# A UTILITY INCENTIVES PROGRAM FOR THE RETROFIT OF COMMERCIAL BUILDINGS

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## ABSTRACT

Seattle City Light (SCL) has designed and is operating a pilot program offering financial incentives to its commercial customers. Seattle will offer two types of incentives: (1) a rebate covering 65 percent of the cost of pre-specified measures, and (2) an "investment incentive" that will cover the difference between the cost of audit-determined measures and the value of two-and-a-half years of savings. The rebates will be available only to small commercial customers, while the investment incentives will be available to medium and large commercial customers.

The three-year test program is being conducted as one of six pilot programs sponsored by the Bonneville Power Administration (BPA) and the participating utilities. While BPA established certain financial and technical parameters, the ultimate program design, administration and level of customer service is left to each utility to determine.

The significant distinguishing features of SCL's program include the method of paying the investment incentives, and the service options available to commercial customers. BPA will pay the investment amount to utilities over a five year period. SCL has decided to pay a lump sum incentive up-front to participating commercial customers. Most participating utilities will provide technical and financial assistance only through the utility. SCL will also contract with Energy Service Companies (ESCo's) to offer specific services to customers. ESCo's may offer management of retrofit installations as well as third party financing of the capital costs not covered by the incentives. This dual option customer service will increase SCL's capacity to serve commercial customers and will provide flexible services for customers with differing needs.

Program details are provided, and preliminary responses to the financial incentives and customer services are discussed.

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## BACKGROUND

For a number of years, Seattle City Light (SCL) has offered free energy audits and technical analysis to its commercial customers. Since 1980, Seattle has planned several programs to offer incentives for commercial retrofits, but has been stymied in implementing any of these programs for a variety of reasons.[1] Finally in 1986, SCL has begun to implement a pilot program that provides incentives to commercial customers and that builds upon an existing audit and information program.

Commercial customers account for about 40 percent of SCL's system load. There are about 26,000 commercial customers in the utility's service area, but approximately 5,500 of these use less than 6,000 kWh annually and are not eligible for the program. These very small customers may be thought of as phone booths and billboards. Many of the remaining eligible commercial customers are still quite small and rent or lease space in a portion of a building. There are an estimated 9,600 commercial buildings in the service area. The program will offer incentives to either building owners or to businesses in leased space if the lease (or owner authorization) allows for installation of conservation measures and the space has an electrical load separable from a central meter. Table I shows the potential market for a commercial retrofit program, and Figure 1 illustrates the typical businesses by their level of consumption.

Table I. Estimated eligibility for BPA commercial incentives pilot program.

| | Number of Buildings | % of Total Number of Buildings | Number of Customers | % of Total Number of Customers |
|---|---|---|---|---|
| BPA Level I | Less than 3,800 | Less than 39% | 13,600 | 52% |
| BPA Level II | At least 5,260 | At least 54% | 6,800 | 26% |
| BPA Level III | No more than 585 | No more than 6% | 380 | 1% |
| TOTAL | 9,645 | 99% | 20,780* | 79%* |

*Approximately 5,500 of Seattle City Light's commercial customers (20%) consume less than 6,000 kWh annually.

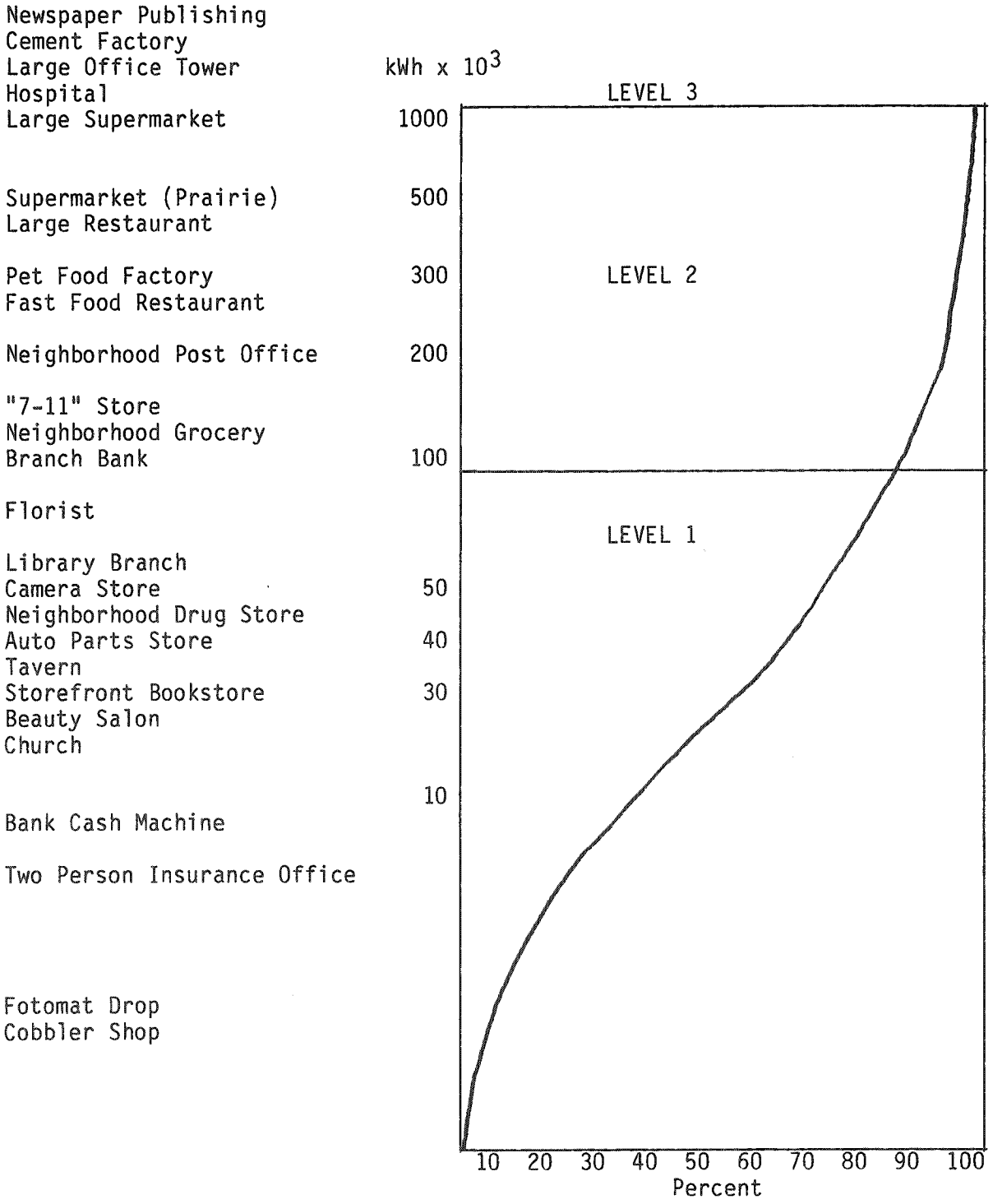


Figure 1. Typical businesses by consumption, % of customers using less than "X" kWh.

In late 1984, SCL conducted surveys of commercial building owners and tenants.[2] A random sample of 100 building owners was drawn from tax assessor records, and a random sample of 100 tenants was drawn from commercial accounts. Results showed that 63 percent of building owners were the sole occupant of their building; 35 to 50 percent of the tenant leases permit exterior wall modifications by the tenants and about 75 percent permit lighting and heating system changes; and of those owners or tenants who had already taken some conservation action, 50 to 60 percent had performed no economic analysis but the actions were relatively simple. When questioned about incentive options, both owners and tenants preferred pre-established rebate amounts for specific measures as their first choice. But tenants opted for low interest loans as their second choice, while owners rated loans as the least attractive option. Owners rated seven annual payments for the savings as their second choice, while that option was understandably last for tenants. A payment of 40 percent of installed cost was rated third by both owners and tenants.

## MOTIVATION FOR THE PILOT PROGRAM

SCL's Strategic Resources Plan estimates that in excess of 25 average MW of firm energy can be saved in existing commercial buildings. At present, the Pacific Northwest has a regional energy surplus and, therefore, there is no need to acquire this resource immediately. Instead, most of the region's utilities, including SCL, will use the surplus period to experiment with new conservation programs to develop the administrative and technical capability, to test incentives and marketing techniques, and to develop the external or private sector infrastructure. In short, SCL will be building the capability to deliver the conservation resource when it is more urgently needed.

Seattle's interest in offering a commercial incentives program began to converge with BPA's plans in 1984. In 1985, BPA began serious discussions with several regional utilities which culminated in an agreement to operate a three-year pilot program named the Commercial Incentives Pilot Program (CIPP). Under the CIPP agreement, SCL will offer financial incentives to commercial customers for the installation of conservation measures in existing buildings. The incentive payments made to these customers by SCL will be reimbursed by BPA upon compliance with BPA's requirements. BPA will also reimburse a portion of the program's operating expenses. While the CIPP agreement specifies certain program parameters, SCL has developed its own program goals and objectives, as follows:

### Goals

1. To build conservation capability at SCL by participating in BPA's regional Commercial Incentives Pilot Program.

2. To promote cost-effective electricity conservation through the financing of conservation measures in commercial buildings.

Objectives

1. To provide financial incentives to 153 commercial customers during 1986, 1987, and 1988 for installing energy conservation measures in their facilities. By year, the program objectives for number of customers installing such measures are: 1986 (36); 1987 (57); and 1988 (60).

2. To deliver effective and efficient commercial conservation services using SCL staff and contractors.

3. To motivate customers to increase the energy efficiency of their facilities by a minimum of 7 percent following program participation.[3]

4. To achieve energy savings that are cost-effective to the Pacific Northwest region, SCL, the utility's service area, and the customer.

Evaluation Plan

SCL will conduct two evaluations of the Commercial Incentives Pilot Program. The first evaluation will begin after 12 to 18 months of program operation and will be completed within 6 months. The purposes of this process evaluation will be to determine whether the program met its objectives for the number of customers installing energy conservation measures in their buildings, and for operating the program in an effective and efficient manner. Information will be collected from the program tracking system on the number of customers who install conservation measures in their buildings, the number, type, and cost of conservation measures that are installed, and the timeliness of program services. In addition, surveys will be conducted with program participants in order to ask customers whether they are satisfied with the conservation services and what program changes they would prefer.

The second evaluation will begin after 24 months of program operation and will be completed within 12 months. The purpose of this impact evaluation will be to determine whether the program met its objectives for electrical energy savings and cost-effectiveness. An energy savings analysis will be conducted to compare each customer's pre- and post-program electrical consumption. To determine the program's economic value, the program's costs and the dollar value of the program's energy savings will also be compared. A net present value analysis will be done from the viewpoints of the Pacific Northwest region, SCL, the SCL service area, and the participating customers.

INCENTIVE PAYMENT STRUCTURE

Under the CIPP agreement, BPA has described two types of financial incentives to be offered to commercial customers. One incentive is available only to small commercial customers (defined as customers who use more than 6,000 kWh but less than 48,000 kWh annually). Another incentive is designed for the medium to large commercial customers who use in excess of 48,000 kWh annually.

For the small commercial customer, BPA agrees to reimburse the utility for 65 percent of the installed cost of certain prescribed conservation measures. BPA has established a list of the common measures and has set maximum amounts for their installed costs (see Table II). The customer will receive payment for 65 percent of the installed cost from SCL upon satisfactory completion of an inspection. The 65 percent rebate was set by BPA, based on SCL commercial rates, to approximate a two-year payback for a package of common measures. The customer will pay the remaining 35 percent of the costs. SCL will be reimbursed by BPA for the amounts paid to small commercial customers.

SCL's historical experience with a commercial audit program has concentrated on recommending measures with short paybacks periods. Because of SCL's low rates (less than three cents per kWh), operation and maintenance measures have been the most common audit recommendations. Capital investment in conservation generally does not produce an acceptable payback. For medium to large customers under the CIPP, SCL staff recommend all measures with a levelized cost up to 50 mills per kWh. This is a cost criterion required by BPA to reflect the regional avoided cost of new resources. This standard, coupled with SCL's low rates, makes it difficult for a comprehensive set of conservation measures to achieve an acceptable payback without a subsidy.

For the medium to large customers, BPA agrees to reimburse SCL for the difference between the total installed cost of conservation measures identified in an energy audit and the value, at customer rates, of 2.5 years' worth of energy savings. The customer must provide the funds equal to the value of the 2.5 years' energy savings. In other words, BPA, through SCL, requires that the customer accept a 2.5-year payback on investments in conservation measures before receiving any additional incentive money. BPA will reimburse SCL for the amounts paid to the medium to large customers in five equal annual installments plus interest at 14 percent.

One significant feature of SCL's program is the method of payment of the investment incentive paid to medium and large customers. Instead of simply passing the five annual payments with interest on to the participating customer, SCL will pay the difference between the installed costs and 2.5 years' worth of savings in a lump sum amount upon satisfactory completion of an inspection of the installed conservation measures. SCL will still be reimbursed over five years with interest.

Table II. Small commercial rebate list of eligible measures (June 10, 1986).

| Measure | Pre-Condition | Post-Condition | Max. Allowed $ Cost/Unit |
|---|---|---|---|
| **Lighting** | | | |
| Energy Efficient Lamp | 40 W Fluor. | 34 W Fluor. | 2.00/Lamp |
| Energy Efficient Lamp | 75 W Fluor. | 60 W Fluor. | 3.50/Lamp |
| Electronic Ballast | STD. F40T12 | Electronic Ballast | 42.50 Ea. |
| Electronic Ballast | STD. F96T12 | Electronic Ballast | 47.50 Ea. |
| Fluorescent Screw-in | 60 W Incand. | 22 W Fluor. | 10.00/Lamp |
| Fluorescent Retrofit | 60-100 W Incand. | 22 W Fluor. | 32.00/Fix. |
| Exterior Photocell | Manual Control | Photocell Control | 55.00 Ea. |
| Exterior Timeclock | Manual Control | Timeclock Control | 90.00 Ea. |
| Interior Timeclock | Manual Control | Timeclock Control | 90.00 Ea. |
| Exterior Fixtures | 200-400 W Incand. | 70 W HPS | 200.00/Fix. |
| Interior Fixtures | 100-150 W Incand. | 4 Foot Fluor. | 65.00/Fix. |
| Exit Signs | 30 W Incand. | 8 W Fluor. | 15.50/Sign |
| Fluorescent Adapter | 60 W Incand. | 9 W PL Fluor. | 13.00 Ea. |
| Exterior Fixture | 1000 W Mercury | 400 W HPS | 500.00/Fix. |
| **Building** | | | |
| Wall Insulation | R-0 | R-11 | 0.55/S.F. |
| Ceiling Insulation | R-0 | R-30 | 0.60/S.F. |
| Floor Insulation | R-0 | R-19 | 0.98/S.F. |
| **Miscellaneous** | | | |
| Tank Wrap | No Wrap | R-11 Wrap | 35.00/Wrap |
| **HVAC** | | | |
| Fan Control | Manual | Timeclock | 90.00 Ea. |
| Setback Thermostat | STD. 1 Setting | Programmable Therm. | 150.00 Ea. |
| Economizer | Fixed OSA | Economizer Cycle | 1200/Unit |
| Interior Duct Insul. | R-0 | 1 Inch | 0.75/S.F. |

The primary reason for the lump sum payment from SCL is customer economics. Table III compares the Net Present Value (NPV) to the customer of the five annual payments to the lump sum payment on a per square foot basis. The results show, based on the assumptions stated, that the economically rational customer will not participate if the payment is spread over five years but will do so if the incentive is paid in a lump sum. This result will hold until the customer's real discount rate drops below 20 percent. Some customers may have discount rates that low, but many may be reluctant to consider even a 2.5 year simple payback. The incentive payment was therefore made as strong as possible under the terms of BPA's CIPP agreement.

Table III. NPV to customer comparing alternative incentive payment plans.

Assumptions

1. Measures have an average 16-year life
2. Installed cost is $\$0.74/ft^2$
3. Savings are 2.03 $kWh/ft^2/yr$
4. Average value of savings at customer rates is 28 mills/kWh
5. Inflation is 5.8%
6. BPA payment = installed cost minus - 2.5 yr simple payback = $\$0.74/ft^2$ - 2.5 yrs x 2.03 $kWh/ft^2/yr$ x 28 mills = \$0.74 - \$0.14 = \$0.60
7. BPA payments over 5 yrs at 14% interest are \$0.1748/yr nominal for five years.
8. 25% real discount rate for commercial customers.

Analysis

1. Value of savings to customer = 2.03 kwh/yr x 28 mills/kWh = \$0.0568/yr.
2. Present value of savings = \$0.0568/yr x 16 yrs discounted @ 25% = \$0.22
3. Present value of 5 payments = \$0.1748/yr nominal x 5 yrs at 25% real (1.058 x 1.25 = 1.3225 = 32.25% nominal discount rate) = \$0.41

| Results | Lump Sum Payment | Payment Over 5 Yrs |
|---|---|---|
| Customer Pays | \$0.74 | \$0.74 |
| PV of Savings | 0.22 | 0.22 |
| PV of Payment | 0.60 | 0.41 |
| NPV to Customer | \$0.08 | -\$0.11 |

SERVICE DELIVERY

The operation of a financial assistance program involves numerous functions; some will be carried out by SCL or its agents, and some must be carried out by the customer or its agent. The services to be provided by SCL or its agents include:

- o analyzing energy use and potential energy savings in existing buildings;
- o recommending conservation measures and operation and maintenance measures;
- o training the customer in operation and maintenance (O&M) procedures;
- o preparing the performance specifications as requested;
- o assisting the customer in obtaining financing for the measure(s);
- o inspecting for appropriate installation(s); and

- o monitoring to ensure that operation and maintenance of the installed measure(s) is adequate and that consumption levels are within expected ranges.

The customer or its agent is responsible for obtaining the financing necessary for the installation, bearing in mind that a significant portion of the installed costs will be reimbursed by BPA (through SCL) following a satisfactory inspection. The customer must also act as the general contractor throughout the installation process.

Table IV illustrates which functions SCL provides through in-house staff and which functions will be performed under subcontract.

Table IV. Seattle City Light's Service Plan.

| Services | City Light In-House | Contractual Arrangements |
|---|---|---|
| Audits: | | |
| Level 1 | X | |
| Level 2 | X | X |
| Level 3 | X | X |
| O&M Plan | X | X |
| Specifications | X | X |
| Financial Assistance | X | |
| Financial Arranging | | X |
| Installation | | X |
| Inspection | X | |

The energy analysis of the existing buildings varies in complexity and can be roughly classified into three levels. The first level, appropriate for small commercial buildings, is a simple survey using a checklist approach. The second level of energy analysis entails calculating the electrical loads and the associated savings but does not involve complex, detailed modeling. The third level of analysis entails analyzing complex, interactive loads and requires the use of advanced simulation models. Both the technical standards for the energy analysis and the qualifications for the staff eligible to perform the various energy analyses are established by BPA.

ENERGY SERVICE COMPANIES

Seattle City Light expects that basic services provided by SCL will not meet the needs of all commercial customers in the areas of financing and/or management of the installations. Therefore, SCL plans to recommend the services of a limited number of energy conservation firms. These firms can make possible the participation of those commercial customers who, for lack of staff or internal financing, would otherwise be forced to forego involvement with this incentive opportunity.

This point deserves elaboration. In the 1984 survey of commercial owners and tenants, customers cited the lack of capital and the lack of personnel to follow through on recommendations as major reasons for not taking action on recommended conservation measures. During the operation of this pilot program, SCL has an opportunity to address both of these barriers to customer action, but cannot address them solely with the resources at SCL.

The pilot program, as designed by BPA, permits SCL to offer an incentive that covers a significant portion, but not all, of the installation costs. While SCL is offering the incentive as a lump sum payment to the customer, it is not able to offer more to the customer than will be reimbursed by BPA. The customer still has a financial obligation to pay the portion of the costs not covered through SCL. The amount of annual savings will determine the extent of this financial obligation.

In addition, the customer is responsible for overseeing the bid process and the actual installation of measures. For a variety of reasons, particularly because of concerns about liability, SCL is not involved in either of these phases of a project. If a customer does not have the trained staff to carry out these responsibilities, that customer is unlikely to participate in the pilot unless an alternative is available.

SCL does offer customers an alternative: working with Energy Service Companies (ESCo's). While investor-owned utilities in the Pacific Northwest and elsewhere have themselves been forming ESCo's, public utilities in general and municipal utilities in particular have restrictions on the scope of their activities. These restrictions are incorporated into the basic charter for municipalities and are difficult to modify under state law.

Therefore, instead of forming its own ESCo as a subsidiary, SCL has developed minimum standards to establish a listing of "qualified" ESCo's. To qualify for this listing, these companies must be "full-service" or comprehensive service firms, firms which provide all services from audits through installation. The listed firms must also have the ability to offer financing, as needed, to commercial customers for the installation of conservation measures. In order to be listed, ESCo's must achieve a minimum number of points when rated against established criteria, and must agree to a performance contract with SCL.

If a customer needs services not offered by SCL under the CIPP, SCL will suggest that the customer contact any of the companies on this list. The listed companies are also encouraged to identify independently customers who would benefit from the pilot program and to market their services to them directly. The customer will contract directly with the ESCo for specific services.

SCL maintains a degree of quality control through the review and approval of the technical work, and through the inspection of the installations. SCL will be handling the technical review and inspection functions not only because of BPA requirements, but also because commercial customers are

frequently skeptical of the services offered by ESCo's, and SCL's quality control function may allay some of this skepticism. SCL will offer payment of the investment incentive to the customer upon approval of the ESCo's audit, and will pay the incentive to the customer after a satisfactory inspection of the installation of conservation measures.

Recent in-depth discussions with commercial customers have revealed that these customers daily receive aproximately 10 to 25 pieces of material relating to energy products or services. An energy manager for a major department store may meet weekly with as many as seven or eight vendors for products or services. The impressions left by the vendors who will sell a gadget to "clean your electricity" end up mingled with those from reputable firms which offer energy services. Because a great deal of credibility was attributed to SCL by commercial customers, SCL's quality control of the technical work of the ESCo's should be a positive factor in the marketing of ESCo services.

The performance of the ESCo's and of SCL will be evaluated separately in this pilot program. Since a variety of factors contribute to performance differences between these two service delivery systems, the reason for program performance will be explored.

## PRELIMINARY OBSERVATIONS

The marketing and promotional activities carried out during the early stages of the pilot program are not completely representative of the activities necessary under a full production program. SCL is working mainly with pre-identified customers. These are customers who have had audits conducted in the past and who have expressed an interest in the incentive offering. While SCL generally accepts requests for participation on a first-come, first-served basis, various commercial buildings may be selected to insure a mix of building types over the duration of the pilot program. This helps to achieve SCL's capability building goal through increased understanding of a broader market.

During our limited experience with the customers eligible for the small commercial rebates, SCL has concluded that the list of conservation measures and the accompanying preconditions are too restrictive and narrowly defined (see Table II). SCL is participating in a technical group working with BPA to examine the preconditions and the list of measures, with the intent to extend the rebate list and application guide.

In addition, experience has shown that the maximum cost ceiling for rebate measures is frequently low. Therefore, the rebate offered to the customer is a significantly lower percentage of the installed cost than 65 percent. Because of the low ceiling cost, the rebate in some cases is so small that it provides little economic incentive to the customer.

It has also been found that it is important to respond quickly once a customer has indicated an interest in participating. Particularly in chain

stores, branch managers or energy managers are frequently reassigned so it may be necessary to work with several managers over the course of a project. Keeping records of commitments made by managers is important, but adjusting to new styles and preferences is equally important.

## CONCLUSIONS

BPA currently plans to operate the CIPP through the end of federal FY 1988. Since all utilities participating in the CIPP have gotten a late start in 1986, only about two-and-a-half years of program experience will accrue unless the CIPP is extended. SCL will encourage BPA to continue the CIPP an additional year or two because the initial period is insufficient to adequately develop and test the capability to deliver conservation to the commercial sector. BPA may decide to continue or revise the CIPP after 1988, however, if BPA funding does not continue beyond 1988, SCL will then make a determination whether to continue a form of the program. The CIPP experience and the evaluation results will be valuable in revising program costs and savings estimates, and in redesigning and streamlining program operations.

## FOOTNOTE REFERENCES

1 Edward A. Holt, "Public Investment in Commercial/Industrial Conservation: Some Approaches Considered by Seattle", in Vol. I, ACEEE 1984 Summer Study on Energy Efficiency in Buildings.

2 Synergic Resources Corporation, Seattle City Light Commercial Building Survey of Owners and Tenants, December 1984.

3 The savings target was set conservatively at the level achieved by Seattle Seattle City Light's previous commercial audit/information programs. See Brian Coates, et al., Evaluation of the Energy Management Partnership Program, Conservation and Solar Division, Seattle City Light, 1984; and Evaluation of the Walk-Through Survey Program for Commercial and Industrial Customers, Conservation and Solar Division, Seattle City Light, 1983.