Evaluating Multi-Resource Audit Programs to Demonstrate Sustainability, Payback, and Customer Benefits: Incorporating Non-Energy Benefits (NEBs)

Lisa A. Skumatz, Ph.D., Skumatz Economic Research Associates, Inc., Boulder, CO
Brian Coates, Seattle City Light, Seattle, WA
Dennis A. Pearson, Seattle City Light, Seattle, WA
John Green, Skumatz Economic Research Associates, Inc., Seattle, WA

ABSTRACT

A survey of more than two dozen multi-resource audit programs around the nation indicated that these programs provide important benefits, both for participants and for the utility(ies) offering the program. These programs, offering combinations of electricity, gas, water, wastewater, waste, and recycling audit services, were very well accepted by both residential and non-residential participants. The survey of programs found participants appreciated that the audits provided integrated recommendations, and used the participant's time efficiently. The utilities gained because they were able to share information, marketing / outreach efforts, and program costs. Joint programs have strong credibility with participants; program staff report that non-residential participants are more willing to let them in the door, and participants find utilities a trustworthy source of information on audits and measures.

As a second phase, Seattle City Light's Operations Resource Assessment Program (ORA) provided an excellent opportunity to conduct a detailed process and impact evaluation of a specific non-residential multi- resource audit program. The evaluation included analysis of program documents, interviews with participants and non-participants, and installation data to assess the program's effects, and to provide feedback to refine the program. As an added effort, the authors assessed benefits to the participants in the form of non-energy benefits, specifically productivity and a wide range of other benefits. The evaluation found excellent benefit-cost ratios for the program – on the basis of electricity savings alone and including the program's broader benefits. Program design and delivery elements were effective; however, some program aspects warrant focus and improvement in the future.

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Review of Multi-resource Audit Programs

Skumatz Economic Research Associates, Inc. (SERA) surveyed almost two dozen programs across North America offering joint utility resource audits including various combinations of natural gas, electricity, water, wastewater, and solid waste services. The surveyed programs included those targeted at both residential and industrial / commercial / institutional buildings. In a number of areas in the U.S. and Canada, local power, water, and waste utilities have formed collaborative partnerships to provide customers with joint conservation audits under arrangements that offer the if utilities efficient use of resources and expanded markets for their conservation services.

Most of the surveyed programs used joint audit inspections for only up-front auditing for measure recommendations. Formal evaluation activities were limited. Few programs were conducting on-site inspections for ongoing monitoring and evaluation. However, the collaborative model for on-sites is just as applicable for evaluation inspections as for the up-front audits. Based on our review, the programs have shown significant benefits for both participating utilities and utility customers. Participating utilities can leverage scarce resources, diversify conservation programs, and reach more customers. The customers receive more comprehensive and integrated information, service

convenience, and financing flexibility. Collaborative audits have proven to be a cost-effective approach during both initial inspection visits to identify potential savings and during evaluation visits to measure program impacts.

We found challenges associated with these programs include program facilitation, coordination, and administrative issues, as well as some difficulties caused when both private and municipal utilities or potentially competing utilities are involved. Most of the older programs concentrated on joint energy and water services. Newer programs are adding wastewater and solid waste and recycling services. Most of the operating programs combining water and energy audits tend to be in communities where both services are provided by the municipality. In the commercial sector the services tended to be more varied and tailored to the company. Examples of recommended commercial modifications include:

- Energy (electricity and natural gas): efficient lighting fixtures, lighting automation, changes in lighting use, operational modifications, boilers, heat pumps, HVAC distribution insulation, and refrigeration insulation and replacement.
- Water: low flow toilets, water recycling, operational changes, and horizontal axis washers.
- Solid waste: cardboard recycling, food composting, excess materials reuse, reduced packaging, and reduced paperwork.

The programs are trying to provide high-quality, well rounded, and implementable recommendations using convenient, integrated program efforts. Many program staff suggested that the best approaches are not always the most complicated and that it is crucial for the information to be delivered in a way that is accessible to the user. In addition, the program staff we interviewed felt that listening is one of their key jobs. The program staff noted that, for businesses, conservation measures are not essential to the everyday output of product and production. Most business firms have lacked the expertise or mindset to be able to take care of it themselves. The joint audit programs are successful at providing an appropriate level of service conveniently, and from a credible source (the utility). In fact, the program staff found that even when single utilities had already delivered programs, there were still many conservation opportunities to be exploited. Many of the recommended capital items had not yet been implemented, and technology continues to advance. Joint program staff found that customers were particularly willing to implement straightforward behavioral and small capital items, and O&M measures especially fit the very short payback periods that many businesses require for measures to be implemented.

One concern that was especially important for commercial audits was whether high-quality services could be offered using generalist auditors rather than experts. Although generalists could provide recommendations about behavioral changes and fairly low-tech capital recommendations and tend to be good listeners, most of the more sophisticated firms are more open to receiving recommendations from experts that are tailored to their business type. Recognized experts tend to be welcomed in the door more willingly than lower-tech general auditors. Based on evaluations SERA conducted of a variety of specialized commercial audit programs, credibility is a crucial link in getting in the door; inexperienced auditors are immediately recognized as such and business staff feels this wastes their time. We also found that providing multiple audit services at one time was another positive factor in getting in the door at busy commercial and industrial facilities.

Our review of more than two dozen programs found strong benefits from multi-resource audits, but we also noted that detailed evaluations had often not been conducted, so information identifying the program impacts was not available in many cases. In addition, we noted that these types of multi-resource audits were, by their nature, likely to provide strong benefits that extended beyond the confines of simple energy impacts. Therefore, we were interested in finding an opportunity to conduct a detailed evaluation of a multi-resource audit program to examine the associated impacts, benefits, and costs – and to incorporate an assessment of the participant value received from the program.

The Operations Resource Assessment Program

In late 1999, the opportunity arose. Seattle City Light (SCL) undertook an evaluation of their commercial / industrial multi-resource audit and assistance service called the Operations Resource Assessment Program (ORA). Skumatz Economic Research Associates (SERA) was hired to conduct the process evaluation and non-energy benefits analysis and to work with SCL to evaluate the program.

The ORA program has been offered since the December 1997 to Seattle City Light's commercial and industrial customers.[1] ORA provided a free, multi-resource audit to help customers manage their operating costs by identifying specific actions (measures and operations and maintenance recommendations) to reduce electrical, natural gas, and water usage. A resource use audit was conducted at each customer's facility to identify potential resource savings and associated cost reductions. A report prepared for each customer presented actions that would reduce the customer's use of electricity, natural gas, and water. Seattle City light staff discussed the report with the customer and an action plan was developed for implementing the recommended actions. The program was designed to test a new type of interactive, tailored, customer-responsive services to the Utility's commercial / industrial customers. The program's design provided tailored services, covering energy and water measures. The program was named to reflect an emphasis on going beyond traditional measures, and specifically to incorporate operational recommendations as part of the audit. The program also served as a conduit for financial incentives from other existing Seattle City Light Programs.

The City of Seattle was well-positioned to offer this multi-utility audit program. The City has municipal electric service and municipal water service. The City also has some control over the solid waste service; however, this was not a feature of the 1997-1999 version of the program we evaluated. Even though the City does not run the natural gas utility, the ORA program did provide recommendations on natural gas conservation measures.

The ORA program delivery involved a number of steps:

- Outreach and recruit participants: Utility staff took the lead on this effort, with some assistance from consultant staff.
- Schedule and conduct on-site audit of the facilities: Consultant experts were used to conduct the audits, usually with City Light Staff accompanying and providing additional input and expertise. Walk-through and detailed interviews were part of the audit process.
- Analyze savings and prepare report: The consultants reviewed the on-site information, prioritized recommendations, and prepared standardized reports that included a summary of the site, recommendations with estimated savings and costs. The reports included graphs and tables to summarize information and provide graphics to illustrate the potential of measures. The reports were issued from the utility.
- Referrals and Incentives: Auditors and utility staff took notes of the questions asked during the audit. Then, the utility forwarded questions to designated experts within the utility to provide answers to the customer – a "referral" process. In addition, the utility examined whether the measures recommended within the audit might be eligible for specific financial incentives from other existing programs at the utility, and discussed those options with the customer.
- Meeting and Action Plan: A short time after the delivery of the ORA report, the utility scheduled a meeting to discuss the recommendations, what help the utility might be able to provide, and as a follow-up, provided an "action plan" summarizing the results of the meeting and suggesting "next steps".

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[1] The program continues currently, renamed the "Facilities Assessment" Program.

- Follow-Up: The utility staff person assigned to the customer was expected to call back customers and check on progress, respond to remaining questions, and provide assistance where they could.

To provide the most tailored service and to use program funds most effectively, the ORA classified the audits into mini, standard, and premium assessments, with more complicated facilities getting more detailed audits. This avoided the "one size fits all" approach of many programs.

Evaluation of the ORA Program

The authors conducted both process and impact evaluations of the Seattle City Light ORA program to assess the program's effects and to provide feedback to refine the program. In addition, the evaluators assessed benefits to the participants in the form of productivity and a wide range of other benefits (and negative benefits). The authors also gathered information on several dozen multi-resource audit programs operating around the country to identify savings, design, and implementation lessons for expanded audit programs. The research questions central to the analysis included:

- How well was the ORA program designed and operating?
- What were the impacts attributable to the program, and what was the cost-effectiveness?
- What lessons can be learned in designing effective multi-resource audit programs?

As part of the process evaluation, interviews were conducted with: ORA Program staff and other involved utility staff; consultant auditors; and program participants and non-participants. The evaluation was conducted to assess customer, staff, and consultant opinions and satisfaction with several elements of the service. To assess opinions and satisfaction for each of the elements, telephone interviews were conducted with 73 customers who participated in the program during 1998 and 1999. In addition, 14 in-person interviews were conducted with program staff and consultants who were involved with the service. The process evaluation assessed the program's:

- Planning and design
- Marketing
- Service delivery
- Referral program
- Reasons for participating
- Obstacles to participation
- Barriers to implementation of the measures
- Strengths and weaknesses, and
- Suggested service improvements.

In the 1998/1999 period, there were 129 audits performed, 110 audit reports were delivered to participants, and there were 123 completed action plans. From a combination of program records and detailed interviews, we assembled data on conservation measures implemented and the associated energy savings from 96 program participants – representing 78% of those participants with completed action plans (or almost 90% of the 110 participants receiving reports for 1998 and 1999). The detailed participant interviews provided information on additional conservation measures (or non-programmatic measures) installed for 73 of these program participants (60% of those with completed action plans). The impact evaluation assessed the outcomes of the program, and examined:

- Measures implemented through the program
- Measures implemented outside the program

- Energy savings from the program
- Water savings from the program
- Non-energy benefits from the program, and
- Overall payback, performance, levelized cost, and cost-effectiveness statistics for the program.

Finally, the evaluation was designed to provide recommendations about further refinements to the ORA program.

Impact Evaluation: Energy and Water Savings

As mentioned, we interviewed both participants and non-participants. To support the impact evaluation, participants were asked about the recommended measures that were installed, which ones were funded with assistance by the utility, which were still under consideration, as well as any measures they installed that were not recommended or mentioned as part of the program. Non-participants were asked about any measures they had installed since the program started.

Using the 96 commercial industrial participants for which we had follow-up data, the program had identified potential electrical savings of almost 23 million kilowatt hours or 2.6 average megawatts. Of this potential, savings representing more than 9.0 million kilowatt hours or one average megawatts were achieved by the conservation actions implemented by the facilities. Although most of the conservation actions were taken with partial financing from Seattle City light's conservation programs, a sizable proportion of the savings, specifically 23 percent, were financed entirely by the customers.

The ORA service also achieved considerable success in identifying potential water savings in customer facilities. For the facilities studied, the audit staff identified potential savings of more than 34 million gallons per year. A smaller percentage of the total available water savings were implemented than the electricity measures -- but measures estimated to result in savings totaling 5 million gallons per year were implemented. Almost all of the conservation actions taken by customers to obtain water savings were financed by the customers themselves. Only one of the eight water projects received funding through a Seattle Public Utilities water conservation program.

Substantial natural gas savings were also identified in the audits, representing a potential total of almost 199,000 therms. Although there was large potential, actions were only taken in three facilities and the resulting gas savings represented only about 5,000 therms. All of the natural gas savings were financed solely by the customers.

The program was designed to identify conservation actions which, if implemented, would be cost-effective to both the customer and to utility. The program was quite successful from the viewpoint of cost-effectiveness, as low levelized costs and positive benefit cost ratios were found in both the electrical and non-electrical analysis. For the electrical resource, the levelized costs per kilowatt hour saved were: 31 mills per kilowatt-hour for the service area, 19 mills per kilowatt hour for the utility, and 13 mills per kilowatt-hour for the customer.

Process Evaluation findings

The process evaluation interviews uncovered findings related to satisfaction, delivery, and program design issues.

- Service participation: A large number of commercial and industrial customers participated in the program during 1998 and 1999. Over this two year period, 129 facility audits were conducted, 110 reports were provided to customers, along with 123 action plans. In the interviews, the

majority of customers said their participation resulted from a telephone or personal contact with program staff. The reasons for participating included the free service, identification of conservation measures in the audit, and the fact that they viewed the utility as a trusted information source. Also, at the time of the participation in the service, most customers understood they would receive a facility audit and a report. Only 20 percent understood that the audit would cover non-electrical resources and that an action plan was part of the service provided.

- Customer satisfaction: The telephone interviews revealed that customers were very satisfied with the skills of the audit staff and the services delivered. On a five-point satisfaction scale, where five represents very satisfied, the ratings for staff skills and the services averaged 4.4. The participants also rated the reports as understandable, accurate, complete, and useful. Customers were asked how satisfied they were with the energy and non-energy savings and the cost reductions that their company achieved as a consequence of participating in the program. In contrast to their ratings for the services, customers were merely moderately satisfied (ratings averaged 3.3) with the savings and cost reductions they achieved as a consequence of participating in the program.

- Program strengths and weaknesses: Participants, staff, and audit staff were each asked about the strengths and weaknesses of the program. All were quite satisfied with the audit, the reports, and the recommended measures. Participants were also satisfied with the staff knowledge and the increased conservation awareness that they gained in taking part in the program. Weaknesses noted by the interviewees included the timeliness of the services, and the extent to which savings were realized in the facilities. Program staff and auditors also noticed weaknesses in the marketing efforts and referral process involved in the program. Feedback from the staff and auditor interviews also identified several other weaknesses of the program. Several noted that there was variability in the capabilities of the on site auditors. As a result, some businesses received more comprehensive audits than others. Staff and auditors also noted that in the end, the program recommendations ended up focusing mainly on energy and lights, and gave shorter shrift to water recommendations and operations and maintenance (O&M) measures. The audit staff noted that uneven marketing and throughput led to uneven workloads across the year. This led to significant problems in handling peak periods, notably at the end of the year as goals needed to be met. Finally, there was only limited ongoing feedback about whether measures were actually implemented, and which might still be under consideration at the facility.

- Percentage of measures recommended and implemented: Lighting and HVAC measures dominated the recommendations, representing a total of 60 percent of the 279 measures included in the study. Split by resource type, water measures accounted for another 18 percent of the recommended actions. Approximately 86 percent of the measures recommended were electric, 10 percent water, and for percent were gas. In addition over 80 percent of the measures recommended were capital measures, not operations and maintenance recommendations.

Follow up is very important, and was not as formalized as it might be in association with the City Light program. This led to some potential missed opportunities. One important issue identified during the interviews was that many of the participants seemed to be unaware that the program had financial incentives to offer. This has important implications in terms of getting measures installed – especially because 21% were still considering implementing the measure and another 15% reported the economics or payback as the barrier for not implementing the measure. Clearly, it is important to follow-up with

customers to keep recommendations in the participant's mind, and to be able to provide assistance as programs and needs change.

In addition, it is important to explain the program clearly. When we asked non-participants what they recalled regarding the description of the program, over 1/3 believed it was an energy-only audit and none recalled that multiple utility services were to be audited. For non-participants, we also found that a bad fit or bad timing was an important factor, representing about one-quarter of those turning down the assistance. Other reasons included customers that had already upgraded equipment, plans to move (making upgrades useless), time and money considerations, or other reasons. In a few cases, non-participants reported that they didn't think they had refused to participate, but merely deferred it. Another non-participant said they were awaiting metering results before going forward with a program like this.

Measuring Non-Energy Benefits

One of the enhanced evaluation activities we conducted was a detailed assessment of the program's non-energy benefits. This was especially important given the multi-resource focus of the program. However, we went beyond interpreting non-energy benefits as just the water savings, but went the extra distance to try to measure and quantify the productivity and other types of benefits that the customers themselves recognized and valued from the program. The non-energy benefits have a strong influence on the measures of program cost-effectiveness.

Based on our previous work in Non-Energy Benefits (NEBs) -- or Non-Utility Benefits (NUBs) as we designated them in the ORA analysis to distinguish them from the water resource benefits -- we determined that the participant-side benefits were an area that had significant potential for additional benefits. However, this area had been virtually unstudied. Although a number of researchers hypothesized the various types of benefits that might be experienced, the literature search turned up virtually no quantitative work in this area.

Arguably the most direct method of assessing the value of non-energy benefits to customers would be to ask them directly. However, the most direct form of the question (e.g., "what is the dollar value of the reduction in drafts in your building after it was insulated") can be difficult for program participants to answer and can lead to unreliable results. This is a "willingness to pay" approach, and there is considerable literature on the validity and constraints of this approach. However, for this project, SERA, Inc. developed an innovative approach for obtaining customers' self-reported valuation of non-energy benefits, and found promising results. This is an approach we pioneered in residential program applications,[2] and determined to test for the commercial / industrial sector for this project. Our basic idea was to ask customers to characterize the value of the non-energy benefits *relative to* the energy savings expected from the measure. We found that customers were quite willing to talk about these benefits and able to answer our questions about relative values. Because we had estimates of the estimated bill savings from each of the measures, we could then attribute a dollar value to the non-energy benefits after the fact.

For each measure installed, in the SERA-developed valuation method we asked the participant to:

- Enumerate the list of non-energy benefits they felt they received/ realized in association with each measure, and

[2] See Skumatz, Lisa A., and Chris Ann Dickerson, "What do customers value? What benefits utilities? Designing to maximize non-energy benefits from efficiency programs in the residential sector", 1999 International Energy Program Evaluation Conference Proceedings, August 1999, Denver, Colorado.

- Tell us whether the sum of all the non-energy benefits for that measure was more valuable or less valuable to them than the energy savings from the measure. We then asked them to assess how much more or how much less valuable the NEBs were, using multipliers.

In the case of the commercial/industrial benefits, each participant had relatively reliable and convenient estimates of the level of energy benefits expected with each measure. Commercial and industrial participants were interviewed in detail via phone and asked to provide detailed feedback on the non-utility benefits that they received from the variety of operational and capital measures implemented over the course of the last two years. These include:

- Lighting measures: Better lighting, safety/security, lower maintenance, improved work environment, better aesthetics, reduced glare/eyestrain, improved productivity, better control, and other benefits.
- HVAC measures: Lower maintenance, longer equipment lifetimes, greater comfort, better air quality / airflow / quality, better productivity, higher tenant satisfaction, better aesthetics, better control, environmental benefits.
- Water measures: Reduced water losses and bills, greater efficiency and control of water use, reduced over watering of landscaping, labor savings, better aesthetics, greater tenant/ guest satisfaction, and better water flow.
- Refrigeration: Lower maintenance, longer equipment lifetimes, reduced noise, greater control of equipment / temperatures, greater product life, lower losses of product, reduced water use, and better aesthetics.

Other measures were also addressed, but fewer were installed, so their results are not separately reported here. However, many of the same types of benefits were mentioned for variable speed drives and other equipment.

We used the feedback and estimates of multiplier effects from the participants to develop estimates of the participant valuation – beyond the energy savings – for the ORA measures and program. We find that overall, the ORA participants reported non-utility benefits valued at 50% of the energy savings from the program. This figure varied based on the types of measures installed – similar values were found for lighting and water measures, but higher multipliers were realized for HVAC measures installed (equivalent to the energy savings). Refrigeration measures had non-utility benefits equal to about one-fourth of the energy savings associated with the installed measures.

Since this project, SERA has developed and used two additional methods to gather reliable quantitative data on the value of non-energy or non-utility benefits from programs. One approach incorporates a more traditional willingness-to-pay method, and the other uses cutting-edge academic research on psychological "scaling" metrics. Both methods have shown excellent promise in these types of analyses.

This extra analysis provides some of the first quantitative information on the value of non-energy, non-utility value for key types of measures implemented in the commercial / industrial sector. Specifically associated with the ORA program, we find that the values that participant's gain from the measures installed is significantly higher than that traditionally counted by the utility in its benefit cost analysis. The results here indicate that the paybacks would be reduced (overall) by about 1/3, and the mills per kilowatt-hour figures could be reduced also by 1/3, significantly increasing the program's performance statistics. However, potentially more important is the advantage that these customer-related results provide for marketing the program to customers. The total extra dollar value for non-utility benefits realized from the ORA was $170,000 per year, or about $2.7 million over the anticipated

15 year measure lifetimes. Discounted by 10 percent per year, the lifetime savings would be $1.3 million, or the figure would be $2.0 million if discounted at the utility rate of 3 percent per year.

ORA Program Recommendations

On the basis of the evaluation findings, seven recommendations were made to improve the program for City light commercial and industrial customers.

1. Increase staff and financial resources so the program can reach its full potential. Customers were highly satisfied with the program, but it had not reached its full potential. The program is effective and represents a progressive change of pace from narrowly-targeted (energy-only) traditional incentive programs. However, the ORA program could benefit from: better marketing to reach customers with the greatest value (to customers and the utility) from participating, expanded emphasis on water measures and inclusion of waste management and recycling measures, cost savings from delivering the program jointly with other utilities, and greater recognition of the program's value within the utility.

2. Increase the number of recommended measures implemented in customer facilities. Additional follow-ups with customers that have not implemented measures would increase the program's cost-effectiveness. The program would benefit from stronger links to other (traditional) City Light financial incentives programs, which would help leverage funding and help provide and promote additional savings associated with the ORA efforts.

3. Improve the link to water utility programs and funding. Fewer water measures were installed than energy measures. This occurred because greater funding was available for energy services, and because the program was closely linked with the energy utility. If the water utility increases the funding available for retrofit measures, this should improve the percentage of water measures installed and water savings achieved.

4. Improve the timeliness of services provided by the program. The program evaluation found the median processing time for projects to move from facility audits to action plan was three months. Benchmarks should be introduced for interim deliverables to help move the program along in a more timely fashion.

5. Enhance service and value through additional emphasis on non-electricity resources. Customers rated concerns about garbage, recycling, water, wastewater, and gas costs nearly as high as electricity. Previous SERA research finds that integrated services can provide important leverage in selling services and achieving participation and entry into nonresidential facilities. The City of Seattle is uniquely positioned to offer integrated services because the City is the service provider for many of these resources. A more integrated program will benefit both participants and the City.

6. Conduct additional research to improve program marketing and targeting. Marketing and recruitment for the program were among its weaker areas. The evaluation demonstrates which customers can benefit most from this program. By using the utility's databases on customer energy usage, the utility can develop an even more effective targeting and marketing plan for the program.

7. Consider other refinements to improve delivery, impact, and service to customers. Other recommendations related to checklists, tools, training, and tracking, were provided in the full report to further enhance the program's efficiency and effectiveness.

Conclusion

As customer opportunities and options change, utilities are responding with innovative programs designed to meet customer needs. Based on a review of programs around the nation, multi-resource audit programs show promise to provide a whole range of advantages for both utilities and customers. The survey of multi-resource audits provided information on performance of these types of programs around North America. Seattle City Light's ORA program is a good model of the next generation of programs, and the detailed evaluation conducted provided a good assessment of the types of benefits that can be achieved from a tailored, responsive, multi-resource audit program.

We integrated several useful steps into the evaluation of the ORA program to recognize its multi-resource design, and reflect the customer-based focus of the program. We included the traditional interviews with program and delivery staff, and interviews with both participants and non-participants. We made sure to collect information on measures installed outside the program (from both participants and non-participants), which can be used to provide a baseline to measure program impacts beyond what would have happened without the program. We measured the impacts and value of the bill or resource savings for all the utilities included – gas, electricity, and water. We also incorporated a detailed and innovative analysis of the non-utility benefits recognized by the participants themselves, and developed a method of valuing these benefits. These values could then be used to compute a more comprehensive benefit cost ratio for the program, and can be adapted for marketing and in future discussions with customers considering participating in the program.

The percent of measures installed from the ORA program can be compared with implementation levels found for other City Light programs and for other similar programs elsewhere; we find they exceed some, and are lower than others. The findings on non-energy benefits add new information to the literature on commercial program impacts, and provide lessons on successful ways to gather that data. The results of the evaluation were used to modify reporting, design, and targeting for the ORA program. In addition, the non-energy benefits information is being used in marketing. The findings about lessons from other programs will hopefully prove useful to other utilities designing these types of programs. Other findings include:

- The ORA program led to significant savings in terms of electricity and water, with very favorable payback and mills savings from the program.
- Direct bill savings and substantial non-energy benefits were identified and quantified through the evaluation.
- Within a period just one or two years after program recommendations were made, moderately high percentages of recommended measures were implemented through the program, with variations by type of measure.[3] Future programs should take the steps necessary to be certain that O&M measures are highlighted, especially since they are often very cost-effective.
- Customers were favorable about the specific ORA program evaluated, but some redesign issues were identified and are being implemented.
- Commercial/industrial businesses were likely to score other utilities nearly as important to them in terms of operating costs as they scored energy. Thus, multi-resource audits provide desirable services to commercial customers. Commercial businesses are more likely to participate in these

[3] Within the evaluation period, the ORA program saw 22% of measures representing 41% of the potential audit estimated savings implemented.

types of programs if multiple services are offered together – saving them time and providing integrated savings opportunities.

- Even if audits have previously been conducted at the facility, opportunities continue to arise in both residential and commercial applications because all recommended measures are usually not implemented, because technology changes, and because the multi-resource audit provides a whole new set of measures and changes that can lead to savings for the participant.
- High quality, experienced auditors are especially important for credibility with valued non-residential customers. Cross training across utilities (for example, teaching electricity auditors about water conservation measures), and some specialization in business types can help improve skills and manage costs.
- Considerable savings can be achieved if administrative costs are shared between multiple utilities, making the programs especially cost-effective for each utility
- Additional information for effective and leveraged customer targeting can be obtained when usage databases can be shared among energy, water, and waste utilities.
- Integrated programs help improve program cost-effectiveness, sustainability of programs and resources, and fit well with an integrated customer service approaches.
- Evaluations of these programs should make certain to highlight not only the traditional energy savings, but also the non-energy benefits of the programs – especially quantifying those benefits that are valued by the participants themselves. For the ORA program, the non-utility benefits represented half-again the value of energy savings to participants. If this information is incorporated into their computed paybacks, more measures can be cost-effective from their point of view, increasing program savings and performance. Adding an assessment of non-energy benefits to the traditional evaluation toolkit recognizes program benefits that were previously ignored, may help with customer retention, and provides useful information for marketing and designing programs in the future. Specifically, examining NEB estimates can be used to: (1) adjust program design and measures included to maximize all or selected program benefits, (2) minimize program budgets given NEB and other benefits totals – and help determine how to spend funds in areas of greatest benefit, (3) aid in customer retention and help utilities and customers understand the value of the program – in **participant-valued** terms, and (4) support estimation of more complete or inclusive benefit-cost ratios.

REFERENCES

Coates, Brian, Dennis A. Pearson, and Lisa A Skumatz 2000. "Evaluation of the Operations Resource Assessment (ORA) Program", Seattle City Light, Seattle, WA.

Skumatz, Lisa A., and Chris Ann Dickerson, 1999. "What do customers value? What benefits utilities? Designing to maximize non-energy benefits from efficiency programs in the residential sector", 1999 International Energy Program Evaluation Conference Proceedings, Denver, Colorado.