The Facility Assessment Service: An Effective Design for Commercial and Industrial Multi-Resource Audits

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ABSTRACT

The Facility Assessment Service (FAS) program, designed in 1997 and implemented from 1998 to the present, represents a viable programmatic approach to utility operated multi-resource audits for commercial and industrial sector customers. Employing a formalized customer needs assessment dialogue as the basis for prioritizing resource audit focus and scope, followed by a technical audit and a follow-up action planning process. The FAS has been quite successful in identifying resource savings opportunities and motivating Seattle City Light (SCL) commercial and industrial customers to implement them. The FAS identified almost 23,000,000 kWh (2.6 average megawatts) of electric energy conservation savings in its first 2 years of operation at SCL, with actual implementation of more than 9,000,000 kWh (1 average megawatt) by customers. In addition, substantial water and natural gas conservation opportunities were identified. Although partial funding through SCL incentive programs supported most of the conservation actions, fully 23% were financed entirely by the customers. The levelized costs for this program were 31 mills/kWh for the service area, 19 mills/kWh for the utility and 13 mills/kWh for the customer. This paper describes the design process, program design, implementation, and first 2 years' evaluation results for this innovative audit program.

Introduction

FAS Description

The Facility Assessment Service (FAS), originally called the Operations and Resource Assessment (ORA), helps Seattle City Light (SCL) commercial and industrial customers manage their resource costs and improve productivity by identifying specific action items that can reduce both energy and non-energy (e.g., water) usage and associated costs. The service consists of a customer needs guided multi-resource audit to identify potential energy and non-energy savings at the facility and associated cost reductions. The principal product of this service is a report for the customer that includes recommended actions to reduce the customers' use of electricity, gas, water, and other resources of importance to them. To complete the FAS process, SCL staff discusses the report with the customer and, together, they develop an action plan to implement the actions recommended in the report, linking to SCL and other providers' services as appropriate.

Motivations for the Facility Assessment Service Development

In 1996, Seattle City Light's Energy Management Services Division (EMSD) began the development and delivery of "value added services" for its commercial and industrial customers. The overarching goal of these services was to provide new products and services designed to meet customer energy and operational efficiency needs and enhance customer relations, viewed in the context of the threat of utility deregulation and competition. These value-added services reflected a new SCL commitment, as outlined in its 1996 business plan to design and deliver a wide variety of customer-focused services (Seattle City Light 1996). As a part of this initiative, SCL conducted surveys of its customers to determine which types of services they would value the most. So-called "customer focused audits", defined as resource audits where customer input and their perceived needs provide significant direction to the audit process, were highly rated by all types of commercial and industrial (C/I) customers in market research by a consultant to the utility (Barakat & Chamberlin et al. 1995). Customer focused audits were considered "very valuable", by 74%, and "somewhat valuable", by 23% of a sample of 34 Commercial and Industrial customers surveyed in the SCL service territory. Such statistics were a clear mandate to develop and deliver customer-focused audits to as many SCL C/I customers as practical, and formed the conceptual basis for the FAS program design.

The same study noted that respondents in particular valued the more comprehensive look at resource efficiency opportunities (beyond just electricity) proposed for this service, and bringing the customer's broader business goals into consideration. Many customers made the distinction between this new "Customer Focused Audit" service and past City Light audits which they perceived as narrowly focused on electrical energy issues.

When queried on their opinions on scope and content they would like in the audit, the overwhelming majority (74%) indicated that auditing resource use efficiency inclusive of other fuels would be "very valuable". Including other resources, such as water and sewage in the audit was also favored by 69%.

In response to these findings and shared institutional knowledge of energy auditing based in previous energy audit program experiences, SCL developed the FAS as a customer-focused multi-resource audit of the business operations and facilities primarily for their large customers. Three versions of the service were developed: the "standard FAS", for C/I customers whose facilities use between 500,000 - 3,000,000 kWh/yr., a "premium FAS" for SCL's largest customers (>3,000,000 kWh/yr.), and a stripped-down "mini-FAS", for customers using 100,000 - 500,000 kWh/yr. Most of the audits and resource savings have come from the "standard FAS" service. All these services are offered at no charge to the customer, with cost recovery being in the form of energy and water cost savings to SCL and their water utility partner, Seattle Public Utilities (SPU).

Why Multi-Resource Audits?

Energy audits are at least as old as electrical demand side management, and when effective have been a key step in identifying and prioritizing opportunities for energy savings efforts by end users and their utilities or other energy service providers (ESPs). Unfortunately, many audit reports end up gathering dust on shelves despite the considerable expense and time spent to prepare them. Worse, when such efforts come to nothing, the

relationship between an ESP and their customer may actually be damaged by the perception of wasted time and effort.

Focusing audit efforts only on energy resource uses, although common, is not optimal. Electricity end-users usually also consume water, and often gas or some other energy resource. In addition, these consumers are invariably also generators of waste streams of multiple kinds, including sewage, solid and gaseous wastes. With the considerable effort made to recruit and execute an energy audit of a facility, it is a natural extension to also include audits of as many of these other resource streams as possible. At first consideration the primary value of this approach may appear to be efficiency from the auditor's perspective, and the necessity of considering interactions in uses of interchangeable energy supplies. While these are important advantages of a multi-resource approach, perhaps the strongest motivation for combining audits is a desire to maximize the valuable attention of the customer being audited. The efficiency of multiple resource audits improves professional image, credibility and customer relations both when requesting facilities staff for needed audit support, and when presenting proposals for facility improvements to a customer's management. This approach both minimizes intrusions in the customers' valuable time, and also provides multiple motivations to entice the customer to action: while one customer's management will have more interest in water savings, another's may be focused more on energy or solid waste reduction.

Goals of the FAS

The primary goal of the FAS from SCL's perspective is to increase energy and water conservation by their commercial and industrial customers. A secondary goal, as noted before, is to improve customer relations. Both these goals are achieved by providing the customer with recommended actions to improve their facility operations and use of resources. This approach provides benefits to both the utility and the customer, as listed below in the FAS Business Plan (Van Holde 1996):

FAS benefits to the customer. SCL assumes FAs provide benefits to customers by helping them:

- Develop personal relationships with utility representatives. When they have utility problems, they will know people to call;
- Implement action plans to refine their facility operations and increase their efficiency in utilization of resources, thus improving their business;
- Reduce their over-all operating costs through opportunities directly identified in the FA and through other analysis services recommended by the FA;
- Identify technical specialists with knowledge or skills they need through referral by City Light Staff or in the FA report;
- Obtain other needed City Services through referral by City Light staff; and
- Increase their pool of business contacts and trade allies for operating their business.

FAS benefits to Seattle City Light. Facility Assessments complement SCL corporate goals. As noted in the 1996 Seattle City Light Business Plan:

"The most valuable and sought-after piece of the future electric utility business will be the customer relationship".

If well implemented and supported by the utility, FAs can be used as a springboard for continuing dialog with our customers, leading to mutual trust and a better understanding of their needs and interests.

FAs support City Light goals in general and the SCL Retail Services Branch specifically through:

- Increasing acquisition of conservation resources. Assessment of customer facilities will naturally lead to identification of conservation opportunities.
- Higher customer satisfaction. Developing personal knowledge of our customers builds relationships based on trust.
- A gateway to develop markets for other services with our customers. FAs are used to identify and prescribe retail services SCL is offering, thus increasing subscription to these services.
- Personal interaction to find out what services customers value most. FAs provide valuable market intelligence as the first step to developing new retail services.
- Providing a direct contact data source from customers. City Light urgently needs information conduits direct from the customer (as do most utilities).

Program Design Highlights

Key Elements

Opportunities for improvements to the customers' facilities are identified and articulated to the customer through a sequence of three distinct elements in the Facility Assessment, similar to processes defined by others (Harrigan 1991, Frahm 1996):

1. *Customer Needs Assessment interview(s)* begins the process by providing an understanding of major business issues affecting the customer, areas of utility business interest to the customer, and customer perceptions of their primary needs and/or service deficiencies as they relate to the utility.
2. *Prescribed data gathering, analysis and reporting*. Examples of data gathering include billing data, equipment inventories, building system characterization, and industrial process mapping. Analysis is the application of best practices in resource efficiency to identify and prescribe improvements for the customer's facilities. Reporting includes all aspects of documenting the current facility conditions and recommendations for improvements in a manner promoting effective communication.
3. *Action planning directed to encourage and support post-audit implementation* is the crucial step to keep the audit report off a dusty shelf. Experience has shown that the customer needs to be led through the audit results, followed by a discussion leading to agreement on next steps that are then documented and communicated back to the customer after the presentation. Ideally, this "Action Plan" step leads smoothly into follow-on services that will implement at least some of the audit recommendations.

FAS Service Process

Figure 1. illustrates the FAS process once the customer has been qualified and accepts; please refer to it while reading this section for an understanding of the interrelationships between the various steps in this process.

A Facility Assessment is typically a one-work-week task, a good part of which is spent with the customer. This time includes 2 to 4 hours in which the SCL representative(s) becomes familiar with our information on the customer, including a review of utility records; 4 to 12 hours in the facility interviewing staff and looking at the systems (this may include technical support staff, either SCL or contracted); and 10 to 24 hours analyzing the data and preparing a report. Much of this last category of tasks can be done by either the SCL representative or a contracted specialist. Total time per assessment averages 40 hours for the "Standard" FAS.

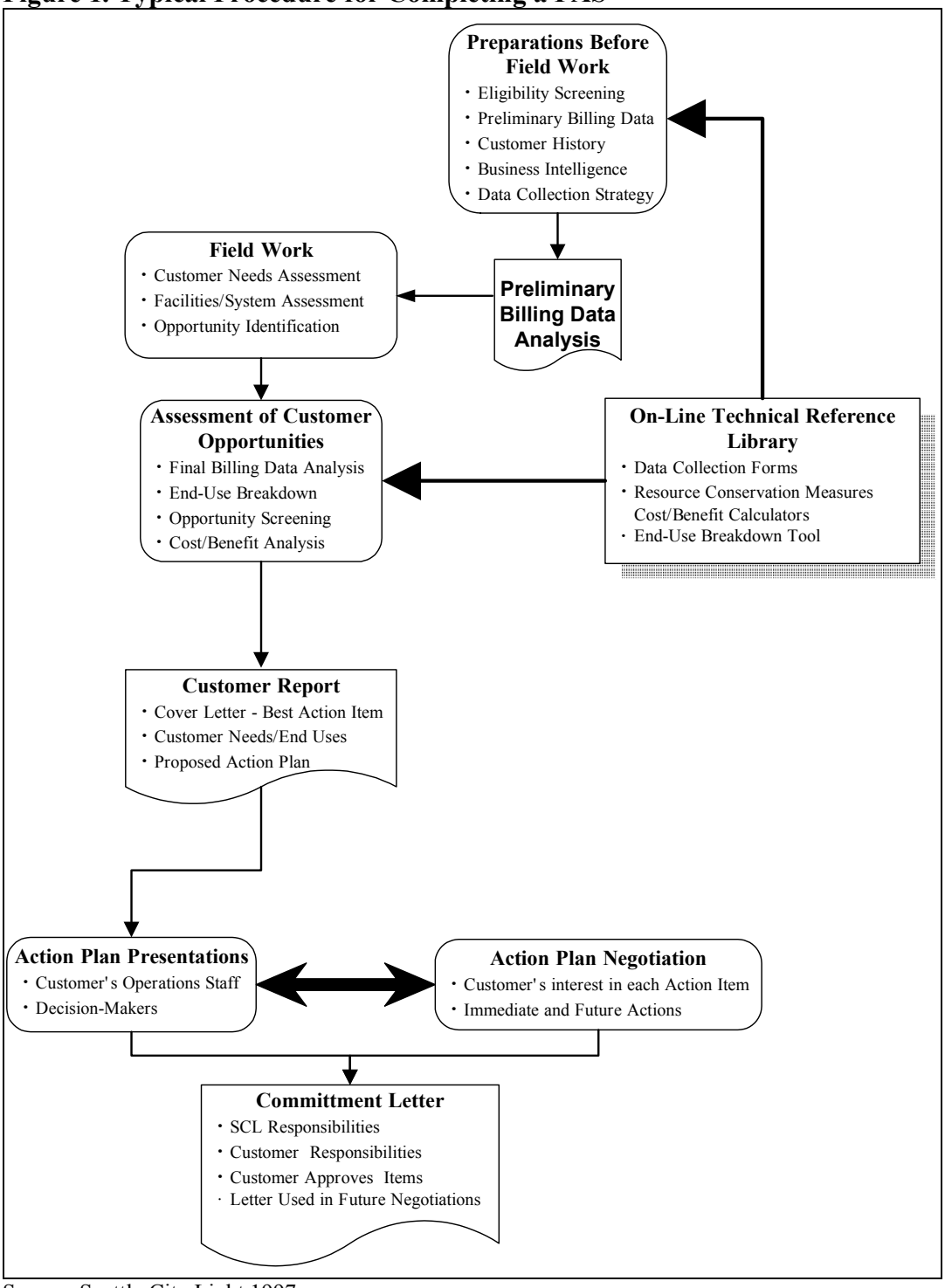
"Premium" and "Mini" FAS processes were scaled from the base product. Roughly 80 hours are allocated per FA for the "Premium", recognizing the complexity of their facilities, while a "Mini" is limited to no more than 20 hours in principle. As might be expected, expanding the time allotted is easier than reducing it. In the longer FAS, the extra time is typically taken up in more complex data gathering and/or modeling tasks, while in the shorter version time is saved through simplified resource use and conservation calculations based on minimal data gathering and assumptions about these customer segments.

In preparation for the customer visit, SCL staff research the customer. This effort includes collecting appropriate resource billing data, rates information, and study of any other information we may have on that customer. This sets the stage for a productive dialogue with the customer by immediately demonstrating that we have information of value to them.

While visiting the customer, staff assesses their business needs in structured *customer needs assessment* interviews. These interviews will define, in part, the focal areas of the FA. Following interviews SCL staff accompanies facility personnel familiar with operations on a tour of the facility to identify and characterize systems and look for opportunities. If the facility or the customer's interests are technically complex, it is often necessary to bring persons experienced with the systems in question to assist. In many cases a contractor will provide this technical expertise.

Having collected data and views on the customer's business, City Light staff produces the FAS report, working with contractors as needed. When complete, the report is sent to the customer and a presentation of the results with the appropriate facility staff is scheduled.

Figure 1. Typical Procedure for Completing a FAS



Source: Seattle City Light 1997

An action plan is developed in discussions with the customer when the FAS results are presented. There are three distinct steps in ratifying an action plan:

1. Customer agreement in principle to some or all of the recommendations made in the report
2. Customer prioritization of the action plan
3. Customer agreement to pursue, with SCL, one or more recommendations in the action plan on some schedule.

Customers are not expected to finalize this process at the presentation session, but the FAS process is not considered finished until an action plan is ratified or the customer indicates no interest in pursuing any actions. Likely actions include:

- For-cost services currently being marketed
- Detailed technical studies of specific systems the customer is interested in improving
- Simple Incentive Services (such as lighting projects) for implementation directly
- Specialized SCL services as appropriate
- Power Quality Surveys

This is considered the end of the FAS process.

Performance Standards

Measures of success set for this service included:

- *Implementation rate of Action Plans:* Were recommendations made in the FAS action plans implemented? What percentage of recommendations was implemented within a 1-year period following the service?
- *Impacts of Implemented Recommendations:* What was the actual resource savings captured as compared to those estimated in the FAS? What are the revenue or cost avoidance values of these implementations to the customer and utility?
- *Customer Satisfaction/Value:* Were customers satisfied with the quality and timeliness of the FAS reports, did they value the dialogue with utility representatives? Was SCL's image improved by this service?
- *Creation of Opportunities for Related Services:* Was the service a successful marketing tool for related services?
- *Meeting Market Share Objectives:* Did the FAS meet production goals for the estimated potential market for the service?

Measurement Methods

The measurement of these performance standards included:

- *Implementation rate of Action Plans and recommended Related Services:* SCL EMSD conservation tracking systems were used to measure implementation rates of recommendations the number of recommended services customers opted for, and the timing of these events.

- *Impacts of Implemented Recommendations:* SCL EMSD conservation tracking systems were also used to measure and report resource and financial savings resulting from the recommendations implemented.
- *Customer Satisfaction/Value:* The FAS service satisfaction survey was, performed by SCL's Energy Management Evaluation Unit (with consultants).
- *Meeting Market Share Objectives:* This was measured with existing SCL tracking systems along with implementation rates.

FAS Results

Evaluation Survey

To assess opinions and satisfaction with each element of the FAS service, independent evaluators conducted telephone interviews with 73 customers who participated in the FAS service during 1998 and 1999. The data that follows below are primarily from that evaluation, with permission and thanks to those who prepared that evaluation (Coates, Pearson & Skumatz 2000)

Service Participation

During 1998 and 1999, 129 FAS audits were conducted, producing 110 FAS reports and 123 action plans. Those 123 FA services that include action plans were considered completed. Although the implementation plans projected a customer demand of 99 FAS services per year, both early marketing and staffing limitations were barriers to achieving that goal. Management recognized this early in the first year of operation, and was satisfied with the numbers achieved. Customers said in the evaluators' interviews that their main reasons for participating included the free service, the identification of conservation measures in the audit, and viewing City Light as a trusted information source. Most customers understood that they would receive a facility audit and an FAS report. Unfortunately, fewer than 20% of the customers understood that the audit would also cover non-electrical resources and that an action plan was part of the service. This is believed to be one reason that fewer non-electric resource conservation recommendations were identified and implemented.

Customer Satisfaction

Evaluators' interviews revealed that FAS recipients were very satisfied with the ability of the FAS staff to explain the service, and their awareness of and responsiveness to the customers' business needs. They were also quite satisfied with the three FA services- the facility audit, the FAS report, and the action plan. On the five-point satisfaction scale, where 5 represent "very satisfied," the ratings for staff skills and the service components averaged 4.4.

Customers were also asked how satisfied they were with their energy and non-energy savings and with the cost reductions their company achieved as a consequence of the FA service. In contrast to their ratings for FA services, customers were merely satisfied (ratings averaged 3.3) with the savings and cost reductions they achieved as a consequence of the FA service. This result was not unexpected, although no specific satisfaction goal had been set

for this measurement. Unfortunately, the survey instrument did not reveal the exact reasons for this discrepancy in satisfaction. SCL staff used this data to induce that the action-planning phase of the program needed more focus to foster higher implementation rates.

Service Strengths and Weaknesses

SCL staff, consultants, and FA customers were quite satisfied with the audit, the report, and the recommended conservation measures. Customers were also quite satisfied with the staff's knowledge and the increased conservation awareness that they gained from taking part in the service. Service weaknesses noted by both customers and staff included the lack of timeliness of services and the extent to which resource savings and associated cost reductions were realized in the facilities. These results were expected: Many reports took substantially longer than the prescribed time to complete, and only 39% of resource savings projections in the recommendations were actually implemented within 1 year of the FAS. Some more savings are expected as customers find funds to implement projects. While this difference between projections and actual implementations may disappoint those involved, compared to most audit programs, this is an excellent result.

Resource Savings

There was considerable success in the FAS identifying potential electrical savings in customers' facilities and in having them take action to obtain savings. Of the first 96 projects served by the FAS (those for whom at least 1 year had passed since the audit at the time of evaluation), staff identified potential electrical savings of almost 23,000,000 kilowatt-hours (2.6 average megawatts). This exceeded a goal of 22,000,000 kWh for the 2-year period, assuming 99 audits per year, as originally projected. Of this, actual savings of more than 9,000,000 kilowatt-hours (1 average megawatt) were captured by conservation measures in the facilities during the first year following the FAS. Although most of these measures were supported in part by financing from City Light's conservation programs, a sizable proportion of the savings (23%) were financed entirely by the customers.

The FAS was also successful in identifying potential water savings in customers' facilities. For the initial FAS projects, the audit staff identified potential savings of more than 34,000,000 gallons. A smaller percentage of these savings were ultimately captured by customers than for electricity, with the water savings being more than 5,000,000 gallons. Almost all of these conservation actions taken by customers were financed entirely by the customers themselves. Only one of the eight water projects received financing through a Seattle Public Utilities conservation program.

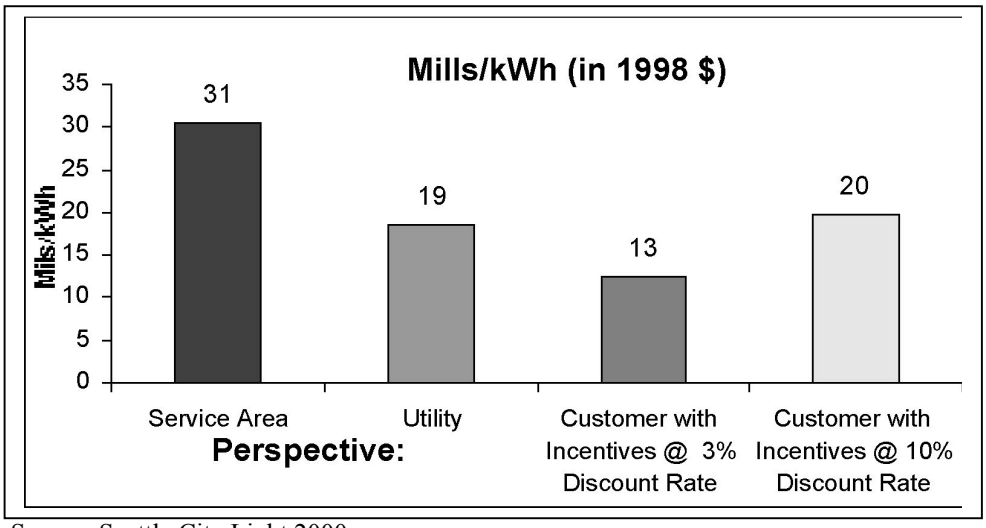
Almost 199,000 therms of natural gas savings were identified in the FAS audits. Of this potential, actions were only taken in three facilities and the resulting energy savings were approximately 5,000 therms. All of the natural gas savings were financed solely by the customers.

Resource Savings Cost-effectiveness

The FA service was designed to identify conservation actions that, if implemented, would be cost-effective to both the customer and Seattle City Light. The FAS was successful

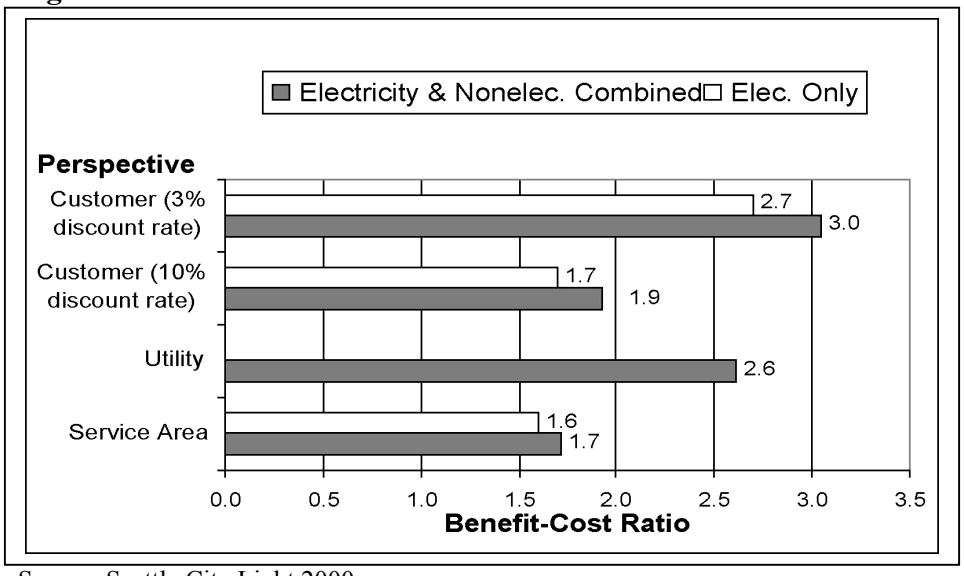
from the viewpoint of cost-effectiveness, with low levelized costs and positive benefit-cost ratios for both the electrical and combined electrical and non-electrical analysis. For the electrical resource, the levelized costs per kilowatt-hour saved from the three perspectives typically used at SCL were: 31 mills/kWh for the service area; 19 mills/kWh for the utility; and 13 mills/kWh for the customer. For the analysis that combined electrical and non-electrical costs and savings, the benefit-cost ratios for the three perspectives were: 1.7 for the service area; 2.6 for the utility; and 3.0 for the customer. Figures 2. and 3. show these numbers graphically.

Figure 2. FAS Levelized Costs



Source: Seattle City Light 2000

Figure 3. FAS Cost-Benefit Ratio



Source: Seattle City Light 2000

Types of Measures Implemented

Lighting and HVAC measures represented a total of 60% (38% and 22%, respectively) of the 279 measures included in the study. Water measures accounted for another 18% of the recommendations. Table 1 shows the distribution of the types of measures recommended through the service.

Notably, it was also found that a large share of customers took actions that were not among the recommendations from the FAS. More than one-third (38%) of the non-participants have implemented measures since mid-1998. Both of these statistics are to be expected, because SCL maintains many other incentive and conservation programs. In addition, 12% of the FAS participants implemented additional measures that were not recommended as part of the service. These 15 measures represented a total of 5% of the total measures (recommended and non-FAS measures) studied in the evaluation.

Table 1. Percent of FAS Recommended Measures by Type

Measures Recommended	Percent
Percentage of measures recommended by type of resource	
Electricity	86%
Water	10%
Gas	4%
Percent of measures recommended by O&M vs. Capital	
Capital / measures	84%
O&M measures	16%
Percent of measures recommended by end use	
Lighting	38%
HVAC	22%
Controls	10%
Refrigeration	5%
Other	7%
Water	18%

Conclusions

The Facility Assessment Service has been successful for Seattle City Light. We feel that this is primarily a result of detailed up-front business planning and the incorporation of innovative features, including customer needs assessment as the audit process driver and action planning on the rear end to increase adoption of recommendations made in the audit. Although reporting on the early results of the FAS was delayed substantially (virtually 2

years, given the timing of evaluation and ACEEE conference schedules), the team feels that the approaches used, with their demonstrated results are worthy of being shared.

Acknowledgements

The authors would like to thank all the dedicated staff in the SCL auditing teams, SCL's Energy Management Services Division in general, the consultant firms SBW Consulting and Willis Energy Ltd., as well as the evaluation teams at SCL and Lisa Skumatz, of Skumatz Economic Research Associates, for their efforts to make this service a good one.

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