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LETTER REPORT

FOLLOW-UP PROCESS EVALUATION OF
BONNEVILLE POWER ADMINISTRATION'S
ENERGY SAVINGS PLAN PROGRAM

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EXECUTIVE SUMMARY

The Energy Savings Plan (ESP) program has been operated as a pilot program by the Bonneville Power Administration (Bonneville) since late fall 1987. Designed to build conservation capability in the non-aluminum industrial sector in the Pacific Northwest, the program offers an incentive to firms to install energy efficient measures that upgrade their existing industrial processes.

In 1988, ERC Environmental and Energy Service Company (ERCE) and Pacific Northwest Laboratory (PNL) conducted a process evaluation of the first year of the program (*Interim Report*, March 1989). In 1989, ERCE and PNL conducted a follow-up evaluation to focus on several key issues of program design as an assessment tool for Bonneville's program redesign effort. As such, this is not a final assessment of the program process.

From the beginning of the program through September 1989, 40 project Abstracts were submitted. Thirty projects were submitted in 1988, followed by a decline in participation in 1989 with ten projects submitted. From these 40 projects, 20 have resulted in signed contracts and 10 of these have been completed. The projects under contract or completed represent nearly \$2 million in incentives and have an estimated annual electricity savings of nearly 73 million kWh.

Generally, the program has been well received by all participants, both firms and utilities. However, areas have been identified for program improvement. There is a perception that the program application process is too complex and requires excessive paperwork. The program also needs flexibility to accommodate the wide variety of industries and utility conditions in the region.

Utilities and firms generally supported proposed program changes to make the Abstract optional, to increase the incentive from \$0.05 to \$0.10 per kWh, and to include lighting as an eligible measure when other measures are installed. Some refinements to these changes were suggested, including increasing the incentive limit above the \$250,000 ceiling and allowing

lighting to be a stand-alone measure. Utility operation of the program was encouraged by utilities, and most, but not all, of the firms said they would work with their utilities.

Recommendations for program redesign to enhance participation or improve procedures are as follows:

- Allow utilities the option to operate the program and provide technical assistance to the utilities and the firms as needed.
- Simplify and streamline the application process and the paperwork.
- Allow maximum flexibility in the program requirements and procedures.
- Further explain the program and its benefits to utilities and firms.
- Proceed as planned with the higher incentive and consider raising the incentive ceiling.
- Consider expanding the scope of the program by making industrial lighting a stand-alone measure, or include it under other Bonneville programs such as the Commercial Incentives Pilot Program.
- Concentrate marketing efforts on one-on-one direct contact and include case studies in written materials.
- Include engineering firms in marketing efforts by providing them with program information, promotional materials to hand out, and lists of utility territories and contact persons.

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1.0 INTRODUCTION

The Energy Savings Plan (ESP) program has been operated by the Bonneville Power Administration (Bonneville) since late fall 1987. The program is designed to build capability in the acquisition of conservation resources in the non-aluminum industrial sector in the Pacific Northwest.

According to the Northwest Power Planning Council, the non-aluminum industrial sector accounts for about 23% of the total regional electricity consumption. Five non-aluminum industries consume 85% of this total. Three major industries--chemical producers, pulp and paper plants, and lumber mills--account for around 68% of non-aluminum industrial consumption (i.e., 16% of the total regional electricity consumption).

1.1 PROGRAM OVERVIEW

The ESP Program is operated through the Bonneville Area Offices. Bonneville offers to pay an incentive to industrial firms for implementing projects that save energy. Before fiscal year (FY) 1990, the incentive was the lesser of \$0.05 per kWh saved in the first year or 80% of the project cost, up to a maximum of \$250,000. In FY 1990, Bonneville will increase the incentive to \$0.10 per kWh. This report describes the program process as operated through the end of FY 1989 (September 30, 1989). It is a follow-up evaluation, conducted by ERC Environmental and Energy Services Company (ERCE) and the Pacific Northwest Laboratory (PNL)^(a) for the program (ESP) redesign efforts.

Firms submit projects through a two-step Abstract and Proposal process. Projects are selected on a first-come, first-served basis. Projects must use proven technologies, have a simple payback of greater than 1 year, and have an operating life of at least 15 years. Output for the year following program participation is not permitted to increase more than 20% above a pre-installation base.

(a) Operated by the Battelle Memorial Institute for the U.S. Department of Energy under Contract DE-AC06-76RLD 1830.

Initially, a firm submits an Abstract which briefly describes the project, the estimated savings, and project costs. If a project meets the program criteria, Bonneville then asks for a detailed Proposal to be delivered in 60 days. If a Proposal is accepted by Bonneville, a contract is negotiated.

After signing a contract with Bonneville, a firm then proceeds with the retrofit. When installation is complete, the project is inspected by Bonneville and energy savings are determined by comparing post-installation measured electricity use against pre-installation use for a comparable standardized period. Generally this requires a pre-installation measurement at average system output and a post-installation measurement under similar conditions. Measurements are then extrapolated to an annual basis. A Completion Report is then prepared and submitted to Bonneville before the incentive payment is made.

Table 1.1 summarizes the status, as of September 30, 1989, of projects submitted from the beginning of the program through the end of FY 1989. Projects are organized by the year in which their Abstracts were received. Abstracts and Proposals refer to projects that have been submitted but not yet accepted by Bonneville. Projects with contracts are those that have been accepted and have signed contracts but have not yet completed installation. Rejected projects are Abstracts and Proposals that have not been accepted by Bonneville. Firms can also withdraw a project during the Abstract or Proposal phase or terminate a project (i.e., a contract) during installation.

Table 1.1 shows a decline in program participation in 1989. One-third as many projects were proposed in 1989 as in 1988. However, 20 contracts have

TABLE 1.1. E\$P Project Status (September 1989)

<u>Current Status</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>Total</u>
Abstracts/Proposals	3	4	7
Contracts	10	1	11
Withdrawn	4	2	6
Rejected	2	1	3
Terminated	3	1	4
Completed	<u>8</u>	<u>1</u>	<u>9</u>
Total	30	10	40

been signed (completions plus contracts) out of 40 projects submitted; i.e., 50% of the projects submitted have been accepted and will likely go on to completion.

The distribution of projects submitted by type of industry is shown in Table 1.2. The program appears to have attracted more interest from one of the top three energy consuming non-aluminum industries (pulp and paper) than the other two (chemical and wood products). However, food processors dominate with 11 projects submitted, followed by pulp and paper plants and cold storage facilities.

The 20 projects either under contract or completed represent a total of nearly 73 million kWh saved per year. The total incentive to be paid to these 20 firms will be just under \$2 million, resulting in a cost to Bonneville of 27 mills per kWh saved (1 mill = 1/1000 of a dollar). The total of these 20 projects' costs is \$35,636,349. Subtracting the incentive, the cost to industry was \$33,644,265. Tables 1.3, 1.4, and 1.5 show the range of projects by savings, project costs, and incentives.

1.2 EVALUATION DESIGN

In 1988, ERCE and PNL conducted a process evaluation of Bonneville's ESP Program (*Interim Report*, March 1989). In 1989, ERCE and PNL undertook a follow-up assessment to focus on several key issues of program design and implementation. The issues were 1) utility needs, concerns, and desired level

TABLE 1.2. ESP Project Distribution

<u>Industry Type</u>	<u>Abstracts Received</u>	<u>Contracts/ Completions</u>
Food processing	11	7
Pulp and paper	7	3
Cold storage	6	4
Chemical plant	5	3
Wood products	3	2
Glass manufacturing	3	1
Petroleum products	2	0
Milling/machining	1	1
Heavy Assembly	1	0
Brewery	1	0

TABLE 1.3. ESP Electricity Savings Distribution

<u>Annual Electricity Savings (kWh)</u>	<u>Completed Projects</u>	<u>Under Contract</u>	<u>Total</u>
<1,000,000	5	2	7
1 - 2,000,000	2	0	2
2 - 4,000,000	0	6	6
4 - 6,000,000	1	0	1
6 - 8,000,000	0	2	2
8 - 10,000,000	0	0	0
>10,000,000	<u>1</u>	<u>1</u>	<u>2</u>
Total	9	11	20

TABLE 1.4. Project Cost Distribution

<u>Project Cost</u>	<u>Completed Projects</u>	<u>Under Contract</u>	<u>Total</u>
<\$100,000	4	3	7
100 - 200,000	2	3	5
200 - 400,000	1	2	3
400 - 600,000	0	1	1
600 - 1,000,000	0	0	0
>1,000,000	<u>2</u>	<u>2</u>	<u>4</u>
Total	9	11	20

TABLE 1.5. Incentive Distribution

<u>Project Incentive</u>	<u>Completed Projects</u>	<u>Under Contract</u>	<u>Total</u>
<\$50,000	5	3	8
50 - 150,000	2	5	7
150 - 250,000	2	1	3
>250,000	<u>0</u>	<u>2</u>	<u>2</u>
Total	9	11	20

of involvement; 2) industrial firm needs, concerns, and potential barriers to participation; 3) trade allies' (engineers and vendors) preference for involvement and potential barriers to participation; and 4) additional conservation measures for inclusion in the program.

To conduct the follow-up, ERCE completed discussions with utilities, industrial firms, engineers, and equipment and material suppliers (vendors). The list of contacts is contained in Appendix A. Discussion protocols were developed and are contained in Appendixes B and C. Table 1.6 shows the distribution of the contacts.

This follow-up evaluation served primarily as a market assessment tool for Bonneville staff as they worked on a redesign of the program to meet changing resource needs. As such, this report constitutes another interim process evaluation and is not a final assessment of the program process.

TABLE 1.6. Evaluation Contacts

Utilities	
With participants	16
Without participants	15
Industrial Firms	11
Engineers	7
Vendors	<u>9</u>
Total	58

2.0 INDUSTRY RESPONSE TO THE PROGRAM

Eleven industrial firms associated with the ESP program were contacted in person. Six firms were participants with projects completed or well under way, three firms were in the proposal review phase, one firm had withdrawn its project, and one firm had its project rejected. Characteristics of the firms are presented below.

The firms were asked general questions such as their view of program goals and their perception of program strengths and weaknesses. Then they were asked detailed questions about the program process and their reactions to proposed program changes (see Appendix B for protocol).

2.1 CHARACTERISTICS OF FIRMS CONTACTED

The types of firms contacted and the significance of their electricity costs are explained in the following subsections.

2.1.1 Types of Firms

The firms contacted represent a cross-section of most of the types of firms that have participated in the ESP program. The majority contacted were located in the Puget Sound area, which is also the case for program participation in general. Food processing firms are the most common, followed by pulp and paper and wood products firms. See Appendix A for a list of firms contacted.

2.1.2 Significance of Electricity Costs

To gauge the magnitude of electricity costs relative to other costs, firms were asked the significance of the electricity costs and the relative proportion to other operating costs. Most firms considered electricity costs to be significant; only one firm said they were not very significant. Annual expenditures for electricity ranged from \$16.8 million to \$306,000. Electricity costs as a percentage of total operating costs ranged from 5% to 33%. In general, electricity costs usually ranked third or fourth behind raw material and labor costs, indicating that electricity is important enough to warrant attention.

About half of the firms felt they did not have control over their electricity costs, and most of the others said they only had some control. Two firms said they had means of controlling electricity costs.

2.2 REACTION TO THE INITIAL PROGRAM

Participants' understanding of the program and reasons for participation or nonparticipation are explained in the following subsections.

2.2.1 Understanding of Program Goals

Most of the firms contacted had some general understanding of the program's goals. Half the firms contacted thought the primary goal of the ESP program was to help Bonneville and utilities avoid adding expensive new generation. Two others felt the purpose of the program was to reduce regional energy consumption. Others felt it was intended to make room for new industry without adding new generation; to help firms, that is, to benefit industry in general; to make plants more efficient; to make projects more feasible; to test ways to get savings in industry; and to demonstrate proven technologies. One firm had no idea of the program's goals.

A number of firms expressed concern that Bonneville had not clearly explained why it was offering the program. They felt that if they could understand how Bonneville and the region benefitted from the program, they would be more comfortable in accepting the incentive. As is often the case with industrial firms, they do not like the idea of a "free lunch;" i.e., the industrial firms have difficulty believing that the federal government will give them money to save money.

2.2.2 Rationale for Participation

The most frequently mentioned reason for participation in the program was to reduce electricity costs. Two other firms stated that they participated to make one or more of their processes more efficient, i.e., reduce cost per unit and thus allow production of more units. This raises a question about the net savings attributable to the program, an issue which is being addressed in

PNL's ongoing impact evaluation of the ESP Program. For two others, the program helped them justify a project to management by reducing its cost. This latter reason was also a major part of the rationale for the other participants as well.

The firms were also asked about secondary reasons for participating. These included desiring a better system control to improve the product; helping to maintain degraded equipment, or better maintenance in general; collecting data on energy use; replicating a successful project at another plant; and forcing management to look at energy use and potential savings.

2.2.3 Reasons for Rejection or Withdrawal

The few firms contacted that had withdrawn a proposal or had a proposal rejected were asked what the reasons had been. While each firm had unique site-specific reasons, two revolved around technical issues, two related to problems with management, and one firm was concerned about having to reimburse Bonneville if savings were not achieved.

In one case, the technical problems were discovered during testing and modeling prior to submittal of the final proposal, thus eliminating one portion of the project (40% of savings). Then it was found that a vendor had given inaccurate information that affected costs, resulting in costs exceeding benefits on another part of the project (60% of savings). In another of the technical cases, a power factor project was rejected because most of the savings were in transmission offsite.

In one of the cases involving management, the project engineer initially had not been aware of management's decision to relocate the plant within 2 years. In the other, management did not understand Bonneville's goals or reason for the program. They felt that "people don't just give away money for free."

Three of the four firms plan to submit another proposal in the future. One of those firms is doing additional monitoring and analysis, one firm is waiting until it moves, and another is planning to resubmit its original proposal.

2.3 APPLICATION PROCESS

Half of the firms contacted first heard of the program from their utilities. However, first contacts ranged from the utility to Industrial Customers of Northwest Utilities, Bonneville, and vendors. When asked who else had contacted them about the program, all firms indicated they had a second contact by a source different than the first.

2.3.1 Working with the Utility Versus Bonneville

There has been a positive impact on program participation where utilities have been directly involved in recruiting participants. Most of the firms said that their utility influenced their decision to participate; five said the utility had a lot of influence and two said it had some, but four firms said the utility had no influence on their decision. Most of the firms responded positively to direct contact with the utility representatives.

Of the 11 firms, 6 indicated they would prefer working with their utility rather than Bonneville. One reason for this preference is that the local utility was more familiar with local conditions and issues. One of the firms had its Abstract and Proposal prepared by the utility. Two other firms said it did not matter whom they worked through, and three said they preferred working directly with Bonneville. Essentially, while many firms are willing to work with their utility, some firms prefer not to for a number of reasons ranging from general distrust of utility objectives or procedures to concern over utility industrial expertise.

Those firms working directly with Bonneville had concerns about the Bonneville Staff's technical expertise with special processes and were overwhelmed by the number of people attending kickoff meetings.

2.3.2 Preparing Abstracts and Proposals

In preparing Abstracts, firms generally need to make an assessment of energy use in the process proposed for a project. Firms vary in their in-house expertise and capability for energy analysis and project design. The firms contacted were split between those requiring assistance on the Abstract and Proposal and those able to do it in-house. Generally, the larger firms have the in-house expertise, but this is not always the case. Occasionally

they have to bring in specialists on particular processes. Technical assistance, for those firms who used it, came from a number of sources, including a vendor, a consulting engineer or process specialist, and utility staff.

In general, very little additional engineering was needed between the Abstract and the Proposal, confirming the finding that the Abstract was not being used as intended. Most of the firms put most of the analysis in at the beginning instead of in the Proposal. Those having a significant amount of additional engineering done for the Proposal used it to prepare specifications and drawings, or did so because there was a change in the project as a result of feedback from Bonneville. Two firms spent over \$20,000 for consultants.

The firms are also split between those that had an energy analysis performed and those that did not. Three firms conducted their own analysis in-house and two were done by the utility.

2.4 PROPOSAL PREPARATION COSTS TO FIRMS

As shown in Table 2.1, Abstract and Proposal preparation required a significant amount of time from the plant engineer or management. Time spent by firms preparing Abstracts and Proposals includes:

- review time to read and understand the Notice of Program Interest (NOPI)
- contacts with Bonneville and the utility
- energy analysis of process
- engineering and analysis
- contacts with consultants and vendors
- preparation of specifications for bids from vendors
- filling out forms and writing the proposal
- discussions with internal management
- repetition of any of the above due to changes.

TABLE 2.1. Abstract and Proposal Preparation Costs

	<u>Minimum Hours</u>	<u>Maximum Hours</u>	<u>Average Hours</u>
Abstract Preparation	8	160	43
Proposal Preparation	8	128	48
Abstract and Proposal Preparation	50	170	94

If we accept the claim in many of the cases that the Abstract served as the Proposal (i.e., the bulk of the work went into preparation of the Abstract and little extra effort was expended for the Proposal), then we would expect to find a lower level of time and money spent on the Proposal. Instead we find this to be the case with only three of the firms. Two others spent about the same effort on Abstract and Proposal. In the rest of the cases, two to three times as much effort was spent on the Proposal as the Abstract. Estimates of time spent by the firms for both Abstract and Proposal ranged from 50 hours to 170 hours.

In addition, a number of firms hired consultants to assist in Proposal preparation. Nonetheless, a significant amount of time was also spent in preparation of the Abstract. With consultant and labor costs combined, the highest cost to a firm for the preparation of both the Abstract and Proposal was \$27,680. In most cases the cost was much lower because no outside engineering assistance was required. The lowest combined cost was about \$1,280.

Preparation cost was not a factor in the level of detail of the Proposals. Most firms would not have prepared a more detailed Proposal if costs were reimbursable. In fact, many included the Proposal costs as part of the engineering and design costs.

2.5 INFLUENCE OF INCENTIVES

For most of the firms, the incentive was an important factor in deciding to initiate a project. Most (seven firms) felt the incentive was very important or "critical" to their decision to do a project. Only one firm said that it had no influence because they were going to do the project regardless of

the availability of an incentive; they had planned the project as if there were no incentive in anticipation of picking up the costs if the project were rejected by Bonneville.

The incentive put most projects on a higher priority list because they achieved a shorter payback or higher rate of return, both of which are critical criteria in the decision to proceed with a project. This also helped justify projects with management. For example, one firm said the incentive allowed the project to be done outside of the normal planning/funding cycle because of the higher rate of return.

The impact of the incentive was confirmed by the fact that over half of the firms contacted would not have done the project without the incentive. The remaining firms said they probably would have done the project without the incentive, but not in the next few years, or possibly not until power costs increased.

2.6 PROGRAM BENEFITS AND STRENGTHS

The industries contacted offered a number of strengths or benefits of the program. Some firms feel the program helps raise the awareness of possible energy savings available. In their words, "money is a good salesman." The program is also seen as encouraging industry to do things it would not normally do, thus achieving electricity savings that would have been lost.

For other firms, the program allows companies to consider initiating a project sooner than they would otherwise. It also helps plant engineers "sell" a project to their management by providing capital and reducing the payback period.

Other perceived strengths of the program are that it offers an additional incentive beyond the rising costs of power, and that it is simple and flexible enough to accommodate a variety of industries.

2.7 PROGRAM PROBLEMS AND WEAKNESSES

The firms contacted also provided their perceptions of some problems with the program. In general, most of these relate to program requirements and

specifications. Specific comments are listed below and discussed in more detail in later sections:

- The NOPI and other documents are "frightening" and time-consuming to read.
- There is too much focus on the "black and white" of the contract. Rigidity does not allow for changes between the estimates of the proposal and the final result.
- The paperwork requirements are too detailed and time-consuming. There is a related concern with the length of the review process.
- The program is geared toward medium-sized industries by the limit on incentives and the types of eligible measures.
- The limits on the number of projects per year and the incentives per project are seen as limitations.
- The program assumes plants have someone on staff, or with extra time, to look for energy-saving projects.

2.8 REACTION TO PROGRAM CHANGES

Proposed changes in the program were presented to the firms for their reactions. These changes include making the Abstract optional, increasing the incentive from \$0.05 to \$0.10 per kWh saved, including lighting as an eligible measure where it does not exceed half of the overall savings, and offering assistance with energy analyses.

2.8.1 Optional Abstract

All firms found the two-step Abstract/Proposal process understandable. Few firms had problems with the process. The problems included difficulty explaining the project to Bonneville staff; too much requested in the Abstract; and confusion resulting from an Abstract being approved, but having the project rejected in the Proposal stage.

Although the initial intent of the two-step process was to make it easier for firms to begin the process (leading to full participation without committing a significant amount of time), only 4 of the 11 firms contacted felt that it did. Specifically, they found the Abstract to be a useful overview that helped bring the firm in one step at a time. The Abstract was also useful to plant engineers for informing and convincing management to initiate a project.

A problem identified with the Abstract was that, by its nature, it was a rough estimate of savings and costs, whereas the Proposal required more accuracy. Thus, the numbers in the Proposal might be different from those originally included in the Abstract, leading to questions from Bonneville. Some firms felt that the Abstract made the application process more difficult because of the extra paperwork involved.

When asked if they would submit an Abstract if it were optional, only 4 of the 11 firms indicated they would definitely do so. Others said it would depend on circumstances, including internal use for management approval, whether a large or complex project was involved, or if the Abstract was actually a brief project overview.

Several firms specifically stated that they would submit only a Proposal because they perceive that their project would be viewed more favorably by Bonneville. Therefore, the likelihood of receiving an incentive would be increased. Originally, the Abstract was their Proposal.

2.8.2 Incentive Level

Nearly all firms contacted considered the initial incentive (\$0.05 per kWh) to be a good deal. Only one firm thought it was not enough to bring the project payback into an acceptable range. Several projects went up to the limit (\$250,000) and these firms felt that the incentive level did not matter as much as the limit. Several said the new incentive would not matter on larger projects as long as there is a limit of 80% of project costs.

Since the initial incentive was very acceptable, an increased incentive level of \$0.10/kWh was also considered to be a good deal. Most of the firms thought the new incentive level would increase participation. Several firms also felt that the new level would encourage them to look at other more marginal projects. None of the firms that withdrew said the new incentive would make a difference in their participation because they withdrew for other reasons (i.e., technical or managerial).

When asked for suggestions for other types of incentive schemes, only a few firms offered any suggestions, most of which are amendments of the existing approach. These include:

- Buy the kWh saved at the avoided cost in a one-time payment, based on calculated long-term (average) savings instead of first-year actual savings, because conditions may vary in any given year.
- Have a graduated payment based on actual savings so that projects that save less energy than the amount estimated will not lose the whole incentive.
- Include research and proposal preparation costs.
- Maintain flexibility by allowing for multiple methods of determining the incentive.

2.8.3 Usefulness of an Energy Analysis

In general, an energy analysis was considered useful for the program application process. As noted before, over half of the firms actually had energy analyses conducted before or during the project application process. Three were conducted by in-house staff and three were done by a utility representative. None retained the services of an engineer for this purpose.

All of those who did not do an energy analysis said such an analysis would have been helpful. Only one firm indicated that the cost of an analysis was prohibitive. Two said they did not think of doing it, and two said they did not have sufficient in-house expertise.

As a measure of value to the firms, they were asked if they would be willing to pay a portion of the costs of an analysis. Less than half of the firms said they would be willing to pay a portion of the costs of an analysis. Most of these said they would be willing to pay 50% of the costs.

2.8.4 Measures to Consider

To determine other possible conservation measures to be added to program eligibility for future program design, firms were asked what measures (i.e., projects) they had considered submitting for the ESP program. They were also

asked to suggest other measures they would like to see included in the program. In addition, specific comments on the inclusion of lighting were obtained.

Almost all the firms contacted had considered other energy conservation projects besides the ones they submitted. As can be seen below, there is as wide a range of projects as there are types of industrial processes.

<u>Project Purpose</u>	<u>Project Type</u>
Demand limiting	Membrane/electrode enhancement
Heat recovery	Blast freezing efficiency
Engine room automation	Controls on freezing
Lighting in general	Lighting in warehouses
Lighting controls	Slow start for motors
Fan pump improvements	Variable speed drive on kiln fan
Load shedding	Power factor correction

There are a number of reasons why firms did not submit these projects. A number relate to program requirements, such as a particular measure not being a proven technology, or not being eligible under the current program requirements. Most, however, were dropped for other reasons. These include:

- The firm wanted to finish one project at a time.
- The firm went for the biggest savings first.
- The cost-benefit ratio was too high even with incentive.
- The savings were too small.
- The firm was looking for advice from the utility or Bonneville.
- The plant was to be shut down or relocated.
- The measure was not compatible with other processes down the line.
- The proposal was submitted to Bonneville as an R&D project.

The firms were then asked what other currently ineligible measures they would like to see included in the program. One firm felt that all measures

should be eligible as long as they meet the financial criteria. Additional measures suggested for eligibility included demand limiting projects, power factor correction, transformers, harmonic control for rectifiers, and lighting.

Although few firms mentioned including lighting, most of the firms reacted favorably to the idea. However, only four firms indicated they would definitely have included lighting measures had they been eligible. Two others said they might have considered it. Even so, few firms indicated they would like to make lighting improvements in the future. Interestingly, half of the firms have already made some improvements in lighting over the past 5 years, most commonly converting to high-pressure sodium-type lighting.

Two problems were encountered regarding the inclusion of lighting: 1) lighting loads are considered too small to worry about, and 2) the 50% limitation made it difficult for several firms' consideration because they did not want to combine measures into one "project." This is because different consultants, subcontractors and vendors are involved.

2.9 MARKETING AND PROMOTION

In developing a marketing strategy, it is important to understand something of the process, criteria, and priorities industrial firms have for developing projects. The firms contacted were asked about their budgeting and investment process. Three critical factors for the ESP program are 1) the project planning cycle, 2) investment priorities, and 3) payback criteria.

2.9.1 Budgeting and Investment Process

As was found with the Sponsor Design Program and the Industrial Test Program, for most projects there is at least a 1-year interval from management approval to project implementation. This is mostly because of the firms' project budgeting process. Nearly all of the firms have a 1-year budget cycle; one firm has an 18-month cycle. Several firms have 3- and 5-year general planning cycles with a 1-year detailed action list. Generally, all

projects on the 1-year list are implemented. The shortest timeframe mentioned, and one that was not typical, was 60 days for projects under \$300,000 and 90 days for projects over that amount.

Projects with a high rate of return or short paybacks can occur outside of the normal planning cycle. The shorter the payback, the shorter the approval time. However, one firm said it was difficult to break the planning timeline. Annual budget submittal dates vary widely among firms. Due dates included February, March, May, July and November.

Project approval rests with different levels of management depending on the project cost. Plant managers can approve small (\$2,000 to \$50,000) projects, followed by the regional manager for larger projects, followed by the corporate president (up to several million dollars). The Board of Directors has final approval on very large projects. The time needed for approval increases for each level.

The firms, when asked what their highest priority was for investment at the plant, said cost reduction. Following this, a few firms mentioned modernization and expansion. Maintenance and marketing were mentioned by one firm each. Energy conservation investments would qualify under many of these priorities, particularly cost reduction, modernization, and maintenance; thus, the ESP program is compatible with their criteria.

Business expansion was mentioned most frequently as a second priority, followed by cost reduction. Modernization and quality improvements were each mentioned by one firm.

In assessing or rating projects, most firms indicated they used simple payback criteria in their project planning. The ESP program requires a simple payback of more than 1 year. Paybacks required by the firms for normal projects ranged from 1 to 5 years. In most cases there is a maximum payback that ranges from a maximum of 5 years in one case to 1 year. Obviously, a firm with a 1-year payback threshold would have difficulty with the ESP program requirement. A number of firms said that projects with 1-year payback get automatic approval. This fits well with Bonneville's intent to stimulate projects that would not otherwise be done without the incentive.

2.9.2 Program Marketing

The firms contacted had numerous suggestions for marketing the program in the industrial sector: the most common suggestion was for direct, personal contact by either the utility or Bonneville staff. A number mentioned placing articles and case studies in their industry association publications and presentations at annual trade shows and conferences. Some of the associations represented by the firms contacted include the Northwest Food Processors Association, the Northwest Forest Products Association, the Trade Association of Pulp and Paper Industries, the International Association of Refrigerated Warehouses, and the Association of Plant Engineers.

Most of the firms also said they would respond to (i.e., read) a personalized letter from Bonneville or their utility. Some felt such a letter should include a brochure and possibly a few case studies or examples where measures have proved themselves.

There is also an indirect promotional process at work. All the firms contacted said they would recommend participation in the program to other firms.

3.0 UTILITY PERSPECTIVES

Prior to 1989, few utilities were directly involved in the ESP program. This was initially by design, in that Bonneville offered the program directly to industry, with the Bonneville Area Offices acting as project contacts. Local utilities were offered the option of participating, but few chose to do so. The program redesign team is considering full integration of utilities into the program.

3.1 CHARACTERISTICS OF UTILITIES CONTACTED

As part of the follow-up study, we contacted a stratified sample of 31 utilities representing different types of utilities in the Pacific Northwest. These included large, small, generating, and non-generating utilities. Relative to the program, we had three levels of involvement: utilities active in ESP and having participants (N=6); inactive utilities that have participants or proposals (N=6); and inactive utilities that do not have any participants (N=19).

Since utility participation is not required in the program, there is a wide range of involvement among the utilities depending on their own interest and staff capabilities. Active utilities are defined here as those that have been directly involved in the major aspects of program implementation, including marketing, recruiting, handling Abstracts and Proposals (as a pass-through to Bonneville), and maintaining contact with the participants through the process. Inactive utilities either have had no involvement or some minor level of participation such as providing mailing lists, mailing brochures, and minimal recruiting.

Most of the active utilities were located west of the Cascades, predominantly in the Puget Sound area. ESP projects in the territories of the six active utilities accounted for 55% of all contracts and 67% of all Abstracts and Proposals in process.

There are two types of utilities actively involved in the program. The first category includes those non-generating utilities that are committed to conservation (both as a need and as a service). Generally, they have a

moderate industrial base. Most of these have some staff and resources allocated to conservation activities and have spent some time working on the ESP program.

The second category consists of generating utilities that are generally committed to conservation and have well staffed and funded conservation programs. They contain the majority of the region's industrial customers. They have been active in the program and would prefer to have direct responsibility for program operation.

All of the large Puget Sound utilities, generating and non-generating, are actively involved in most aspects of the program. They market the program, provide some technical assistance and energy analysis, help with proposal writing, and assist in the follow-up. They provide a direct link between Bonneville and the firms. Four of these six utilities contacted had specifically allocated staff time for recruiting participants, with amounts ranging from 0.10 to 0.33 full-time-equivalent (FTE).

A third category consists of non-generating utilities with few industrial customers. These utilities are generally not interested in conservation since their primary concern is load retention or growth. They are concerned about loss of revenue due to conservation programs. They have few staff and have had little involvement with ESP.

Only one of the inactive utilities with participants felt it played a direct role in the program, with specific staff time allocated to recruiting participants. This was the extent of their involvement, however. Four other utilities said they played an advisory role and put in some time by providing mailing lists to Bonneville or mailing the NOPI directly. The reasons cited for involvement were that it is a good customer service, and that the utility did not want Bonneville to be the link to its customers. Two utilities said they were not involved in any way.

The most common reason for not participating more directly was staff limitations. In other cases, the firms found out about the program before the utility did and the firms and Bonneville were too far into the contracting

process for the utilities to get involved. A number of utilities claimed that there is not enough customer interest in the program.

A final category consists of utilities with no program participants in their territories. Most of these utilities were not even aware of the program. Reasons for not participating (from the few that were aware of the program) included not having staff available, lack of utility interest, or utility opposition to offering Bonneville programs in general, preferring instead to offer their own.

Interestingly, two of these utilities felt they were actively involved in the program because they mailed the NOPIs and therefore served as the link between Bonneville and their customers. One said they allocated 0.10 FTE to recruiting participants; the other said the utility manager spent time talking to firms.

3.2 REACTION TO THE INITIAL PROGRAM

3.2.1 Knowledge and Understanding of Program Goals

All the actively participating utilities were familiar with Bonneville's goals for the program. Most of the inactive utilities with participants in their areas had some idea of Bonneville's goals, but there was a wide range of specific goals mentioned. These tend to fall into three categories: demand-side management, customer service, or economic development. Demand-side management goals included finding out what can be done to save energy in the industrial sector, encouraging industry to save energy, and directly acquiring energy resources. Utility customer goals focused on helping businesses reduce peak loads and on demonstrating efficient technologies. Helping businesses become more efficient was an economic development goal mentioned.

Most of the inactive utilities without participants (79%) were not even aware of the program and had no idea of the program's goals. Four of these utilities had only a vague idea.

3.2.2 Program Compatibility With Utility Goals

Over half of all utilities contacted did not have specific goals related to industrial customers. Four of the active utilities have specific goals.

These include buying all cost-effective conservation, offering technical assistance on request, and providing customer service to assist with energy management.

Goals mentioned by ten of the inactive utilities mostly relate to economic development and customer service. Specifically they include keeping firms viable and competitive by providing the most economical power to them and helping them reduce energy and demand cost-effectively; satisfying customer needs (customer service); and assisting in obtaining possible money and for the firms, i.e., to offer any Bonneville programs.

Nearly all utilities with industrial customer goals felt that the ESP program was compatible with these goals. One utility was concerned that the program would reduce revenues, but on the other hand wanted to help its industries stay competitive. In this regard, this utility would prefer to see some demand reduction measures in the program.

3.2.3 Perceived Impact on Utilities

Anticipating a concern about loss of load, we asked utilities a hypothetical question about the impacts of a significant reduction in energy use leading to load factor reductions as the result of ESP projects in their areas. In general, generating utilities showed little concern. In fact, participation allows them to sell more power elsewhere or helps them stay within their current capacity. The large active utilities were also not concerned. However, they noted that if the program resulted in a very significant load reduction, it could affect rates.

Most of the inactive utilities were concerned about the potential load factor impacts of the program. One possible consequence would be either an adjustment in rates or operation costs to compensate for lost revenue. A number of small utilities had a few major industrial customers that represented the majority of their load. As a result, the impact would be felt quickly.

Despite their concern, a number of utilities mentioned that there would be a greater impact if businesses had to close down or switch fuels. They therefore feel a need for the program to help with load maintenance. Another

utility said because it had such a low mark-up on industrial power, the program would not affect rates that much, i.e., less industrial revenue goes to fixed costs. Several utilities also felt that reducing electricity costs to firms would encourage them to invest in expansion, thus increasing their load again.

Utilities were then posed a situation where demand reduction occurred that had less impact on load factor. Few utilities thought this scenario would be a problem. Most felt it would be good for the utility because it would lead to higher system efficiency, it would help in the winter and other peak periods, and it would extend capacity or it would help in a growth area where capacity is a premium. It would potentially lower the utility's bill to Bonneville and the utility could also reduce charges to industry.

3.2.4 Interaction With Bonneville

Most utilities involved in the program felt that Bonneville's Area Offices and the Central Office were well coordinated. The only concern was that Area office staff did not have enough authority to make decisions.

Utilities had a general concern about Bonneville contacting utility customers directly. The inactive utilities also were upset that they had not been informed about program activities in their areas.

3.2.5 Expertise and Information Needs

All of the large active utilities consider their in-house expertise to be sufficient to operate the program, requiring only occasional assistance from consultants. Inactive utilities that were somewhat familiar with the program generally felt they did not have sufficient information or resources, although a number of them felt they had the expertise.

Only seven utilities wanted training. Suggested topics for training include marketing and market assessment, Abstract and final report preparation, energy analysis and technical assistance, sessions on specific industries and processes, and sessions on specific technologies such as refrigeration and controls.

3.2.6 Program Strengths in General

For the active utilities, the major strengths of the program were that it provides cash (incentives) instead of a loan, it focuses on the industrial sector, it allows multiple measures, and it has flexibility as a result of Area Office involvement.

The inactive utilities with participants saw the program as a good customer service and good public relations for the utility. They also mentioned that it helps firms become more efficient and that its lack of structure provides an open door for firms to participate.

3.2.7 Program Problems and Weaknesses

The utilities were asked what they felt were major problems or weaknesses with the program. Again, the comments are distinguished by active versus inactive utilities.

For the active utilities the NOPI was confusing and the two-part application process was burdensome. Utilities felt that the incentive (at \$0.05 per kWh) was too low and that important measures are ineligible (e.g., demand reduction, lighting). These utilities preferred to have direct responsibility for the program and wanted administrative support from Bonneville. As a final comment, most of them did not like Bonneville making direct contact with their customers.

Problems identified by the inactive utilities with participants were different from those of the active utilities. Some felt that the use of financial incentives was not a good strategy. Another problem was that they felt they lacked the infrastructure (skills, staff) needed to run the program. A number of these utilities felt that Bonneville's marketing efforts were limited.

Inactive utilities without participants voiced concern that the program might reduce revenue or affect load factor, that it is focused on larger projects, that smaller measures cannot be done first, and that it is difficult for the utilities to understand the program well enough to explain it to their customers.

3.3 REACTION TO PROGRAM CHANGES

As with the industrial firms contacted, utilities were also asked for their response to specific proposed program changes. The utilities were also given the opportunity to suggest other changes they would like included in the program.

3.3.1 Optional Abstract

Most of the utilities felt that making the Abstract optional was a good idea. This was true for all utilities with participants or some program experience. Expected benefits associated with such a change mostly related to reducing the administrative and time requirements placed on industrial customers. It was suggested that this might help where firms are reluctant to participate because of program paperwork.

A few utilities saw some benefit in requiring an Abstract. One of the active utilities felt a "simplified" Abstract would be useful in quickly and easily determining the nature of a project. One of the inactive utilities also felt that the Abstract kept firms from spending a great deal of time on proposals that could possibly be rejected.

Most of the utilities felt that firms would probably not submit an Abstract if it were optional. Some might submit an Abstract if it were very simple or if they were proposing a large project. These comments are consistent with the response from the firms.

3.3.2 Increase in Incentive Levels

There was mixed reaction to increasing the incentive level. Although a majority of the utilities heartily encouraged such a change, a number had reservations. Over half of the utilities responding felt that an increased incentive was a good idea and would increase participation, or at least the level of interest in the program, and would have a number of benefits. Most importantly, it would reduce the payback even further, thus bringing in more projects with marginal measures. It would also be good for smaller measures where the project costs are below the \$250,000 ceiling. Projects above the

ceiling would not be affected. The change in incentive would also provide a new marketing tool. As one utility stated, it provided an opportunity to go back and talk to the firms.

A few utilities did not think the increased incentive would have much impact on participation. Their responses point out some of the inherent factors that will limit the impact of the increased incentive. Specifically, it will not affect larger projects that would be above the ceiling under the existing incentive, or where the increased incentive exceeds the 80% of project cost limit. These utilities also felt that response depends more on how the utility promotes the program than the amount of the incentive.

One utility generally dislikes the idea of offering incentives, particularly where they are above marginal cost. This utility is concerned about the implications for an acquisition program. Another utility found that an industrial customer was concerned that the incentive was taxable income and felt a loan would be better for its tax situation. Still another utility suggested tying the incentive structure to the life of the measure or offering it as a fixed percentage of costs as in Bonneville's Commercial Incentive Pilot Program (CIPP).

Two comments related to problems independent of the incentive. In one utility area there are few industries to participate in the program; in another, industries are struggling with more critical survival concerns and are not interested in energy conservation.

3.3.3 Inclusion of Lighting Measures

Few utilities with participants thought the inclusion of lighting measures would increase participation. Estimates of the number of firms that would be interested in lighting measures ranged from 30% to 50% of their industrial customers. It was felt that all storage and food processors would be interested in lighting.

Concern that the payback would be too long or that lighting is too minor a load to interest the firms are among the negative reactions to inclusion of lighting. Some firms have already done lighting retrofits and may not be likely to address it soon.

None of the active utilities liked the idea of limiting lighting measures to less than 50% of the total combined project electricity savings. They view lighting as a stand-alone measure; also because it would allow utilities an opportunity to participate with industry in a less threatening way, i.e., not disturbing their production processes.

Concerns about a lighting limit focused on restricting participation and on its appearance as an additional programmatic requirement that will interfere with the program's flexibility. It was also felt that lighting measures have limited application because the ability to take advantage of them depends on plant configuration. This is particularly a problem where there is not a lot of process load. For the same reason, the requirement is perceived as inequitable, excluding some firms from including lighting in their proposed projects. This was also seen as sending a signal that Bonneville either has a limited budget or is not interested in full resource acquisition.

Interestingly, many inactive utilities with participants thought there would be no problems with this limit. One inactive utility went so far as to suggest that lighting should be limited to 15% of total project savings so that more money would go to major load measures.

3.3.4 Energy Analysis Assistance

Nearly all utilities contacted, both active and inactive, welcomed the idea of Bonneville funding for energy audits. Many utilities feel that they have the expertise to do it themselves and that Bonneville should reimburse them for the effort. Alternatively, Bonneville could also offer to pass funds for audits through the utilities to firms which would hire their own consultants. To do this, utilities felt that screening or pre-qualification of consultants would be needed. A few utilities felt that audits should be required and, in fact, two utilities are now performing audits for any industrial customer wanting to participate in the program.

Nearly all utilities were supportive of the idea of engineering firms providing technical analyses for ESP projects, as long as no one is forced to

use them and customers can choose their own consultants. It was also suggested that utilities be allowed to contract out this function. The use of local engineers was encouraged.

3.3.5 Other Suggested Program Changes

The utilities were also asked for additional suggestions for program improvement. There were nearly as many unique suggestions as there were utilities contacted. Many suggested changes are procedural, while others relate to financial factors and project eligibility. The following suggestions came from the inactive utilities. (Bonneville has already received detailed input from the active utilities and thus they were not asked for suggestions.)

As a program process improvement, it was suggested that there could be accommodation of smaller industries and smaller measures with a simplified process (similar to a rebate program). An often repeated suggestion was that the concept and program explanation should be kept very simple in all program materials. As for program information and education, it was suggested that firms be shown that Bonneville and the utilities also benefit from the program. In addition, firms should be shown the potential for energy conservation and the magnitude of the savings. It was also suggested that more technical assistance and audits be offered to firms.

As for additional measures to include, utilities were not very specific beyond the need to include other measures. A specific suggestion was that smaller measures, such as lighting, should be allowed by themselves as a less threatening (less intrusive) introduction of the program to industry. One utility suggested including all measures and buying kWh saved. Bonneville was also encouraged to raise the incentive payment ceiling above the current level of \$250,000.

Ways of increasing utility interest in the program were also suggested. The active utilities are most interested in changes allowing them to be more directly in charge of the program. Specifically, they wanted more authority to make decisions and the option to run the program themselves with a contractually determined budget for incentives offered directly by the utility. It

was also suggested that Bonneville provide administrative or staff support and advertising money, whether or not utilities fully operate the program.

The inactive utilities' suggestions related to their limited staff experience and resources. They wanted training for their staff and a pool of available process engineering consultants. They also suggested that they be provided with marketing materials and case studies.

Program design suggestions from the inactive utilities included focusing more on education and technical assistance, passing dollars through utilities to convey the impression of Bonneville and the utility working together, and guaranteeing fixed-time intervals with no program changes.

Two other suggestions were aimed at encouraging utility participation. One, relevant to all the less active utilities, is having Bonneville staff explain the program in person to utility staff and management. The other is to give utilities a bonus for each completed project.

3.4 MARKETING AND PROMOTION

Industries targeted for the program, as well as marketing strategies, are explained in the following subsections.

3.4.1 Targeted Industries

To date, only five utility areas produced more than one Abstract submittal. Three of these--Puget Power, Seattle City Light and Tacoma City Light--had seven submittals each. The projects came from a variety of industries, but food processing, pulp and paper, and chemical producers dominated.

Almost every type of industry is found in the territories of the utilities contacted. General types include extraction industries, chemical processes, glass and metal furnaces, machining and milling, food processing, cold storage, and assembly.

A few utilities serve a wide variety of industry types, while most utilities have a few major industries or one common industry type (typically forest products or food processors). Most of the larger utilities have a

small number of very large industrial plants and a larger number of medium to small industries. Industrial customers accounted for anywhere from 0% to 80% of total utility load.

Most utilities said they distinguished between large commercial and industrial accounts. However, this distinction is based on demand (criteria ranging from 300 kW to over 10 MW) and is not based on whether process functions were present.

3.4.2 Marketing Efforts and Strategies

All of the active utilities conducted program marketing at many levels, including mailing a letter and the brochure, as well as calling and visiting firms. One utility has account representatives assigned to its larger customers. Most of the inactive utilities with participants also indicated they did some marketing. A few of the inactive utilities without participants said they did some marketing, but this consisted mostly of mailing out the brochure and the NOPI.

Utilities were evenly split over whether their efforts were effective. Where information was available, we found response rates to direct mail marketing to be 10% or less. This indicates that there is a need for alternative marketing approaches if a higher response rate is desired.

Specific marketing activities of utilities included mailing brochures and NOPIs, mailing a utility letter, calling firms, visiting firms, arranging meetings with customer groups, arranging meetings between Bonneville and a customer, placing program notices in utility newsletters, and offering quick walk-through audits.

Utilities were also asked for suggestions for marketing the program for higher customer response. Suggestions covered promotional materials, presentations, and utility-targeted efforts.

Suggestions for enhancing promotional materials included providing case histories, creating brochures targeted to specific industries, creating better brochures with clear bottom-line information, and placing a notice in Chamber of Commerce publications.

Suggestions related to presentations included presentations at trade association meetings, seminars for customers, and direct one-on-one presentations.

Efforts related to utilities included working through utility power engineers, reimbursing utility staff for outreach efforts, and promoting the program to utility management.

Other suggestions included encouraging vendors to participate and offering incentives or awards to plant engineers who are responsible for making projects happen.

3.4.3 Role of Engineering Firms and Vendors in Marketing

Utilities are split over engineering firms promoting the program in their areas. Half of them said it was fine; half had reservations or did not think it was a good idea. Many of those who approved of the idea wanted some utility oversight, or at least a preapproval of engineering firms.

Utilities were also evenly split over the use of vendors. Those who supported the idea again wanted some form of utility oversight and control so they could keep vendors from harassing their customers or providing false information. They wanted to make sure vendors are informed about the program. They were also concerned that too many entities promoting the program could confuse their customers.

4.0 PERSPECTIVE OF TRADE ALLIES

Trade allies, i.e., consulting engineers and equipment suppliers (vendors), were contacted to obtain their views on the same issues discussed with firms and utilities. Trade allies are generally directly involved in industrial projects, and as such can be potentially significant contributors to the success of the ESP program.

Engineers may be involved throughout the project from conceptualization through detailed design and application, or they may merely be consulted for advice about a specific component or application. Vendors also can contribute to design work as well as sell and install equipment. Vendors are often involved to a lesser degree by merely selling off-the-shelf equipment.

4.1 ENGINEERING FIRMS

Seven firms experienced in industrial energy conservation work were contacted for this study. A number of these participated in Bonneville's Industrial Test Program (ITP), and three of them have been involved in one or more ESP projects. Two of the seven were not aware of the ESP program.

Engineering firms are used by small industrial firms that have no in-house plant engineers as well as by larger plants that are augmenting in-house capability. Outside engineers are frequently asked to help justify projects by conducting the feasibility studies necessary to convince plant management and work on special processes or individual components of complex processes.

The engineers were asked what they considered to be problems with the ESP program. Most of the comments related to program requirements and paperwork. Specifically, it was felt that the paperwork is excessive and submittal forms have an awkward format. The preparation costs (time) are thought to be too high to justify doing smaller projects. Another deterrent related to the process is that there are too many steps and entities involved--Bonneville Area staff, Central staff, the utility, consultants and others. It was felt that firms prefer to deal with one decision-maker. One engineer commented

that there is a perception that Bonneville constantly changes the rules (requirements), and this creates a feeling of uncertainty about the program that worries firms.

Some of the problems mentioned relate more to the technical aspects of the program. It was felt that verifying savings from projects is difficult because there are few periods when plant operations are "typical" and pre- and post-measurements can be made. Firms also do not like to restrict their operations for the measurements, which some of them perceive to be a program requirement. There is also concern that reliance on measured savings will hurt an industry because the incentive is paid after installation based on the savings. Firms fear that the possibility of poor savings during the testing period will lead to a reduced incentive.

Nearly all of the engineering firms said they would be interested in offering the program to their clients. A few have already mentioned it but found little interest. The firms that were unfamiliar with the program need to be informed about the program, but a number of the others indicate they would like additional program information before they can "sell" it to their clients. One firm would not market the program because there was no clear signal that it was going to be around for any length of time and because projects could be rejected or terminated. The latter fear was based on this firm's experience with Bonneville's Purchase of Energy Savings (PES) program.

Engineering firms had suggestions for marketing the program. Most of the comments covered program changes and improvements including informing vendors about the program and prequalifying them and their products; explaining to industry that the program allows firms to recover all or a portion of their costs; detailing how energy projects can be done at the same time as other projects; letting vendors prepare single proposals for similar measures over a number of projects, or having certain measures prequalified so that no proposal would be necessary; informing state economic development agencies about ESP; providing interim financing or partial payment up-front; and paying for energy analysis and proposal preparation.

The engineers were also asked whether lighting measures should be included in the program. Most of them felt that lighting was too small of a load

to interest industry. This is particularly true for pulp and paper plants and lumber mills. It was also mentioned that plants are concerned about adequate light levels and good color rendition so their workers can function well. Nonetheless, the engineers offered suggestions for measures including the following: indoor area lighting, particularly in high bays; replacement of all older fixtures; switching from mercury vapor to metal halide or high pressure sodium; and some photocell switching on exterior lights.

4.2 VENDOR FINDINGS

Nine vendors (equipment suppliers) in five product areas were contacted. The product areas are process equipment, controls, lighting, motors and mechanical/HVAC.

4.2.1 Awareness of E\$P

Most of the vendors contacted were not aware of the E\$P program. Only two had any direct experience with the program. One vendor had been involved in marketing the program to its clients. This vendor first heard about the program through one of its clients, while the other vendor heard about it through an employee who had worked with Seattle City Light. Neither of these vendors heard about the program from Bonneville.

It should be noted that all the vendors contacted are major suppliers to industry in the Northwest. Given that most were unaware of the program, it is likely that their clients were not asking them about projects for potential submission for the program. This suggests that program information has not spread through the market.

4.2.2 Program Design

Vendors are typically involved only indirectly in the project proposal phase (i.e., preparation of Abstracts or Proposals). All but one of those contacted stated that they generally receive detailed specifications, either from plant engineers or consulting engineers, and then are asked to provide bids. In some cases they are asked to provide assistance in the design, but only as it pertains to the equipment they supply. It is not likely they would be involved in preparation of Abstracts and Proposals. One vendor who receives

bid requests from consulting engineers frequently is not told who the client is because of the competitive nature of the industry.

4.2.3 Incentives

Most vendors felt that the incentive (at \$0.05 per kWh) was sufficient and that the \$250,000 limit would cover a significant portion of their product costs. However, the two process equipment vendors typically sell equipment costing more than \$250,000. A lighting vendor and a mechanical equipment vendor felt that the \$250,000 limit was unfair to larger plants. One vendor felt the \$0.05 per kWh rate for one year's savings was too low, and \$0.10 per kWh was much better.

Two vendors commented on the effectiveness of incentives in their sales efforts. One felt incentives would not be useful, and the other felt they help significantly by making their product more competitive (affordable). The others had no comment because they are rarely in the position to sell directly to a plant.

4.2.4 Sales and Marketing

Most of the vendors contacted used a less active marketing effort than door-to-door sales pitches. The most typical pattern seems to be one in which the vendor receives a request for a bid on specified equipment from either the plant engineer or a consulting engineer, usually the result of prior contacts or advertising by the vendor. Established contacts within the industrial plants are also key to being contacted for a bid. An important consequence of this sales procedure is that the vendors usually come into a project well into the design stage, and likely too late to make recommendations about energy-efficient equipment.

The other marketing approach used is direct solicitation by door-to-door sales representatives. This method is generally used where established contacts between the firm and the vendor do not exist. The sales person often inquires about potential projects, facilitating involvement early in the design phase. Usually, vendors design or provide off-the-shelf equipment as requested by the engineers.

As for willingness to use energy efficiency as an element in the sales pitch, we found that a few of the vendors currently do so if it will help in the sale. One vendor would not promote his product based on claims of energy savings because he felt there was a liability issue.

Vendors typically limit their technical assistance efforts to the particular equipment they supply. Only the mechanical contractors indicated they had the capability to offer whole-plant energy analysis, and they provide this service in a limited number of cases. Most of the other vendors said they could perform energy analysis related to the portion of the equipment or process related to their products.

The two process equipment vendors contacted said they did not provide energy analysis on plant processes because they were costly to the vendor and their customers had not expressed an interest. One controls vendor specializes in refrigeration technologies and can offer full technical assistance for food processing plants and warehouses that primarily do refrigeration and freezing.

4.2.5 Roles for Bonneville, Utilities, Engineers and Vendors

Since vendors are usually responsible for the installation of measures, they have little opportunity to sell energy efficiency. They have to respond to decisions made prior to the requests they receive from engineers or the plants. Thus, most vendors felt that it was the role of Bonneville and the utilities to raise the level of awareness and interest in energy efficiency. Bonneville could do the general marketing while utilities did site-specific promotion. Vendors can also provide program information to the plants through their normal contacts.

Another anticipated role for Bonneville is providing credibility to the vendor's products by case studies showing where products and services have been used successfully, and showing the actual energy savings.

Engineers were seen as having a key role in actually recommending energy-efficiency measures. Industry generally deals with the engineers in designing

or redesigning a retrofit or new process. Engineers provide the specifications to the vendors. Engineers can also provide the whole-plant analysis which vendors generally are unable to do.

Several vendors recommended that Bonneville offer mini-seminars or one-on-one introductions to the program for both vendors and engineers. Brochures and letters in the mail are seen as less effective.

Vendors were asked if there were other measures that should be eligible for the ESP program. About half the vendors had suggestions. These include software for statistical process control, soft-start controls, lighting system design upgrades, reflectors for lights, energy-saving ballasts on high-pressure sodium lamps, large blowers in pneumatic transport systems (in place of conventional conveyor systems), piping improvements, and heat recovery from exhaust air. Half of these measures are already eligible under the Program.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 EXISTING PROGRAM

The current ESP program was generally well received by both industrial firms and utilities. The firms thought the program design was a good one because it was flexible, was a fairly quick process, and provided a good incentive. Utilities generally felt the program was a good customer service even though they had some reservations about the program structure. Our process evaluation provides insight into areas that could be improved to enhance program participation and implementation. Conclusions and related recommendations follow.

Conclusion: Among the concerns raised about the program is the perception by both utilities and firms that the process from application-to-completion-report is complicated and requires excessive paperwork. The eligibility criteria were perceived as a problem as well. Utilities felt the original NOPI created some confusion among potential participants.

Recommendation: Bonneville has already taken a significant step by making the Abstract optional in 1990. However, we believe a simplified summary Abstract will be a useful tool for Bonneville. Wherever possible, efforts should be continued to minimize the steps required for participation. Either the number of steps should be reduced or responsibility should be transferred to an intermediary, such as a utility or architect-engineer firm, while assuring quick turnaround time. Clearly outlining the program requirements will also help.

Conclusion: There is a lack of understanding of Bonneville's intent and goals for offering the ESP program. Firms have concerns about the use of government or ratepayer money. Also, many utilities were unaware of the program itself.

Recommendation: The benefits to Bonneville and the region from the program should be clearly explained. All utilities should be informed about the program and provided with a sample application package, as well as training on program requirements and operation.

Conclusion: A wide variety of industries with diverse industrial processes and conditions exist in the Pacific Northwest. Each plant is unique, even within the same industry. There are also a number of different situations with different needs, interests and capabilities within utilities. As a result, it is important that the program have maximum flexibility to accommodate site-specific conditions.

Recommendation: Program requirements and forms should allow for maximum flexibility, and be broad enough to handle a variety of conditions. Local implementation of the program by utilities would also allow local needs to be met more easily.

5.2 PROGRAM CHANGES

Conclusions and recommendations for program changes follow.

Conclusion: There was general support from all firms and utilities for the idea of an optional Abstract. A few firms indicated they would use it anyway to help inform their management about a project. The new simplified Abstract for 1990 is also a positive step.

Recommendation: Proceed with simplifying the abstract and making it optional.

Conclusion: The incentive was considered critical to making projects feasible and receiving authorization from plant management. This is partially the result of requiring projects to have simple paybacks of more than 1 year combined with the normal practice of firms requiring shorter paybacks on nonessential projects.

All firms felt the initial incentive (\$0.05 per kWh) was sufficient. However, the payment ceiling of \$250,000 was a concern for firms with larger projects. They felt that this limits the program participation to smaller projects.

All respondents, utilities and firms welcomed the idea of the increased incentive, allowing firms to consider more marginal projects and increasing potential participants.

Recommendation: Proceed with the higher incentive and consider raising the maximum payment.

Conclusion: The inclusion of lighting as an eligible measure was supported. However, firms generally considered lighting loads to be too small to worry about, and there is little motivation for them to include this measure. The 50% limitation will make lighting less attractive because many firms do not like to mix measures in a single project. Utilities also disliked the 50% limitation. They would like the option of having a point of contact with firms in using lighting as a separate measure, since it does not interfere with the industrial process.

Recommendation: Consider expanding the scope of the program by making industrial lighting stand-alone ESP measure, or make it a part of the Commercial Incentive Program.

Conclusion: Utility operation of the program was encouraged by the active utilities. Even the smaller utilities preferred to be the direct link to their customers, but they realize their involvement is limited because of lack of staff and resources. Most firms felt comfortable with the idea of utility operation, while a few preferred to work directly with Bonneville.

Recommendation: Utilities should be allowed the option to participate to the degree possible. Technical assistance should be made available for those with less in-house capability. More effort is needed on Bonneville's part to educate utilities about program benefits to the region as well as about specific requirements.

5.3 PROGRAM MARKETING

There is recognition of marketing needs among industrial firms. Several suggestions for marketing approaches are explained.

Conclusion: A need for the program exists among industrial firms. Industrial firms generally considered electricity costs to be significant even though they usually rank third or fourth among operating expenses. Most firms

feel they have little control over their electricity costs without major capital investment. As a sign of program potential, all firms contacted in this study have considered energy conservation projects besides those submitted for the program.

Recommendation: Personal contact between the utility or Bonneville staff and the plant engineers or management is the most effective and accepted marketing approach. In addition, it is important to have simple promotional materials that describe program requirements concisely and point out the direct benefits to participants. The benefits to Bonneville and utilities should also be mentioned.

Case studies can be effective in that they help take the uncertainty out of the program by showing how others have benefitted. Case studies also help stimulate ideas for conservation applications.

It was found that a number of engineering firms were not aware of the program. By providing them with program materials, Bonneville will open a new avenue of program promotion.

Conclusion: Engineering firms can play a key role in marketing the program since they are regularly in contact with firms. They also deal with the firms in the areas most likely to have energy efficiency applications, i.e., processes, lighting, mechanical systems.

Recommendation: Provide engineering firms with a description of the program that clearly outlines the program structure, requirements, and roles and relationships of the different actors. Explain how to work with utilities. Include a list of utility service areas and contact persons. Also, provide multiple copies of program brochures for engineers to distribute.

6.0 REFERENCE

Peters, J. S. 1989. "Interim Process Evaluation of the Bonneville Power Administration's Energy Savings Plan (ESP) Program." Letter report prepared for the Bonneville Power Administration. Bonneville Power Administration, Portland, Oregon.

APPENDIX A

EVALUATION CONTACT LIST:
FIRMS, UTILITIES, ENGINEERS, AND VENDORS

APPENDIX A

EVALUATION CONTACT LIST: FIRMS, UTILITIES, ENGINEERS AND VENDORS

Industrial Firms

Participants

Bellingham Cold Storage
(Bellingham)
Lamb-Weston (Quincy)
Ostermann & Schwiewe (Tacoma)
Pennwalt (Tacoma)
Seafreeze (Seattle)
Simplot Foods (Ferndale)

In Process

Ball-Incon (Seattle)
Kenworth Trucks (Seattle)

Withdrawn, Rejected, Terminated

Boise-Cascade (Vancouver)
Darigold (Seattle)
James River (Clatskanie)

Utilities

With Participants

Central Lincoln PUD
Chelan PUD
Clark PUD
Clatskanie PUD
Consumers Power
Cowlitz PUD
City of Ellensburg
Eugene Water & Electric Board
Grant PUD
Klickitat PUD
Lewis PUD
City of Port Angeles
Puget Sound Power & Light
Salem Electric
Seattle City Light

Snohomish PUD
Tacoma City Light

Without Participants

Blachley Lane Co-Op
City of Centralia
City of Cheney
Emerald PUD
Glacier Electric Co-Op
Grays Harbor PUD
City of Heyburn
Lincoln Electric Co-Op (MT)
Lower Valley Power & Light
Mason PUD #3
City of McMinnville
Missoula Electric Co-Op
Okanogan PUD
Ravalli Electric Co-Op
City of Richland
Salmon River Electric Co-Op
City of Springfield
Surprise Valley Electric Co-Op
Wells REA

Engineering Firms

Abacus Consultants (Seattle)
Carroll, Hatch and Associates
(Portland)
CRS Sirrine (Portland)
Evergreen Engineering (Eugene)
Harris Group (Portland)
Mater Engineering (Corvallis)
Momentum Engineering (Portland)

Vendors

Process Equipment

Coe Manufacturing (Tigard)
Harris Thermal (Portland)

Motors

Beckwith & Kuffel (Portland)

Lighting

EOFF Inc. (Salem)

Hollophane (Portland)

Controls

Pacific Micro Controls (Campbell, CA)

Platt Electric (Portland)

Mechanical/HVAC

Fullman Co. (Portland)

McKinstry Co. (Portland)

APPENDIX B

DISCUSSION PROTOCOL:
PARTICIPATING INDUSTRIAL FIRMS

APPENDIX B

DISCUSSION PROTOCOL: PARTICIPATING INDUSTRIAL FIRMS

PROGRAM OVERVIEW

1. In general, how significant are electricity costs in your overall operations?

What proportion of your overall operating expenses is represented by electricity costs?

Do you currently feel your firm can control its electricity costs?

2. What is your view of Bonneville's goals and objectives for this program?
3. How did your firm hear about the program?
4. Did any firm, utility or other organization (including vendors) contact your firm about the program?

If so, describe the contact.

5. Did your utility have any effect on your firm's decision to participate?
6. [NDN-PARTICIPANTS ONLY]
 - a. [REJECTED PROJECTS] Do you feel Bonneville has fully informed you of the reasons for not accepting your project?
 - b. [WITHDRAWN PROPOSALS] Why did you decide to withdraw your proposal?
 - c. [BOTH] Do you plan on submitting any other proposals?
[IF YES] For what type of project?
[IF NO] Why not?

INITIAL RESPONSE TO THE NOTICE OF PROGRAM INTEREST

1. What were your primary objectives in submitting the abstract? (PROBE: Other than energy savings?)

2. Bonneville selected a two-step abstract/proposal process with the intention of making it easier for firms to respond to the NOPI. Was the two-step abstract/proposal process understandable? Did you have any problems with it?
3. Bonneville has now made the Abstract optional, allowing firms to submit only the Proposal for qualification. Would you still submit an Abstract, or just a full Proposal?
 - a. Did the two-step process make it easier to respond to the program compared to submitting a single proposal?
4. Did you require any engineering assistance to prepare the Abstract for submittal?
5. How much did it cost your firm to prepare and submit the Abstract?
6. Bonneville calculated the incentive in the ESP program using the following: (1) up to 80% of estimated eligible project costs, or (2) \$.05/kWh of one years estimated savings, whichever is less, not to exceed \$250,000.
 - a. Do you consider these incentive amounts sufficient?
 - b. Is there any other type of incentive scheme you would prefer?
7. Bonneville has proposed modifying the incentive structure by increasing the savings based payment from \$.05/kWh to \$.10/kWh of the estimated annual electricity savings.
 - a. Do you think this will help increase participation?
 - b. [WITHDRAWN FIRMS ONLY] Would this increase the likelihood of your participation?
8. Has your firm considered submitting any other energy conservation projects?
 - a. What types of other projects?
 - b. What were your reasons for not submitting one of these projects?
 - c. What additional energy conservation measures should Bonneville consider for ESP incentives?
9. Bonneville plans to add lighting improvements to be eligible for reimbursement as long as other electrical efficiency upgrades of processes,

equipment, or controls are also done at the same time and lighting savings are less than 50% of total project savings. What do you think of this change?

- a. Would you have included lighting measures in your proposal if they had been eligible?

PROPOSAL PREPARATION

1. Did your firm use (or desire) outside technical expertise in developing the proposal?
2. Would your firm have preferred to deal with a Bonneville contractor, an equipment vendor, or a utility rather than directly with Bonneville? Why or why not?
3. How much additional engineering was required to submit the proposal and start the negotiations process?
4. Did you conduct a detailed energy analysis while preparing the Abstract and/or the Proposal?

[IF YES, SKIP TO Q5]

[IF NO, ASK THE FOLLOWING]

- a. Would an energy analysis have been helpful to you?
 - b. Was the cost of an energy analysis a prohibitive factor?
 - c. Would you be willing to pay a portion of the costs of conducting such an analysis?
 - d. What percent would you be willing to pay?
5. How much did it cost your firm to prepare the proposal?
 6. Would you have prepared a more detailed proposal if the costs were reimbursable?
 7. Did you have any difficulty meeting the 60 day time requirement for submitting the proposal? Why or why not?

EXPERIENCE WITH BONNEVILLE

1. Were Bonneville's responses timely and appropriate?
2. Did you have any problems during the proposal and negotiation process?

- a. Did you know what steps to take to resolve these problems?
3. What, if anything, would you like to see changed in the program process?

INVESTMENT CRITERIA

1. Do you have any other energy conservation projects currently planned for the future? If so, please describe them.
2. Have you made any efficiency improvements in lighting or HVAC at the plant?
[IF YES] When?
[IF NO] Why not?
 - a. Would you like to make improvements in lighting or HVAC efficiency?
3. What source of capital is normally used to finance conservation investments in your plant?
4. How does your firm's budget planning cycle affect the timing of potential investments?
5. What level of payback or rate of return do you look for in funding capital improvement and energy conservation projects?
6. How important was the Bonneville incentive in the decision to do this project?
 - a. Did the incentive make a difference in the timing of when this project was done?
 - b. [FOR PARTICIPANTS] Would you have eventually done this project, or a portion of it, if no Bonneville funding were available?
[FOR NON-PARTICIPANTS] Have you proceeded, or will you eventually do this project, without Bonneville funding?
 - c. What relationship, if any, does the project have to the periodic replacement and/or upgrading of equipment?

FIRM DEMOGRAPHICS

1. What type of firm is this? (Describe products and SIC code)
2. How many employees do you have at this plant?
 - a. How many employees do you have in this firm (all locations)?

4. What types of major production process(es) do you use in this plant?
5. What are your plant's current major investment priorities? (PROBE: cost reductions, new investments or marketing? Currently, what are the relative levels of importance between these three investment approaches?)
6. How would you characterize the current profitability of your industry relative to the long-run average of all industries: high, medium or low?
 - a. How would you characterize the profitability of your firm relative to the average for your industry: above average, average, or below average?

FINAL COMMENTS

1. What are the ESP program's strengths and weaknesses?
2. Would you recommend that other firms participate in the program?
 - a. What advice would you give other firms?
3. Can you suggest ways to promote the program among members of your industry?
4. Would you have done anything differently if you had it to do all over again?
5. Finally, how do you think the ESP program could be changed to better meet your needs?

APPENDIX C

DISCUSSION PROTOCOL:

UTILITY STAFFS

APPENDIX C

DISCUSSION PROTOCOL:

UTILITY STAFFS

INTRODUCTION

Explain purpose of call and length of time required. Reschedule at a better time if necessary.

I. OVERVIEW OF THE PROGRAM

1. What, in your opinion, are the goals and objectives of the program?
 - a. Do you think strategies necessary to achieve the goals and objectives have been implemented?
 - b. In what ways?

[IF NOT FAMILIAR WITH PROGRAM, EXPLAIN PROGRAM, THEN ASK:]

2. Does your utility have specific goals and objectives for customer service and/or conservation programs for industrial customers?
 - a. Is the program consistent with your utility's objectives?
 - b. [IF NOT] Why not?
3. At this stage in the program, do you think the ESP program is achieving its goals?
 - a. [FOR UTILITIES WITH PARTICIPANTS] In what ways is it successful? Why have firms in your territory participated?
 - b. In what ways has it not been successful?
 - c. [FOR UTILITIES WITHOUT PARTICIPANTS] Why have you not had participation in the program?
 - d. What could be done to improve the program to make it more successful in your area?

4. Assume for a minute that your utility were to experience a significant reduction in actual kWh use and a reduction in load factor from one or more ESP projects. Is this a concern of your utility?
 - a. What kind of operational impacts does a reduction in energy use have on your utility? [Cost of power; revenue; customer rates; system efficiency]
 - b. What would the impacts be if there were a reduction in demand (i.e. less impact on load factor)?

[DESCRIBE THREE LEVELS OF UTILITY INVOLVEMENT]

[1. NONE 2. ADVISORY 3. DIRECT INVOLVEMENT]

5. What has been your utility's approach to program implementation?
 - a. Why was that approach taken? [PROBE: Staff, Budget, utility priorities, etc.]
 - b. What changes would you recommend in the utility's policies to encourage more active utility participation?

II. PROGRAM REVISIONS

1. Bonneville has just added lighting system and control modifications and upgrades to the program as long as other actions are taken for process improvements. Are there many industrial firms in your area that might take advantage of the opportunity to improve lighting efficiency? [% OF FIRMS]
 - a. A provision of including lighting measures is that total lighting energy savings shall be less than 50% of total project savings. What do you think the effect of this requirement will be?
2. Bonneville has also raised the incentive payment that is calculated on kWh saved from \$.05/kWh to \$.10/kWh of estimated annual savings. Will this affect program participation in your area?
3. Do you have any other comments on these changes?
4. What changes in the program would be necessary to increase industry interest in it?
5. What changes could Bonneville make in the program to make your utility more interested in the program?

III. EXPERIENCE WITH THE PROGRAM

1. Do Bonneville activities in this program seem adequately coordinated between area and central staff?
2. Do you see any problems in the current management structure of the program between Bonneville and the utilities?
3. Are the guidelines for acceptable projects and procedures for applying clear? Do you have recommendations for improving these?
4. Bonneville has now made the Abstract optional. What do you see as benefits from this change?
 - a. Any problems with it?
 - b. Do you anticipate submitting firms would or would not submit an Abstract if it were optional?
5. What do you see as barriers to interested firms in submitting Abstracts and Proposals?
 - a. Have the costs of preparing Abstracts and Proposals been a deterrent to any of your industrial customers?
6. Do you think you have sufficient information and resources to implement the ESP program?
 - a. Do you have sufficient technical expertise on staff to assist firms in developing proposals and to review Proposals.
 - b. Do you feel you need training or more information?
 - c. What type of training or information would you like?
7. Bonneville is planning to provide funding for audits that can be used in planning ESP projects. Would the audits be helpful to you?
 - a. Are there other forms of assistance that you would like Bonneville to provide?
 - b. Are there any types of assistance you would not like?
 - c. What do you think of participation by engineering firms in providing the technical analysis for projects?

IV. MARKETING AND PROMOTION

1. What are the primary industries in your territory?

- a. Does your utility differentiate between larger industrial and commercial accounts?
 - b. What minimum kW demand determines whether it is a large commercial/industrial customer?
2. Has your utility specifically allocated staff time to recruiting participants in the ESP program?
3. Did you do any marketing of the program to your customers or offer any assistance or encourage any firms to respond to the program?
 - a. Describe your efforts.
 - b. Was this effective?
 - c. How could this be improved? Can you suggest other strategies?
 - d. [UTILITIES WITHOUT PARTICIPANTS] Does your utility think the program is worth promoting to your industrial customers?
 - e. [IF NOT] Why not?
4. Do you think there is a role for engineering firms in promoting the program? How do you feel about their involvement?
 - a. Is there a role for equipment vendors?

V. FINAL COMMENTS

1. What are the strengths of the program?
2. What are some of its weaknesses?
3. Do you have any other comments?

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