Construction Value (Billions of \$s)	Estimated new or affected Square Feet	Average new or affected sq. ft. per building	Percent of total Square Feet ^(a)
New construction	235	606	\$4.82 billion \$20.5 million/bldg.	38,237,686	162,713	68%
Addition/ Alteration	238	842	\$1.47 billion \$6.2 million/bldg.	11,635,000	48,887	21%
Tenant Improvement	376	2,775	\$0.78 billion \$2.1 million/bldg.	6,153,192	16,365	11%
Total	849	4,223	\$7.07 billion (\$8.33 million/bldg. or \$126 per sq. ft.)	56,025,878	65,990	100%

Additions and alterations involved \$1.5 billion in estimated construction costs and 11.6 million affected square feet, or 21% of total permit floor space.⁴⁵ Tenant improvements involved the

⁴⁵ Only new buildings and additions to existing buildings contain new floor space. The term “affected square feet” refers to that unknown portion of “additions/alterations” that is not new space, but affects existing building space. Likewise, all tenant improvement space is not “new” space, but a modification of existing space.

largest number of permits and buildings of the three types of construction, but the smallest portion of total affected floor space; 6.1 million square feet, or 11% of all permitted commercial building space. This finding is consistent with the common knowledge that tenant improvement construction projects, while more numerous, tend to be relatively small in size and cost. See Figure 10 for a graph of the relative cost and size of each of these three construction categories in Seattle over this seven-year period.

**Figure 10 DPD Construction Cost and Estimated Affected Square Feet
by Type of Construction, 1998 through 2004 ⁴⁶**



DPD Permits by Type of Building

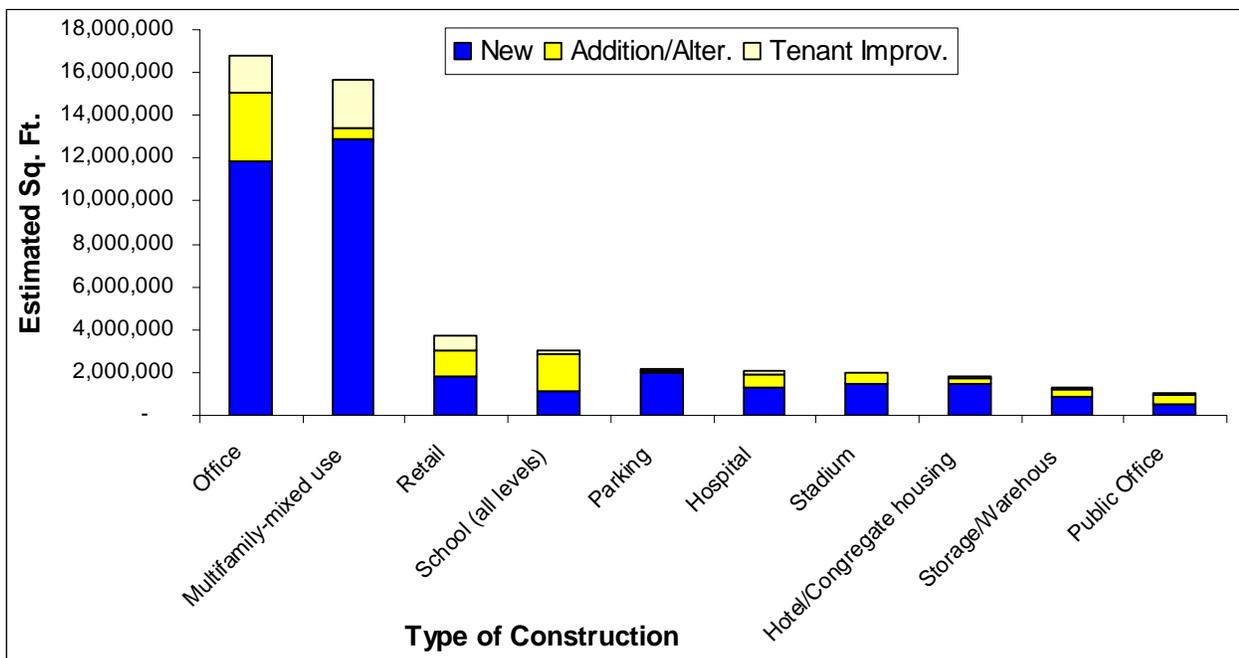
Office, mixed-use multifamily and retail buildings account for 68% of total new construction floor space and 63% of total new, addition/addition, and tenant improvement floor space (see Figure 10 and Table 15). Figure 11 gives a picture of the total square footage and construction cost of new, addition/alternation, and tenant improvement buildings by type of building for each of the top ten building types by size. The top 10 building types comprise 92% of all new construction floor space and 89% of total new, addition/alteration and tenant improvement square feet.

Table 15 provides a more detailed breakdown of building size by type of construction, across all 40 DPD building type categories.

⁴⁶ It must be remembered that some portion of alterations and tenant improvement affected space is in newly constructed buildings and that affected area would be duplicated in the new construction square footage, if those alterations and improvements were in buildings constructed during this same seven-year period.

Individually, office building construction comprises 31% of all new construction space, 27% of all addition/alteration space, and 29% of tenant improvement space. New mixed use, multifamily building construction is 34% of all new space. From the retail category down the rank-ordered list of building types, there is a substantial drop in the amount of new, altered and tenant improvement space. Retail buildings, although the third greatest contributor to total new construction space, constitutes less than 5% of new building space, 11% of all addition/altered floor space, 3% of tenant improvement construction space.

Figure 11 Square Feet of New, Addition/Alteration and Tenant Improvement DPD Construction Permits – Top Ten Largest Categories Only, 1998-2004 ⁴⁷



⁴⁷ Again, some portion of alterations and tenant improvement affected space is in newly constructed buildings and that affected area would be duplicated in the new construction square footage if those alterations and improvements were in buildings constructed during this same seven-year period.

Table 15 New and Affected Square Feet of Construction by Type of Building,

Sorted by Total Square Feet – 1998 through 2004

Rank	Building Type	Type of Construction			Total Sq. Ft.
		New Const. Sq. Ft.	Addition/Alter. Affected Sq. Ft.	Tenant Improv. Affected Sq. Ft.	
1	OFFICE	11,890,721	3,133,777	1,772,329	16,796,827
2	MULTIFAMILY (Mixed Use)	12,861,820	568,048	2,192,312	15,622,180
3	RETAIL	1,783,715	1,267,154	665,877	3,716,746
4	SCHOOL	1,121,633	1,758,616	187,812	3,068,062
5	PARKING	2,003,738	100,072	17,404	2,121,213
6	HOSPITAL	1,269,986	653,643	191,514	2,115,143
7	STADIUM	1,460,695	540,387	11,742	2,012,824
8	HOTEL/CONGREGATE HSNG.	1,479,581	267,866	101,609	1,849,056
9	STORAGE/WAREHOUSE	855,805	343,877	131,761	1,331,442
10	PUBLIC OFFICE	486,478	495,163	20,605	1,002,246
11	CONVENTION CENTER	625,060	11,314	73,324	709,698
12	RESTAURANT	170,843	293,804	171,362	636,009
13	LIBRARY	501,643	88,075	723	590,441
14	MANUFACTURING	180,345	340,189	31,296	551,831
15	UTILITY	206,837	207,869	91,254	505,960
16	TRANSPORT TERMINAL	357,659	76,200	881	434,740
17	ASSISTED CARE	0	60,367	337,453	397,820
18	COMMUNITY CENTER	270,092	45,730	3,098	318,921
19	MARINA/SHIPYARD	17,243	275,575	0	292,818
20	CONCERT HALL	0	288,008	1,315	289,323
21	PUBLIC ASSEMBLY	120,543	155,941	5,592	282,076
22	MUSEUM	180,937	32,317	4,970	218,223
23	FITNESS CENTER	53,855	146,994	13,335	214,185
24	ASSISTED CARE	161,114	1,717	8,129	170,960
25	THEATER	6,672	130,987	989	138,648
26	DAY CARE	65,422	27,732	6,930	100,084
27	CHURCH	20,213	73,425	818	94,457
28	PARK	1,599	71,114	5,953	78,665
29	PRIVATE CLUB	0	64,485	9,472	73,957
30	AUTO REPAIR	21,947	30,410	18,282	70,639
31	DORMITORY	0	10,160	56,186	66,345
32	GYMNASIUM	25,125	13,000	0	38,125
33	AUDITORIUM	0	15,858	14,066	29,924
34	MAINTENANCE	19,277	0	0	19,277
35	HAZARD	8,034	8,431	0	16,465
36	JAIL	0	10,941	2,919	13,860
37	CARGO TERMINAL	9,055	4,560	135	13,750
38	TRANSIT STATION	0	12,268	0	12,268
39	NURSING HOME	0	8,925	1,551	10,477
40	UNK	0	0	195	195
	Total	38,237,686	11,635,000	6,153,192	56,025,878

Comparison of ESS Program Participation and DPD Commercial New Construction

The purpose of this section is to describe the portion of all commercial construction in Seattle affected by the ESS new construction service. To do this, the total square footage of the 121 ESS new construction participant structures (170 projects including multiple projects at some participant buildings) was compared to the total new commercial construction square footage from the DPD database over the period 1998 through 2004.

Table 16 displays the proportion of DPD new construction permits and square footage affected by the ESS new construction services. Of the 235 newly constructed buildings over the seven-year period, 121 buildings, or 51% were affected by one or more ESS new construction services. The 22.3 million square feet of affected ESS new construction building projects were 58% of the 38.2 million square feet of new commercial building space. This demonstrates that ESS has been successful in reaching a substantial portion of Seattle's recent new construction.

**Table 16 ESS Penetration of the Commercial New Construction Market –
1998 through 2004**

COMMERCIAL NEW CONSTRUCTION (1998 – 2004)					
ESS project buildings	DPD number of buildings	% of DPD locations affected by ESS new construction projects	ESS affected project sq. ft.	DPD permit sq. ft.	% of DPD sq. ft. affected by ESS new construction projects
121 buildings (170 ESS projects)	235 buildings (606 permits)	51%	22,335,078	38,237,686	58%

CITS and DPD Permit Analysis Summary of Findings

CITS New Construction Projects (1998-2004)

- There were a total of 170 total new construction projects; including 128 incentive, 21 Cx projects, and 21 EAA projects in 121 unique buildings.
- Cumulative tracking system savings were 49.5 million kWh (5.7 aMW). These savings include a transmission and distribution adjustment of 1.052.
- \$7.3 million were paid for completed new construction projects. Contracted incentives associated with these completed incentive payments totaled \$7.5 million. A total of \$9.6 million were contracted for all projects, both completed and still active as of the end of 2004.
- ESS new construction projects affected a total of 22.3 million sq. ft. of floor area.
- ESS new construction services experienced a thirty-seven fold increase in new construction energy savings between 1998 and 2004 (1998: 5 projects and 350,316 kWh savings vs. 2004: 35 projects and 12.9 million kWh savings).

- However, an update of 2005 ESS new construction contracted projects shows that energy savings decreased from the peak years of 2003 and 2004. Estimated contracted energy savings during 2005 were 4.1 million kWh. These savings compare to an average of 7.1 million kWh of contracted energy savings per year for the previous seven-year period, or a 42% decrease.
- The vast majority of savings were in bio-medical and office facilities. Relatively large savings also occurred in stadium/convention centers, schools (all levels), medical services, museums, and mixed-use multifamily buildings.
- Eighty-nine percent of all ESS new construction savings resulted from HVAC and lighting end uses.

Commissioning and Energy Analysis Assistance Projects

- Commissioning (Cx) and Energy Analysis Assistance (EAA) projects are effective “gateway” projects that lead to or supplement existing ESS incentive projects.
- There were a total of 21 Cx and 21 EAA completed over the seven-year assessment period.
- Of these 42 Cx and EAA projects, 37 (88%) were associated with ESS incentive projects, which provided a total of 22.9 million kWh of energy savings (46% of total ESS incentive savings).

New Construction Service Cost-Effectiveness

- The average *utility levelized costs* for ESS new construction incentive projects was \$0.019/kWh.
- Average customer and service area levelized costs for those projects with actual incremental costs were \$0.023/kWh and \$0.039, respectively.
- There is a dramatic increase in customer and service area levelized costs for those measures whose incremental costs were not known, but were estimated as a percentage of material or total costs. For those projects with estimated incremental costs the average *customer cost* was \$0.069/kWh and the average *service area cost* was \$0.088/kWh, two to three times greater than those projects with actual incremental costs.
- By adjusting all incremental costs to be equal to those measures where the actual incremental costs are known, the average *adjusted customer levelized cost* decreased 59% to \$0.028/kWh and *average adjusted service area costs* declined 47% to \$0.047/kWh. This adjustment is done for illustrative purposes only, to call attention to the fact that if a larger proportion of incremental costs were known, there could be a significant reduction in average program customer and service area levelized costs.

DPD New Construction Permit Analysis

- A total of 235 new commercial and mixed-use multifamily buildings were constructed in Seattle over the period 1998-2004. An additional 238 buildings had additions or alterations and 376 buildings had one or more tenant improvements

- A total of 56.03 million sq. ft. of space was permitted by DPD during this seven-year period. Sixty-eight percent of this space was new construction; additions or alterations affected 21% of this total space, and the remaining 11% of the affected space was in tenant improvement projects. However, it must be mentioned that some unknown portion of the alteration and tenant improvement affected floor area was in new buildings that were built over the same seven-year period, and was therefore duplicated in the new construction floor space.
- The ten largest building types account for 89% of all new, addition/alteration and tenant improvement space. The largest share of new construction was in office (31%) and mixed-use multifamily buildings (34%). The remaining 35% of new construction was spread in relatively small amounts across 38 different types of buildings.
- The building types having the largest share of addition/alteration building permits were; office (27%), schools (15%, all levels), retail (11%), hospitals (6%), and mixed-use multifamily (5%).
- The majority of tenant improvements was in mixed-use multifamily, office, retail, and assisted living facilities.

Market Penetration: Comparison of ESS Program Participation and DPD Commercial New Construction

- **58% market penetration:** Of the 38.2 million sq. ft. of permitted new construction floor space, 22.3 million sq. ft. (58%) were affected by ESS incentive projects.
- Affected ESS new construction floor space was 45% of total DPD new, addition and alteration floor space.

Discussion and Recommendations

ESS New Construction Energy Savings by End Use

Table 8 and Figure 7 listed the achieved new construction project energy savings by end use. The majority (89%) of savings was in HVAC and lighting measures. All other end use savings were only 11% of total savings. This suggests that there may be additional cost-effective savings in non-HVAC and non-lighting measures that could be tapped in new buildings to increase savings acquisition.

Part of the Integrated Resource Plan (IRP) City Light is currently engaged in includes a Conservation Potentials Assessment (CPA) to estimate the remaining, cost-effective conservation potential in our service area. This conservation potential will likely include estimates of the achievable cost-effective conservation for both retrofit and new construction (“lost opportunity”), by end use. The output of the CPA should provide guidance that could be used to pursue cost-effective savings in other end-uses besides lighting and HVAC.

In addition, ESS may be able to acquire more energy savings through greater emphasis on whole building options and integrated design. This is especially the case in larger new building projects and projects where City Light can collaborate with NEEA’s new construction programs; for

example, the Commercial Sector Initiative, Better Bricks, and NEEA's proposed Integrated Design Lab in Seattle.

Recommendation 1: In the course of examining the conservation potential assessment when it is completed in 2006 (and subsequent IRP reports), the C/I Section should look for potential cost-effective savings, not only in the major end-uses of lighting and HVAC, but also in other end uses that have received relatively little emphasis in ESS. Of course, this will have to be weighed against the needs of ESS participants and the goals and resources of the C/I Section.

Incremental Costs and ESS Cost-Effectiveness

Figure 8 showed that the *utility levelized costs* vary over a relatively narrow range of \$0.15/kWh to \$0.21/kWh across all five incremental cost estimation methods and are consistent with historical commercial program cost-effectiveness levels. Also, when the incremental costs are known, the customer and service area levelized costs are also at reasonable levels. However, the average *customer levelized cost* jumps from \$0.23/kWh when based on actual levelized costs to a range of \$0.56/kWh to \$0.090/kWh when the incremental costs are *not* known, but estimated as a portion of total or material costs. Likewise, the *service area levelized costs* for those measures with estimated incremental costs are 85% to 185% greater than those based on actual incremental costs.

This finding indicates that unless efforts are made to understand why the *estimated* incremental cost estimates are so high relative to those measures where the *actual* incremental costs are known; ESS customer, service area, and total resource cost-effectiveness will be inaccurately high. This will have negative impacts on the ESS program's overall cost-effectiveness.

Recommendation 2: Efforts should be made to determine why the estimated (not actual) incremental cost estimation methods lead to substantially higher incremental costs, and consequently cause the customer and service area levelized costs to be much greater than those projects where the incremental costs are known. Other approaches to estimate incremental costs should be explored to find more realistic incremental cost estimates.

Need for Square Footage Estimates

Only a third of new construction projects over the seven-year analysis period had the building's square footage recorded in CITS; the remaining project square feet estimates had to be gathered from EMA's and the King County Tax Assessors database. However, during 2005 the proportion of all new construction projects having square footage estimates in CITS has grown substantially.

Square footage data is needed to calculate project building's energy use intensity (EUI) and ESS energy savings per square foot. ESS project square feet can also be compared to the estimated square feet from the DPD database over comparable periods of time to assess the proportion of new non-residential building area that is being affected by ESS new construction services.

Recommendation 3: Establish a requirement that the square footage of ESS project buildings be recorded in CITS - both new buildings and the affected sq. ft. in retrofit buildings. Where available, it would be of value to include both the gross square feet and conditioned square feet of each ESS project building.

Recommendation 4: Continue to encourage DPD to add a square footage field to their permit database to record the area of new construction and additions to existing buildings and the affected square footage of alteration and tenant improvement permits. This will reduce the time and effort needed to derive DPD permit square footage through the current laborious process. Having readily available DPD estimates of new building square footage would simplify the calculation of the penetration of ESS into the total new construction building area. Care would have to be taken to minimize duplication of square footage estimates in the DPD database for buildings with multiple permits.

Need to Update the DPD New Construction Database Extract

This analysis of the DPD permit database provided a useful analysis of new construction, addition/alteration, and tenant improvement activity in Seattle. That analysis was essential to compare the proportion of the estimated square footage of DPD-permitted new construction affected by ESS new construction services.

Recommendation 5: Every six-months or annually, DPD should be asked to provide a similar extract of permit data to be edited and appended to the existing DPD permit file by the Evaluation Unit. This would provide a reasonably up-to-date benchmark to compare with ESS new construction project activity and to identify trends in nonresidential construction.

Need to Distinguish between New Construction Categories

CITS currently groups all commercial projects into one of two categories: “new construction commercial” or “retrofit commercial.” There is no way from the tracking system itself to distinguish between new buildings, additions or alterations to existing buildings, or tenant improvement ESS projects. This makes it difficult to compare the relative portion of each of these construction types affected by ESS.

Recommendation 6: Consider adding a field to CITS which would label each ESS project as one of four types: 1) new construction, 2) addition, 3) alteration, or 4) tenant improvement.⁴⁸ This will allow more direct comparisons of CITS and DPD permit data by type of construction.

Recommendation 7: Encourage DPD to divide their current “addition/alteration” construction type category into two separate categories: 1) addition and 2) alteration. This will allow for

⁴⁸ Alterations and tenant improvements can sometimes be used interchangeably. An alternative would be to use only three construction types: 1) new, 2) addition, 3) alteration; or 1) new, 2) addition, or 3) tenant improvement.

more accurate comparisons of ESS project and DPD permit activity by type of construction and make it possible to determine what portion of permitted buildings may be eligible for new construction services or retrofit services.

Need to Develop A Common Facility Use Classification

Having a more broadly accepted and uniform commercial and industrial building or business type classification system incorporated in City Light’s billing system and CITS would be of great value in planning and directing our ESS program resources. City Light is beginning a long-term commitment to integrated resource planning (IRP) and the conservation potential assessment (CPA). Both of these planning processes would benefit if City Light’s billing system and CITS used a common set of building/business types.

Because SIC codes in our billing system are old and incomplete and CITS contains its own unique facility types, there is no common method of comparing CITS project savings data, historical and forecasted load and forecasted conservation potential within a uniform set of building and business types. If the billing system and CITS were eventually modified to include a common building/business classification system, it would facilitate breaking out 1) load and demand, 2) load forecasts, 3) achieved ESS energy savings, and 4) forecasts of the remaining technical and achievable conservation potential by a uniform set of business types.

The CITS database currently labels participants on the basis of the type of building using the “facility use” variable. This field contains the twenty-three building use types shown in Table 17.

Table 17 CITS Facility Types

CITS Facility Types	CITS Facility Types (contd.)
<ol style="list-style-type: none"> 1. Cement (manufacturing) 2. Church 3. Commercial Bio-Medical 4. Education 5. Food (restaurants) 6. Food Processing 7. Glass (manufacturing) 8. Grocery store 9. Hotel/motel 10. Medical services 11. Metals 12. Mixed use 13. Multifamily 	<ol style="list-style-type: none"> 14. Office, not medical or educational 15. Other 16. Other-commercial 17. Other-Industrial 18. Parking 19. Retail, not food 20. Sewer treatment and pumping 21. Street lights 22. Transportation manufacturing (ground, water and air transport and manufacturing) 23. Warehouse

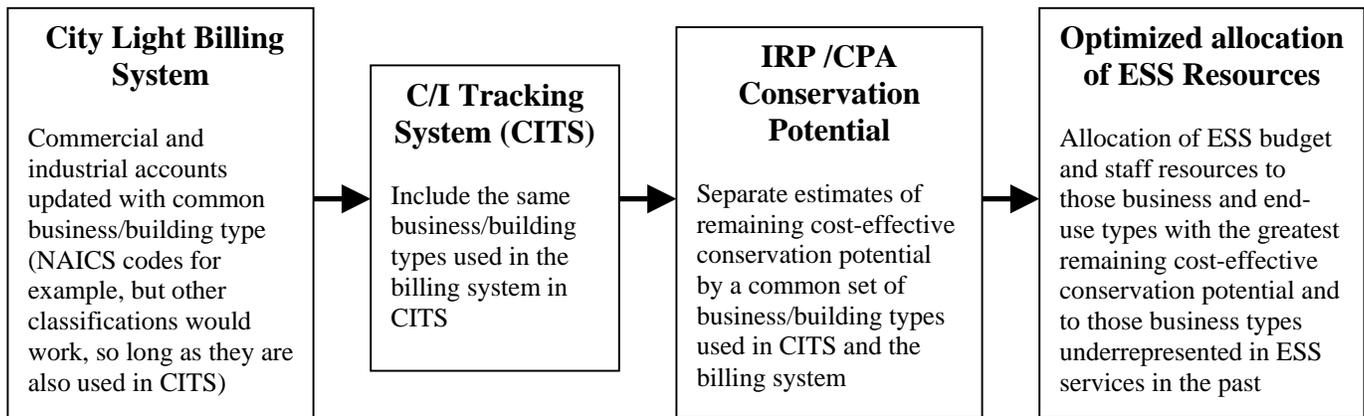
These facility use types are a reasonably comprehensive list of commercial/industrial/institutional business types. But they are a standalone set of categories that aren’t used in City

Light’s billing system or load forecasting systems. If City Light adopted a common business classification method it would be a valuable tool in identifying and directing ESS marketing to those business types, both new and existing, that have relatively high remaining energy savings potentials, or have received relatively little ESS attention in the past. Figure 12 provides a schematic of how this could be used in the CPA process as an additional tool to guide ESS resource allocation.

Recommendation 8: City Light management should move toward the adoption of a common set of commercial, industrial, and institutional building/business type categories to be used in the billing system, CITS and other City Light tracking systems and databases where customer and service information is maintained. Whatever system is chosen should be comprehensive and kept up to date. This is a long-term goal.⁴⁹

Figure 12 is a diagram of how a common building or business classification method can be used to link City Light’s billing system and CITS and IRP/CPA processes to provide Commercial/Industrial Section management and staff with information to target those business types having greater remaining cost-effective energy savings potential.

Figure 12 Value of Adopting a Common Business Classification System in Billing System, CITS, and Integratrated Resource Planning



A complete cross-referenced list of SIC and NAICS business type codes can be found the U.S. Bureau of Census website at:

<http://www.census.gov/epcd/naics02/N02TOS87.HTM>

⁴⁹ The current commercial/industrial classification system is the North American Industrial Classification System (NAICS). NAICS could be the model to follow, as NAICS is used by the U.S Department of Commerce, the U.S. Department of Energy, and the Energy Information Administration. Or a more simplified but comprehensive classification system could be adopted. What’s important is the whatever method is chosen it should be used in CITS and SCL’s billing system to provide a common set of business types to group energy use, customer bill amounts, energy program savings and conservation potential data.

Appendix B: Process Evaluation Interview Guides

Internal interview Guide – ESS C/I New Construction

Name _____ Phone _____

E-Mail _____

Notes: _____

Introduction

[Notes: When interviews are arranged, the interviewer will explain study purposes and obtain permission to tape the interviews. The questions in this interview are intended to guide the conversation and will not be delivered verbatim.]

These acronyms indicate which questions are to be asked to various respondent types::

- New commercial team management and staff = **NCT or specific individuals**
- Account Executive manager and staff = **AE**
- Department of Planning and Development staff = **DPD**
- Sustainability Coordinator = **SC**

ALL: Today I want to talk with you about various aspects of the Seattle City Light’s Energy Smart Services new construction services for commercial buildings. As you know, I’m a member of the process evaluation team. Our job is to find out – from various people involved in delivering new commercial construction services – how well these services are operating – what is going well, what are the current issues and challenges, and what improvements might be made. We particularly want to collect “lessons learned” from your experiences so far.

Later, we’ll be interviewing samples of ESS new construction participants and non-participants. We’ll combine the results of the staff and customer interviews with the results from recent commercial new construction efficiency studies, including best practices, to provide feedback to you and present recommendations to improve ESS services to the new construction sector.

I also want you to know this interview is confidential. By the way, if I ask you about areas you don’t know about, please feel free to tell me and we will move on. Do you have any questions before we start?

First, I’d like to know a little about your background.

8. **(All)** Could you give me your job title, briefly describe your job (or role in the C/I section as applicable), and tell me how long you’ve been in this position?
9. **(All)** Could you briefly describe your background and how it led to this job?

(NCT Continue; DPD and AE go to Section F)

A. Program History and Design (ALL NCT)

Now I want to ask you about the new construction services intent and design.

10. **(Shaffer & Maadanian only)** Part of our charge is to characterize the history of new construction services. Could you give me a brief history of Seattle City Light's Energy Smart Services (ESS) to the commercial new construction sector?
 - When were commercial new construction services first provided and how have they evolved over time?
 - Are there others I should talk with about the history of these services or written sources I should consult?
11. Please help me define the types of projects that fall under new construction services. What eligibility criteria are used for each type?
 - New buildings
 - Additions to existing buildings
 - Renovations/alternations to existing buildings
 - Tenant improvements (Probe: Are all TIs eligible for new construction services or just those in new buildings?)
 - Other?
12. What are the target markets for new construction services?
 - Are there any established ranges of building types and sizes in this target group?
 - What is your sense of the size of the target market?
 - Have target markets changed over time? Why?
 - Should the target markets be defined any differently?
 - What is SCL trying to accomplish with its commercial new construction services?
 - Would you say the primary focus of the new construction services is to acquire energy savings, transform the market, or both? If both, how do these goals conflict or work together?
 - What barriers in the marketplace are these services trying to overcome?
 - What benchmarks or indicators are used to assess how well the new construction services are progressing?
 - How well are these indicators currently being met? Why or why not?

- **(Shaffer only)** Does the C/I Section have any annual goal or expectations regarding the number of new construction projects and energy savings? If so, how are these goals set?

B. Outreach And Lead Tracking (All NCT)

Now I'd like to talk with you about outreach and marketing.

13. What are all the types of marketing and outreach that are done for new construction projects?
14. When is the best time to reach new construction projects?
15. What are the most effective tools for reaching customers at this time? Why?
16. Which are less effective? Why?
17. Does effectiveness vary by type of project, market actors etc? If so, how?
18. What happens when a potential customer contacts SCL about assistance with an energy saving possibilities in new construction project?
19. Are you getting the types of projects you want?
20. How can outreach efforts or initial customer handling be improved?

▪ (Shaffer, Maadanian, & Roberts only)

- We know that you proactively search out project leads (e.g. developers, A&E firms, contractors, DPD, Daily Journal of Commerce). How does this work? How many leads to you have at one point in time? How do you keep track of these leads?
 - What sources/methods have you found to be most effective in generating leads?
 - What methods are less effective?
 - How could these lead generating efforts be improved?
17. Once you have a new construction project lead, how is that lead tracked over time until it either becomes a participant or until it is no longer viable?
 - How effective are the methods used to track project leads? Why/why not?
 - What improvements can be made to developing and tracking project leads?

C. Customer Motivations And Barriers (All NCT)

Now I'd like to ask you about what you hear from customers about new construction services.

18. What do customers tell you about the reasons they decided to participate in new construction services?
 - What do you think are their top motivations?
 - Do these motivations vary by type of participant – e.g., developer, owner, or architect?
 - Do these motivations vary by type of service – Energy analysis assistance, standard incentives, and custom incentives, building commissioning
 - Do you think customer motivations change at all as they progress through the program?
19. What are the biggest challenges or barriers to customers that deter them from participating in new construction and tenant improvement services?
20. What do you know about customers who begin participating but “drop out?” (e.g., how many, why do they drop out?)

D. Project Coordination and process (ALL NCT)

21. How do you work with DPD regarding new construction and tenant improvement projects?
 - How effective are these working relationships? Why/Why not?
 - How can they be improved and how might this improve the awareness and delivery of new construction projects?
22. How do you work with SCL Account Executives regarding new construction and tenant improvement projects? Please tell me about both formal and informal channels of communication.
 - How effective are these working relationships? Why/Why not?
 - How can they be improved and how might this improve the awareness and delivery of new construction projects?
23. (**Shaffer, Maadani, & Roberts only**) Please help me create an accurate flow chart for how projects can progress through the new construction services process and tell me what happens in each step. (Note: We will develop an initial flow chart for these respondents to review and correct. Updated information will be incorporated into subsequent interviews.)
 - Do most projects fall into one path, or can projects take multiple paths?
24. Now I want to ask your views about the project flow through the program and how well each step works. **Step 1. Application:** First there’s the application process, is that correct? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)
 - Does the application step vary by type of service such as Standard Incentives and Custom Incentives, Commissioning, and Energy Analysis Assistance?
 - What kind of screening is done at this point?
 - Are there any improvements that need to be made to this part of the process?

25. **Step 2. Contract request form:** Then the customer must submit a Contract Request Form, correct? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)
- Does this step vary by type of service?
 - Do you suggest any improvements to this step?
26. **Step 3. Estimate of energy savings:** The next step is for a Trade Ally or Seattle City Light Energy Management Analyst to prepare an Energy Savings Estimate, correct? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)
- Does it vary by type of service?
 - Do you suggest any improvements to this step?
27. **Step 4. Preparation and selection of bid(s).** How about the preparation of bids? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)
- (**Shaffer only**) How involved are you in reviewing issues with the bidding process?
 - (**Other NCT**) How involved are you/your staff in initiating and following through on the bidding process, or does the customer and Trade Ally typically develop the bid or bids between themselves and submit the selected result to you?
 - Does this vary by type of service?
 - Do you suggest any improvements to this step?
28. **Step 5. SCL Project Review:** Then an EMA reviews the savings and funding calculations and City Light issues a contract, correct? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)
- Does contracting vary by type of service?
 - Do you suggest any improvements to project review and developing the contract?
29. **Step 6. Contract Execution:** What about contract execution? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)
- Do any issues emerge during contract execution? Do contracts vary by type of service?
 - Do most measures that look good from the utility point of view get into the contract? Why or why not?
 - Are there circumstances under which contracts must be changed? What happens then?
 - Do you suggest any improvements to contract execution or to how contracts are amended?
30. **Step 7. Inspection and payment:** The last step I have is inspection and payment. Once installation is complete, the customer schedules an inspection and submits invoices for payment, correct? (**For Shaffer, Maadani, Roberts only:** What happens in this step?)

- What customer contact, if any, occurs between contract execution and the request for inspection?
 - Do most measures in the contract actually get installed?
 - Why might some measures not be installed? Are there types of measures that are more likely not to be installed?
 - Do you suggest any improvements to the inspection and payment processing steps?
31. The contract requires customers to operate and maintain the equipment over its service life.
- How well does this requirement work? Why/Why not?
 - Do you suggest any improvements to ensure this requirement is met?
32. Some projects include commissioning.
- How well does this process work? Why/Why not?
 - Do you suggest any improvements for the commissioning service?
33. Looking back over all the parts of the coordination and participation process that we've been talking about, how effective is the process overall? Why/why not?
- What are the key improvements that need to be made?

E. Program Administration (ALL NCT)

34. (**Shaffer, Maadani** only) Overall, how many new construction projects does the NCT staff collectively handle at any one point in time or does it vary quite a bit?
35. How many projects do individual members of the NCT typically handle at one time? How are projects assigned?
- Are there any issues with the flow or volume of projects? If so, what creates these problems and how can they be resolved?
36. Has the participation rate matched program expectations? Why or why not?
- What are some of the factors that are outside your control that affect new construction participation?
37. How is the Commercial/Industrial Tracking System (CITS) used to monitor NC project progress and spot delays in progress?
- How effective is the CITS reporting? Is CITS flexible enough to produce unique reports as needed?
 - Are you aware of any reporting issues that need to be resolved? How would you suggest resolving them?

38. Besides the tracking of projects in the Commercial/Industrial Tracking System (CITS), are there any other informal tracking mechanisms used to track the progress of participating projects.
- What is tracked and who does it?
 - How effective are these informal, non-CITS tracking mechanisms?
 - Are you aware of any tracking issues that need to be resolved and how would you suggest resolving them?
39. How do you obtain feedback from participants (A&E firms, owners, other decision-makers, vendors etc)? Are these mechanisms effective? Does the feedback get disseminated?
40. What additional information or feedback would you like to have from past participants in the program? From non-participants?
41. How do you communicate any changes in your services to your target markets? How well does this work?

F. DPD And Account Executives (DPD, AE, SC Only)

47. What do you think SCL's new construction services are trying to accomplish?
48. What are your perceptions about how effectively SCL new construction services are marketed to customers?
49. What impressions do you have about the value of ESS new construction services to customers?
- What motivates customers to participate?
 - What barriers to participation do customers encounter?
45. How do you work, both formally and informally, with SCL new construction services managers and staff? (Probe relationship with LEED services.)
- How effective are these working relationships? Why/Why not?
46. **(SC Only)** How do you work with the Account Executives Division?
- How effective are these working relationships? Why/Why not?
47. How does **(DPD) (AE) (SC)** support SCL's new construction efficiency services?
48. In turn, how does SCL's new construction team support the work of **(DPD) (AE) (SC)**?
49. How can coordination or procedures be improved so that your efforts and those of SCL's new construction team can be made more mutually beneficial?

G. Conclusions (ALL)

I have just a few final questions to ask about SCL's new construction services..

50. The first one is about the Seattle Energy Code. In your opinion, what has been the impact of the current Seattle Energy Code on new construction projects generally?
 - What has been the impact of the current energy code on developers, owners, and A&E firm's willingness to go beyond code requirements and apply for ESS new construction services?
51. Overall, how well do you think new construction services adapt to new issues or concerns?
52. What would you say are the greatest strengths of the SCL's new construction services?
53. Are there any improvements that you would like to see made to new construction services such as providing additional services, using different outreach mechanisms, or changing the requirements for participation?
54. What is needed to make these improvements?
55. Is there anything else about new construction services that we have not discussed that you feel should be mentioned?

Thank you so much for your time and insights.

Participant Interview Guide – ESS C/I New Construction

Name: _____

Title: _____

Firm: _____

Phone: _____

E-mail: _____

Date called	Results/Notes, including time/date/location for interview

Introduction

[Notes: When interviews are arranged, the interviewer will explain study purposes and obtain permission to tape the interviews. The questions in this interview are intended to guide the conversation and will not be delivered verbatim.]

Today I want to talk with you about Seattle City Light’s Energy Smart Services for new commercial buildings. As you know, I’m a member of a team that has been hired to evaluate these services. I’m going to be asking you a series of questions that will help us provide clear feedback to City Light about how well its new construction services are working and to convey suggestions to improve services..

I also want you to know this interview is confidential. This means that all your comments will remain anonymous and your responses to our questions will not be associated with your name and company. By the way, if I ask you about areas you don’t know about, please feel free to tell me and we will move on. Do you have any questions before we start?

If needed: Here are the contacts if you have any questions about the study.

- John Roberts 206 684 3761
- Jean Shaffer 206 684 3747

BACKGROUND

First, I’d like to know a little about your background.

1. Could you give me your job title, tell me how long you’ve been in this position, and briefly describe your responsibilities?

GENERAL AWARENESS

Now I’d like to ask you some general questions about City Light’s commercial new construction services.

2. What do you think SCL is trying to accomplish through its Energy Smart Services for new commercial construction?

3. How did you first find out about these services? (circle all that apply)

- 1 Contractor or vendor -- specify _____
- 2 A&E firm

- 3 Business or professional publication
- 4 SCL mailing or brochure
- 5 SCL Website
- 6 Telephone call to SCL
- 7 SCL staff person
- 8 Trade show
- 9 SCL sponsored event (e.g., such as a lunch meeting or presentation at their offices)
- 10 Participant in other SCL program
- 11 Other _____

4. Could you tell me anything about Seattle City Light's Energy Smart new construction services that particularly caught your attention when you first found out about them?

5. After finding out about SCL's new construction services, how did you become more familiar with the services? How clear were the service options that were available to you? Do you have any suggestions for improving the clarity of the services being offered?

6. City Light offers a variety of efficiency services for new construction and major remodels of commercial buildings. Which of the following services are you aware of at this point? (read list, circle all that apply)

- 1 Financial incentives for installing lighting and controls
- 2 Financial incentives for installing high efficiency HVAC equipment
- 3 Financial incentives for installing custom efficiency measures
- 4 Energy analysis assistance, which provides financial support for professional engineering services to research and evaluate various building system designs in terms of energy efficiency
- 5 Building commissioning support and funding
- 6 Lighting Design Lab training and support
- 7 Assistance for LEED certification for sustainable new buildings (includes financial grants)

PROJECT BACKGROUND

For the next series of questions, I'd like you to think in terms of the **XXX project**. I'd like to double-check some information I already have and then add to it, so that I can better understand the context in which decisions were made.

7. Please tell me (let me double-check) about some characteristics of the _____(project):

- Size: square feet and floors
- Building type/primary occupancy and use
- Leased or owner occupied (or mix of both)
- Approximate construction cost per square foot

- Unique building features
8. How did this project come about (who was involved, reasons it got started, investor/developer goals, etc.)?
 9. What were the key design goals or issues for this project?
 10. What were some of the key decisions or turning points in the project that shaped the building's final design and construction.? As an owner/designer, how were you involved in these decisions? Who was involved in these decisions?
 11. What motivated the development of a more energy efficient/green building? How important was this? How did you make decisions about which energy efficient/green features to include?

MOTIVATIONS TO PARTICIPATE

My next questions ask about your decision to make use of Seattle City Light's Energy Smart new construction services for the project we've been discussing.

12. At what point in the design process was the decision made to use City Light's Energy Smart Services for new commercial construction projects?

- 1 conceptual design
- 2 schematic design
- 3 design development
- 4 construction drawings
- 5 other _____

13. Who decided whether this project would use Energy Smart Services? (Probes: Who recommended, who influenced, who gave final approval?)
14. What were the key reasons for deciding to participate in the program?
15. To what extent do you think the energy code has any impact on developers, owners, and A&E firm's willingness to go beyond code requirements and apply for ESS new construction services?
16. Was there anything that caused questions or concerns about participating in the SCL Energy Smart new construction program? (barriers)

SERVICE DELIVERY

Now I would like to ask you about the delivery of Energy Smart commercial new construction services, again focusing on XXX project.

17. **Application:** First I am interested in the application for new construction services. Who completed this application? How satisfied were you with this part of the process? Why? Do you have any improvements to suggest for this step in participating?
18. **[For projects that included Energy Analysis Assistance]** This project received support and incentives from SCL for energy analysis services – professional engineering services that examined the energy efficiency of proposed systems in your building. How useful was this service? Why/Why not? Do you have any improvements to suggest for energy analysis services?
19. **Estimate of energy savings and measure costs:** Another part of the participation process is for a Trade Ally or Seattle City Light Energy Management Analyst to prepare an energy savings estimate and then to determine costs (bids) for the measures. How satisfied were you with this part of the process? Why? Do you have any improvements to suggest for this step in this process?
20. **SCL Project Review and Contract Execution:** Once the savings and funding calculations are prepared, a SCL Energy Management Analyst reviews them and City Light issues a contract. How satisfied were you with this part of the process? Why? Do you have any improvements to suggest for this step in the process?
21. **[For projects that included commissioning services for SCL]** You received support and incentives from SCL for building commissioning. How useful was this service? Why/Why not? Do you have any improvements to suggest for the commissioning service?
22. **Inspection and payment:** Once installation is complete, the customer schedules an inspection and submits invoices for payment? How satisfied were you with this part of the process? Why? Do you have any improvements to suggest for this step in the process?
23. The contract requires customers to operate and maintain the equipment over its service life. Do you have any comments about this requirement?
24. Thinking over the process and services you received from SCL, how well did the Energy Smart New Construction Program process fit into your development and construction process? What parts of the process worked well with your development and construction process? What could be done to improve how the program works with your development/construction process?

BENEFITS AND OUTCOMES

Now I would like to ask you about the benefits and outcomes from the services you received from Seattle City Light.

25. What were (have been) the primary benefits from using Seattle City Light's new commercial construction services? What was (has been) the most valuable benefit?
Probe with these if not mentioned:
- Improved lighting
 - Improved occupant comfort
 - Improved occupant productivity
 - Improved property market value (and/or attractiveness to buyers or tenants if building is built to sell or lease)
 - Reduce building operating costs
 - Reduced payback time
 - Lower tenant costs
 - The added value of SCL technical assistance
 - Protect the environment
26. How did the City Light's services add value to the design process for this building? How did it influence the design process?
27. How do you think your experience with Energy Smart Services will influence future building projects you are involved with?
28. [If involved with more than one project:] Since you have had more than one project receive new construction assistance through Energy Smart Services, were there any differences that you'd like to note between your experience with the project we focused on and other projects that received services? This could be in terms of the services, process, or outcomes.
29. [If not already addressed] Do you think the SCL's commercial new construction services contributed to a building that has higher value in the marketplace. How?
30. Do the energy efficient/green features in the building affect the market value the building? If so, how?
31. Do you think SCL Energy Smart Services for new commercial construction has influenced design practices among members of the commercial building community in Seattle?

- 1 No **Skip to Q33**
- 2 Yes

32. **If Yes:** How has Energy Smart Services influenced design practices for new construction?

MARKET TRENDS AND OPPORTUNITIES

Next I would like to ask you about market trends you have observed and the opportunities they might create for your firm and energy efficiency.

33. What do you believe are the important trends in the building development industry? [What changes in the real estate market are occurring? What changes in development processes are occurring? Are there any innovations occurring?] What is causing these changes?
34. What do you see as the [new] market opportunities for your firm in the current market? Do you believe this will change in the future?
35. What market trends might encourage energy efficiency? Discourage it?
36. What market trends provide opportunities for SCL new construction energy efficiency services?

RECOMMENDATIONS

Finally, I have some questions on improving the effectiveness of the SCL Energy Smart New Construction Program.

37. What do you think are the strengths of the City Light's new construction services?
38. What do you think discourages owners and design firms from taking advantage of these services?
39. What suggestions do you have for more effectively reaching potential Energy Smart Services participants about the services available for new commercial buildings?
40. What recommendations do you have for improving the value and effectiveness of the new construction services.
41. Are there gaps in service or services that should be added?
42. Some new construction programs offer a 'whole building' approach that provides incentives per square foot or a per kWh of whole building energy savings, relative to a baseline. In Seattle, the baseline would be the energy code. This would differ from the options in the current ESS program where incentives are available for standard and

custom energy efficiency measures. Do you think SCL should offer a whole building option in their new construction program? Why/why not? Would you take advantage of this option?

43. Some new construction programs are putting more emphasis on green buildings and LEED (Leadership in Energy and Environmental Design) certified buildings. Are you familiar with LEED certification, which rates a building on various aspects of its sustainability, including energy efficiency?
- (If familiar) Are you aware that SCL currently offers technical support and financial incentives to building owners/developers to pursue LEED certification?
 - (If not taken advantage of support but know about services) Have you considered applying for LEED certification for your building projects in Seattle? Why or why not?
 - (For all) Do you think SCL should put more emphasis on supporting green and/or LEED certified buildings? Why or why not? How could SCL increase your involvement in LEED certification?
44. "Some new construction programs offer design incentives to design teams to help cover the extra design costs for developing an energy efficient building. These incentives are often based on exceeding a certain energy performance threshold. Do you think SCL should offer a portion of ESS project incentives to design teams if it can be shown that the design improvements resulted in increased energy savings? Why or why not? (If appropriate) Would you take advantage of these incentives?"
45. Do you have any other ideas or feedback that you would like to provide to SCL about their Energy Smart new construction program?

(Ask about other contacts for the project if needed.)

THANK YOU

Non-Participant Interview Guide—ESS C/I New Construction

Name:

Title:

Firm:

Focal Project:

Phone:

E-mail:

Date called	Results/Notes, including time/date/location for interview

Recruitment Strategy

When interviews are arranged, the interviewer will explain:

- They are calling on behalf of Seattle City Light
- Study purposes (as described in the introduction below)
- How they obtained the respondent's name (either through referral or from the DPD data base)
- Check that they are the right person to talk with about the focal project
- Check that they haven't received financial incentives or technical assistance from Seattle City Light
- Set up a time and place to do the approximately 30 minute interview
- Obtain permission to tape record the interview.

Introduction (at time of interview)

As I explained to you by phone, I am under contract to Seattle City Light to assess its efforts to improve energy efficiency in new commercial buildings in Seattle. We're talking with a small, select sample of decision-makers (developer/owner/architects) that have undertaken new construction projects in the past few years but have not received assistance or incentives from Seattle City Light. Some of my questions today will have to do with (focal project).

Your opinions are very important to improving the services Seattle City Light offers to people like yourself who make decisions about new commercial buildings.

I also want you to know this interview is confidential. This means that all your comments will remain anonymous and your responses to our questions will not be associated with your name and company. By the way, if I ask you about areas you don't know about, please feel free to tell me and we will move on. Do you have any questions before we start?

If needed: Here are the contacts if you have any questions about the study.

- John Roberts 206 684 3761
- Jean Shaffer 206 684 3747

BACKGROUND

First, I'd like to know a little about your background and the new commercial building project that we'll talk about a little later on in this interview.

1. Could you give me your job title, tell me how long you've been in this position, and briefly describe your responsibilities?
2. What was your role with _____ (focal project)?
3. Please tell me (let me double-check) about some characteristics of the _____(project):
 - Size: square feet and floors
 - Building type/primary occupancy and use
 - Leased or owner occupied
 - Approximate cost per square foot
 - Unique building features

GENERAL AWARENESS

The next set of questions asks about SCL's Energy Smart New Construction Program.

4. Now I would like to ask you about Seattle City Light services for commercial new construction projects. Have you heard of Seattle City Light's Energy Smart Services for new commercial construction? (If needed: In the past, this service was called Energy Smart Design, so you might have known it by that name.)

- 1 No
- 2 Yes **Skip to Q6**

5. Seattle City Light's Energy Smart Services for new commercial construction provides financial support to conduct technical assessments of energy-efficiency measures in building designs. It also offers incentives to offset a portion of the incremental capital costs to purchase and install energy-efficient equipment in these buildings to reduce electric energy consumption. Have you heard about a program like that at SCL?

- 1 No **Skip to Q20**
- 2 Yes

6. How did you first become aware of SCL's Energy Smart Services for new commercial construction? (pinpoint first source)

- 1 Contractor or vendor -- specify _____
- 2 A&E firm
- 3 Business or professional publication

- 4 SCL mailing or brochure
- 5 SCL Website
- 6 Telephone call to SCL
- 7 SCL staff person
- 8 Trade show
- 9 SCL sponsored event (e.g., a lunch meeting or presentation)
- 10 Participant in other SCL program
- 11 Other _____

7. **Aside from** (_____ **fill in from Q6**), how else have you heard about the SCL services for new construction? (Probe for specifics, circle all that apply)

- 1 Contractor or vendor -- specify _____
- 2 A&E firm
- 3 Business or professional publication
- 4 SCL mailing or brochure
- 5 SCL Website
- 6 Telephone call to SCL
- 7 SCL staff person
- 8 Trade show
- 9 SCL sponsored event (e.g., a lunch meeting or presentation)
- 10 Participant in other SCL program
- 11 Other _____

8. **Have you heard about any other new commercial construction projects** that have used Energy Smart Services for new commercial construction?

- 1 No
- 2 Yes

9. At this point, how familiar would you say you are with the Energy Smart services and incentives for new commercial construction? Would you say. .

- 1 Very unfamiliar [*Note: If they really know nothing, skip to Q20*]
- 2 Somewhat unfamiliar
- 3 Neither familiar nor unfamiliar
- 4 Somewhat familiar
- 5 Very familiar
- 6 Don't Know

10. Before this call today, which of the following Energy Smart new construction services were you aware of?

- 1 Financial incentives for installing lighting and controls
- 2 Financial incentives for installing high efficiency HVAC equipment
- 3 Financial incentives for installing custom efficiency measures

- 4 Energy analysis assistance, which provides financial support for professional engineering services to research and evaluate various building system designs in terms of energy efficiency
- 5 Building commissioning support and funding
- 6 Lighting Design Lab training and support
- 7 Assistance for LEED certification for sustainable new buildings (includes financial grants)

11. Could you tell me anything about the Energy Smart Services that particularly caught your attention? This could be either benefits or concerns you might have.

- a. Let's talk first about any benefits you think the program might offer you.
- b. Now let's talk about any concerns you might have about participating in the program.

12. Has anything that you've learned about Seattle City Light's Energy Smart New Construction Program influenced the way you design or construct new commercial buildings?

- 1 No **Skip to Q14**
- 2 Yes

13. What have you learned and how has it influenced your practices? (Probe: energy efficiency; green building design; what steps have you taken due to knowing about the SCL Energy Smart New Construction Program)

14. From what you know, do you feel SCL Energy Smart Services for new commercial construction has influenced design practices among members of the commercial building community in Seattle?

- 1 No **Skip to Q16**
- 2 Yes

15. How has Energy Smart Services influenced design practices among those involved in commercial new construction in Seattle?

BARRIERS TO PARTICIPATION

The next questions are about potential barriers to participating in the SCL Energy Smart new construction program.

16. For the _____ project, had you given any thought to using SCL's Energy Smart Services for new commercial construction?

1 Yes

2 No **Skip to Q18**

17. What kept you from participating in SCL's Energy Smart New Construction Program with this project? Who made this decision? Please be as specific as possible.

18. For any other new construction projects in which you've been involved, had you considered using SCL's Energy Smart Services for new commercial construction?

1 Yes

2 No **Skip to Q20**

19. What kept you from using SCL's Energy Smart Services for new commercial construction for those projects? Please be as specific as possible.

ENERGY EFFICIENCY MOTIVATIONS

The following questions ask about the importance of energy efficiency in project development.

20. What were the key design goals or issues for the _____(focal) project?

21. What were some of the key decisions or turning points in the project that shaped how the building was designed and built? As an owner/designer, how were you involved in these decisions? Who was involved in these decisions?

22. What motivations, if any, did (you) (owner) have for developing a more energy efficient/green building? How important was this?

23. Were any energy efficient or green features incorporated into the ___ project? If so: How were these decisions made?

24. If appropriate: Do you think SCL's Energy Smart Services for new commercial construction could have added value to the design process for this project?

25. In general, how important is maximizing energy efficiency in the design of the new commercial buildings you've involved with? Would you say . . .

1 Very Unimportant

2 Somewhat unimportant

3 Neither important nor unimportant

4 Somewhat important

5 Very important

6 Don't Know

26. And why do you say _____ (insert rating)?

27. **If appropriate:** Do you think SCL's Energy Smart Services for new commercial construction could have added value to the design process for this project?
28. In your opinion, what has been the impact of the current Seattle Energy Code on new construction projects generally? Do you think the energy code has any impact on developers, owners, and A&E firm's willingness to go beyond code requirements and apply for Energy Smart new construction services?

MARKET TRENDS AND OPPORTUNITIES

Next I would like to ask you about market trends you have observed and the opportunities they might create for your firm and energy efficiency.

29. What do you believe are the important trends in the building development industry? [What changes in the real estate market are occurring? What changes in development processes are occurring? Are there any innovations occurring?] What is causing these changes?
30. What do you see as the [new] market opportunities for your firm in the current market? Do you believe this will change in the future?
31. What market trends might encourage energy efficiency? Discourage it?
32. What market trends might provide opportunities for SCL new construction energy efficiency services?

RECOMMENDATIONS AND OBSERVATIONS

Finally, I have some questions on improving the effectiveness of the SCL Energy Smart New Construction services.

33. What do you think might encourage owners and designers to participate in SCL's New Construction Services?
34. What do you think discourages owners and design firms from taking advantage of these services?
35. What suggestions do you have for more effectively **reaching** potential participants about the services available for new commercial buildings through Energy Smart Services?
36. What recommendations do you have for improving the value and effectiveness of the new construction services. Are there gaps in service or services that should be added?
37. Some new construction programs offer a 'whole building' approach that provides incentives per square foot or a per kWh of whole building energy savings, relative to a baseline. In Seattle, the baseline would be the energy code. This would differ from the

options in the current ESS program where incentives are available for standard and custom energy efficiency measures. Do you think SCL should offer a whole building option in their new construction program? Why/why not? Would you take advantage of this option?

38. Some new construction programs are putting more emphasis on green buildings and LEED (Leadership in Energy and Environmental Design) certified buildings. Are you familiar with LEED certification, which rates a building on various aspects of its sustainability, including energy efficiency?
- (If familiar) Are you aware that SCL currently offers technical support and financial incentives to building owners/developers to pursue LEED certification?
 - (If not taken advantage of support but know about services) Have you considered applying for LEED certification for your building projects in Seattle? Why or why not?
 - (For all) Do you think SCL should put more emphasis on supporting green and/or LEED certified buildings? Why or why not? How could SCL increase your involvement in LEED certification?
39. Some new construction programs offer design incentives to design teams to help cover the extra design costs for developing an energy efficient building. These incentives are often based on exceeding a certain energy performance threshold. Do you think SCL should offer design team incentives if it can be shown that the design improvements resulted in increased energy savings? Why or why not? (If appropriate) Would you take advantage of these incentives?
40. Do you have any other ideas or feedback that you would like to provide to SCL about their Energy Smart new construction program?

(Ask about other contacts for the project if needed.)

THANK YOU

Appendix C: Example of Logic Model Report – NYSERDA’s New Construction Program

Program Theory and Logic Model Activities
for the New York Energy \$martSM Program

Commercial New Construction Program

Full Program Theory and Logic Model Assessment

Prepared for

The New York State
Energy Research and Development Authority

Victoria Engel
Project Manager

Prepared by

GDS Associates, Inc.
Suite 205
1181 Elm Street
Manchester, NH 03101

And

ECONorthwest
Megdal & Associates
Research into Action
Sandia National Laboratories

NYSERDA PROJECT/AGREEMENT NUMBER: 7680

NYSERDA
Report 04-__

June 2004

NOTICE

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ABSTRACT

This document represents the logic model and program theory analysis for the **New York Energy \$martSM** Commercial New Construction Program (NCP). The report consists of two major components. First, a logic model that attempts to describe the logic of the NCP, as implemented, in the broader context of the market(s) that they influence. The second component is a program theory analysis which takes the logic model of this program as implemented and examines the program theory and logic in the context of the experience of other similar programs and potentially relevant social science theory. A preliminary draft of the logic model and program theory analysis was reviewed in a half-day workshop with NYSERDA program staff and subsequent feedback on a revised draft was received and addressed. This final document draws on the outcome of the workshop and all feedback in order to: identify key measurement indicators and researchable issues from the logic model component; note any critical elements that could require further analysis or market assessment; and make recommendations for potential program modifications or enhancement to better ensure that the program fulfills its goals and objectives.

GDS Team Program Analysis Activities
Logic model and program theory analysis
FOR THE NEW YORK ENERGY \$MARTSM
Commercial New Construction Program

I. Introduction

This document is the logic model and program theory analysis for the **New York Energy \$martSM** Commercial New Construction Program (NCP). The write-up consists of two major components. First, a logic model that attempts to describe the logic of the New Construction Program, as implemented, in the broader context of the market(s) that it influences. The second component is a program theory analysis, elements of which are discussed below.

Key activities performed in developing the logic model included:

- Data collection and document reviews;
- Barriers identification and context development;
- Logic model elements definition - including identification of key program inputs, activities, market actors, outputs, outcomes, potential external influences, and other NYSERDA program interactions;
- Logic model diagram construction – entailing transposition of key logic model elements into a series of ovals, boxes and arrows to identify preliminary logical relationships among the elements;
- Identification of potential program measurement indicators and researchable issues;
- Initial discussions with program staff on an earlier version of the logic model to help correct and refine the draft logic model; and
- Detailed discussion and input from program staff at a workshop held at NYSERDA.

The program theory analysis takes the logic model of the program as implemented and examines the program theory and logic in the context of the experience of other new construction programs and potentially relevant social science theory. Key activities performed in developing the program theory analysis included:

- Review of articles and proceedings on nonresidential new construction programs;
- Review of recent evaluations of new construction programs;
- Review of social science literature pertinent to key theory inherent or explicitly incorporated in the program design.

A preliminary draft of this logic model and program theory analysis was reviewed in a half-day workshop with NYSERDA program staff and subsequent feedback has been received and addressed. This final product draws on the outcome of the workshop and all feedback received to date in order to:

- Identify key measurement indicators and researchable issues from the logic model component;
- Notes any critical elements that could require further analysis or market assessment; and

- Provide recommendations for the evaluation efforts that will follow and insights regarding critical program design elements that, if tracked may help to ensure that the program remains well positioned to achieve its goals and objectives.

II. Relationship to OVERARCHING Energy \$martSM GOALS

Based on initial program documentation reviews and this subsequent program logic and theory assessment, the following relationships to key New York Energy \$martSM overarching goals (and associated objectives)⁵⁰ were identified:

- The New Construction Program is a market transformation program that incorporates significant resource acquisition components designed to reduce environmental impacts of energy production and use (PSC Goal III). This is accomplished by increasing the environmental performance and sustainability of buildings (Objective 4).
- The program logic suggests that there is a very direct relationship between the program and the development of an energy service industry as the program specifically targets the design community (which is part of NYSERDA's broad definition of energy service industry). This is facilitating competition to benefit end-use customers through development of an energy service industry (PSC Goal IV, Objective 5).
- The New Construction Program also supports improving system-wide reliability and peak reduction (PSC Goal I) through energy management and load reduction (Objective 1) and through its fostering of long-term market changes (Objective 5).
- The New Construction Program also improves energy efficiency and access to energy options (for underserved customers) (PSC Goal II) through saving consumers, businesses and institutions money on their energy bills (Objective 3).

III. Market Issues/Barriers And Associated Market Actors Addressed

The new construction market is large and complex, characterized by multiple actors who may or may not be aware of energy efficiency products and services. Over \$3 billion in commercial new construction activity and \$6 billion in energy-related renovation occurs annually in New York. The program aims to directly impact, through program participation, about 10-12% of this activity.

There are many barriers to investments in energy efficiency in the new construction market and the renovation market. Key barriers are shown below and are grouped by those that have the potential to impact the demand side of the new construction market and those that impact the supply side.

A. Barriers Faced by Building Owners and Developers (Demand Side)

- Lack of information on technologies and expected savings.
- Information search costs.
- Undervaluing of energy efficiency (creating perceived high first cost barrier).
- Perception of risk.

⁵⁰ See NYSERDA June 2002 Revised Operating Plan for a listing of PSC goals. Related NYSERDA objectives are presented in the May 2004 Evaluation and Status Report.

- Lack of experience with high efficiency products, buildings or LEED certification.
- Lack of awareness (leading to low demand for whole building design and energy efficiency products).
- Split incentives.
- Competition for decision makers' attention from other design decisions.

B. Barriers Faced by Design Professionals, Consultants, Equipment Providers (Supply Side)

- Lack of information on expected savings.
- Information costs.
- Perception of risk to recommend energy efficiency.
- Lack of experience with high efficiency products, buildings and LEED certification.
- Lack of awareness (leading to limited supply of whole building design and energy efficiency products).
- Uncertainty about reliability or performance.
- Split incentives.

IV. Program Approach, Activities and Outputs

The primary goal of the commercial New Construction Program is to educate design teams and their customers and to transform the market in a way that leads to permanent improvements in overall building energy efficiency in new construction and changes in building technology and design practices. This is to be accomplished through technical design assistance, financial incentives, training, and demonstrations for building owners, designers and architects. The program seeks to directly influence the design and construction of 785 projects involving custom measures, prequalified measures or whole building design by 2006.

The program goal is to permanently improve standard design practices among building designers, and awareness and interest in efficiency by owners through accelerating the installation of energy efficient and renewable energy sources into the design, construction and operation of new and substantial renovations of commercial, institutional, and multifamily buildings. The program targets those involved in the development of commercial buildings (large users of electricity that are often not resource efficient), and also works to reach underserved customers such as not-for-profits and schools. The program seeks out projects that will provide good examples of success.

Activities include Outreach Project Consultant (OPC) recruitment, providing technical assistance (TA) to design firms, providing stipend incentives to architect and engineering (A&E) firms, and processing and awarding building owner incentives. These activities are designed to reduce the barriers to installing sustainable, high efficiency measures in new building construction through:

- Promotional and information activities to increase awareness of and experience with high efficiency products and buildings;

- Technical assistance activities to provide information and reduce the perception of risk, and
- Incentives to reduce high first costs to introduce efficiency so the initial experiences assist market actors to increase their perceived value of energy efficiency.

Following is a brief description of the activities associated with NYSERDA's New Construction Program, grouped into three key areas.

A. Promotion Activities

Promotion activities to owners, developers and to designers are expected to increase awareness of building energy use and strategies to achieve highly efficient buildings. Promotion activities include using brochures, website information, presentations, in-person customer meetings to explain program benefits, press events, charrettes and scoping meetings, continuing education credits, and finally case studies illustrating the positive aspects of completed projects. These activities are designed to increase awareness of the program and concepts advocated by the program, as well as generate leads for new projects. The concept of "green buildings" is included in these activities. The promotion activities were greatest in the first year of the program; since then they have been quite modest, as program activity has kept pace with or exceeded program resources.

B. Technical Assistance Activities

Technical Assistance activities assure that accurate information and technical expertise are available to owners, developers, and designers (architects and engineers) at critical points in the design and planning stages to overcome perceived risk and lack of knowledge and to ensure equipment is properly installed and working through independent review and third party commissioning. Technical assistance (through contractors working with NYSERDA) is provided directly to design firms to increase their ability to integrate high efficiency strategies into their designs. Specific measures targeted include lighting, motors, HVAC, EMS, compressed air systems, refrigeration equipment, process equipment, agricultural systems, transformers, photovoltaic/solar electricity, daylighting, and other various energy efficiency measures and strategies. The integration of these measures in whole building design is the ultimate target, as measures interact.

Contracted Outreach Project Consultants (OPCs) track and monitor individual project progress, provide an independent review of the technical assistance analyses, and help to keep the lines of communication open between all project participants. Additionally, technical assistance activities work to apprise decision makers (often not the building designer) of the benefits of the program and assure that owners have a positive experience with energy efficient technologies and green building strategies – ultimately allowing for positive stories to be told via case studies in promotion efforts.

Although the program tries to capture projects early in the design stage, program staff is developing a custom measure tool that will permit analysis of opportunities for projects that enter the program at a later stage of development or that are too late to benefit from extensive technical assistance. The custom measure tool will be launched in 2004.

C. Incentives

Incentives and stipend payments are made available to design teams/firms to cover the additional design costs of incorporating energy efficiency into the building design (e.g., to help “push the envelope” on designing the building). Financial incentives, combined with low interest financing arrangements are also provided through the program to building owners and developers to lower the capital costs of efficient equipment and construction by 50 to 80%.

Specifically, incentives are offered to:

- Partially defray the cost of technical assistance, including the cost of evaluating energy efficiency options, building commissioning services, green building services, and additional design and engineering work;
- Increase the efficiency of building components and install energy systems at the time of construction or renovation to building envelopes and major systems (pre-qualified, custom, or whole building improvements); and
- Install building-integrated photovoltaics and advanced solar and daylighting technologies.

In September 2003, several changes to incentives were made, including: increased incentives to design teams; reduced incentives on measures considered to be standard practice, and a switch to performance-based incentives for custom and whole-building projects resulting in buildings with higher annual operating hours qualifying for higher incentive amounts than buildings with lower annual operating hours. This may penalize buildings such as schools. Program staff is currently considering additional weighting factors to assist underserved customers such as schools.

V. Program Resources

A variety of funding and staffing resources has been dedicated to this project and is summarized below:

A. Funds Budgeted

Total Budget (1999-2006): \$74.2 million

Projected Incentives: \$62.4 million

Technical assistance, design and outreach: \$11.8 million

1999-2001 (3-year budget): \$17.1 million (\$14.6 in incentives)

2003-2004 \$10 million

B. Funds Estimated to be Disbursed

- \$8 million encumbered by 6/30/00
- \$28.1 million encumbered by 6/30/01
- \$67.3 million encumbered by 12/31/02
- These amounts represent dollar awarded in total for both design and for measure installation incentives.

C. NYSERDA Staff

The New Construction Program requires a significant amount of project specific monitoring and contractor tracking. NYSERDA staff resources include five full time equivalents (FTEs) working on the program. Mark Eggers, Chris Reohr, Craig Kneeland, Elizabeth Perry (1/2), Charle-Pan Dawson (1/2) and Michelle Peckham.

D. Partners

There are a number of informal partners who assist in marketing and promotion, directly or by referral including the New York American Institute of Architects, Department of State, US Green Buildings Council (USGBC), Lighting Research Center, Economic Development, Dormitory Authority of the State of New York, New York State Office of General Services, New York State Office of Mental Health, New York State Department of Environmental Conservation, and local utility account managers.

E. Contractors

The program currently has seven Technical Assistance Contractors with nine FTE staff and three Regional Outreach Program Consultants with 6.5 FTE staff.

F. Information

A pre-qualified list of measures as well as new or emerging information about sustainable building practices and efficiency measures is provided as part of the program's Application Form. Technical assistance reports are provided to customers detailing custom or whole building energy savings through integrated design strategies. Case studies that emerge from program experiences are incorporated into documents available on NYSERDA's program website and at other locations in hard copy.

VI. External Influences

Key influences beyond the control of the program include economic realities that may impact the level of new investment in commercial building and renovation, the impact of changes (up or down) of the price of power, the effect of changing political climates (either supporting or not supporting investment in energy efficiency), and the future of burgeoning interest and business related to sustainability and LEED buildings nationally.

VII. Relationship to Other NYSERDA Programs

This initiative interacts with a number of other NYSERDA programs as follows:

- **New York Energy \$martK** Loan Fund (customers can finance measures and receive New Construction incentives).
- **\$mart Equipment Choices** (Providing incentives for projects that are small or that enter the program at too late of a date to benefit from technical assistance.)
- **Existing Buildings Program** under design (will address retro-commissioning)

- Premium Efficiency Motors (Providing the incentives for motors used in new residential buildings.)
- Small Commercial Lighting, NY State Green Building Tax Credit (Providing incentives for qualifying green buildings.)
- USGBC's LEED Certification Program. (Providing certification if designers and owners chose to pursue the green buildings path.)
- Technical Assistance (Technical assistance services unique to new construction are part of the broader technical assistance efforts for commercial projects.)
- End-Use Renewables (Providing incentives from PV on Buildings Program for building integrated PV, wind, etc.)

VIII. Current Program Goals

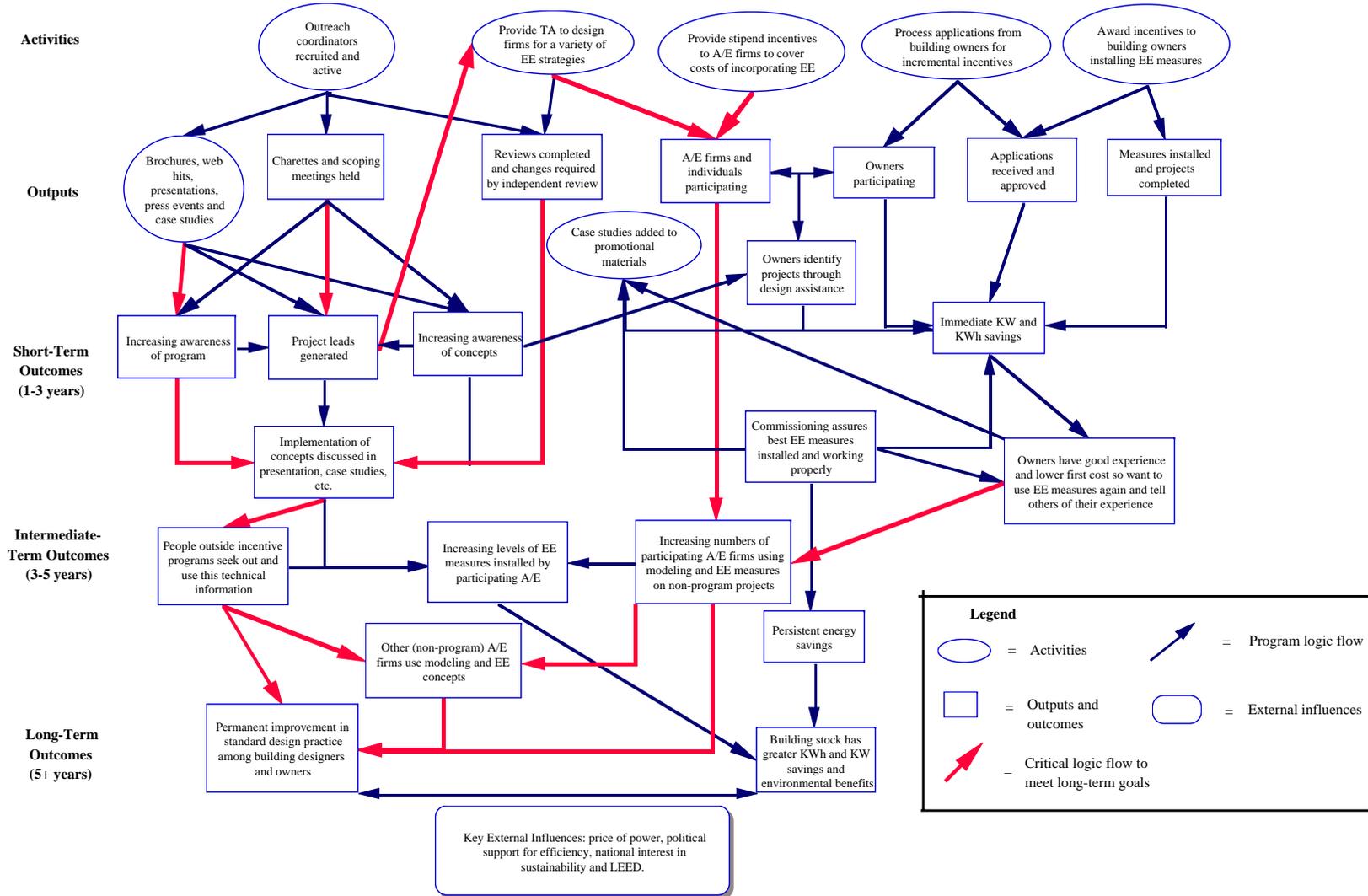
Specific goals and objectives identified in the program summaries include:

- 300 participating A&E firms by 2006
- 785 buildings funded by 2006
- 120 GWH by 2006
- 30 MW peak reduction by 2006
- **20% reduction to average energy bill (all fuels)**
- **Increase LEED certifiable buildings (there were zero in NY at outset of program)**

IX. Logic Diagram and program theory analysis

The following page illustrates the program logic at a relatively high level in diagram form. This diagram is based mainly on key activities and logic elements derived from a careful review of program-specific documents and related program implementation details. The diagram was then modified based on feedback received through teleconferences, a workshop and other meetings with NYSERDA staff to help better define specific elements and logic flow. In the diagram, program activities, outputs and short, intermediate and long-term outcomes are denoted within ovals and text boxes and general program inputs and potential external influences are also noted. Linkages between elements are shown with arrows. Bold/red lines and arrows indicate those links that appear, based on literature review to be most critical to the market transformation logic of the program. The Program Analysis table presented in Appendix A presents specific comments on the program logic and theory resulting from this additional literature review.

Inputs: Funds, staff, allies, market knowledge, synergistic program management



X. Discussion of Comparative Program and Theory Research

The following discussion summarizes results from a targeted literature review conducted to further probe the underlying theory and logic associated with NYSERDA's New Construction Program. This review is organized by the primary program activities shown in the logic diagram and assesses the theoretical causal links to long-term outcomes. This focus on key interventions and comparative program findings and/or theory literature will provide support for the program theory and will help to identify areas that might need to be tested through evaluation or addressed in future program refinements.

Two approaches were taken during this literature review. First, commercial new construction literature was identified and reviewed to assess whether the assumptions and logic of NYSERDA's New Construction Program were validated from experiences with other comparable programs. Second, potentially relevant social science literature was identified and reviewed to see if the assumptions and logic pathways within the program were supported by either empirical studies or theoretical arguments. The results of this analysis are presented in the Program Analysis Table of Appendix A.

To conduct this program analysis each activity was examined along with the assumptions that are apparent in the logic model as being important to the market transformation program outcomes (these are highlighted as red lines in the logic model). The program logic for the market transformation aspect of the program is highly dependent on outreach and success with architects and engineers in the design community for new nonresidential buildings. The program logic for the resource acquisition portion of the New Construction Program is highly dependent on the use of incentives to ensure measures are installed. At this time, the program provides incentives for two purposes: (1) to ensure that sufficient whole building or custom measure analysis is conducted to identify all opportunities to make buildings more energy efficient; and (2) to ensure that the energy equipment installed is as energy efficient as possible. It is through changes in architectural practice that the program anticipates the sustainable change will occur in new construction projects in New York State so that ultimately incentives are no longer required to ensure energy efficient buildings are designed and built.

The key activities that support these assumptions of the program logic concern:

- Technical support and design incentives for designers;
- Incentives to owners to ensure identified measures are installed;
- Promotion, marketing and outreach to attract designers and owners to the program.

The program experiences and social science theories that are relevant to these activities include: diffusion of innovation and social marketing theories relative to outreach, promotion and marketing; program design on the use of training and incentives to increase measure installation; and program experience working with designers and owners.

A. Promotional Activities

Promotional activities are important for the resource acquisition and the market transformation hypotheses of the New Construction program. Through promotional activities, owners and their designers learn about the program and enter the program.

The promotional activities of the New Construction Program at NYSERDA use the NYSERDA website, brochures and press events to inform owners and designers about the program. The NYSERDA program website is a modest approach with a limited set of case studies for NY buildings and a link to the PON for participation in the program. Two examples of approaches that are focused at barriers that designers and owners report are the www.Betterbricks.com site operated by the Northwest Energy Efficiency Alliance and the www.SavingsbyDesign.com site operated by the California investor owned utilities. Both of these programs are targeted to reach designers and owners to explain the value of energy efficient design practices. The Savings by Design site encourages participation in the program, while the Betterbricks.com site, which does not have an associated incentive program, is solely attempting to influence the market to change their design practices. Both of these sites are attempting to respond to the barrier that owners and designers have regarding lack of information, experience and knowledge of energy efficient design practices.

In general the literature on promotion for socially beneficial programs is found in the area of social marketing literature. Arthur Andreasen's book on social marketing provides these guidelines on how to reach a market (p. 147):

1. *Creating awareness and interest.* The target consumer has to be aware that there is some desirable new behavior to be undertaken and that may be appropriate to the current situation.
2. *Changing values.* For behaviors that involve important changes in customers and community norms, target consumers have to come to believe that the proposed behavior is acceptable to people like them.
3. *Persuading.* Once the consumer perceives that it is OK to carry out the behavior, he or she has to be convinced that it is personally desirable to do so.
4. *Creating action.* It is one thing to convince a consumer to believe that a behavior is a good thing. It is another to get action. The latter may be more a matter of making the behavior easy to undertake.
5. *Maintaining change.* Many behaviors that social marketers want to influence are for a lifetime. Social marketing does not stop when consumers make the first necessary step.

The promotional activities of NYSERDA's New Construction program are targeted at Andreasen's guidelines 1, 2, and 3 – aimed at generating awareness and persuading owners and designers to participate in the program. The outreach and technical assistance activities below are built on guidelines 4 and 5. The Savings by Design programs and the Betterbricks.com effort are examples of other ways these aspects for promotion could be addressed.

B. Outreach Consultant Recruited and Active

The role of the Outreach Project Consultants (OPC) is to work with owners and designers to ensure that projects come into the program and they proceed through the program. NYSERDA's New Construction Program staff carefully selects highly skilled OPCs ensuring that most are professional engineers and LEED accredited. The role of the OPC appears from the logic model to be a critical role in the market transformation hypothesis and to be useful but not necessary for the achievement of the resource acquisition hypothesis.

The program analysis table in Appendix A points out the following:

- Designers are not actually in decision-making positions, financial and real estate entities drive many of these efforts [Beamish, et al. (2000), Kunkle, et al. (2002)].
- Designers who have been involved in new construction programs typically are from different types of firms, "idea firms", compared to non-participants who are in more business-centered firms. (Janda, 1998).
- Owner interest in the program is most often the driver of program participation (RLW Analytics, 2003).
- Diffusion theory points out that outreach in social networks can be highly effective (Hamalainen & Schienstock 2001)
- Interpersonal ties and networks are demonstrated to be significant in new commercial construction projects. (Reed & Oh, 2003).
- Diffusion theory also notes that: a "noncommercial" change agent is critical for being able to have credibility with businesses about new ideas; and that change agents need to target and work with opinion leaders in the networks (Rogers & Shoemaker, 1983).
- Architects that have multiple contacts with energy efficient design programs report greater use of energy efficient design practices than architects with only one or no contacts with energy efficient design programs (Peters & McRae, 2001).

The OPCs were initially conceptualized as lead generators and developers of connections with designers in the 1999 Marketing and Communications Plan for the **New York Energy SmartK** New Construction Program. Such a role would be consistent with the logic model, with diffusion theory and also consistent with other research reviewed in this analysis. Since the first years, OPCs are no longer marketing the program since the program has sufficient interest to meet program goals. Now the OPCs primarily serve in a project management/facilitation role, ensuring that designers and end users get to the best program for their project and that the technical assistance reports are conducted and delivered.

Examples of best practice approaches suggest that it is very important to focus market change efforts on relationship marketing to opinion leaders in design networks. As discussed for the Savings by Design program (Stone, et al., 2000) such an approach in which designers are courted and design teams nurtured to work as integrated teams can result in shifts toward the practice of whole building system and integrated design.

Efforts to work with designers need to have multiple interactions to have a lasting impact. The Savings By Design and the Architecture + Energy (A+E) program both demonstrate this. The California Statewide Savings by Design program, which achieves annual savings of over 90,000

MWh, attempts to attract new firms to the program through direct marketing and outreach to designers. The program encourages multiple interactions and what is similar to team building efforts throughout the design process. The A+E program (with no incentives, only training and outreach) found the greatest impact of the program with those designers who had multiple interactions with the program.

As noted in the Wisconsin Best Practices study (2003) “higher end program(s) offer extensive end user support...program involvement is typically required throughout all phases of planning and construction.” These studies suggest that someone (such as a skilled OPC) who can market to and attract the opinion leading design firms to the program and then actively work with them throughout the entire scope of the project as a neutral change agent would be most effective not only in ensuring the transfer of information throughout the project process but also to ensure the information reaches broadly into the general design market.

C. Provide Technical Assistance to Design Firms for Assessment of Variety of Energy Efficiency Strategies

Providing technical assistance (TA) to designers is a key component for the resource acquisition and market transformation hypotheses. The purpose of the TA for designers is to ensure that the project designs are as energy efficient as possible given the point at which the projects enter the program. The hope is that projects will enter the program at the conceptual design stage such that technical assistance can be provided throughout the design process along with incentives to the design team to conduct analyses needed to make decisions about different efficiency strategies. In those cases where the projects enter the process at later stages, TA can still be provided to improve the energy efficiency of the design.

Since the focus is on design teams, it is important that the designer learn about the process for increasing the energy efficiency of their design. The OPC and TA contractors are the vehicles for transferring this knowledge to the design teams (including design firms and other project decision makers). As a result, there is a related issue to that discussed above for OPCs for the Technical Assistance contractors. Discussions with NYSERDA program staff suggest that rather than the OPC, the program staff perceives the TA contractors as those most likely to act as change agents for the design teams and owners. All TA reports are provided to the owners and the design firms. TA contractors involvement in the projects tends to be limited to the TA study.

As noted previously, diffusion theory suggests that a commercial change agent is less likely to be as persuasive as a noncommercial change agent. In determining how to implement the role of lead generation, coordination of the scoping effort and getting the report to the designers, the person with the role is likely to be most effective if they are from firms or organizations that are not in potential commercial competition with the design firms who are the target of the program. Thus, diffusion theory suggests that the TA contractors, as potential suppliers of design assistance services on a commercial basis to owners and design firms, are not in as strong a position as OPCs are to be change agents.

D. Provide Stipends and Incentives

The three activities (shown on the logic diagram) that provide incentives to designers and building owners are directly related in the program theory as they all, in part, are designed to address the barrier that energy efficiency is undervalued. In addition, the incentives to designers are designed to address the barrier for designers that they have limited experience with energy-efficient strategies. These incentives are structured to ensure that the designers learn about and incorporate efficiency strategies in their designs while the incentive to owners ensures that the energy efficiency measures that were recommended in the design are implemented.

The anticipated result of the incentives is to ensure the measures are installed, with the expectation that designers will learn how to do efficient design and thus begin to use these practices on projects that do not enter the program. The program also hopes to encourage changes in design practices such that building owners are attracted to energy-efficient equipment in order to ensure that they actually accept the recommendations and thus savings are generated. Furthermore, as a result of installing the measures, it is expected that owners have a positive experience and through word of mouth pass along their good feelings to other owners who then choose to incorporate energy efficiency measures without participating in the program.

The program analysis table in Appendix A points out the following:

- The Savings by Design program in California assures there are larger incentives for the owners than designers to ensure that owners are committed to the project and are involved in the process, since the process can be lengthy.
- The Savings by Design program also gives incentives to the design firms specifically for savings in excess of 15%.
- The Wisconsin Best Practices study notes that program involvement is typically required throughout all phases of planning and construction.
- Johnson and Nadel point to the need to focus programs on a “code plus” strategy.

The program logic and program activities as designed appear to follow the literature fairly well, including: the OPC and TA activities at the outset of the program, and design incentives to encourage whole building modeling and analysis. These incentives were refocused in 2003 to be greater for projects coming into the program at early design stages. Incentives are also provided for owners at the construction phase to ensure implementation of measures. The refocusing of incentives in 2003 also provided performance based incentives to encourage installation of measures above code.

As is always important in evaluation, this review suggests it will be important to ascertain whether the program is being implemented as designed, or whether the program has had to be less consistent with its intent in order to satisfy competing objectives (*i.e.*, ensuring that owners and designers are satisfied with the program; or ensuring that short term metrics are achieved even if such achievement could reduce the likelihood of achieving long term metrics; or restricting resources and thus potentially limiting the ability to achieve market effects).

XI. Program Indicators

The following table identifies program outputs and outcomes for testing key program activity and outcome relationships and for program tracking, market baseline and progress measurement, and causality/attribution assessment. The program outcomes are associated with the following time frames:

- Short-term – one to three years post program implementation
- Intermediate-term – three to five years post program implementation
- Long-term – more than five years

A. New Construction Program Output and Outcome Indicators

Program Outputs	Short Term Outcomes	Intermediate Outcomes	Long Term Outcomes
<ul style="list-style-type: none"> • Number of A&E participants • Number of buildings participating • Square footage of participating buildings • Occupancies and building types (not really an output, but important for tracking reach to target markets) • Location of projects (not really an output, but important for tracking reach across New York) • Estimated baseline annual energy use and demand (per energy code) • Estimated annual energy use and demand of proposed design • Number of incentive awards by type • Incremental cost of measures • Incentive payment for measures • Number of applications received and approved • Number of measures installed • Number of LEED certifiable buildings • Number of TA studies • Number of commissioned projects 	<ul style="list-style-type: none"> • Change in awareness of NYSERDA program by owners/developers and designers • Immediate KW and KWh savings resulting from program activities, compared to standard construction • High customer satisfaction with energy efficiency/green solutions • Case studies • Ratio of incentive dollars to private investment in energy efficiency 	<ul style="list-style-type: none"> • Percent of new construction activity in NY involved in the program • Percent of A&E participating firms' projects incorporating energy efficient measures • Participating A&E firm familiarity with green buildings, PV, whole building modeling and use of commissioning – pre and post program measurements • Increasing awareness and usage of energy efficient options by designers • Reduced perception of importance of barriers • Increasing energy efficient measures available • Increasing numbers of (non program) A&E firms recommending whole building modeling and energy efficiency measures • Increasing number of LEED certifiable buildings 	<ul style="list-style-type: none"> • Perception of importance of barriers eliminated • Non-energy benefits perceived for energy efficient/green solutions • Increasing market share and penetration of energy efficient/green buildings • Sustained change in energy efficient/green market behavior for each market actor group • Long-term KW/KWh savings • Increasing installation of energy efficient/green solutions/LEED certifiable • Changes in standard practices among participant and non participant designers • Persistent energy savings

B. Key Issues for Indicator Measurement

These suggestions are offered to the evaluators as they seek to develop population and sample lists for measurement of program indicators.

- A&E firms are not monolithic. One principal or project manager may be familiar with green practices while the rest of the firm is not (or vice versa).
- Firms do not use a consistent nomenclature for their hierarchy so it can be difficult to identify the design decision makers.
- It is possible to define volume by square footage, by number of projects or by revenue, yet building professionals cannot consistently answer questions relative to any of these approaches and each one has different implications for interpreting market share. Generally market share is difficult to estimate.
- The term “EE measures” does not pertain to the presence of specific measures, but rather the way in which measures are used that saves energy. For example, T-5s may be more efficient, but if twice the number of lamps is used as needed than no energy is saved. Thus stocking practices has no meaning for new construction, percent above baseline or above code and relationship to LEED certification is a technically more correct way to assess changes in EE measures over time.

XII. Researchable issues

Based on recognition of key underlying program hypotheses, the following issues are proposed for potential testing. These issues are grouped into short, intermediate, and long-term time periods, to represent when they are expected to become important or verifiable.

A. Short Term Issues (one to three years post program implementation)

- Promotion using brochures and the website generates project leads that result in technical assistance being provided for new construction projects. *Promotion for the NCP is limited to brochures and the website. The promotion is designed primarily to get owners and designers to use the technical assistance services.*
- OPCs generate project leads that result in technical assistance being provided for new construction projects. *OPCs responsibilities include generating leads for technical assistance; however marketing dollars are limited and outreach by OPCs was very limited after the first year of the program.*
- Technical assistance reports lead to changes in project designs, resulting in more energy efficient buildings than would have been built otherwise. *Technical assistance is offered to change project designs to be more energy efficient, or if conducted early in program design process, the results of the technical assistance carries through to a more energy efficient building than would have been built otherwise.*
- Stipend incentives to designers lead them to develop energy efficient designs. *A stipend incentive is offered to designers to encourage them to do the steps necessary (such as*

computer modeling) to design a more energy efficient building. These incentives are distinct from incentives offered to owners for installation of measures.

- American Institute of Architects (AIA) continuing education credits offered to A&E firms, which persuade them to participate in scoping meetings. *In the late 1990s, AIA implemented a requirement for CEU credits to maintain AIA status. NYSERDA has been able to gain AIA members CEU credits for participation in scoping meetings in the hopes that this will encourage AIA architects to participate in scoping meetings.*
- Because of program incentives, owners incorporate recommended measures from technical assistance reports. *Owners may install the measures not only because of the incentives, but also because their architect recommended them, or because of a return-on-investment (ROI) analysis, among other things; however, the program offers incentives primarily to motivate owners to install the recommended measures. It is important for the evaluations to test the program logic and to also explore what might be driving the installation in addition to the incentives, the assumed driver.*
- Because technical assistance studies are well done, A&E firms and owners have confidence in the recommendations and specify and install the measures, resulting in energy and demand savings. *Program staff believe that the people they selected to do the TA reports are doing a good job and that the reports are accepted by the designers and building owners because they are well done. An alternative hypothesis is that because the TA studies are supported by NYSERDA, designers and owners accept them and install the measures. It is important for the evaluators to look at the reasons (perhaps multiple) that owners are accepting the TA reports to test the assumptions that are driving the program.*
- Commissioning of large projects assures that long-term energy and demand savings are achieved. *Commissioning is the process of ensuring that systems are designed, installed, functionally tested, and capable of being operated and maintained in order to maximize the energy efficiency relative to the owner's operational needs. It is required only for larger projects.*
- Participating owners are enthusiastic about their projects and are willing to highlight their projects as case studies at the NYSERDA website. *This premise is critical to the marketing process for the program, which is primarily being promulgated through case studies.*
- Outreach activities by NYSERDA and word-of-mouth information from participating designers lead to program awareness by non-participating designers. *Word-of-mouth communications among designers, along with outreach by NYSERDA, are the major methods of information transfer from program participants to non-participants.*
- Outreach activities by NYSERDA and word-of-mouth information from participating building owners lead to program awareness by non-participating owners. *Word-of-mouth*

communication among building owners, along with outreach by NYSERDA, are the major methods of information transfer from program participants to non-participants.

B. Intermediate and Long Term Issues (greater than three years post program implementation)

- The combination of technical assistance and stipend incentives provided to A&E firms and the active involvement of program-recruited OPCs lead to changes in the frequency or number of energy efficiency measures and strategies suggested by A&E firms in non-program buildings designed by the A&E firms. *The model assumed in this research issue is summative for these various actions (TA + stipend to A&E + OPC involvement = more measures in non-program buildings designed by participating A&E firms). The program premise is that the TA + stipend + OPC is the means by which A&E firms learn enough to be able to apply the ideas on their own to projects that don't have technical assistance or incentives from the program.*
- Opinion leaders in the design community participate in the program and influence other designers to participate. *Diffusion theory suggests that opinion leaders (versus large firms or most commercially active firms) will be the most persuasive to other designers. The evaluation should explore whether opinion leaders are participating in the program and influencing other designers.*
- The combination of technical assistance and stipend incentives provided to A&E firms lead to increased use of whole building modeling for non-program buildings designed by participating A&E firms. *As above, this research issue assumes a summative relationship between program features in terms of influencing participating A&E firms to use whole building modeling for their work on non-program buildings. It is likely that fewer A&E firms will use whole building modeling than just design more efficient buildings.*
- Non-program building owners/developers and building professionals are aware of the experience of program building owners/developers and building professionals as a result of word-of-mouth and NYSERDA promotional activities. *This addresses how building owners and building professionals (designers and others in the profession) who are not program participants are influenced by the program.*
- Participating A&E firms increase the use of efficient practices on buildings they design that are not in the program, which leads to building owners and building professionals seeing the value in efficient practices without participating in the program. *The program logic anticipates that non-participants will implement efficiency because the participating A&E firms and owners they know of implement these practices without TA or incentives.*
- Participating owners and developers apply energy efficiency practices when constructing other buildings without using incentives. *The premise is that owners will see the value of energy efficiency and if they build buildings in the future, they will want to build efficient*

buildings even without incentives. It is implicit that building owners are not expected to build new buildings very often, but if they do, it is anticipated that the program will have long-lasting effects on their decisions.

XIII. Recommendations

The following recommendations are presented to highlight potential areas for further research and potential program modifications or enhancement areas that should be considered to help position NYSERDA's New Construction Program to better achieve its overarching goals and objectives. These recommendations are built on the hypotheses above and therefore are structured to respond to results that might emerge empirically through measurement and evaluation activities. Because of this dependence on results to be measured in the future, the following recommendations are posited as "if-then" statements (*i.e.*, "if" a given finding is established, "then" a related action is recommended).

- The logic model and program analysis suggest that designers that are opinion leaders in the design community will have the greatest potential to influence other designers. **If** the designers that are participating in the program are not found to be influencing others in the design community, **then** outreach efforts could be modified to target some program resources to design community opinion leaders.
- The logic model and program analysis suggest that a change agent, who has a noncommercial relationship with designers and owners will be most effective in influencing designers and owners. **If** either the OPC or TA contractors are perceived as lacking independence or credibility by designers and owners, **then** it is important to understand where the credibility can be enhanced and to modify the roles or activities of the OPC or TA to increase their potential effectiveness as change agents.
- The logic model and program analysis suggest that the provision of technical assistance will result in changes in building design that result in a more efficient building than would have been built without the technical assistance. **If** the technical assistance is not perceived as changing the designs, **then** it would be important to understand what barriers remain that reduce designers willingness or ability to implement the more efficient building designs.

Appendix A: Program Analysis Table

Potentially relevant social science theories were researched as a critical part of this program theory analysis. Results from this research can provide useful insights and create important evaluation questions, the answers to which might be used to support the logic of this NYSERDA program (*i.e.*, that the program caused theorized and observed market changes) or to aid in program pilot changes and redesign. A discussion of the analysis of this research was presented in Section X above. This appendix provides more details on the information that was abstracted during the review. The following program analysis table has two columns. The column on the left identifies specific program activity and comments on the relevance of the research, while the right hand column presents an abstract of the key information gleaned from each document reviewed.

ACTIVITY & COMMENT	RESEARCH
<p>Market Actor: Designers</p> <p>Goes directly to the assumption that design team have influence over design direction - implies that many decisions are made upstream in a very conservative financing and investment reality.</p> <p>Acknowledges the value of incremental change.</p> <p>Suggests that various informal professional networks provide a vehicle for working in new construction market.</p>	<p>Why Innovation Happens: Structured Actors and Emergent Outcomes in the Commercial Buildings Sector.</p> <p>Describes construction market as a complex, social network. "Through an almost exclusive research focus on those actors involved in the design and construction process (architects, engineers, and contractors and to a limited extent, "owners") much of the complexity of this market place has been ignored." Also assume that these market actors are autonomous and isolated in their decision-making. These limit usual accounts of the complex, interactive and socially rooted nature of decision making in this market context. Advocates seeing the social embeddedness and dynamic and evolving systems of social and commercial relations. "open systems" view, informal networks,</p> <p>Specifically focuses on the upstream decision making in real estate lending, investment and financing that tend toward risk-aversion and limit the decision making of downstream design and production processes. What has been successful in the past?</p> <p>Advocates that innovation will result from addressing the focus on stable income - " to do this energy efficiency innovations must respond to specific market needs that translate them into <u>increased income streams, not reductions in operating costs.</u>"</p> <p>Communities of practice - the way project participants are selected (reputations, social ties, predictability) work against newness</p> <p>[ACEEE proceedings 2000. Beamish, Kunkle, Lutzenhiser, Biggart - theoretical, not focused on specific program impacts]</p>
<p>Market Actors</p> <p>Diffusion of EE requires program be complementary to industry, respond to</p>	<p>New Commercial Office Building Markets: Strategies for Improving Building Energy Efficiency. Key market concepts/findings:</p> <p>Macro influences (political, economic, urban, social) continually influences building development and construction. (boom/bust)</p>

<p>market (rather than impose) and reduce uncertainty for market actors.</p>	<p>Buildings as investments: control risk in an inherently risky business due to uncontrollable market variables (similar to conclusions above)</p> <p>Industry itself is actually a series of six major industries separate but interrelated. For the most part upstream actors constrain the choices of downstream actors... decisions made by developers and providers of capital about budgets, location, revenues, target markets... shape the form of the building and constrain the options of design and delivery professionals</p> <p>Three views from building industry: 1. code=efficiency. 2. We do EE and 3. we have been burned by ee</p> <p>“for ee to diffuse in the market place, our research suggests that it must (1) be embedded in complementary interests in the building industry, (2) provide value by responding to market requirements, while (3) also reducing uncertainty”</p> <p>MT needs to address energy efficiency in the marketplace on multiple levels, in concert with the efforts of multiple market and non-market allies through: (1) making EE relevant (by linking it with complementary building industry trends/interests) (2) encourage demand by creating an impetus for change in the market that leads to demands by owners, occupants, and investors (more than sharing information, rather involve and engage market actors) and (3) standardization within the development and design process. Building industry tends to standardize/routinize - take advantage of this... new ideas need to fit within existing development models as much as possible.</p> <p>Strategies:</p> <ul style="list-style-type: none"> Leverage green buildings Interest in quality work environments Smart buildings/technology <p>Changes in development practice through partnerships with leading edge design /delivery firms. Integrated design teams, commissioning, targeting large, vertically integrated real estate firms.</p> <p>Regulation/incentives for public goods (for example: flexibility on other aspects of use permits and community design goals)</p> <p>Use design and delivery professionals to reduce risk (buffer from energy price spikes - allow a building to function in an outage situation (windows that open, daylighting)</p> <p>Overall marketing and coordination to increase the relevance of ee to key market actors (use market actors as intermediaries.</p> <p>[ACEEE 2002. Kunkle, Lutzenhiser - focuses on several programs including CBI]</p>
<p>Market Actor: Designer influence</p> <p>Addresses some of the on-going issues related to how</p>	<p>Designing from Experience: The Effects of Research on Practice. Reviews impacts (long term) of BPA’s Energy Edge. Notes that many factors are at play regarding adoption of ee measures, including social aspects of firm (educational level of chief building official, size and positioning of firm in the market, personnel resources). Finds that designers experience with the project was mixed. Less than half of the participants said they would design differently as a result</p>

<p>much influence designers actually have, as well as the long-term impacts on the design community (i.e. will designers change their behavior on future projects) Suggests that designers are not necessarily an effective vehicle for change.</p>	<p>of their experience with the program. Goals were to influence current practice by promoting interest and proficiency in construction and create prestige and recognition for Energy Edge building professionals - promoting conservation among the general population.</p> <p>“Designers constitute a crucial connection between innovation and implementation. They decide whether and how to incorporate Energy Efficiency Measures in the buildings designs they provide to their clients. <i>Although architects, engineers, and others involved in the construction industry are in a position to provide efficiency, it is usually not their primary job to do so.</i> To the extent that EEMs fit within designers’ occupational context, their adoption should be rapid. But if attributes of EEMs detract or are perceived as detracting form designers’ goals, then it is unlikely they will be adopted”</p> <p>[ACEEE 1996 Janda. Reviews longer term impacts of BPA’s Energy Edge program - looks for lasting change in design strategies]</p>
<p>Market Actors: Designers Awareness and Practice of Energy Efficiency</p> <p>Points out the designers limited role in driving efficient practice and that program influence occurs only after multiple interactions between designer and program.</p>	<p>MPER 3 Architecture + Energy Program. The Architecture + Energy program between 1998 and 2000 educated over 400 architects in the region. These architects came from 163 firms. The evaluation demonstrated that participants in the program reported engaging in more energy efficient design practices than architects who had never attended an event. Further, those architects that had attended multiple events or from firms that had had multiple participants reported engaging in significantly more energy efficient design practices than individuals that had attended only one event or in firms where no others had attended.</p> <p>The branding of the program had appeal with regional architects and recognition among nonparticipants as well as participants.</p> <p>[NW Energy Efficiency Alliance, 2001. Peters & McRae]</p>
<p>Program Design</p> <p>Describes rationale for setting building design targets for efficiency. Notes that “standard practice” in NY exceeds code by 4-6%.</p> <p>Importance of TA</p>	<p>Moving Architects and Engineers Beyond Typical Practice. Generally describes the New Construction program when it was new, by NYSERDA staff. Key program features include the TA services provided by expert energy consultants to provide technical assistance and a local network of outreach professionals. Does not describe how the outreach to designers actually happens prior to an application being received by NYSERDA or present strategies for getting to projects in the key earlier stages (except by hiring credible and connected OPCs and having them attend meetings).</p> <p>Contains major components to reach designers through technical assistance and incentives.</p> <p>Lessons learned:</p> <ul style="list-style-type: none"> • New construction programs are transaction oriented. [many transactions, variety of players] • Customer commitment is critical. [rather than communication between TA providers, OPCs and A/E teams. Became clear that customer (owner) needed to be consulted and involved if the design team was to be encouraged to pursue ee. “Developing and maintaining an active working relationship with the building owner (or their representative) creates a strong advocacy for participation] • Provide flexible program guidelines. [forms kept brief, terms and conditions clear and condensed]

	<ul style="list-style-type: none"> • Develop an early intervention network. [ID projects at planning stages. An early detection network] • Define standard practice. [Standard Practice Document defines standard practice and does not discourage those with good base design standards] <p>[ACEEE proceedings 2000, Mark Eggers, Craig Kneeland, Chris Reohr]</p>
<p>Incentives for Owners and Designers</p> <p>Owner incentives are high to gain owner support of project. Program focus is to permanently alter designers practice to use whole building integrated design. Targets the Team and building the team capability for continuing on future projects.</p>	<p>Transforming Design Practices: A Statewide Program for Nonresidential New Construction. Describes the initial year and goals of Savings By Design as launched in California. Outlines reasons for the design focus. Program is aimed at “encouraging greater design team cooperation and integrated building design”</p> <p>Notes that nonresidential new construction programs have generally focused on motivating owners to incorporate ee features in their projects (producing significant energy savings at an effective cost) but producing little in the way of “sustainable changes in design practices”. Sustainable changes = MT... no measure yet on sustainability of changes in design practice (published in 2000 - needed more time)</p> <p>SBD is described as being designed to address the major barriers to design teams, using a whole building analysis approach.</p> <p>“Market has two sets of important actors:”</p> <ol style="list-style-type: none"> 1. building owners and developers 2. design team members (architects, engineers, lighting designers, energy consultants, contractors and others) - [note if all potential members of a design firm are targeted?] <p>Describes fragmented “over-the-wall approach” of design currently</p> <p>Due to diminished communication between architect and owner, construction manager has taken more responsibility for contracting</p> <p>Describes theory and the barriers the program seeks to overcome through (a) helping to integrate the design team and their process, (b) encouraging integrated energy efficiency analysis/design, and (c) providing incentives to encourage all the actors to support the extra up-front work that integrated design requires.</p> <p>Whole building approach vs. Systems approach. Whole building is preferred...“maximizes energy savings through an iterative process” that fosters a “more cooperative relationship among the design team than does an isolated, sequential look at the building systems”</p> <p>Offers incentives directly to the design team for whole building work that achieves at least 15% efficiency improvement over Title 24. Generally must be in schematic or early design phase. Owner’s incentives are described as “always larger than the design team’s”</p> <p>“Although owner incentives by themselves are unlikely to bring about sustainable changes in the nonres. New construction market it is important to have the full support of the owner.”</p> <p>Described as going beyond incentives and focusing on permanently altering the practices of the design community.</p>

	<p>Have designers work more as teams, have them have positive experiences from doing so and maintain those teams over the course of future projects.</p> <p>Contains several possible recommendations for the future.</p> <p>[ACEEE 2000. Stone, Mahone, Chappell, Duhon]</p>
<p>TA and incentives to designers.</p> <p>Designers in CA-SBD only get incentives for whole building design.</p> <p>Impact of designer focused program (Savings By Design).</p>	<p>NRNC Building Efficiency Assessment Study Statewide Final Report. (CALMAC). (Savings by Design) Designer participants were asked to state which member of their design team was the biggest advocate for participating in SBD. Responses were owner/developer (42%), mechanical engineer (29%) and architect (17%). Owners cited energy managers/facility managers as the second biggest advocate for the program where as designers cited mechanical engineers.</p> <p>Significantly detailed reporting on various aspects of Savings By Design including impact and process information. Familiarity with Integrated Design approach, overall building performance, importance of financial aspects in planning. Summary data:</p> <p>Gross Realization Rate 106.6%</p> <p>Participant Net Realization Rate 63.2%</p> <p>Participant Net to Gross Ratio 59.3%</p> <p>Comprehensive Net Realization Rate 86.9%</p> <p>Comprehensive Net to Gross Ratio 81.6%</p> <p>Some indication and discussion of non-participant spillover: "It is very likely that as Savings By Design continues to deliver energy savings through owner and design team incentives and training that the program will change standard practice related to energy efficiency design practices.... As SBD program administrators strive to bring new customers into the program, while at the same time limiting service to those that have previously participated, the net to gross</p>

	<p>may vary well exceed 100%. Suggest an adoption of ee technologies without the need for utility subsidy." Pg. 68. Methodology used to determine discussed.</p> <p>[RLW Analytics, 4/2003. Report on the NRNC. Savings By Design SCE. CALMAC website]</p> <p>Note: there are other market and quarterly reports on SBD available on the CALMAC website.</p>
<p>Marketing</p> <p>Social marketing is approach for changing behaviors, especially high involvement behaviors that are resistant to change. Most effective as a relationship based approach that addresses each step of change process in a sequential fashion.</p>	<p>Social Marketing. "Marketing Social Change Changing Behavior to Promote Health, Social Development and the Environment" Promotion has to include "personal selling" or one-on-one interactions. Behaviors must be easy to do. Customer driven approach critical = asking for behavior that is "high-involvement" competition is status quo- customers may have ambivalent or negative feelings about the activity (there may be perception of significant risk).</p> <p><i>Transtheoretical Model (p 144-45)</i></p> <ol style="list-style-type: none"> 1. Precontemplation: Market actors really are not thinking about the behavior as being appropriate for them at this point in their lives. 2. Contemplation: Market Actors are actually thinking about and evaluating recommended behaviors 3. Preparation: Market Actors have decided to act and are trying to put in place whatever is needed to carry out the behavior. 4. Action: Market Actors are doing the behavior for the first time - or first several times. 5. Confirmation: Market Actors are committed to the behavior and have no desire or intention to return to earlier behavior. <p>Andreasen notes that they found it was important to emphasize the benefits in early stages and emphasize costs in larger stages.</p> <p>Andreasen's own five stages:</p> <ol style="list-style-type: none"> 1. Creating awareness and interest. Target market actor has to be aware of desirable new behavior and that it may be appropriate. 2. Changing values. Changes in market actor customers and community norms will require the target market actor believe that the proposed behavior is acceptable to people like them. 3. Persuading. Market Actor perceives that it is ok to carry out the behavior (generally) must move to conviction that it is personally desirable to do so. 4. Creating action. Convincing a market actor of the value of a particular behavior is one thing. Getting action is harder - may be more a matter of making the behavior easy to undertake. 5. Maintaining change. Often behaviors targeted are being targeted for lifetime change (or persistent change) <p>[Andreasen, Alan. 1997. Lawrence Erlbaum Associates. Inc.]</p>
<p>Marketing</p> <p>Aspect of marketing successful in residential programs - in commercial through LEED.</p>	<p>A Business-Venture Approach to Green Building Programs. New construction approaches that involve branding and collaboration. Establishing relationships with a variety of market participants who embrace the common values and goals of environmental stewardship - Green Building practices promote health, comfort and well-being of the building occupants while minimizing the impact on the environment. GoodCents, USGBC, Earth Advantage... discusses the value of brand identity, licensing and marketing.</p>

	<p>Provides technical and marketing support to enrolled builders - few incentives, rather increased merit.</p> <p>[ACEEE proceedings 2002. Banks, Katz. Addresses the efforts of Portland General Electric to develop and market their "Earth Advantage" homes program.]</p>
<p>Promotion/Marketing</p> <p>Recommends promoting enhanced value strategies to design professionals - have them promoting</p>	<p>Commercial New Construction Programs: Results from the 90's, Directions for the Next Decade. Advocates that commercial new construction programs wanting to have MT effects focus on "code plus" strategy - steady adoption of code improvements into state building codes (not publicized externally) using the same general format as current codes, but with more stringent requirements. Also focus on "enhanced value" strategy. Overcome barriers through increasing perceived value that decision-makers place on efficient construction practices. (make operating costs a concern to owners - multiple benefits, increased comfort, reduced construction costs, improved equipment, environ impacts). Advocates promoting these measures to design professionals to help make them advocate for the design strategies. Changing attitudes and values is a slow process, long term effort.</p> <p>Describes the relationship of these strategies with roles of diffusion.</p> <p>[ACEEE 2000. Johnson, Nadel. Refers to several programs that offer various aspects of services to new construction market: PacifiCorp's FinAnswer, SCE & PG&E's early efforts at component oriented programs, BC Hydro's Commercial New Construction Program, Mass. Electric's Design 2000, UI's Energy Blueprint program, Good Cents and Super Good Cents, BetterBricks]</p>
<p>Promotion/Marketing</p> <p>The NYSERDA New Construction program uses 1 and 2, but appears weak on 3, 4 and 5.</p>	<p>Developing a Roadmap to the 21st Century for Commercial Buildings. DOE work on RD&D activities for the next 20 years regarding commercial buildings. Value of Whole Building approach, interrelated systems. Commercial buildings are responsible for roughly one-sixth of all energy used by US. Recommends that the overall building process be revolutionized to eliminate fragmentation and minimize inefficiencies and lost opportunities - through early and continued collaboration between various players (owners, architects, financiers, and operators). Cooperative, integrated building construction process is a fundamental change. Need QA for building performance. Create receptive audience for Whole Building approach, incent early collaboration in design, siting, etc.</p> <p>For MT:</p> <ol style="list-style-type: none"> 1. Prove the whole building approach through case studies and database of stellar buildings 2. Develop overall marketing plan 3. Conduct market testing and analysis for best approach, promote creative financing and procurement 4. Develop brand name and id sustainable whole buildings. Benefits for branded product could include preferential land use, tax incentives, variances 5. Disseminate info about the value of whole building approach. Change specs/guidelines and standards, operations and maintenance. <p>[ACEEE 2000. Crawley. Discusses DOE's Office of Building Technology, State and Community Programs efforts to develop a "technology roadmap", a big picture of where the industry sees itself over the next few decades]</p>

<p>Communication</p> <p>Support for idea of integrated, whole building design strategy</p>	<p>Revealing Myths About People, Energy and Buildings. Reviews some common beliefs/messages in efficiency and building design. “Communal knowledge is a complex body of ideas and statements.” Specifically: “Energy efficiency increases the first cost of buildings” - integration can lead to lower loads.</p> <p>Another “If only we had gotten into the design process earlier we could have improved the energy and environmental performance of the design.” <i>“Reality is that design budgets allow for only brief encounters between energy consultants and the design team, and it is not always clear at what stage the partnership is most useful. Too often a strong energy design is compromised by decisions made later in the process after the energy consultant has left the team.”</i></p> <p>Sustainability=environmental quality=greater productivity. Challenges this concept through discussing the difficulty of measuring and evaluating “productivity” .</p> <p>Another: “people behave rationally” (rational from their perspective)</p> <p>Another: “EE measures and retrofits reduce energy use” (dependent on accuracy, appropriateness, behavior)</p> <p>[ACEEE 2000. Diamond, Moezzi.]</p>
<p>Outreach - nature of networks. Ability of networks to absorb and reframe information.</p>	<p>Several articles/books related to “small-worlds” and networks. Concept of networks being re-wired to introduce increasing amounts of disorder. Absorbing and processing new/discontinuous or unfamiliar information. [Rather than a hierarchy approach - information lost or trapped at various steps.] Diffusion related to adult learning - combining knowledge, creating new competencies, integrating new knowledge - “put simply, firms must become processors of knowledge. [Adult learning articles reflect need for self direction in learning.]</p> <p>Key lessons:</p> <ul style="list-style-type: none"> • Firms rarely innovate alone, increasingly rely on interactions with a variety of actors • Knowledge intensive services is increasingly important in innovation • Informal networks and trust are important. Network building is slow, relies on affinity and builds loyalty. “It takes time and resources to build efficient communication channels which seemingly rest on more “soft aspects,” such as culture, personal experience and mutual trust.” • Institutional frameworks reflect the differences in the way innovation is pursued. <p>Knowledge is increasingly specialized - requires that two or more experts combine their different knowledge sets and create a new, partially shared knowledge base. (Hamalainen & Schienstock.)</p> <p>Difficulties in exchanging individual knowledge over come through individuals have access to each other; development of common cognitive frame; shared language; overlapping knowledge structures (absorptive capacity). [All indicate that integration and reframing of problem will require on-going relationship].</p>
<p>Outreach</p>	<p>Building Change: Characteristics of Design Firms and Their Effects on Energy Efficiency Adoption.</p>

<p>Only including firms that are likely to respond will limit the reach into design community.</p>	<p>Categorizes architecture firms and suggests that design firms that participated in utility-funded energy efficiency projects are more qualitatively oriented than non-participants. More apt to be strong idea firms than non participant firms</p> <p>[ACEEE 1998 Janda.]</p>
<p>Outreach</p> <p>Innovations need key aspects and need to have a wide range of tools - particular windows of opportunity need to be exploited.</p>	<p>Hurdling Barriers Through Market Uncertainty: Case Studies in Innovative Technology Adoption. Focuses on Roger's Diffusion theory. Discusses key aspects: relative advantage; compatibility; complexity; trialability; observability.</p> <p>Implies strong component of time dependency to adoption. Windows of opportunity (CA crisis) enlarges the window of innovations that may be adopted. Break down the supporting framework of the steady state, building inertia for change.</p> <p>A program implementation approach that identifies and attempts to capture the ee potential of a wide range of measures is more likely to have the right tool in the box at a critical point than one that targets a specific tech or small set.</p> <p>[ACEEE 2002. Payne, Radspieler, Payne. Discusses the efforts of the CPUC and others during the energy crisis and how the perception of crisis allowed a window to open increasing diffusion of tech.]</p>
<p>Outreach</p> <p>Plan suggested OPC would be lead generators not project managers</p>	<p>Marketing and Communications Plan for the New Construction Program. (Baston, McAteer, 1999) Important for laying out the proposed marketing and outreach strategies for the NC program. Outlines target clientele, priority decision makers. Notes several barriers and strategies including mining leads at the earliest possible stage, relationship and ally building, the importance of word-of-mouth information dissemination, the ultimate need for training for building managers (BOC), address concerns about discomfort (rather than simple equipment failure). Significant focus on lead generation at early phases.</p>
<p>Outreach</p> <p>Strategy for outreach in which working the city planning departments provides access to project teams at early design stage.</p>	<p>EE Design assistance As Offered through City Planning, Zoning and Permitting Departments: Experience from the City of Oakland.</p> <p>Early intervention key and achieved through making contact with development teams through the city's Planning and Zoning Department. EE standards can be improved on only if the opportunities are addressed early in the building design. Point of Permit design assistance. City's active promotion was key to gaining access to decision makers early in the process - maximizing potential savings and cost effectiveness.</p> <p>Some issues with design build contracts.</p> <p>[ACEEE 2002. Kelsey, Vance. Focused on the impacts of the Energy Efficiency Design Assistance Program which provided free customized energy efficiency design assistance in Oakland]</p>
<p>Outreach</p> <p>Suggests very targeted</p>	<p>The Structure and Operation of the Commercial Building Market</p> <p>Key: there are a relatively small number of large firms operating at the regional and national level who, if influenced</p>

<p>outreach, long term relationship building to influence the most important actors</p> <p>NC program appears to target projects that follow traditional plan/design/build in which the architect is major player. Being used less than in the past, prone to mngmt & communication issues, national/intl. stage for architecture, lip service to sustainability.</p> <p>Are there efforts to encourage collaboration?</p>	<p>may cause significant transformation of the efficiency of commercial buildings. More attention needs to be given to understanding these regional and national markets.</p> <p>Programs that target the commercial building market often assume that the market is a relatively homogenous place. For example, programs target architects and architectural firms specializing in commercial structures assuming that they have significant influence over the design of the building. In some cases this is true. In other cases, the architect is just one of several building professionals having input but only minimal influence in the final design. (see communities of practice, above). Their research suggests the market is highly differentiated, with a small number of actors positioned to disproportionately influence the efficiency of buildings.</p> <p>Decision-making for large amounts of space is controlled by a relatively small number of large national and regional firms - may be best addressed through regional and national programs.</p> <p>Increased space is designed with lessee (split-incentive issues) recommend targeting tenants with information about increased productivity - tenants are a large audience that can be reached.</p> <p>Addresses specific issues with plan/design/build, design-build, collaborative process - collaborative process presents opportunities</p> <p>[ACEEE 2000. Reed, Oh, Hall. Meta review of other evaluations and findings related to commercial buildings. Not focused on impacts of one particular program]</p>
<p>Outreach</p> <p>Important to use existing networks and to build on these networks.</p>	<p>Network theory - "Examining Networks of Building Professionals, Developers, Owners and Contractors in the Commercial Building Sector". Interpersonal ties and networks are the key to widespread acceptance of new ideas and products. The importance of interpersonal communication through networks is stated as "the most effective way to reach about 85% of the target audience in a population such as professionals in the commercial building sector." Must understand the structure of a specific network, create linkages, shorten communication distances, use ties (even if they're weak). Implies that the onus is on the outreach contractors and technical assistance contractors to reach the right people.</p> <p>[Reed, Oh. 2003 IEPEC] econorthwest</p>
<p>Outreach</p> <p>Important to locate opinion leaders and use them to enter the networks. In general the cautious, risk adverse nature of NR construction means that "early adopters" may be perceived as poor models for most professionals.</p>	<p>Communication of Innovations: A Cross-Cultural Approach. Opinion Leadership. ID and focus on opinion leaders in a group. Use the clique. Notes that communication is improved when source and receiver are similar in certain attributes (beliefs, values, education, and social status) Must be rewarding to those involved. "New ideas usually enter by means of higher status and more innovative members of the system". Conflicting nature of "homophilious" communication: need common ground for communication, yet high degrees of it may restrict the flow of information out of the group to people lower or different than the clique.</p> <p>Some of the more cautious types wait until opinion leaders adopt the innovation. Need trusted leader to model the behavior. (Focus education and efforts on opinion leaders in a group).</p> <p>[Rogers & Shoemaker, 1983]</p>

<p>Outreach</p> <p>Process by which change agents are used to connect with opinion leaders and networks. Change agents need to have contacts in the networks.</p>	<p>Communication of Innovations: A Cross-Cultural Approach. (Same book as above, different aspect) Change Agent.</p> <p>Seven roles typical of change agent:</p> <ol style="list-style-type: none"> 1. Develops need for change. [Outreach and promotion would make the case. Needs statement - why the status quo is not sufficient.] 2. Establishes change relationship. [Need credibility to offer a solution - perception of motives is important.] 3. Diagnoses of problems. [Technical solution -maintaining credibility and providing solutions that work within the cultural values of the given market - "many change programs fail because they seek to swim against the tide of clients' cultural values, without steering toward clients' perceived needs."] 4. Creates intent to change 5. Translate intent into action 6. Stabilizes change and prevents discontinuances 7. Achieves a "terminal relationship" with client [i.e. non-commercial relationship. Notes that commercial change agent's motives are questioned due to potential that the change agent may seek to promote the "over adoption" of new ideas.] <p>Notes the importance of friendships, relationships of trust, and opinions of people they know and respect. [Relationship building aspect]</p>
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