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UTILITIES COMMISSION

LISA D. NORDSTROM
Senior Counsel

April 1, 2009

Jean D. Jewell, Secretary
Idaho Public Utilities Commission
472 West Washington Street
P.O. Box 83720
Boise, Idaho 83720-0074

Re: Case No. IPC-E-09-09
IN THE MATTER OF THE APPLICATION OF IDAHO POWER COMPANY FOR A PRUDENCY DETERMINATION OF ENERGY EFFICIENCY RIDER FUNDS SPENT IN 2002-2007.

Dear Ms. Jewell:

Please find enclosed for filing an original and seven (7) copies of Idaho Power Company's Application in the above-referenced matter.

Very truly yours,

Lisa D. Nordstrom

Lisa D. Nordstrom

LDN:csb
Enclosures

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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF IDAHO POWER COMPANY FOR A PRUDENCY DETERMINATION OF ENERGY EFFICIENCY RIDER FUNDS SPENT IN 2002-2007.	)	CASE NO. IPC-E-09-09 APPLICATION

Idaho Power Company ("Idaho Power" or "the Company"), in accordance with RP 052 and RP 201, *et seq.*, hereby respectfully makes application to the Idaho Public Utilities Commission (the "Commission") for an order designating Idaho Power's expenditure of $14,657,971 in Energy Efficiency Rider funds in 2002-2007 as prudently incurred expenses.

In support of this Application, Idaho Power represents as follows:

I. PROCEDURAL BACKGROUND

1. In testimony spread throughout the technical hearing record in Case No. IPC-E-08-10 on December 16-19, 2008, Idaho Power requested that the Commission

explicitly find that its expenditures of funds obtained from the Energy Efficiency Rider ("Rider") during the 2002-2007 period were prudently incurred. The Commission Staff presented testimony recommending that the Commission defer a prudency determination for Idaho Power's Rider expenses until the Company was able to provide a comprehensive evaluation package of its programs and efforts. Idaho Power contended that information sufficient to make the prudency determination existed and had been provided or made available for Staff review.

2. On February 18, 2009, Idaho Power and the Commission Staff filed a Stipulation in Case No. IPC-E-08-10 regarding the prudency of a portion of the $28,961,716 in Rider funds Idaho Power spent during 2002 and 2007. As described in the Stipulation, the Parties agreed that $14,303,745 in Rider-funded expenses associated with twelve programs was prudently incurred. This amount includes $2,160,878 in Rider funds paid to NEEA from 2005- 2007. Finding that "the Stipulation identifying approximately $18.3 million in energy efficiency expenditures for 2002-2007 as prudent to be just, reasonable, and in the public interest," the Commission approved the Stipulation in Order No. 30740, issued on March 6, 2009.

3. In the time following the Stipulation, the Company and Staff have exchanged information with regard to the remaining $14,657,971. The Commission-approved Stipulation required that, "On or before April 1, 2009, Idaho Power will file a pleading with the Commission seeking a prudency determination of the balance of Rider funds spent during 2002-2007." This Application represents Idaho Power's fulfillment of that term of the Stipulation.

II. PRUDENCY DETERMINATION

4. Since the Rider was instituted in 2002, Idaho Power has implemented and/or managed a broad array of cost-effective demand-side management ("DSM") programs and energy efficiency initiatives. The Company currently offers 19 Rider-funded programs to serve its different customer classes. These programs benefit customers two-fold with opportunities to lower individual energy consumption and also reduce upward pressure on the Company's collective rates by minimizing the need to generate additional power or buy power from the wholesale market. As discussed in its Application to increase its Energy Efficiency Tariff Rider in Case No. IPC-E-09-05, Idaho Power anticipates spending $29.7 million on energy efficiency in 2009.

5. Idaho Power considers energy efficiency and demand response to be an important and necessary part of a balanced approach to meeting the electricity needs of its customers. Energy efficiency is recognized by Idaho Power and its customers as providing economic and operational benefits. Therefore, the pursuit of all cost-effective demand-side resources is a primary objective for Idaho Power even as new supply-side resources are added to the Company's resource portfolio. Idaho Power accomplishes this objective with input and consultation with its Energy Efficiency Advisory Group ("EEAG"). Formed in May 2002 with 12 members representing customers, state agencies, and other stakeholders, Idaho Power relies on the EEAG for a broad range of recommendations, including input on new program proposals, modifications to existing programs, and overall expenditures of Rider funds.

6. DSM programs are considered cost-effective when energy savings and/or demand reduction can be achieved at a lower cost than the next best resource

alternative. Idaho Power relies on the *Electric Power Research Institute End Use Technical Assessment Guide* and the *California Standard Practice Manual* for its cost-effectiveness methodology, and primarily uses the Total Resource Cost test[1] and the Utility Cost test[2] to develop benefit/cost ratios to determine the cost-effectiveness of DSM programs. Idaho Power conducts cost-effectiveness analyses on both a measure-by-measure basis and a program basis. With cost-effectiveness expressed as a ratio between the benefits and costs, a value of 1.0 or greater indicates a program is cost-effective. For its total portfolio of DSM programs and energy efficiency initiatives funded by the Rider from 2002 to 2007, Idaho Power has calculated a portfolio cost-effectiveness ratio of 2.90 using the Utility Cost test and 1.74 using the Total Resource Cost test. To date, no party has suggested that any energy efficiency or demand response program or associated expenditure made since 2002 and collected under rate Schedule 91 is imprudent.

7. The Commission Staff requested more detailed expense information for several programs and expense categories before they could determine that the funds were prudently incurred. To aid Staff's review of its programs and expenditures, Idaho Power has prepared Attachment No. 1, *Energy Efficiency Rider Expense Documentation*. Attachment No. 1 contains expense documentation for all 2002-2007 DSM expenditures funded by the Energy Efficiency Rider where prudency was not addressed by the Stipulation and Order No. 30740. Expenses from these yet-to-be-reviewed programs totaling $14,657,971 are from Irrigation Efficiency Rewards,

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[1] The Total Resource Cost test evaluates whether a DSM program is cost-effective as a resource option from the prospect of a utility and its ratepayers as a whole.

[2] The Utility Cost test is a measure of the cost-effectiveness from the perspective of the utility to implement a DSM program.

ENERGY STAR® Lighting, Building Efficiency, Easy Upgrades, A/C Cool Credit, Heating & Cooling Efficiency, Appliance Program, Building Operator Training, and Indirect Program Expenses/DSM Overhead/Administration.

8. To facilitate the Commission's prudency review of its 2002-2007 DSM expenditures, Idaho Power has included tabs within Attachment No. 1 with the program reports and excerpts of supporting documents. Although each program or expense category has a different amount of data available depending upon how long the program has been implemented and the complexity of the cost-effective analysis, Attachment No. 1 generally includes the following:

a. An introduction and general program overview
b. The purpose of the program and how it was selected for implementation
c. A detailed explanation of the cost-effectiveness of the program and the assumptions used in the analysis
d. Program performance and analysis
e. Program evaluation

Idaho Power has included a detail of expenditures by year of the major expense categories and other supporting documentation as appendices to each program report contained in Attachment No. 1. Additional tabs include a description of its DSM cost-effectiveness and program evaluation taken from Idaho Power's 2008 DSM Annual Report[3] and the DSM Analysis and Screening Criteria portion of the 2006 Integrated Resource Plan Technical Appendix D.[4]

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[3] The 2008 DSM Annual Report filed in Case No. IPC-E-03-19 can be found in its entirety at: http://www.puc.idaho.gov/internet/cases/elec/IPC/IPCE0319/company/20090316DSM%202008%20REPORT.PDF.

[4] The 2006 Integrated Resource Plan Technical Appendix D was filed in Case No. IPC-E-06-24 and can be found in its entirety at: http://www.puc.idaho.gov/internet/cases/elec/IPC/IPCE0624/20061002APPENDIX%20D.PDF.

III. MODIFIED PROCEDURE

9. Idaho Power believes that a technical hearing is not necessary to consider the issues presented herein and respectfully requests that this Application be processed under Modified Procedure; i.e., by written submissions rather than by hearing. RP 201 *et seq.* If, however, the Commission determines that a technical hearing is required, the Company stands ready to present its testimony and support the Application in such hearing.

IV. COMMUNCIATIONS AND SERVICE OF PLEADINGS

10. Communications and service of pleadings with reference to this Application should be sent to the following:

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V. REQUEST FOR RELIEF

11. Idaho Power Company respectfully requests that the Commission issue an order designating Idaho Power's expenditure of $14,657,971 in Energy Efficiency Rider funds in 2002-2007 as prudently incurred expenses.

Respectfully submitted this 1st day of April 2009.

Lisa D. Nordstrom

LISA D. NORDSTROM
Attorney for Idaho Power Company

BEFORE THE

IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. IPC-E-09-09

IDAHO POWER COMPANY

Energy Efficiency Rider Expense Documentation

ATTACHMENT NO. 1

PROGRAM SUMMARY

IDAHO POWER®

An IDACORP Company

Idaho Power Annual Demand-Side Management Rider Expenses

2002	2003	2004	2005	2006	2007	TOTAL
$ 240,576	$ 707,380	$ 1,147,509	$ 4,533,878	$ 8,844,913	$ 13,487,460	$ 28,961,716

ID	DSM Descriptions 2002-2007	Category	Duration	Idaho Rider Expenses 2002-2007	Other Regulatory Account 2003-2004	NEEA Credit & Interest 2003-2007	Total
	Staff's List of Prudent DSM Programs from 2002-2007						
1	NEEA	Energy Efficiency	2003-Present	2,160,878	2,406,364	1,620,796	6,188,038
2	Custom Efficiency	Energy Efficiency	2003-Present	5,850,106			5,850,106
3	Irrigation Peak Rewards	Demand Response	2004-Present	4,496,611			4,496,611
5	ENERGY STAR® Homes	Energy Efficiency	2003-Present	1,303,583			1,303,583
6	Energy House Calls	Energy Efficiency	2007-Present	251,743			251,743
7	Rebate Advantage	Energy Efficiency	2007-Present	58,854			58,854
8	Local Energy Efficiency Funds	Research	2003-2007	54,318			54,318
	Staff's Small Projects (most edu. & research)						-
9	Commercial Education Initiative	Education	2007-Present	25,427			25,427
10	Air Care Plus Pilot	Research	2003-2004	3,436			3,436
11	Window A/C Trade-up Pilot	Research	2003	6,687			6,687
12	Distribution Efficiency Initiative	Research	2005-Present	37,763			37,763
13	DSM Direct Program Overhead	Administration	2007-Present	54,339			54,339
			Subtotal	$ 14,303,745	$ 2,406,364	$ 1,620,796	$ 18,330,905
	Staff List of 2002-2007 DSM Programs/Overheads Needing More "Prudency" Information						
14	Irrigation Efficiency	Energy Efficiency	2003-Present	4,758,294			
15	ENERGY STAR® Lighting	Energy Efficiency	2002-Present	1,247,368			
16	Building Efficiency	Energy Efficiency	2004-Present	1,232,815			
17	Easy Upgrades	Energy Efficiency	2006-Present	710,613			
18	A/C Cool Credit	Demand Response	2003-Present	4,878,578			
19	Heating & Cooling Efficiency	Energy Efficiency	2006-Present	497,698			
20	Appliance Program	Energy Efficiency	2007-Present	8,746			
21	Building Operator Training	Education	2003-2005	94,572			
22	Indirect Program Expenses DSM Overhead and Other In	Administration	2002-Present	1,229,287			
			Subtotal	$ 14,657,971			$ 14,657,971
			Total	$ 28,961,716			$ 32,988,876

IRRIGATION EFFICIENCY REWARDS

IDAHO POWER.
An IDACORP Company

Irrigation Efficiency Rewards
April 1, 2009

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Irrigation Efficiency Rewards
April 1, 2009

Introduction

This report will provide an overview and documentation on the Irrigation Efficiency Rewards Program (Program) offered by the Idaho Power Company. The report includes information relating to the Program through 2007. The Program has been offered by Idaho Power since 2003 and continues to provide cost-effective energy savings for the Company.

The purpose of the Irrigation Efficiency Rewards Program is to encourage Idaho Power's irrigation customers to install energy efficient equipment and improve irrigation system design to be more energy efficient and lower their energy consumption. Irrigation customers are eligible to receive monetary incentives to improve their irrigation systems to be more efficient. Customers choose to participate in the Program through two options. The first is a custom option that is designed for extensive retrofits of existing systems or installation new irrigation systems. The menu option is designed to encourage customers to repair or replace specific components on existing systems that enables the irrigation system use less energy.

From 2003 through 2007, the Program costs of the Irrigation Efficiency Rewards Program were $4,758,294 paid from the Idaho Power Energy Efficiency Rider (Rider) account and $187,531 from the Idaho Power operations and maintenance (O&M) budget for a total of $4,945,826. The total of utility costs including those paid in Oregon was $5,094,055. Through 2007 the Program resulted in energy savings of an estimated 31,142,568 kWh. The following table provides the total Program results for Idaho and Oregon jurisdictions. A detailed breakdown of the Idaho DSM Rider expense of the Program is included in Appendix I.

Irrigation Efficiency Rewards Program results for the Idaho and Oregon jurisdictions:

		Costs		Benefits			Measure Life	Benefit/Cost Ratios	
Year	Projects	Total Utility Cost	Total Resource Cost	Annual Energy	Peak Demand	Energy Savings		Utility	Total Resource
	(number)	(dollars)	(dollars)	(kWh)	(kW)	(dollars)	Years		
2003	2	$41,089	$54,609	36,792	18				
2004	33	$120,808	$402,978	802,812	449				
2005	38	$150,577	$657,460	1,012,883	401				
2006	1,235	$2,779,620	$8,514,231	16,986,008	5,100				
2007	819	$2,001,961	$8,694,772	12,304,073	3,407				
Total	2,127	$5,094,055	$18,324,050	31,142,568	9,376	$28,439,390	8	5.58	1.55

Program Development

The Irrigation Efficiency Rewards Program was fully developed following its selection during the 2004 Integrated Resource Plan (IRP) process. Designed to improve the energy efficiency of irrigation systems in Idaho Power's service area, a wide range of financial incentives and educational methods are provided.

The custom incentive option provides incentives for energy efficient upgrades for large-scale improvements and energy efficient design of new systems. For new systems, the incentive is $0.25 per first year kWh saved above standard installation methods, not to exceed 10% of total project cost. For existing system upgrades, the incentive is $0.25 per first year kWh saved or $450 per first year kW reduction, whichever is greater, not to exceed 75% of total project cost. Idaho Power reviews and analyzes each proposal for an existing system upgrade or new system to determine and verify the estimated energy savings. A copy of the custom incentive application is attached as Appendix II.

The menu option provides incentives for existing systems for which smaller upgrades provide energy savings. This option offers a menu of 11 measures and their associated estimated energy savings and incentives. The incentive levels are determined using an average kWh savings per measure. A listing of the measures under the menu option presented in a customer application attached as Appendix III.

Pre-Implementation Cost-Effectiveness

As Idaho Power does with all energy efficiency programs, a cost-effectiveness analysis was developed for the Irrigation Efficiency Program. Idaho Power follows the cost-effectiveness methodology as described in the DSM Annual Report and the Company's IRP. The most current description of this methodology can be found in the 2008 DSM Annual Report on page 11 and in the 2006 IRP Technical Appendix D on pages 62-73. Since the Irrigation Efficiency Rewards Program was developed during the 2004 IRP process, the cost-effectiveness analysis for the Program presented in this document used inputs from the 2004 IRP.

The cost-effectiveness model calculates the total cost to the utility including: incentives, Program administration and promotion, equipment installation and maintenance, and evaluation. The customer incentives are the largest cost to the Program.

The energy savings estimates for the Program come from a variety of sources as well as site specific engineering analyses for irrigation systems to determine what measures are applicable and cost effective for a customer's application. Idaho Power staff has completed hundreds of energy evaluations of irrigation systems for its customers over the past number of years. For the custom option of the Program, these estimates come from Idaho Power's past experience operating and evaluating irrigation energy efficiency programs. For the menu option Idaho

Power used information from the Bonneville Power Administration (BPA) and the Northwest Power and Conservation Council (NWPCC). Under the menu option, Idaho Power reviewed the energy savings estimates from BPA or the NWPCC and verified or adjusted the energy savings for each measure to account for Idaho's climate zones and typical hours of use for irrigation systems in the Company's service territory. Total market potential for the Program was identified by utilizing agricultural supply curves developed by the NWPCC and BPA.

The Company is able to calculate the value of the energy savings attributed to a Program by using end-use load shapes in conjunction with five DSM alternative cost pricing periods described in the Technical Appendix of each IRP. For this Program, Idaho Power uses load shapes developed from the BPA End-Use Load and Consumer Assessment Program (ELCAP), which ran from the mid 1980s through the early 1990s, along with Idaho Power's load research data. Although the ELCAP is notably dated, these load shapes are the best information available in the Northwest region. The following table demonstrates the percent of energy savings assigned to each DSM alternative cost pricing period in the Irrigation Efficiency Rewards Program cost-effectiveness model.

Energy Savings Allocation for Irrigation Efficiency Rewards					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
15.5%	27.8%	21.3%	19.6%	15.8%	100.00%

Once all inputs and assumptions are made, the benefits and costs associated with the Program are present valued based on Idaho Power's nominal discount rate. For the Irrigation Efficiency Rewards Program, the pre-implementation expected costs and estimated total benefits resulted in positive benefit/cost ratios from the total resource cost and utility cost perspectives. The following table provides the initial assumptions and expected cost-effectiveness of the Program form the 2004 IRP.

Irrigation Efficiency Rewards cost-effectiveness summary

Irrigation Efficiency Rewards	
Program Life (years)	10
Incentive Payment ($/kWh/participant)	$0.25
Administration (%)	25
Monitoring and Evaluation (%)	10
Estimated Participant Cost per Participant	$20,000
Estimated Annual Energy Savings per Participant (kWh)	40,000
Real Discount Rate (%)	5.20
Nominal Discount Rate (%)	7.85
Loss Factor (%)	10.90
Program Cost-Effectiveness	
Total Program DSM Alternative Cost	$50,716,866
Total Program Present Value (UC)	$13,424,690
Total Program Present Value (TRC)	$23,368,905
UC Benefit/Cost Ratio	3.78
TRC Benefit/Cost Ratio	2.17

Idaho Power verified the cost effectiveness of each measure offered under the menu option. The results of this analysis are presented in the following table.

Irrigation Efficiency Rewards menu option measure cost-effectiveness:

Measure	Incentive/Unit	Savings/Unit (kWh)	Utility B/C Ratio	TRC B/C Ratio
New flow-control-type nozzles replacing existing brass nozzles or worn out flow control nozzles of same flow rate or less.	$1.50	20	3.41	1.91
New nozzles replacing existing worn nozzles of same flow rate or less.	$0.25	20	15.59	9.09
Rebuilt or new brass impact sprinklers.	$2.75	40	3.70	1.25
Rebuilt or new wheel line levelers.	$0.75	20	10.50	1.10
New rotating-type sprinklers or low-pressure pivot sprinkler heads with the same flow rate or less.	$2.75	40	6.05	1.17
New low-pressure regulators.	$5.00	40	2.56	2.15
New drains, risercaps, and gaskets for hand lines, wheel lines or portable mainline.	$1.00	30	7.12	3.81
New wheel line hubs.	$12.00	40	3.39	1.03
New gooseneck with drop tube or boomback.	$1.00	20	11.02	1.09
Cut and pipe press or weld repair of leaking hand lines, wheel lines, and portable mainline.	$8.00	60	4.36	2.54
New center pivot base boot gasket.	$125.00	850	2.19	6.39

Program Performance

Through 2006, with help from the newly implemented menu option, Irrigation Efficiency Rewards had steadily increased the number of projects that were approved in the Program resulting in a continual increase in energy savings. However, in 2007 the total incentives paid declined from 2006. Idaho Power believes that incentives paid through the Program may have peaked in 2006 due to the Program addressing a large number of irrigation systems that were in need of more efficient equipment. Although participation varies from year to year, it is expected Program participation will likely be more constant going forward as many systems that were previously improved become eligible to participate in the Program again. The Program energy savings from 2003 through 2007 were an estimated 31,142,568 kWh.

Program Analysis and Validation

Custom Option for Existing Systems

The custom option for existing irrigation systems in the Irrigation Efficiency Rewards Program is very similar to a Program Idaho Power operated in the early 1990's. Under the previous Program, Idaho Power provided farmers with audits of their irrigation systems and offered incentives for cost-effective energy efficiency changes to those systems. An evaluation of this Program was completed in 1993 by Barakat and Chamberlain, Inc., and indicated that participants experienced substantial reductions in peak demand and energy consumption.

The evaluation by Barakat and Chamberlain, Inc. compared engineering estimates on 20 modified systems in the Blackfoot area with impact evaluation results. The evaluation states:

> The findings from the impact evaluation closely matched the engineering estimates from the pre- and post installation audits. ...the changes in both demand and energy consumption were comparable to the engineering estimates. The audits estimated an average demand reduction of 32 to 34 kW. The net average demand reduction was 39 kW, which is significantly greater than the engineering estimates. The total demand reduction for the Program was 780 kW compared to the engineering estimate of 682 kW.

Each application under the custom option received by Idaho Power undergoes an evaluation process to ensure energy savings will be achieved through a customer's participation in the Program. The applicant must submit several parameters to assess the energy savings potential of a proposed upgrade to an existing irrigation system or the installation of a new energy efficient system. These parameters are based on the type of system, with the number of irrigation lines and nozzles or the number of center pivots noted, and include: acres irrigated under system,

horsepower for each pump, elevation change on irrigated land, pumping lift, flow of system, and discharge pressure. Applicants must submit an estimated cost in the form of a bid from an irrigation supply company, specifying the details of what system improvements they are purchasing to install.

In order to estimate the effectiveness of a project, Idaho Power uses a service point's previous five years of electricity usage history and, based on the specific equipment to be installed, calculates the estimated post-installation energy consumption of the system. The Company also verifies the system's design through aerial photographs, maps, and field visits by Idaho Power agricultural representatives to ensure the system is utilized in the manner the application described.

If a proposed system is approved by the Company, Idaho Power informs the customer of the estimated energy savings and corresponding estimated incentive payment. An Irrigation Efficiency Rewards agreement is sent to the customer to sign and return to Idaho Power. Once an agreement is signed, installation of the system must be completed within one year. After the project is completed, Idaho Power reviews the final invoices and details of the system to determine the actual incentive payment. In many cases, post installation energy usage information is available and used to verify the estimated savings calculations. For an example of the analysis performed under this option please see Appendix IV.

Custom Option for New Systems

For the custom option for new systems the application process is the same as it is with an existing system. The customer submits all the information on their proposed irrigation system. In many cases, an Idaho Power agricultural representative has already been to the farm and advised the customer on energy saving considerations to make when they were planning the system.

The difference with a new system is that no historical energy usage is available to compare to the system being planned. Therefore, Idaho Power calculates what a standard irrigation system at the location would consist of and compares the standard practice "base case" to the proposed system to identify if potential for energy savings exists. The primary factor to identify energy savings potential is the pressure design of the system. Other variables are the pump and motor efficiencies and whether the customer is utilizing multiple pumps or a variable speed drive. As with the existing systems after the installation is completed and all invoices are submitted Idaho Power re-calculates the energy savings. By this time there is usually post installation energy usage data available to verify the overall system energy usage and savings. An example of an analysis under this option is included as Appendix V.

Menu Option

Each application under the menu option received by Idaho Power also undergoes an evaluation process to ensure savings are achieved for the system improvements. The most significant

difference from the custom option is that for a menu application each measure is listed with the corresponding energy savings and incentive. Payments are calculated on predetermined average kWh savings per measure. Under this option, the customer submits an application form with typical information regarding the project including: irrigated acreage, size of pump, pumping lift, and pressure. Included in a customer's application are invoices to verify component costs and the number of components installed.

Idaho Power conducts verification of the system using historical electricity usage of the service point. In some cases the energy savings estimated in the menu option are adjusted to reflect how the components are actually being used. For example, in a system that historically has been operated over less hours than a typical system the pre-determined energy savings per measure are reduced to be more representative of realized energy savings. Other information, such as aerial photographs, is also reviewed to verify energy savings potential. For example, the Company verifies if a center pivot system operates in a full circle or a half circle and adjusts energy savings as necessary. Under no circumstances are energy savings increased from those listed on the menu option.

Other Program Factors

In addition to incentives, the Program offers customer education, training, and irrigation-system assessments. Idaho Power agricultural representatives sponsor, coordinate, conduct, and present educational workshops for irrigation customers, providing expert information and training across Idaho Power's service area. Energy audits, conducted by Idaho Power agricultural representatives, evaluate customers' potential savings on prospective projects. Agricultural representatives from Idaho Power also engage agricultural irrigation equipment dealers in training sessions, increasing awareness of the Program and promoting it through the irrigation equipment distribution channels. Marketing efforts include direct mailings, advertisements in agricultural publications, and agricultural trade show participation. Many of these activities pre-date the Rider and, therefore a portion of these expenses are funded through Idaho Power's O&M.

Each year Idaho Power promotes Irrigation Efficiency Rewards across the Company's service area. The Program typically has an Idaho Power exhibitor booth at regional agricultural trade shows, including the Eastern and Western Idaho Agriculture Expos, the United Dairymen of Idaho Expo, Agri-Action Ag show, the Idaho Farm Bureau convention, and the Idaho Irrigation Equipment Association show and convention.

Program Evaluation

At the end of each year Idaho Power reviews all Program payments, summarizes data, and calculates the cost-effectiveness of the Program. As presented in Idaho Power's response to Request No. 96 in IPUC Case No. IPC-E-08-10, the total costs and estimated energy savings of

the Program through 2007 result in a benefit cost ratio of 1.55 from the total resource cost perspective.

Idaho Power plans to conduct billing analyses of participants in the Irrigation Efficiency Rewards program to further verify the impacts of Program. In addition, the Company is currently exploring opportunities to partner with other regional organizations to conduct an updated impact evaluation of the Program and similar programs in the region.

Conclusion

Based on the Program's ability to provide cost-effective energy savings, Idaho Power expects to continue offering Irrigation Efficiency Rewards. Customer participation continues to be high and the Program has proven successful toward assisting irrigation customers improve their systems, achieve energy savings, and reduce their electricity consumption.

Appendix I, Idaho Rider Program Expense, Irrigation Efficiency Rewards

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2003	Labor	-	31,308	31,308
	Materials	-	7	7
	Purchase Services	5,296	-	5,296
	Other Expenses	-	800	800
	Incentives	3,679	-	3,679
	2003 Total	**8,975**	**32,114**	**41,089**
2004	Labor	-	46,332	46,332
	Materials			-
	Purchase Services	1,905	200	2,105
	Other Expenses	1,918	1,088	3,006
	Incentives	69,365	-	69,365
	2004 Total	**73,188**	**47,620**	**120,808**
2005	Labor	8,821	45,136	53,957
	Materials	3,842	-	3,842
	Purchase Services	7,828	-	7,828
	Other Expenses	4,458	1,618	6,076
	Incentives	78,874	-	78,874
	2005 Total	**103,823**	**46,754**	**150,577**
2006	Labor	173,911	35,467	209,378
	Materials	51,909	-	51,909
	Purchase Services	5,557	-	5,557
	Other Expenses	23,072	-	23,072
	Incentives	2,436,743	-	2,436,743
	2006 Total	**2,691,193**	**35,467**	**2,726,660**
2007	Labor	188,354	25,576	213,930
	Materials	6,644	-	6,644
	Purchase Services	208	-	208
	Other Expenses	24,239	-	24,239
	Incentives	1,661,671	-	1,661,671
	2007 Total	**1,881,116**	**25,576**	**1,906,692**
	Total	**4,758,294**	**187,531**	**4,945,826**

Appendix II, Custom Option Customer Application

Custom Incentive Application For Proposed Projects

Idaho Power Customer Account Name		Authorized Applicant and Relationship to Customer	
Address	City	State	Zip
Contact Person	Phone	Cell Phone	

Existing System

Idaho Power Pump # (Service Location)	Acres Irrigated from this Location	Horsepower (List size for each pump & indicate well, canal, or booster)	
Elevation Change on Irrigated Land from the Pump (+ or -)	Pumping Lift	Flow of System	Discharge Pressure

Type of System (Complete all that apply below)

Wheel Lines – Approximate # Operating Nozzles at Any One Time	Hand Lines – Approximate # Operating Nozzles at Any One Time
# Lines _____ # Nozzles _____ # Acres _____	# Lines _____ # Nozzles _____ # Acres _____
Pivot(s)	Linear(s)
# Pivots _____ # Acres _____	# Linears _____ # Acres _____
Furrow	Other
# Acres _____	# Acres _____

Proposed Modified or New System

Total Cost of System	Acres Irrigated from this Location	Horsepower (List size for each pump & indicate well, canal, or booster)	
Elevation Change on Irrigated Land from the Pump (+ or -)	Pumping Lift	Flow of System	Discharge Pressure

Brief Description of Proposed System (Attach additional sheets if necessary)

Describe how this system upgrade is going to save energy. (Attach additional sheets if necessary)

Check any of the following that apply.

- ☐ Reduced Flow
- ☐ Increased Pump Efficiency
- ☐ Added a Variable Speed Drive Panel
- ☐ Reduced Pressure
- ☐ Replaced Existing Pump with Two or More Smaller Pumps

Applicant Agreement (Please initial each statement)

	I have reviewed my project with an Idaho Power Agricultural Representative.
	I have attached all required support documentation. (see previous page)
	I have not initiated installation of this project at the time of this application.
	This system is or will be used for the irrigation of agricultural crops or pasturage.
	If I make any changes to my originally proposed project, I understand it may affect my energy savings and incentive payment from Idaho Power.

I understand that eligibility for the Irrigation Efficiency Rewards program will be determined by Idaho Power, and I must sign the Irrigation Efficiency Rewards Program Agreement and comply with the program terms and conditions to receive any incentive payment from Idaho Power.

Applicant's Signature _____ Date _____

When completed, mail your application and support documentation to:
Irrigation Efficiency, CHQ-7, Idaho Power, PO Box 70, Boise, ID 83707-0070

Appendix III, Menu Option Customer Application

Menu Incentive Application For Completed Component Replacement/Repair Projects

Idaho Power Customer Account Name		Authorized Applicant and Relationship to Customer		
Address		City	State	Zip
Contact Person		Phone	Cell Phone	
Idaho Power Pump # (Service Location)	Acres Irrigated from this Location	Horsepower	Pumping Lift	Discharge Pressure

Component Description	Incentive Per Unit	Savings Per Unit	Number of Units	Total Savings by Item*	Total Incentive by Item
Sprinkler Equipment Incentives	a	b	c	b x c	a x c
1. New flow-control-type nozzles replacing existing brass nozzles or worn out flow control nozzles of same flow rate or less.	$1.50**	20 kWh/yr			
2. New nozzles replacing existing worn nozzles of same flow rate or less.	$0.25**	20 kWh/yr			
3. Rebuilt or new brass impact sprinklers.	$2.75**	40 kWh/yr			
4. Rebuilt or new wheel line levelers.	$0.75	20 kWh/yr			
5. New rotating-type sprinklers or low-pressure pivot sprinkler heads with the same flow rate or less.	$2.75**	40 kWh/yr			
6. New low-pressure regulators.	$5.00	40 kWh/yr			
7. New drains, risercaps, and gaskets for hand lines, wheel lines or portable mainline.	$1.00**	30 kWh/yr			
8. New wheel line hubs (on Thunderbird wheel lines).	$12.00	40 kWh/yr			
9. New gooseneck with drop tube or boomback.	$1.00 per outlet	20 kWh/yr			
10. Cut and pipe press or weld repair of leaking hand lines, wheel lines, and portable mainline (invoice must show number of joints repaired).	$8.00 per joint	60 kWh/yr			
11. New center pivot base boot gasket.	$125.00	850 kWh/yr			
				Incentive Total:	$
				Energy Savings (kWh/yr):	

* These incentive options are limited to the lesser of the incentive or 50% of invoice cost.
** These incentive options are limited at two per acre.

Applicant Agreement (Please initial each statement)	
	This system is used for irrigation of agricultural crops or pasturage.
	The designated sprinkler parts have been purchased for the sprinkler system at the specified metered service location on or after November 15, 2006.
	I have not made an application for the above designated sprinkler parts at this metered service location for the last three years.
	An itemized receipt or invoice identifying the new equipment purchased accompanies this incentive application.
	I, the undersigned, am authorized to make this application for incentive funds.
	I will provide to Idaho Power whatever additional documentation it needs to verify the application for Menu Incentive funds.

I, the undersigned, declare that I am the authorized Applicant and have read the terms and conditions which apply to the Irrigation Efficiency Rewards program, including those on the following page, and agree to the same.

Applicant's Signature _____ Date _____

When completed, mail your application and support documentation to:
Irrigation Efficiency, CHQ-7, Idaho Power, PO Box 70, Boise, ID 83707-0070

Appendix IV, Custom Option Analysis Summary, Existing System

IDAHO POWER
An IDACORP Company

Irrigation Efficiency Program
***Existing System* Internal Form**

Participant Information

Farm Name
Str Address
City, State ZIP
Contact

Owners Name
Teleph#
Teleph#
Ag Rep

System Information

IPCo Location # of Service (Potentially Complete Multiple forms for each Service Location)
Original Acres Irrigated from this Location 110 CIS + Service Point ID# 5513792869
Acres irrigated under new Design 109
Systems with a water source change are considered to be "New" Systems

Proposed System Update Dat 11/5/2008
Horsepower (List size and indicate well, canal, or booster of each pump) 150 deep well

	Tot Head-f	GPM	P-Eff	M-Eff	VFD-Eff	kW	BHP	Shaft Loss-Hp
Pump 1	426.0	705	0.840	0.910	1.000	77.4	93.6	4.5
Pump 2						0.0	0.0	
Pump 3						0.0	0.0	
Pump 4						0.0	0.0	
Pump 5						0.0	0.0	
Pump 6						0.0	0.0	
Pump 7						0.0	0.0	
Pump 8						0.0	0.0	

HP of Endgun Booster Pump(s) = 5.0 77.4
Flow/Acre 6.5 Pivot Tower kW(# Towers x .4)= 4
Proposed System kW = 87.7

Total Cost of System Modifications ($) = 71,137.99
Portion of Total Cost Assigned to Energy Savings ($) = 24,707.40

Past years billing

Year	Max kW	kWh
2006	122	101,520
2005	125	81,320
2004	122	190,520
2003	127	133,480
2002	124	202,800

Past kW Demand = 124
Average kWh past 5 years = 141,928 Average Hours of System (calculated)= 1145

KW Savings = 35.1 %Reduction"kW"= 28.3%

VSD Savings 0
Mult. Pump Savings 0
Other kWh savings 0 Describe: Pivots

Tot kWh Savings = 43,233 %Reduction"kWh"= 30.5%
"EXISTING" System Incen $15,817.08

Estimated Future Total Bill = $5,257 Current Rate = 0.057 $/kWh
Estimated Future Cost/Acre = $48.23
Estimated Future Total kWh's = 92,228

Appendix V, Custom Option Analysis Summary, New System

IDAHO POWER
An IDACORP Company

Irrigation Efficiency Program
***New System* Internal Form**

Participant Information

Farm Name
Str Address
City,State Zip
Contact

Owners Name
Teleph#
Teleph#
Ag Rep

System Information

IPCo Location # of Service (Potentially Complete Multiple forms for each Service Location)

CIS + Service Point ID# 2952926345

Acres irrigated under new Design = 61 Update Date 3/25/09

Systems with a water source change are considered to be "New" Systems

New Proposed System Criteria

		Elev.*1	Pumping Lift +or -(ft)	Total Head (ft) Dsgn of Pmp	GPM	P-Eff	M-Eff	VFD-Eff	kW	BHP
	Pump 1		3	105.0	450	0.800	0.895	1.000	12.4	14.9
	Pump 2								0.0	0.0
Flow/Acre	Pump 3								0.0	0.0
7.37704918	Pump 4								0.0	0.0

*1-Note-ground Elevation change from pump to Critical Point, use (+) number if up and (-) number if down hill

HP of Endgun Booster Pump(s) = 2.0 12.4

Pivot Tower kW(# Towers x .4) 2.4

Total cost of System Modifications= $61,457

Proposed System kW = 17.2

Portion of Total Cost Causing Energy Savings($) $6,300

Base System Criteria

	Elev.&Lift	System Type:* Mostly Pivot Drip	Mostly H/Line W/Line, Linear	Base Total Head ft Dsgn of Pmp	GPM	P-Eff-*2	M-Eff-*3	VFD-Eff	kW	BHP
Pump 1	3.0	x		130.1	450	0.750	0.855	1.000	17.2	19.7
Pump 2	0.0			0.0	0				0.0	0.0
Pump 3	0.0			0.0	0				0.0	0.0
Pump 4	0.0			0.0	0				0.0	0.0

*1-Note-Mark with an "X"
*2-See Pump Eff Table in other Sheet
*3-See Motor Eff table in other Sheet

Base System kW = 21.9

Avgerage Hrs Used 2000

KW Savings = 4.8
VSD Savings 0
Mult. Pump Savings 0
Other kWh savings 0 Describe:
Tot kWh Savings = 9,521
"**NEW**" System Incentive = $2,380.37

Estimated Future Total Bill = $1,780
Estimated Future Cost/Acre = $29.18
Estimated Future Tot kWh's = 29,664

Current Rate = 0.06 $/kWh

ENERGY STAR®
LIGHTING

IDAHO POWER®
An IDACORP Company

ENERGY STAR® Lighting
April 1, 2009

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ENERGY STAR® Lighting
April 1, 2009

Introduction

This report will provide an overview and documentation for the ENERGY STAR® Lighting Program (Program) offered by the Idaho Power Company (Company). The report includes information relating to the Program through 2007. The ENERGY STAR® Lighting Program has been offered by Idaho Power since 2002 and continues to provide cost-effective energy savings for the Company.

From 2002 through 2007, the Program costs were $1,129,890 paid from the Idaho Power Energy Efficiency Rider (Rider) account. Through 2007 the Program resulted in energy savings of an estimated 22,140,683 kWh. Table 1 provides the total costs and benefits associated with the Program. A detailed breakdown of the Idaho Rider expense for this Program is included in Appendix I.

ENERGY STAR® Lighting Program results in Idaho and Oregon jurisdictions:

	Costs		Benefits			Measure Life	Benefit Cost Ratios	
	Total Utility Cost	Total Resource Cost	Annual Energy	Peak Demand	Energy Savings		Utility	Total Resource
Year	(dollars)	(dollars)	(kWh)	(kW)	(dollars)	Years		
2002	$243,033	$310,643	3,299,654					
2003	$314,641	$464,059	3,596,150					
2005	$73,152	$107,810	1,734,646					
2006	$298,754	$539,877	6,302,794					
2007	$557,646	$433,626	7,207,439					
Total	$1,487,226	$1,856,015	22,140,683		$7,182,066	7	4.83	3.87

During the 2002-2003, Idaho Power operated a retail store coupon-based or automatic price reduction-based program in order to promote ENERGY STAR® Compact Fluorescent Lights (CFLs). Idaho Power selected the Program for implementation because it was a way to obtain energy efficiency easily and quickly. There are two reasons for this: first, Idaho Power could leverage the substantial research, marketing and retail lighting store support being conducted at the time by the Northwest Energy Efficiency Alliance (NEEA), and second, Idaho Power could operate the Program inexpensively with low in-house personnel costs. There was Program infrastructure available through NEEA and a regional consulting firm was available to operate the Program. Many other utilities were operating the same Program with similar structure so there were many synergies available. The Bonneville Power Administration (BPA) helped design the Program, and NEEA's ENERGY STAR® Consumer Products team facilitated the creation and launch of the Program. NEEA encouraged retailers who had never stocked CFLs to

do so by supporting in-store merchandising and promotions, and providing staff training. The Energy Efficiency Advisory Group supported Idaho Power in the offering of this Program.

This Program was very successful in quickly incenting cost-effective energy efficiency, providing a heightened awareness of CFL technology and benefits to customers, education, introducing this ENERGY STAR® product to retail lighting stores, expanding the variety of CFL products in the service territory, and positively impacting customer satisfaction.

Program Development

The Northwest Power and Conservation Council's Regional Technical Forum (RTF) estimated kilowatt-hour (kWh) savings per bulb and measure life. Idaho Power and Ecos Consulting, Inc. estimated that each participant purchased and installed four bulbs. This assumption was based on Ecos's previous Program experience. For this early Program it was estimated that each Program participant purchased an average of four bulbs and that 71 kWh is saved annually for seven years for each bulb purchased and installed. The Final Report, completed by Ecos Consulting in 2003, of the Idaho Power Company ENERGY STAR® Residential Lighting Program is attached as Appendix II.

In 2007, Idaho Power developed a strategy to address customer concerns recognizing the role of state and federal health and environmental professionals in regard to risks posed by mercury in CFLs. Idaho Power informs customers of the presence of mercury in bulbs and directs them to the primary sources of environmental and health information for specific questions related to disposal, risk, and management.

Program Performance

A total of 97,124 bulbs were sold or installed as a result of the 2003-2004 Program for a total estimated savings of 6,895,804 kWh. Idaho Power's total Program cost was $557,695. Customer payback with the coupon benefit was approximately seven months. The estimated Total Resource Cost (TRC) levelized cost in 2004 was 1.8 cents/kWh.

Idaho Power continued to participate in regional lighting promotion programs in an effort to offer energy-saving opportunities to residential customers. In 2005, this activity was reported under the BPA's Savings with a Twist (SWAT) Program name.

The 2006 Integrated Resource Plan (IRP) identified additional cost-effective residential lighting resources. In 2006, Idaho Power continued its participation in regional lighting promotion initiatives, including BPA's SWAT. Thus, the year represented both development and implementation for residential retrofit activities. As a result of its commitment to new energy savings targets developed in the 2006 IRP, Idaho Power established the Residential Retrofit Lighting Program to capture the wider range of initiatives in the residential lighting arena. In

2006, the activities in this Program were associated with future Program design, as well as the SWAT initiatives, which are discussed below.

In 2005 and 2006 Idaho Power continued its partnership with the NEEA's Northwest ENERGY STAR® Consumer Products Program and the BPA to promote CFL bulbs as a replacement for inefficient, incandescent lighting. The SWAT Program was designed to highlight attractive promotional pricing and motivate consumers to change out incandescent bulbs with energy-efficient CFL bulbs. Initial Program funding was through the Idaho Rider.

The Program was launched in the fall of 2005 and ran through the early winter of 2006. Given its success, the regional partners staged a second Program, initiated by BPA, for the fall of 2006.

Residential customers were the primary target market. The primary goals of the Programs were as follows:

- Build awareness of the efficiency and other benefits of CFL lighting;
- Highlight recent improvements in lighting technology and quality;
- Continue to build market penetration, especially in smaller, rural markets;
- Capture incremental energy savings in residential lighting use.

Idaho Power's participation included funding paid directly to manufacturers of CFL bulbs to reduce or "buy-down" the retail price of select CFL bulbs. The buy-down reduced in-store prices to as low as $0.99 per bulb.

Much of the Program activity in early 2006 consisted of residual transactions associated with Program efforts initiated in 2005. Idaho Power's role during this phase was to simply support retailers that had additional bulb inventories available for sale in 2006. However, as the Program was reinstated in the fall of 2006, the region shifted its focus to recruiting stores that served small, rural markets. Marketing was focused on in-store, point-of-purchase materials to limit confusion among customers regarding product-inventory availability. In addition, Idaho Power utilized its regional field staff to support the Program with in-store visits.

For the reestablished fall 2006 BPA initiative, the Program operated in both Idaho and Oregon and was funded by BPA–Conservation Rate Credit (CRC) funds. The per-bulb buy-down for the Program that operated in 2005 was $1.25 per bulb. The per-bulb buy-down for the fall 2006 initiative was $1.60. The increase created a higher incentive for the manufacturers to ensure a more reliable supply of bulbs.

Retailer participation not only included both large outlets, but also small companies in hardware, drug, grocery, and discount store channels throughout the Idaho Power service area. For the 2006 Program, 11 retailers and four manufacturers participated in the Program. While not part of the primary target audience for this Program, small commercial customers were likely participants in the Program because the participating retailers also served this customer sector.

In 2007, the majority of energy savings were achieved through Idaho Power's participation in three regional Change A Light promotions sponsored by the BPA. Additional energy savings were achieved from carryover from the 2006 SWAT promotion and limited direct-install opportunities. ENERGY STAR® Lighting Program activities in Idaho and Oregon resulted in the installation of 219,739 CFLs for estimated savings of 7,207 MWh as compared to 6,302 MWh in 2006. In 2007, Idaho's portion included the installation of 213,652 CFLs for estimated savings of 7,007 MWh, while Oregon's portion consisted of the installation of 6,087 CFLs and a savings of 200 MWh.

Program Analysis and Validation

Since 2006, the energy savings impact of the Program was derived through guidance from the Northwest Power and Conservation Council (NWPCC). The guidance called for derivation of savings based upon the difference between incandescent bulbs and CFL bulb replacement, and adjusted for variable impacts due to regional differences including heating impact, market saturation rates, and lighting-usage profiles. This method yielded an estimated average energy savings of 39.6 kWh per CFL bulb and was used to calculate the savings achieved under the first Program phase. Since the second Program phase was funded through the BPA's CRC Program, the energy savings for that portion of the Program was estimated based on a number established by the BPA. The regional average energy savings per bulb established by the BPA was 32.8 kWh. The difference in the savings-per-bulb rate under the two methods was due primarily to differences in market penetration in the region compared to Idaho Power's service area. For example, increased penetration rates resulted in the installation of newly purchased bulbs into lesser-used fixtures, resulting in fewer hours of usage and subsequent savings. Energy savings totals are also adjusted for bulbs sold within Idaho Power's service area but assumed to be installed by out-of-service participants.

Program Evaluation

Beyond regional initiatives, Idaho Power targeted additional opportunities to make ENERGY STAR® qualified lighting available to a broader range of customers, and increase the number of CFLs installed in the homes of those customers who currently have some CFLs installed. Idaho Power contracted with KEMA, Inc. in 2006 to conduct a Consumer Lighting Study. This survey was conducted to obtain consumer information regarding awareness and purchasing behaviors for CFLs. A copy of this study was made available in Response No. 91 in IPUC Case No. IPC-E-08-10.

The energy savings impacts and cost-effectiveness of the ENERGY STAR® Lighting Program have been documented through numerous studies conducted regionally by NEEA, BPA, and the RTF. Other regional studies and evaluations have been completed for the ENERGY STAR® Lighting Program. NEEA completed two regional market progress evaluations in 2002 and 2004. Idaho Power has also participated with NEEA to conduct a lighting hours of use study in

conjunction with the regional ENERGY STAR® Homes Northwest impact evaluation currently underway.

Appendix I, Idaho Rider Program Expense, ENERGY STAR® Lighting

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2002	Labor		4,354	4,354
	Materials	179		179
	Purchase Services	66,314	1,550	67,864
	Other Expenses	50,986	119,651	170,636
	Incentives			
	2002 Total	**117,478**	**125,555**	**243,033**
2003	Labor	106	1,523	1,629
	Materials	-	-	-
	Purchase Services	214,568	(1,550)	213,018
	Other Expenses	212,209	(112,215)	99,994
	Incentives	-	-	-
	2003 Total	**426,883**	**(112,242)**	**314,641**
2005	Labor	8,890	-	8,890
	Materials	6,128	-	6,128
	Purchase Services	12,200	-	12,200
	Other Expenses	2,175	-	2,175
	Incentives	43,760	-	43,760
	2005 Total	**73,152**	**-**	**73,152**
2006	Labor	26,644	3,613	30,257
	Materials	92	-	92
	Purchase Services	16,647	-	16,647
	Other Expenses	1,224	4	1,228
	Incentives	65,429	-	65,429
	2006 Total	**110,036**	**3,617**	**113,653**
2007	Labor	76,558	9,923	86,482
	Materials	20,497	-	20,497
	Purchase Services	67,732	-	67,732
	Other Expenses	4,956	-	4,956
	Incentives	350,074	-	350,074
	2007 Total	**519,818**	**9,923**	**529,741**
	Total	**1,247,368**	**26,853**	**1,274,220**

ecos CONSULTING

Final Report

Idaho Power Company

ENERGY STAR® Residential Lighting Program

Prepared for Idaho Power Company

Submitted By

Ecos Consulting
208 SW Stark Street
Suite 400
Portland, Oregon 97204

IDAHO POWER
An IDACORP Company

August 1, 2003

Making a World of Difference

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Executive Summary

Ecos Consulting (Ecos) worked closely with Idaho Power Company (IPCo) to launch its ENERGY STAR· CFL Program in fall 2002, and completed efforts in June 2003. Specifically, the team sought to acquire kWh savings, achieve strides in market transformation, and enhance customer and industry stakeholder relations through a CFL coupon campaign. Additionally, the Team needed to maintain a delicate balance between over-subscription and meeting the goal of moving 107,000 units into customer homes and small commercial businesses through the retail sector.

The initial strategy was to implement a retail-based coupon program. Consumers would be provided with coupons for CFLs redeemable at retail locations. Two coupons per customer would be distributed as a bill stuffer in a customer's utility bill (one time only) beginning mid-October and ending mid-November. Although the redemption rate for the first "wave" of coupons was significant for consumer coupons, they were still not as high as initially hoped for by the Team. In planning for the second phase of the campaign, the Team took an adaptive management approach and developed a number of options for consideration and ultimately chose a promotion with Costco for the second "wave" of the campaign.

The Costco promotion was selected for a number of reasons, including simplicity, good product selection, and the fact that the program has not worked with this retailer in the initial phase. Costco is different from other retail outlets in that it does not accept coupons of any kind at its stores; however, it is also one of the dominant sellers of CFLs in the Northwest. The Team developed an automatic price reduction promotion with Costco – in effect, a form of "paperless" coupon, and it proved to be highly successful.

Program Activities

The Program kick-off occurred August 30, 2002. Key activities accomplished for the launch and ongoing promotion of the Program include:

- Delivery of the ENERGY STAR CFL Campaign Kit
- Retailer solicitation, outreach and training: More than 140 retailers were sent invitations to participate in the Program and the field coordinators conducted roughly 260 store visits to encourage participation and engage retailers in the Program. In total, 120 retailers signed agreements, and 36 training sessions occurred.
- Marketing: The campaign was branded "The Power is Yours!" and key marketing tools included:
    - Collateral and point-of-purchase (POP) materials
    - Use of utility communication channels – consumer and internal newsletters
    - Advertisements – placed in top-tier Idaho publications
    - Retail Locator – for customers to easily locate participating retailers through a web-based tool and a toll-free number
    - Costco Brochure – developed for Earth Day promotion activities
- Cooperative Marketing: Seven cooperative marketing activities were coordinated through the Program. IPCo spent $1,025.00 and leveraged $6,054.92.
- Outreach Events: A total of seven events promoting the Program occurred in fall 2002 to correspond with the launch, the national Change A Light promotion, Energy Awareness Month, and the traditional season for lighting purchases.

- Public Relations: Three high-profile change-outs, Ike Kisler House, Bannock House and City Lights Women's Shelter, occurred to promote the program and highlight IPCo's energy-efficiency messages.
- IPCo Website: IPCo crafted a section on its website to provide customers an additional resource to gather Program information.
- Advertising: IPCo developed two 60-second radio ads and print ads to run in media outlets throughout the IPCo service territory, featuring the utility's "Team Efficiency." Ads began October 14 and ran through December 9.
- Community Action Program (CAP) Low-Income Weatherization: The Team coordinated an agreement with CFL manufacturer MaxLite to supply 2000 CFLs at a reasonable cost of $3.00/lamp, including shipping.

Program Results

A total of 97,124 CFLs were sold or installed as a direct result of the Program. ES Table 1 below provides a summary of program results. Of note, the Costo promotion demonstrates the value of adaptive management. Not only did the Costo promotion result in more than 48,000 CFLs moving into customer homes, it helped to lower Program costs.

Program Promotion Elements	Promotion Duration	Total CFL Incentives	Total CFLs Delivered
Retailer-Based Consumer Coupons	Oct. 02 – Dec. 02	$139,422	46,474
Costco In-Store Promotion	Apr. 03 – Jun. 03	$69,008	48,500
CAP Change-Out & Outreach Events	Sep. 03 – Apr. 03	NA	2,150
Total		$208,430	97,124

ES Table 1: Program Results

The program was extremely successful in its efforts to work with a wide variety of retailers and market channels. By focusing the initial field activities on cultivating retailer relationships and preparing the market for the introduction of CFL coupons, the program was able to widen its reach to new retailers such as groceries and independent stores, while maintaining the relationship base of retailers participating in Alliance activities.

The program achieved significant consumer energy and cost savings. Based on the regional values used by the Northwest Power Planning Council's Regional Technical Forum, the annual energy saving is estimated at 71 kWh per CFL (this value takes into account both the different types of CFLs and installed locations).

As a result, the program is saving about 6.8 million kWh annually throughout IPCo territories (for utilities, the RTF estimated saving is 76 kWh at the busbar, thus the energy savings are over 7,000,000 kWh annually). Lifetime energy savings (at 6 years RTF estimated lifetime) through the program is estimated at about 426 kWh per CFL. The estimated energy savings through program efforts are summarized in ES Table 2 as follows:

Savings Type	Phase 1 (Coupons Only)	Phase 2 (Costco)	CAP & Outreach Efforts	Program Totals
Total CFLs delivered	46,474	48,500	2,150	97,124
RTF Assumed kWh savings/CFL	71	71	71	71
Total kWh saved (annual)	3,299,654	3,443,500	152,650	6,895,804
Total kWh saved (lifetime)	19,797,924	20,661,000	915,900	41,374,824

ES Table 2: Program Energy Savings

In terms of consumer cost savings, each CFL is estimated to save consumers about $4.47 per year, or $26.84 over its 6 years lifetime, at the current IPCo rate of 6.3 cents per kWh. Total consumer savings are summarized in ES Table 3 as follows:

Savings Type	Phase 1 (Coupons Only)	Phase 2 (Costco)	CAP & Outreach Efforts	Program Totals
Total CFLs delivered	46,474	48,500	2,150	97,124
Annual cost savings per CFL	$4.47	$4.47	$4.47	$4.47
Annual energy cost savings	$207,878	$216,941	$9,617	$434,436
Lifetime energy cost savings	$1,247,269	$1,301,643	$57,702	$2,606,614

ES Table 3: Program Consumer Savings

Retailers in IPCo areas not only benefited from CFL sales because of the coupon program, they also received additional field services and training on ENERGY STAR and energy-efficient lighting. Retailers also reported increased awareness and product availability overall. In fact, the program was able to enlist a significant number of new retailers in Idaho to stock and sell CFLs.

At the onset of the Program, the Team identified the key indicators for success, which fell under the categories of resource acquisition, market transformation, improved customer and industry stakeholder relations, and reporting requirements. Each component is covered below, and then follows with key lessons learned, cost effectiveness analysis and recommendations for future efforts.

Resource Acquisition and Market Transformation

- Reach and educate 327,925 residential and 31,540 small commercial customers about ENERGY STAR-qualified CFL technology: The Program team met this goal through its marketing and outreach activities.
- Achieve moving up to, but not more than, 107,000 CFLs (equivalent to a 15% redemption rate on coupons): Results were 90% of goal, with 97,124 units moved (equivalent to a redemption rate of 13%.) Balancing the target delivery number with minimal risk of over-subscription presented a notable challenge, but through considerable Program planning and adaptive management, the Team met this objective.
- Increase retail support: IPCo's commitment to a strong field presence was key to the success of the program, and a perfect complement to the Alliance base services. The added level of service provided by the IPCo field coordinator to solicit participating retailers and provide training to staff and management was very successful in building IPCo's relationships with the retail sector.
- Solicit and recruit a broad range of participating retailers: The Program's extended field services, education training, assistance with supply and placement of POP in stores dramatically helped to increase participation in the Program. The Program successfully built onto the Alliance infrastructure and further enhanced current relationships while recruiting roughly 40 to 50 new participants to engage in Program activities. Furthermore, small, independent retailers expressed satisfaction with the Program and the Team's efforts to ensure needs of this channel were met, especially in comparison to the larger volumes achieved in the DIY channel.

- Ensure a supply of a broad variety of ENERGY STAR-qualified CFL products are available in participating retail stores: Field reports indicated that the larger retailers had more product variety and the latest technologies available, but the selection at smaller, independent retailers was limited. This is yet another sign that more retailer training will help to improve the product line available and ENERGY STAR awareness with management and staff.
- Determine advances in CFL market penetration: Clearly, the Program would have benefited from an initial baseline study to benchmark advances in the market from Program efforts. A key lesson gained from this experience is that despite the gains in market transformation in the Alliance territory during 2001 and early 2002, IPCo is one of the more nascent markets in the region.

Customer and Industry Stakeholder Relations

- Positively impact customer satisfaction: Although many variables impact customer satisfaction, the customer satisfaction survey conducted by McFain & Associates on behalf of IPCo found that more than 80% of respondents liked receiving energy efficiency program information and promotions.
- Take advantage of the benefits of IPCo as a new ENERGY STAR partner: The primary benefit of IPCO becoming an ENERGY STAR partner is the ability to help brand the utility's commitment to energy efficiency. The ENERGY STAR "brand" or logo now has over 40% recognition by consumers, which helps to extend the utility's marketing reach with key demographic sectors, including consumers who care about energy issues.
- Launch a media/PR campaign to heighten awareness of CFL technology and benefits as well as to ensure target coupon redemption: Coordinating with the Alliance program and IPCo's own branding campaign, the Team conducted a number of change-outs: Governor's Mansion, Ike Kisler House, Bannock House and the City Lights Women's Center. The events garnered coverage for both the Program and IPCo. Additionally, radio and newspaper advertisements ran from October 14 through December 9, and nine retailer outreach events occurred.
- Utilize a variety of channels and tools to inform customers and generate publicity around the Program and IPCo's energy efficiency messages: IPCo, using templates from the Alliance, developed the coupon, advertisements, and POP. Additionally, IPCo crafted press releases and newsletter content to support Program promotion efforts.
- Support strong, consistent motivational ENERGY STAR messages, and co-brand IPCo where appropriate: All collateral, POP and advertisements focused on IPCo's program and included ENERGY STAR messaging and logo where appropriate. As noted above, the messaging from Alliance-developed material helped to ensure consistency with national ENERGY STAR messages, while allowing for customization to brand IPCo.
- Address the mercury issue with IPCo management and customer service staff: The Team provided the current Alliance kit and helped to incorporate messaging for inclusion on the IPCo web site and for customer service staff. The IPCo field coordinator also conducted a training session on CFLs and included this topic in his discussion.
- Fulfill accounting and reporting requirements of IPCo: All IPCo's reporting requirements were met, including submission of this final report.

Lessons Learned

Overall, the Team considers the Program very successful. The increased number of participating retailers and the roughly 95,000 CFL units moved alone indicate highly positive results. Lessons learned from this experience include:

- Embrace the adaptive management approach. The Program shifted the retail-based coupon strategy to a product buy-down strategy so Costco could participate. The result was the Program moved over 45,000 CFL units in about 6 weeks' time.
- Provide prompt response to questions and concerns regarding perceptions of product quality. CFL technology, its benefits and proper application are newer in IPCo's marketplace. Much of the concern related to troubles from earlier generations of products, and worries were quickly alleviated with education about current advances in the technology. Additionally, training for the IPCo customer service staff about general CFL facts and tips for correct use prepared them to respond to questions consumers might have as a result of past experiences with the technology.
- The foundation built by the Alliance lighting program significantly helped to launch IPCo's Program. The Alliance infrastructure enabled the field staff to engage retailers quickly and helped to cover the IPCo service territory more thoroughly. The templates available from the Alliance also assisted IPCo in developing its own branded materials.
- Dedicated field services enhance overall program results. Given that Alliance field coordinators need to cover large regions, the dedicated field coordinator for IPCo made a significant impact on service levels. Another lesson learned from this perspective is that because a dedicated field coordinator is able to provide higher levels of ongoing service, especially for retailers new to the program, time for this individual needs to be spread more evenly throughout the service territory.
- Rural areas may require different tactics than the more sophisticated urban areas. Field coordinator reports indicate anecdotally that product variety was limited in the more rural stores and average prices were higher. Moving forward, the program team may look to address this smaller, rural market in a different manner.
- Cooperative marketing offerings need to address specific market needs. Retailers did not take advantage of the cooperative funds available as the Program Team expected. There may be several reasons for the lack of enthusiasm. First, current economic conditions have left many retailers feeling hesitant about spending on advertising, especially these smaller ticket items. Second, the IPCo advertising market is actually quite expensive and the smaller retailers could not justify an ad to sell a small number of CFLs. These factors combined ultimately left some cooperative marketing funds untouched. In the future, the Program may consider searching for more cost effective alternatives for the smaller retailers.
- Time marketing and outreach efforts with key Program activities (e.g., launch date, blitz weekends, etc.): Although the change-out at the Governor's Mansion provided an excellent venue to spread IPCo's energy efficiency messages, the delay between the event date and the day coupons first began to arrive in customer bills (about a month) did not provide for the ideal launch of a program.

Cost Effectiveness

Overall, the program has proved to be extremely cost effective. Estimates from the original program design, at $3 incentive per CFL at 107,840 units delivered (maximum) yielded a benefit cost ratio of 1.92, and levelized utility resource cost of $0.017 per kWh. Due to a number of factors, including the cost-effectiveness of the Costco promotion, and the lower than expected number of coops, the program actually delivered 97,124 CFLs, or 90% of maximum goal, at a cost of about $545,000, or 64% of the original $850,000 estimate of program costs. These lower costs increased the program benefit cost ratio to 2.16, while reducing the levelized utility resource cost to $0.013 per kWh. ES Table 4 provides a summary of the original estimate and actual results.

ES Table 4. Estimated and Actual Program Results

Program Goals	Original Estimates	Program Actual	% of Original
Delivered CFLs	107,840	97,124	90.1%
Program Cost	$850,421.00	$544,826.00	64.1%
Benefit - Cost Ratio	1.92	2.16	NA
Levelized Utility Resource Cost	0.017	0.014	NA

As IPCo considers the Program's successes and lessons learned, Ecos offers the following thoughts to continue building on Program efforts:

- Conduct a baseline assessment: A baseline assessment could be used annually to determine the impacts of the program. These assessments are typically "snap shots" of the market, and can serve to assist in program design and delivery, especially in the rural or under-served areas.
- Continue retail support between program campaigns with a focus on education: IPCo should continue the momentum developed with its retailer base, providing particular focus on retailer and consumer education. It is much easier to maintain momentum than to restart efforts cold.
- Seek new channels to promote ENERGY STAR lighting: The Team may consider the new construction and remodel markets (especially as Alliance efforts move this direction). Also, IPCo might take advantage of other Alliance offerings, such as the realtor promotion.
- Consider specific, targeted program efforts: A focus on the multi-family sector may offer some cost-effective opportunities to reach this important market, (e.g., work with property managers to promote a change-out of incandescents to CFLs in apartment units).

Introduction

Today's compact fluorescent lamps (CFLs) are smaller, less costly, and better made than earlier generations of the technology. They also have the potential to reduce energy consumption up to 75% and can help to cut consumers' lighting costs in half or more. Yet, CFLs continue to account for a very small share of the residential lighting market in the United States. According to some studies, less than 2 percent of US residential lighting sockets are filled by CFLs.

In the Northwest, the Northwest Energy Efficiency Alliance (the Alliance) has led efforts to promote the adoption and use of CFLs by consumers in Idaho, Montana, Oregon, and Washington, in close coordination with its utility members in the four-state region. Embracing the U.S. Department of Energy and the Environmental Protection Agency (DOE/EPA) ENERGY STAR· lighting specifications, the Alliance launched an ENERGY STAR Lighting Program in 1997. The Alliance's program was designed to establish a retail infrastructure for energy-efficient lighting products, including the introduction of CFLs to new consumers and retailers. The program focused on the development of strong partnerships among retailers, manufacturers, and the ENERGY STAR national initiatives. In addition, the program sought to ensure that high-quality products are promoted to the consumers. The Alliance's program laid the groundwork and facilitated efforts by others to encourage the use of CFLs in areas of the Pacific Northwest.

Ecos Consulting (Ecos) worked closely with Idaho Power Company (IPCo) to launch its ENERGY STAR· CFL Program in fall 2002, and completed efforts in June 2003. Specifically, the team sought to acquire kWh savings, achieve strides in market transformation, and enhance customer and industry stakeholder relations through a CFL coupon campaign. The key indicators for success within these categories were identified at the kick-off meeting and are discussed further below.

Ecos is pleased to present this final report to IPCo. The report is divided into three main sections, addressing the outcomes for each of the goals and objectives listed, identify and discuss Program successes, challenges and lessons learned, and provide recommendations for future efforts.

IPCo Program Goals and Objectives

Resource Acquisition and Market Transformation

Pacific Northwest utilities lead the nation in lighting programs that generally seek to achieve both kWh savings (resource acquisition) and market transformation. Market transformation is the process of encouraging manufacturers, distributors and retailers or service providers to make affordable energy-efficient products and services available in the marketplace. Market transformation works to remove barriers that prevent an energy-efficient product or service from being manufactured and sold (e.g., high price, low demand and awareness or inadequate product availability). By working with current market actors, the opportunity exists to achieve a broader impact and create lasting change in the marketplace.

IPCo's program team identified several objectives for resource acquisition and market transformation. Specifically, the Program sought to:

- Reach and educate approximately 327,925 residential and 31,540 small commercial customers in rural and urban areas about ENERGY STAR-qualified CFL technology characteristics, including brightness, color, start-up, applications, and bulb replacement, as well as the IPCo CFL Program and its energy efficiency messages:

- Achieve moving up to, but not exceeding, 107,000 CFLs to consumers through the program (equivalent to a 15% redemption rate on coupons)*;
- Increase field representation to solicit participating retailers, provide knowledge training to retail staff and management, and assist with local outreach efforts;
- Ensure a broad variety and steady supply of ENERGY STAR-qualified CFL products in participating retail stores through the duration of the Program;
- Solicit and recruit a broad range of participating retailers in the Program through education training, assistance with the Program (through cooperative efforts) and supplying and placing point-of-purchase (POP) materials in stores; and
- Determine advances in CFL market penetration.

Customer and Industry Stakeholder Relations

- Positively impact customer satisfaction;
- Take advantage of the benefits of IPCo as a new ENERGY STAR partner and leverage Northwest Energy Efficiency Alliance activities and program funds where appropriate;
- Launch a media/PR campaign to heighten awareness of CFL technology and benefits as well as to ensure CFL delivery targets;
- Utilize a variety of channels and tools to inform customers and generate publicity around the Program and IPCo's energy efficiency messages;
- Support strong, consistent motivational ENERGY STAR messages, and co-brand IPCo where appropriate; and
- Address CFL disposal and mercury content issues with IPCo management and customer service staff, and provide a PR plan.

Reporting Requirements

- Fulfill accounting and reporting requirements of IPCo.

* Note: The 15% coupon redemption rate was the average rate of redemption experienced by many NW utilities that promoted coupons at the height of the 2001 West Coast Energy Crisis. This benchmark was used by the program team to estimate the upper end of the program's delivery target. Typically, coupon programs experience about 0.3% to 1% in redemption rates.

The Idaho Power Company Residential ENERGY STAR® Lighting Program

A. Overview

IPCo and Ecos (the Team) began discussions for a program in late spring 2002. The Team kicked-off the formal program August 31, with plans to build on the momentum of consumer interest in energy-savings products and the gains made with retailers and manufacturers in the Northwest during the 2001 West Coast Energy Crisis.

The initial strategy was to implement a retail-based coupon program. Consumers would be provided with coupons for CFLs redeemable at retail locations. Two coupons per customer would be distributed as a bill stuffer in a customer's utility bill (one time only) beginning mid-October and ending mid-November. This strategy yields many advantages over mail or other methods of distribution, as it promotes retail involvement and provides multiple distribution points. In addition, a retailer-based program can address such problems as inadequate product supply, limited product choice, lack of return facilities for failed or broken lamps, and incorrect application of particular lamps due to users' unfamiliarity with new products.

Since CFL prices in many parts of the Northwest region had experienced a reduction from pre-2001 energy crisis levels (due to a combination of increased availability and manufacturer competition) the Team determined that the program would offer consumers $3 point-of-purchase (POP) coupon for the purchase of ENERGY STAR-qualified CFLs, instead of the $6 coupon seen during 2001 programs. This reduction was a significant decision for a number of reasons: it effectively doubled the number of CFLs that the program can deliver on the same budget, and making the IPCo program the first in the region to effect a 50% reduction in incentive level. It also carried some risks, as consumers' reaction to a lowered incentive amount was yet unknown.

Additionally, the Team determined the program's focus would remain solely on CFLs and not residential CFL-based fixtures or torchieres because of limited funds and the need to prioritize efforts. IPCo also indicated that the Team needed to maintain a delicate balance between over-subscription and meeting the goal of moving 107,000 units into customer homes and small commercial businesses through the retail sector. Therefore, during Program design planning it was determined that the expiration date of the coupons would be December 31, 2002.

In preliminary discussions, it was envisioned that the program might require two "waves" of coupons, as past experience has shown that the initial consumer response to coupons can be slow and unpredictable. Response rates by consumers to the 2001 coupon campaign varied widely among the region, depending on their level of awareness and familiarity with having coupons available to them in their utility bill, or with the products being promoted. This consumer response pattern was confirmed at the midpoint evaluation, as the redemption rate for the first "wave" of coupons were significant for consumer coupons, but were not as high as initially hoped for by the team.

In planning for the second phase of the campaign, the Team took an adaptive management approach and developed a number of options for consideration, in addition to a second "wave" of coupons. Options explored to help meet the program target included a "blitz" promotion with local do-it-yourself retailers such as the Home Depot or Lowe's Home Improvement Warehouse, and a promotion with Costco Wholesale. The Costco promotion was selected for the second "wave" for a number of reasons, including simplicity, good product selection, and the fact that the program has not worked with this retailer in the initial phase.

Costco is different from other retail outlets in that it does not accept coupons of any kind at its stores; however, it is also one of the dominant sellers of CFLs in the NW. The Team developed an automatic price reduction promotion with Costco – in effect, a form of "paperless" coupon. The team also negotiated for in-store IPCo representation, which previously was not an available option for any of Costco's suppliers. The Costco promotion combined CFL price reduction and in-store product demonstrations by program representatives, and proved to be extremely successful. It quickly met the program target set for the promotion, and was extended with additional coupon resources.

Combined with the initial "wave" of coupon promotions, the Costco promotion helped the program to deliver almost 100,000 CFLs to IPCo customers in less than 9 months, or an average of over 10,700 CFLs per month. The delivered CFLs translated to about 13% redemption rate for coupons. While this equivalent rate is slightly lower than the astounding 15% redemption rates seen at the height of the 2001 West Coast Energy Crisis, it is at least 10 to 30 times more effective than a typical consumer coupon program. Considering that the Program could not go over the 107,000 delivered CFL target, this redemption rate indicates effective planning and adaptive management by the Team.

Additionally, as Program efforts continued other interesting findings emerged specific to the IPCo service territory. Mainly, it was difficult to make the Program appealing to both urban and rural markets and future program efforts may require a dual track, and possibly different incentive amounts to meet the needs of the two different marketplaces. Simply, the urban markets have been prepped better for market transformation and the larger chains have more resources for advertising and outreach, and a smaller amount of incentive was sufficient to encourage CFL purchases. Smaller retailers in the more rural markets participated with interest, but will need alternatives to marketing in the available advertising channels in the IPCo service territory. Additionally, consumers in the rural markets still equate CFLs with high costs, so that more incentives may be required as well as, or instead of, CFL marketing.

B. Program Activities

The Program began August 30, 2002, with a meeting at IPCo's offices. Present at the meeting were IPCo program and marketing staff and Ecos program, field and marketing staff. The team reviewed the Program goals, budget and responsibilities. At this time, IPCo determined that it would manage and implement all marketing and public relations activities, with Ecos providing strategic consult as needed. Work began at this point to prepare retailers for the coupon promotion and identify the marketing materials needed to support it.

Because of the recent efforts of the Alliance, there were some retailers experienced with lighting programs, particularly in the more urban areas of the IPCo service territory. However, to better serve these existing retailers and to solicit new participants, a full-time field representative was hired for the Program. Below are the key activities accomplished for the launch and ongoing promotion of the Program:

1. ENERGY STAR® CFL Campaign Kit

IPCo was provided with all kit components, including the following:

- Samples of customer outreach activities and opportunities;
- Various templates: media advisories, press releases;
- Marketing samples: coupon, brochure, screen shots, 1-800 retailer locator script;
- ENERGY STAR logos and guidelines for use;

- CFL fact sheets and information CFLs handling, application, and proper disposal;
- Information relating to CFL mercury content; and
- Retailer tool kit.

2. Retailer Solicitation, Outreach and Training

An invitation to participate in the Program, along with the contract agreement, was mailed out to more than 140 retailers in late September. IPCo program field coordinator, Tim Clemens, conducted roughly 260 store visits from October to December 2002 to encourage participation from independent retailers and to place POP in stores already engaged with the Program. In 2003, Mr. Clemens conducted another 200 store visits to gather feedback and answer questions about the Program, as well as to continue retailer education and training. Alliance field representative Rick Buchanan also visited stores in the IPCo service territory to introduce the Program opportunities and place POP as well, visiting roughly 90 stores.

In total, 120 retailers signed agreements to participate in the Program. A complete list is included in Appendix A. Tim Clemens conducted a total of 36 training sessions: 32 informal (unplanned sessions done during retail visits at mostly small, independent stores with an average of two or three staff participants) and four formal sessions for the DIY outlets (planned sessions with more than four staff participants).

IPCo customer service staff was also trained by Mr. Clemens to respond to customer questions about CFL technology and the Program. The training session for IPCo occurred in October.

3. Marketing

Marketing has proven to be a key component in meeting a program's redemption goal, and a successful marketing campaign hinges on the proper execution of several tactical activities: effective marketing tools, cooperative marketing, retail-based customer outreach events and public relations. Some of these activities were managed and implemented by IPCo, with Ecos providing some strategic counsel and coordination with Alliance-supported offerings.

Because of the inherent lag between coupons redeemed at the store and their submission by retailers to Ecos for processing, it is difficult to quantify the direct results of marketing efforts. However, experience from past programs as well as feedback from retailers that the program worked with during the campaign indicate that advertising and in-store events generally increase the overall awareness of coupons and lighting products. Below is a breakdown of the marketing activities that were accomplished by the Team.

Marketing

Branding, Collateral and POP

IPCo branded its campaign, "The Power is Yours!" and designed it with Ecos providing consult upon request. Key marketing tools included the coupon itself, a brochure and point-of-purchase (POP) materials. Ecos also coordinated with IPCo to include bar codes on the coupons to assist with tracking and processing efforts. A sampling of the coupons, brochure and POP is available in Appendix B.

Utility Communication Channels

IPCo used its customer newsletter, Consumer Connection, and internal newsletter, News Scans, to help promote the program. Articles focused on the launch of the Program in October, reminders that the coupon expiration date was approaching, and the Costco promotion. Please see Appendix C to view the articles published.

Advertisements

IPCo also managed this component of the program, and Ecos helped to facilitate any approval processes between retailers and IPCo with cooperative marketing opportunities. Samples of ads created can be found in Appendix D.

Retailer Kit

The retailer kit covered the details for participating in the Program. It clearly outlined the agreement and the redemption process. Kits were mailed out upon receiving the agreement from the retailer. See Appendix E for kit components.

Retail Locator

In order for customers to easily locate participating retailers, the following communication tools were utilized:

- Web-based locator (www.lightsite.net) with link from the IPCo web site.
- Toll-free1-888 number

Costco Brochure

The Alliance lighting program team facilitated negotiations with Costco and Feit Electric to develop a consumer outreach brochure for IPCo's Earth Day promotional activities. The brochure was the first of its kind in the Northwest to be available at Costco locations. The Alliance program manager worked with the design team at Feit Electric to produce the brochure, which mirrored the savings information from the Alliance's Smart Choice lighting campaign. Printing of the brochure was handled by the Alliance as part of its cooperative marketing program. Costco and Feit Electric were both satisfied with the brochure and this has led to further efforts to get the brochure into other Costco locations in the Northwest Alliance territories and elsewhere. This activity also illustrates the value of incorporating Program activities with the Alliance program's infrastructure. Please see Appendix F for a brochure sample.

Cooperative Marketing

Cooperative marketing funding refers to funds that can be used to support retailers' advertising efforts or to defray the costs of outreach events held at retail. For example, "coop" funds can be used to purchase a coffee cart or other snacks that draw customers to the table at an outreach events, or to partially support a retailer's advertisement if it contains reference to ENERGY STAR lighting.

The Program coordinated seven cooperative marketing activities with a combination of retailer, Alliance and manufacturer involvement. As Figure 1 demonstrates below, IPCo spent $1,025.00 and leveraged a $6,054.92 for cooperative marketing efforts during the Program. A summary of activity is also provided below in Table 1, with a complete account of all cooperative marketing activities available in Appendix G. The Program had anticipated being able to allocate all cooperative marketing funds (from IPCo and the Alliance) for this Program, but remarkably, many retailers chose not to take advantage of the offering. Possible reasons, primarily a sagging economy, unfamiliarity with the process, and an expensive advertising market, are discussed in the evaluation section along with recommendations for future efforts.

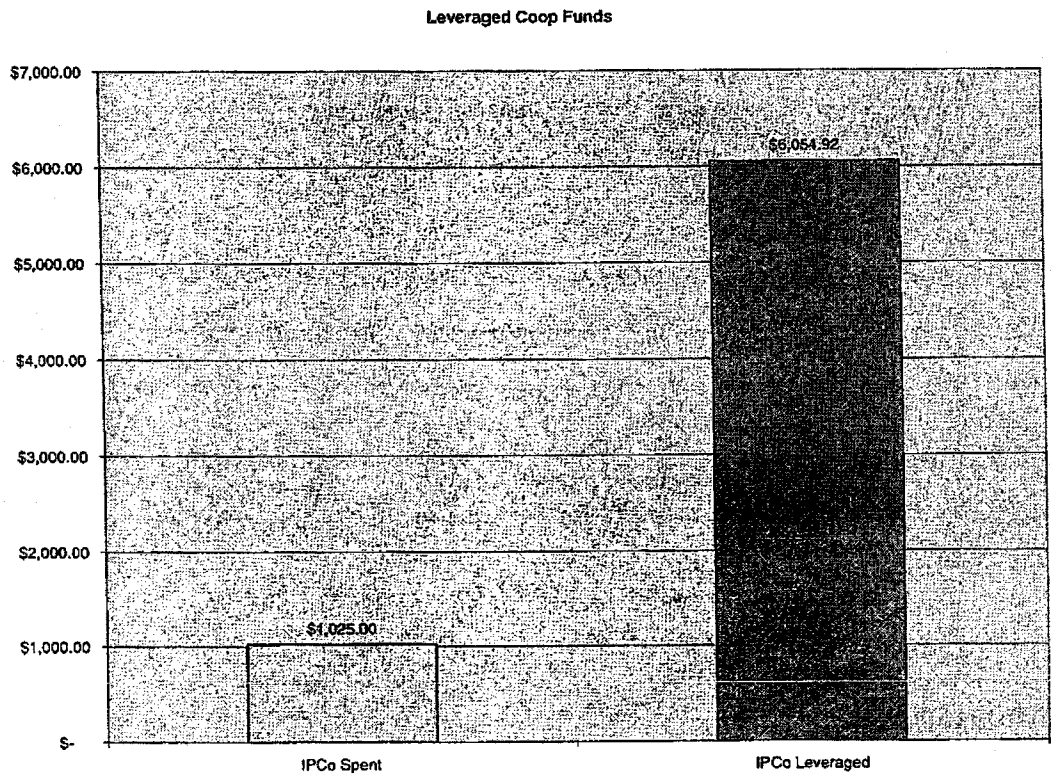

Figure 1 – Cooperative Marketing Funds Leveraged for IPCo Program

Cooperative Marketing Description				Cost Sharing Split		
Organization	City	Description	Date	IPCo	Alliance	Retailer/ MFR
Feit Electric	Gooding, Shoshone, Boise, & Blackfoot	Supplied end caps with six-bulb working display	2002	$ 350.00	$ 350.00	$ 700.00
Penguin Plumbing	Pocatello	Two print ads and ten radio ads in conjunction with an in-store promotion and training	3.15.02	$ -	$ 675.34	$ 213.76
Alloway Lighting	Boise	Ad development and in-store promotion	10.26.02	$ 225.00	$ 225.00	$ 400.00
Grover's Electric & Plumbing	Boise	Advertisement	11.15.02	$ 225.00	$ 316.00	$ 109.22
Alloway Lighting	Boise	Newsprint ad & in-store promotion	11.16.03	$ 225.00	$ 225.00	$ 400.00
Bingham Coop	Blackfoot	Newsprint ad	11.19.02	$ -	$ 960.00	$ 240.00
Valley Coop	Jerome	Twelve TV advertisements	12.13.02	$ -	$ 992.00	$ 248.00
TOTALS				$1,025.00	$3,743.34	$2,310.98

Table 1: Cooperative Marketing Summary

Outreach Events

Most outreach occurred in fall 2002 to correspond with the Program launch, the national Change a Light promotion, Energy Awareness Month, and the traditional season for lighting purchases. Moreover, the expiration date of the coupons was December 31, 2002 so publicity around the campaign needed to occur quickly to stimulate demand. Table 2 below provides an overview of retail outreach events that occurred during the IPCo Program and a full, detailed account is available in Appendix H.

Venue	City	Description	Date
Boise Fall Home Show	Boise	ENERGY STAR PROMOTION	10.04.02
Idaho Energy Conference	Boise	ENERGY STAR lighting promotion/demonstration/education	11.21.02
Home Depot	Meridian & 2 locations in Boise	Coupon Blitz & ENERGY STAR lighting promotion/demonstration/education	11.23.02
Lowe's	Boise	Coupon Blitz & ENERGY STAR lighting promotion/demonstration/education	12.07.02
Wal-Mart	Chubbuck	In-store promotion with coupon distribution	12.13.02
Penguin Plumbing & Electric	Pocatello	In-store promotion	12.14.02
Alloway Lighting	Boise	In-store promotion	12.21.02

Table 2: Consumer Outreach Event Summary

Public Relations

To kick-off the program, several high-profile change-outs occurred in IPCo service territory. A summary of the events is provided below in Table 3. Please see Appendix I for the press releases.

Venue	City	Description	Date
Ike Kisler House	Twin Falls	ENERGY STAR lighting promotion/demonstration/education	10.24.02
Bannock House	Pocatello	Retrofit	10.29.02
City Lights Women's Shelter	Boise	Retrofit & ENERGY STAR lighting promotion/demonstration/education	11.06.02

Table 3: Kick-off Public Relations Events

Energy Efficiency IPCo Website

IPCo crafted for its website a section dedicated to the Program. It provided general information about the campaign (e.g., program description, expiration dates, frequently asked questions, etc.), as well as CFL benefits and tips on choosing the right bulb for the right application. Please see Appendix J for screen shots of the website

Advertising

IPCo developed two 60-second radio ads and print ads to run in media outlets throughout the IPCo service territory, featuring the utility's "Team Efficiency." Ads began October 14 and ran through December 9. Please see Appendix K for the full corporate communications advertising schedule and list of activities.

4. CAP Low-Income

The Community Action Program (CAP) Home CFL program is a weatherization program for low-income homeowners in IPCo's service territories. Part of the program's CAP effort includes a change-out of existing traditional incandescent lighting to ENERGY STAR CFLs in low-income residences. The Team coordinated an agreement with CFL manufacturer MaxLite to supply 2000 CFLs at a reasonable cost of $3.00/lamp, including shipping.

In mid-February, the Team received the product and distributed it to the communities of Salmon, Pocatello, Twin Falls, Boise and Nampa/Caldwell.

C. Program Results

1. Results Summary

A total of 97,124 CFLs were sold or installed as a direct result of the Program. Table 3 below provides a summary of program results. Of note, the Costo promotion demonstrates the value of adaptive management. Not only did the Costo promotion result in more than 48,000 CFLs moving into customer homes, it helped to lower Program costs.

Program Promotion Elements	Promotion Duration	Total CFL Incentives	Total CFLs Delivered
Retailer-Based Consumer Coupons	Oct. 02 – Dec. 02	$139,422	46,474
Costco In-Store Promotion	Apr. 03 – Jun. 03	$69,008	48,500

CAP Change-Out & Outreach Events	Sep. 03 – Apr. 03	NA	2,150
Total		$208,430	97,124

Table 3: Program Results

2. Redemption Summary

The summary below (Figure 2), tracks retailer coupon redemptions for the October to December portion of the Program. As seen, the blitz of marketing to remind consumers of the coupon expiration date, and retailer outreach efforts at the end of November and early December appears to have paid off, with a surge in redemptions, which translated into significant retailer invoice activities to the program shortly after the coupon expiration date of December 31, 2002.

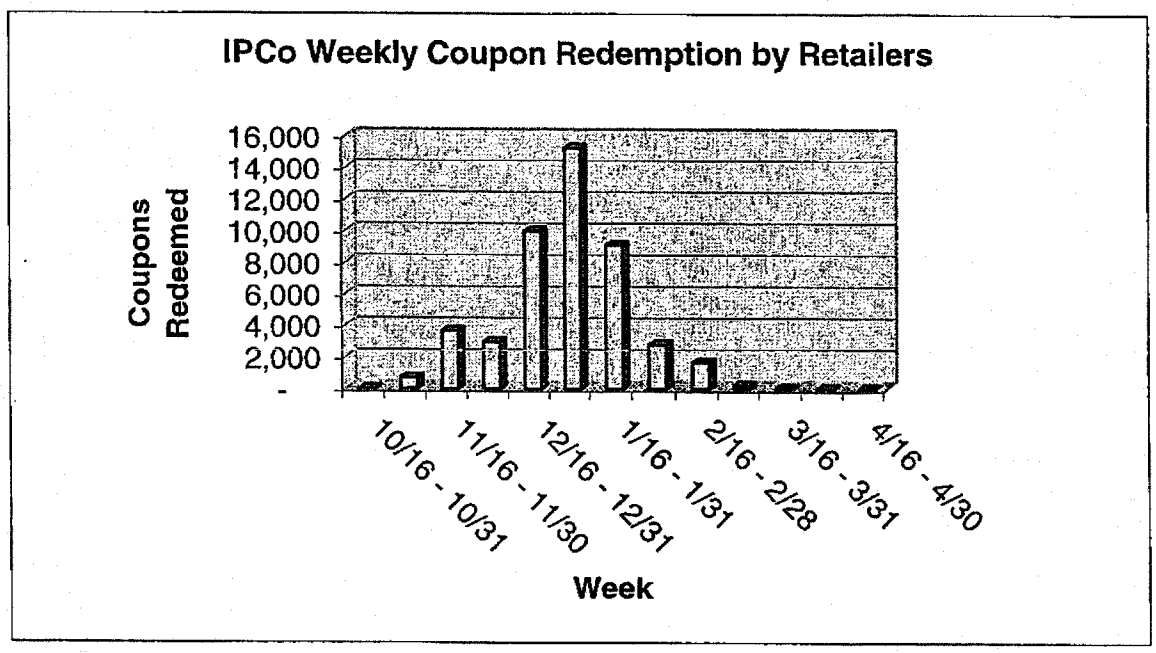

Figure 2: Redemption Summary

3. Retailer Participation

The program was extremely successful in its efforts to work with a wide variety of retailers and market channels. By focusing the initial field activities on cultivating retailer relationships and preparing the market for the introduction of CFL coupons, the program was able to widen its reach to new retailers such as groceries and independent stores while maintaining the relationship base of retailers participating in Alliance activities.

Retailer	Retail Channel	Total Coupons Redeemed
Costco Wholesale	Mass Merchants	48,500
Home Depot	Do-it-Yourself	20,503
Wal-Mart Stores	Mass Merchants	7,682
Fred Meyer	Mass Merchants	4,683
Grover's Electric	Hardware	3,171
Lowe's Home Improvement	Do-it-Yourself	1,944
Penguin Plumbing & Electric	Hardware	1,599
Winco Foods	Groceries	587
Bi-Mart	Mass Merchants	559
Emmett True Value	Hardware	321
Alloway Lighting	Hardware	263
Kinney Bros & Keele	Hardware	261

Table 4: Coupon Redemption by Retailers

As seen in Table 4, which contains the highest coupon redemption totals, retailers with high coupon redemption included retailers who have participated in Alliance programs, such as Home Depot and Lowe's, as well as retailers new to CFLs, including Alloway Lighting and Winco Foods.

4. Estimated Cost and Energy Savings

The program achieved significant consumer energy and cost savings. Based on the regional values used by the Northwest Power Planning Council's Regional Technical Forum, the annual energy saving is estimated at 71 kWh per CFL (this value takes into account both the different types of CFLs and installed locations).

As a result, the program is saving about 6.8 million kWh annually throughout IPCo territories (for utilities, the RTF estimated saving is 76 kWh at the busbar, thus the energy savings are over 7,000,000 kWh annually). Lifetime energy savings (at 6 years RTF estimated lifetime) through the program is estimated at about 426 kWh per CFL. The estimated energy savings through program efforts are summarized in Table 5 as follows:

Savings Type	Phase 1 (Coupons Only)	Phase 2 (Costco)	CAP & Outreach Efforts	Program Totals
Total CFLs delivered	46,474	48,500	2,150	97,124
RTF Assumed kWh savings/CFL	71	71	71	71
Total kWh saved (annual)	3,299,654	3,443,500	152,650	6,895,804
Total kWh saved (lifetime)	19,797,924	20,661,000	915,900	41,374,824

Table 5: Program Energy Savings

In terms of consumer cost savings, each CFL is estimated to save consumers about $4.47 per year, or $26.84 over its 6 years lifetime, at the current IPCo rate of 6.3 cents per kWh. Total consumer savings are summarized in Table 6 as follows:

Savings Type	Phase 1 (Coupons Only)	Phase 2 (Costco)	CAP & Outreach Efforts	Program Totals
Total CFLs delivered	46,474	48,500	2,150	97,124
Annual cost savings per CFL	$4.47	$4.47	$4.47	$4.47
Annual energy cost savings	$207,878	$216,941	$9,617	$434,436
Lifetime energy cost savings	$1,247,269	$1,301,643	$57,702	$2,606,614

Table 6: Program Consumer Savings

5. Other Benefits:

Retailers in IPCo areas not only benefited from CFL sales because of the coupon program, they also received additional field services and training on ENERGY STAR and energy-efficient lighting. Retailers also reported increased awareness and product availability overall.

In fact, the program was able to enlist a significant number of new retailers in Idaho to stock and sell CFLs. The program started in September with a base of about 70 retailers in Idaho who were receiving field visits by the Alliance field representative. The program, in the form of dedicated coupon program field coordinator Tim Clemens, assisted by the coop team, approached over 90 additional retailers to participate, and ultimately had about 120 retailers with signed participation agreements at the height of the campaign, nearly doubling the original retailer count. Many of these "new" retailers, especially independent hardware stores have not been exposed to the ENERGY STAR Program or CFLs prior.

D. Reporting

The reporting processes ran seamlessly, with IPCo receiving redemption results every two weeks with invoices. Monthly accounting of Program labor and materials was provided with budget summary status reports included. The Team also conducted weekly phone conference meetings to coordinate marketing and program efforts and address any timely needs/issues.

Evaluation

At the Program kick-off meeting, the Team identified the key indicators for success, which fell under the categories of resource acquisition, market transformation, improved customer and industry stakeholder relations, and reporting requirements. Below we cover each component with related results, and then address key lessons learned.

E. Resource Acquisition and Market Transformation

At the launch of the Program, the Team identified a number of objectives to help measure Program effects in achieving kWh savings and strides in market transformation.

- Reach and educate 327,925 residential and 31,540 small commercial customers about ENERGY STAR-qualified CFL technology: The Program team met this goal through its marketing and outreach activities. Of note, the customer survey conducted by McFain & Associates on behalf of IPCo found that more than half of both residential and small commercial consumers were aware of the coupons (55% and 53% respectively). The full survey results are available in Appendix L. To recap, key marketing and promotion tools used included:
    - Three publicity events to kick-off the Program;
    - A "teaser" message on the envelope of the utility bill to inform customers the coupons were coming;
    - A "teaser" bill insert promoting the October/November coupon mailing
    - Distribution of roughly 1,000 POP materials to 120 participating stores (1000 each of the bulb wheel, aisle wobblers and shelf talkers);
    - Nine consumer outreach events at the retail level;

- Contributed articles promoting the Program in IPCo's customer newsletter and other various local civic groups' newsletters; and
- Radio and newspaper advertisements.

- Achieve moving up to, but not more than, 107,000 CFLs (equivalent to a 15% redemption rate on coupons): Results were 90% of goal, with 97,124 units moved (equivalent to a redemption rate of 13%.) Balancing the target delivery number with minimal risk of over-subscription presented a notable challenge, but through considerable Program planning and adaptive management, the Team met this objective.
- Increase retail support: IPCo's commitment to a strong field presence was key to the success of the program, and a perfect complement to the Alliance base services. The added level of service provided by the IPCo field coordinator to solicit participating retailers, and provide training to staff and management was very successful in building IPCo's relationships with the retail sector. Numerous retailers, the smaller retailers in particular, appreciated the level of service. Additionally, the increased field services enabled the Team to gain better insight to the IPCo marketplace, especially with needs in the urban vs. rural markets. This experience will be valuable in developing future program efforts.
- Solicit and recruit a broad range of participating retailers: The Program's extended field services, education training, assistance with supply and placement of POP in stores dramatically helped to increase participation in the Program. The Program successfully built onto the Alliance infrastructure and further enhanced current relationships while recruiting roughly 40 to 50 new participants to engage in Program activities, including local retailer Alloway, and grocers such as Winco Foods. Small hardware retailers actively participated in the IPCo program, in large part due to the increased field efforts and the opportunity to attract customers with coupon incentives.

  Furthermore, small, independent retailers expressed satisfaction with the Program and the Team's efforts to ensure needs of this channel were met, especially in comparison to the larger volumes achieved in the DIY channel. Specifically, small retailers felt they were given ample opportunity to engage with the Program with outreach events and product demonstrations, even while the DIYs were holding the larger, more visible events. The fact that the Program received no complaints from smaller retailers is a considerable indicator that expectations were well managed.
- Ensure a supply of a broad variety of ENERGY STAR-qualified CFL products are available in participating retail stores: Field reports indicated that the larger retailers had more product variety and the latest technologies available, but the selection at smaller, independent retailers was limited. This is yet another sign that more retailer training will help to improve the product line available and ENERGY STAR awareness with management and staff.
- Determine advances in CFL market penetration: Clearly, the Program would have benefited from an initial baseline study to benchmark advances in the market from Program efforts. A key lesson gained from this experience is that despite the gains in market transformation in the Alliance territory during 2001 and early 2002, IPCo is one of the more nascent markets in the region. Program efforts in the future will need to incorporate this factor into the design of subsequent programs. Furthermore, different approaches may also need to be considered in future efforts depending whether the market is urban or rural.

F. Customer and Industry Stakeholder Relations

- Positively impact customer satisfaction: Although many variables impact customer satisfaction, the customer satisfaction survey conducted by McFain & Associates found that more than 80% of respondents liked receiving energy efficiency program information and promotions.

- Take advantage of the benefits of IPCo as a new ENERGY STAR partner: The primary benefit of IPCO becoming an ENERGY STAR partner is the ability to help brand the utility's commitment to energy efficiency. The ENERGY STAR "brand" or logo now has over 40% recognition by consumers. The fact that IPCo became an ENERGY STAR partner has helped to extend the utility's marketing reach with key demographic sectors, including consumers who care about energy issues.
- Launch a media/PR campaign to heighten awareness of CFL technology and benefits as well as to ensure target coupon redemption: Coordinating with the Alliance program and IPCo's own branding campaign, the Team conducted a number of change-outs: Governor's Mansion, Ike Kisler House, Bannock House and the City Lights Women's Center. The events garnered coverage for both the Program and IPCo. Additionally, radio and newspaper advertisements ran from October 14 through December 9, and nine retailer outreach events occurred.
- Utilize a variety of channels and tools to inform customers and generate publicity around the Program and IPCo's energy efficiency messages: IPCo, using templates from the Alliance, developed the coupon, advertisements, and POP. This component of the Program demonstrates how a utility can use the base infrastructure developed by the Alliance to create custom materials to brand the utility. Additionally, IPCo crafted press releases and newsletter content to support Program promotion efforts.
- Support strong, consistent motivational ENERGY STAR messages, and co-brand IPCo where appropriate: All collateral, POP and advertisements focused on IPCo's program and included ENERGY STAR messaging and logo where appropriate. As noted above, the messaging from Alliance-developed material helped to ensure consistency with national ENERGY STAR messages, while allowing for customization to brand IPCo.
- Address the mercury issue with IPCo management and customer service staff: The Team provided the current Alliance kit and helped to incorporate messaging for inclusion on the IPCo web site and for customer service staff. The IPCo field coordinator also conducted a training session on CFLs and included this topic in his discussion.
- Fulfill accounting and reporting requirements of IPCo: All IPCo's reporting requirements were met, including submission of this final report.

G. Lessons Learned

Overall, the Team considers the Program very successful. The increased number of participating retailers and the roughly 95,000 CFL units moved alone indicate highly positive results. The program's successes and barriers also provide the opportunity to gain further insight into program design and nuances to a particular marketplace. This analysis requires that we also take a moment to consider the variables that affect program outcomes, namely state of the marketplace and corresponding program design choices.

Key market indicators include consumer awareness levels, saturation of the message, product availability and price, utility image and retailer mix. Implementation choices consequently correspond with these market indicators and include incentive amounts, timing of program launch, marketing strategies and tactics. With these elements in mind, Ecos sees the primary takeaways from this Program as follows:

- Embrace the adaptive management approach. As the coupon rebate expiration date neared, the Team met to evaluate options. It became clear to the Team that resources would be a factor in the second phase of the program. Through the discussions, it became clear that retailer Costco could be a pivotal market actor in the Program. Consequently, the Program shifted the retail-based coupon strategy to a product buy-down strategy so Costco could participate. The result was the Program moved over 45,000 CFL units in about 6 weeks' time. Additionally, the Team

believes that dual Program activities may be needed to meet the needs of the rural market vs. the urban market. IPCo's service territory spans both of these market types, and consequently each may require different program approaches, or even different incentive levels, as they are not on a similar footing with regard to market progress, product availability, and awareness of ENERGY STAR.

- Provide prompt response to questions and concerns regarding perceptions of product quality. CFL technology, its benefits and proper application are newer in IPCo's marketplace. At the onset of the Program, several members from the Idaho Public Utility Commission expressed concerns about products quality. Much of the concern related to troubles from earlier generations of products, and worries were quickly alleviated with education about current advances in the technology. Additionally, the field coordinator Tim Clemens trained the IPCo customer service staff about general CFL facts and tips for correct use to be able to respond to questions consumers might have as a result of past experiences with the technology.
- The foundation built by the Alliance lighting program significantly helped to launch IPCo's Program. The Alliance infrastructure enabled the field staff to engage retailers quickly and helped to cover the IPCo service territory more thoroughly. The templates available from the Alliance also assisted IPCo in developing its own branded materials.
- Dedicated field services enhance overall program results. Given that Alliance field coordinators need to cover large regions, the dedicated field coordinator for IPCo made a significant impact on service levels. Another lesson learned from this perspective is that because a dedicated field coordinator is able to provide higher levels of ongoing service, especially for retailers new to the program, time for this individual needs to be spread more evenly throughout the service territory.
- Rural areas may require different tactics than the more sophisticated urban areas. Field coordinator reports indicate anecdotally that product variety was limited in the more rural stores and average prices were higher. Moving forward, the Program team may look to address this smaller, rural market in a different manner. For instance, the Program had little trouble enlisting the larger stores in the urban markets to participate in promotions and other events to promote CFLs. With the smaller, independent stores, the same or higher levels of field and program efforts were required for each promotion or cooperative marketing per retailer.
- Cooperative marketing offerings need to address specific market needs. Retailers did not take advantage of the cooperative funds available as the Program Team expected. There may be several reasons for the lack of enthusiasm. First, current economic conditions have left many retailers feeling hesitant about spending on advertising, especially these smaller ticket items. Second, the IPCo advertising market is actually quite expensive and the smaller retailers could not justify an ad to sell a small number of CFLs. These factors combined ultimately left some cooperative marketing funds untouched. In the future, the Program may consider searching for more cost effective alternatives for the smaller retailers.
- Time marketing and outreach efforts with key Program activities (e.g., launch date, blitz weekends, etc.): Although the change-out at the Governor's Mansion provided an excellent venue to spread IPCo's energy efficiency messages, the delay between the event date and the day coupons first began to arrive in customer bills (about a month) did not provide for the ideal launch of a program. Ecos commends IPCo on its timely development of marketing materials. Despite extremely tight deadlines to launch the program, IPCo developed POP and collateral at a remarkably brisk pace.

H. Cost Effectiveness

Idaho Power Company Energy Star CFL Coupon Program

Item	Phase 1 (Coupons)	Phase 2 (Costco)	CAP & Installs	Program Total
CFLs	46,474	48,500	2,150	97,124
Incentives	$139,422.00	$69,008.00	$0.00	$208,430.00
Processing	$30,208.10	$15,520.00	$0.00	$45,728.10
Total delivered CFL costs	*$169,630.10*	*$84,528.00*	*$0.00*	*$254,158.10*
Average CFLs/Month	***5,164***	***5,389***	***NA***	***10,792***

Item	Phase 1 (Coupons)	Phase 2 (Costco)	CAP & Installs	Program Total
Estimated customer base (R & C)	359,465	359,465	359,465	359,465
Estimated customers reached	23,237	12,125	1,075	36,437
Participant percentage	6.46%	3.37%	0.30%	10.14%
Program target	107,840	107,840	107,840	107,840
% of target	***43.10%***	***44.97%***	***1.99%***	***90.06%***

Savings	Phase 1 (Coupons)	Phase 2 (Costco)	CAP & Installs	Program Total
Total CFLs delivered	46,474	48,500	2,150	97,124
RTF Assumed kWh savings/CFL	71	71	71	71
RFT Assumed measure life	6	6	6	6
Total kWh saved (annual)	3,299,654	3,443,500	152,650	6,895,804
Total kWh saved (lifetime)	19,797,924	20,661,000	915,900	41,374,824
Annual cost savings per CFL	$4.47	$4.47	$4.47	$4.47
Annual energy cost savings	$207,878.20	$216,940.50	$9,616.95	$434,435.65
Lifetime energy cost savings	***$1,247,269.21***	***$1,301,643.00***	***$57,701.70***	***$2,606,613.91***

Costs	Phase 1 (Coupons)	Phase 2 (Costco)	CAP & Installs	Program Total
Total incentives	$ 139,422.00	$ 69,008.00	$ -	$ 208,430.00
Rebate per CFL	*$ 3.00*	$ 1.42	$ -	*$ 2.15*
RTF Cost per CFL	*$ 5.73*	*$ 5.73*	*$ 5.73*	*$ 5.73*
RTF Cost per incandescent	*$ 0.63*	*$ 0.63*	*$ 0.63*	*$ 0.63*
Coupon processing cost	$ 30,208.10	$15,520.00		$ 45,728.10
Labor & Directs	$ 147,019.65			$ 147,019.65
IPCo marketing costs	$ 127,098.49			$ 127,098.49
IPCo other costs	$ 16,549.76			$ 16,549.76
Total program costs	***$ 460,298.00***	***$ 84,528.00***	***$ -***	***$ 544,826.00***

Cost Effectiveness	
Customer payback - mo (per CFL)	7.3
Payback w/o rebate - months	15.4
Cost per kWh saved (straightline)	$0.013

Table 8. Program Summary

Program Cost Effectiveness Calculations

Item	Notes
7.638%	after-tax discount rate
2.520%	escalation rate
10.800%	loss factor
$0.063	avg rate ($/kWh)
6.00	Measure life (yrs) per RTF
$290,668	fixed admin cost
36,437	program participants
per participant values	
142	annual savings (kWh)--two bulbs saving 71 kWh/yr
$10.20	incremental capital cost ($)--2 bulbs @ $5.73 per bulb, less incandescent cost
$4.29	incentive ($)--2 bulbs @ $2.15 average incentive
$0.94	variable admin per participant ($)--2 bulbs @$.47 average fullfillment costs
6,895,804	annual savings (kWh)
$556,521	direct cost
$208,430	program incentives
$336,396	program administration
$544,826	total utility cost
$892,917	total resource cost
4.84931	nominal PV factor
5.13781	real PV factor
$0.015	nominal levelized utility cost per kWh
$0.014	real levelized utility cost per kWh
$0.024	nominal levelized total resource cost
$0.023	real levelized total resource cost
0.66	payback for participant (years)
$0.13	total resource cost/annual savings (kWh)
Based on Regional Technical Forum benefit data:	
$0.28	Present Value Total Societal Benefits ($/kWh)
2.16	Benefit/cost ratio

Table 8. Program Cost Effectiveness

Overall, the program has proved to be extremely cost effective. Estimates from the original program design, at $3 incentive per CFL at 107,840 units delivered (maximum) yielded a benefit cost ratio of 1.92, and levelized utility resource cost of $0.017 per kWh. Due to a number of factors, including the cost-effectiveness of the Costco promotion, and the lower than expected number of coops, the Program actually delivered 97,124 CFLs, or 90% of maximum goal, at a cost of about $545,000, or 64% of the original $850,000 estimate of program costs. These lower costs increased the Program benefit cost ratio to 2.16, while reducing the levelized utility resource cost to $0.013 per kWh. Table 9 provides a summary of the original estimate and actual results.

Program Goals	Original Estimates	Program Actual	% of Original
Delivered CFLs	107,840	97,124	90.1%
Program Cost	$850,421.00	$544,826.00	64.1%
Benefit - Cost Ratio	1.92	2.16	NA
Levelized Utility Resource Cost	0.017	0.014	NA

Table 9. Estimated and Actual Program Results

Conclusions and Recommendations

Overall, the Team considers the Program successful. Effectively adapting to changing market conditions, the Program ultimately moved close to 95,000 CFLs in the marketplace, developed and strengthened relationships with retailers throughout the IPCo service territory. As IPCo considers the Program's successes and lessons learned, Ecos offers the following thoughts to continue building on Program efforts:

- Conduct a baseline assessment: A baseline assessment could be used annually to determine the impacts of the program – this would include product penetration, price, placement, variety as well as retailer attitudes, etc. These assessments are typically "snap shots" of the market, and can serve to assist in program design and delivery, especially in the rural or under-served areas.
- Continue retail support between program campaigns with a focus on education: IPCo should continue the momentum developed with its retailer base, provide particular focus on retailer and consumer education. Another option is to take advantage of Alliance offerings for the national Change a Light promotion. The important thing to note is not to "go dark." It is much easier to maintain momentum than to restart efforts cold.
- Seek new channels to promote ENERGY STAR lighting: The Team may consider the new construction and remodel markets (especially as Alliance efforts move this direction). Also, IPCo might take advantage of other Alliance offerings, such as the realtor promotion designed to reach homeowners when they buy their homes with retail welcome kits, and IPCo coupons for the purchase of CFLs. Another promotional activity to consider is an IPCo ENERGY STAR discount card, whereby customers may receive a discount off the purchase of ENERY STAR home products when they present their card (similar to grocery retailer club cards).
- Consider specific, targeted program efforts: A focus on the multi-family sector may offer some cost-effective opportunities to reach this important market, (e.g., work with property managers to promote a change-out of incandescents to CFLs in apartment units).

In closing, the program team was grateful for the opportunity to develop and implement this ENERGY STAR Residential Lighting Program, and is excited to work with new programs using the lessons learned should the opportunity arise.

BUILDING EFFICIENCY

IDAHO POWER
An IDACORP Company

Building Efficiency
April 1, 2009

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Building Efficiency
April 1, 2009

Introduction

The Building Efficiency Program (Program) is designed to achieve energy savings by providing incentives for commercial customers involved in the construction of new buildings or significant construction projects. This Program enables customers to apply energy-efficient design features and technologies to their projects. The Program was launched in Idaho in the spring of 2005 and expanded to Oregon in January 2006.

Through 2007, the Program had expenses of $1,232,815 from the Idaho Power Energy Efficiency Rider (Rider) account, and $8,663 from the Idaho Power Operations and Management (O&M) budget. The following table provides the Program results through 2007. A detailed breakdown of the Idaho Rider expense of Building Efficiency is included in Appendix I.

Building Efficiency Program results in Idaho and Oregon jurisdictions:

		Costs		Benefits			Measure Life	Benefit/Cost Ratios	
Year	Participants	Total Utility Cost	Total Resource Cost	Annual Energy	Peak Demand	Energy Savings		Utility	Total Resource
	(number)	(dollars)	(dollars)	(kWh)	(kW)	(dollars)	Years		
2004	0	28,821	28,821						
2005	12	$194,066	$233,149	494,239	162				
2006	40	$374,008	$463,770	704,541	338				
2007	22	$669,032	$802,839	2,817,248	454				
Total	74	$1,265,928	$1,528,580	4,016,028	954	$2,515,965	12	1.99	1.65

The Building Efficiency Program enables customers in Idaho Power's service area in Idaho and Oregon to apply energy efficient design features and technologies to their projects that would otherwise be a lost opportunities for savings. The Building Efficiency Program offers a menu of measures and incentives for lighting, cooling, building shell, and control-efficiency options. Program incentives also include funding for custom projects, as well as additional incentives for commissioning of projects that ensures the systems perform as designed.

The Building Efficiency Program is offered to commercial and industrial customers involved in the construction of new buildings or construction projects with significant additions, remodels, or expansions. The Program offers incentives up to $100,000. Commercial and industrial customers taking service under, or who will take service under, Schedule 7 (Small General Service), Schedule 9 (Large General Service), Schedule 19 (Large Power Service), or Special Contract customers are eligible to participate.

Program marketing is targeted at architects, engineers, and other local design professionals. Monthly e-mail Program updates are sent to building developers, design professionals, contractors, building owners, Idaho Power field personnel, and other interested parties.

Program Development

The Building Efficiency Program development activities started in mid-2004 with the assistance of a third-party consultant, Schick Consulting, to help define initial direction. The targeted customers for this Program were commercial customers taking energy services under rate Schedules 7 and 9 in Idaho. The Program focused on commercial customers planning new buildings, expansions, or major renovations. Full Program roll-out occurred in 2005.

The development of the Building Efficiency Program coincided with Idaho Power's relationship with the Integrated Design Lab. Beginning in October 2004, Idaho Power partnered with the Northwest Energy Efficiency Alliance and the University of Idaho to open the Integrated Design Lab (IDL) in downtown Boise. This facility provides day-lighting design modeling and other energy efficiency advice to local developers and design professionals.

Program Performance

Through 2007, the Building Efficiency Program has provided energy savings estimated to be 4,016,028 kWh. The following table provides the breakdown of annual Program performance.

Building Efficiency estimated energy savings through 2007:

Year	Participants (number)	Incentives (dollars)	Annual Energy Savings (kWh)	Peak Demand Reduction (kW)
2004	0	$0	0	0
2005	12	$39,083	494,239	162
2006	40	$219,253	704,541	338
2007	22	$535,116	2,817,248	454
Total	74	$793,452	4,016,028	954

Program Cost Effectiveness

As Idaho Power does with all energy efficiency programs, a cost-effectiveness analysis was developed for the Building Efficiency Program. Idaho Power follows the cost-effectiveness methodology as described in the DSM Annual Report and the Company's Integrated Resource Plan (IRP). The most current description of this methodology can be found in the 2008 DSM Annual Report on page 11 and in the 2006 IRP Technical Appendix D on pages 62-73.

The cost-effectiveness model calculates the total costs of the Program including: incentives, Program administration and promotion, equipment installation and maintenance, and evaluation. The customer incentives are the largest cost to the Program.

The Company is able to calculate the value of the energy savings attributed to a Program by using end-use load shapes in conjunction with the five DSM alternative cost pricing periods described in the Technical Appendix of each IRP. For this Program, IPC uses load shapes that were first developed by a study performed in 2004 by Quantum Consulting Inc. and updated in the Nexant DSM Potential Study, which was published for Idaho Power in 2008. The following tables include the energy savings allocation used in the Building Efficiency cost-effectiveness measure analysis.

Energy Savings Allocation for Commercial Lighting					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
8.80%	9.20%	5.80%	49.70%	26.40%	100.00%

Energy Savings Allocation for Commercial HVAC					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
19.70%	18.60%	10.50%	35.10%	16.20%	100.00%

Energy Savings Allocation for Commercial Refrigeration					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
6.90%	9.60%	7.70%	43.20%	32.50%	100.00%

To calculate savings, the Building Efficiency Program measures the incremental efficiency of each measure over a code or standard practice installation baseline. Savings are calculated through two main methods. When available, savings are calculated using actual measurement parameters for both the measure at code and at efficiency. For example, the lighting load reduction measure (L1) is calculated using the difference between code and actual kW of the lighting measure, then multiplied by the number of operating hours of the building to get to total annual savings number. The savings equation for this measure is provided below.

kW Reduction: Reduction = Code kW-Actual kW
kWh Savings: Savings [kWh/yr] = kW Reduction [kW] x operating hours [hr/yr]

The other method for calculating savings in Building Efficiency is based on industry standard assumptions when precise measurements are not available. Because the measures are being installed in new buildings, there is no baseline of previous measureable kilowatt hour usage in the building. Therefore, industry standard assumptions from regional and national sources (RTF, DEER, CEE) are used to calculate the savings achieved over how the building would have used energy absent of efficiency measures. A measure that utilizes this method of calculating savings is measures L3, Occupancy Sensors. Here, a standard industry practice percentage stated by the Electric Power Research Institute (EPRI) uses 25% savings of actual kW load multiplied by the number of operating hours of the building. The savings equation for this measure is demonstrated below.

[kWh/yr] = 25% x actual load [kW] x operating hours [hr/yr]

Building Efficiency incentives are based on a variety of methods depending on the measure type. Incentives are mainly calculated through a $/unit equation, using square footage, tonnage, operating hours or kW reduction as the unit being used. The below equation is the incentive calculation for measure B2, High Performance Windows, where ft^2 stands for square footage.

Incentive = Window Area [ft^2] x $0.50 per ft^2

A major challenge faced by all new construction projects is accurately reporting the value of incremental costs of the project. In order for a precise dollar amount, the contractor would have to report both the total project cost at standard practice (code), as well as the total project cost with energy efficiency measures. Due to the common practice of sub-contracting in new construction, individual invoices are rolled up into total project costs and the detailed cost data becomes unavailable to the customer. In addition, with many new construction projects, the overlap in costs by multiple efficiency measures being installed at one time can also make it difficult to separate out individual measure costs. Many contractors find it against their best business interest to report these dollar differences. Another method commonly used to calculate incremental costs of energy efficiency measures is to first model the construction at code (or standard practice), second, model it with energy efficient measures incorporated and, third, calculate the difference. However, this method is usually not economical for the customer or designer with projects of this size.

Using deemed savings, costs, and incentives, a cost effective analysis has been completed for each Building Efficiency measure over the life of the Program. Measures with an 'NA' did not have any reported participation up to the time of the analysis. As presented in the following table, each measure was demonstrated to be cost effective through 2007.

Building Efficiency cost-effectiveness summary:

Measure	Projects	Savings (kWh)	Incentives	Benefit/Cost Ratios	
				UC	TRC
Lighting					
L1	29	1,225,198	$133,880	6.25	5.33
L2	5	17,909	$12,679	1.26	1.03
L3	19	123,012	$10,250	7.55	6.51
L4	29	14,101	$4,222	2.76	2.28
Total	82	1,380,220	$161,031	5.96	5.07
HVAC					
A1	84	529,792	$161,623	2.05	1.43
A2	38	NA	$46,707		
A3	0	0	$0	NA	NA
A4	12	265,067	$47,549	4.25	3.56
Total	134	794,859	$255,879	2.26	1.64
Controls					
C1	5	773,270	$106,225	5.40	4.51
C2	8	99,574	$8,323	2.94	2.41
C3	6	1,083,792	$54,150	8.07	7.02
Total	19	1,956,636	$168,698	6.34	5.29
Shell					
B1	7	75,112	$12,151	5.63	4.70
B2	6	99,574	$8,323	9.35	8.00
B3	2	72,204	$12,034	5.49	4.58
Total	15	246,890	$32,508	6.65	5.58
Program	250	4,378,605	$618,116	4.31	3.43

Program Evaluation

A Building Efficiency program evaluation has been scheduled to begin in 2008. Idaho Power signed a contract with the IDL to analyze and evaluate measures in the Program. This evaluation is designed to specifically identify and analyze measures where deemed energy savings are less certain or where Idaho Power would like site specific information.

The IDL began a measurement and verification study on four of the 14 measures offered under the Building Efficiency Program. The four measures to be evaluated first include: Lighting Photo Controls (L2), Air Side Economizers (A4), Energy Management Controls Systems (C1), and Demand Control Ventilation (C2). Through the contract with IDL, additional measurement and verification activities for the Program are expected to continue through 2009. The results of the first four measures evaluated will be available in 2009.

Conclusion

Idaho Power believes that the Building Efficiency Program is cost-effective on a measure and a Program basis. One of the most important aspects of this Program is that it captures savings that might have otherwise been lost during the new construction process, or lost opportunity savings. The savings from this Program has increased significantly from year to year from 2005 through 2007. Based on the success of Building Efficiency, Idaho Power plans to continue the Program into the future.

Appendix I, Idaho Rider Program Expense, Building Efficiency

Year	Expense Type	Idaho DSM Rider	IPC O&M	Total Expense
2004	Labor	4,170	-	4,170
	Materials	1,735	-	1,735
	Purchase Services	21,581	-	21,581
	Other Expenses	1,335	-	1,335
	Incentives	-	-	-
	2004 Total	**28,821**	**-**	**28,821**
2005	Labor	87,356	6,226	93,582
	Materials	13,284	-	13,284
	Purchase Services	38,265	1,550	39,815
	Other Expenses	8,303	-	8,303
	Incentives	39,083	-	39,083
	2005 Total	**186,290**	**7,776**	**194,066**
2006	Labor	83,446	798	84,244
	Materials	8,512	-	8,512
	Purchase Services	48,240	-	48,240
	Other Expenses	15,207	-	15,207
	Incentives	200,814	-	200,814
	2006 Total	**356,218**	**798**	**357,016**
2007	Labor	82,470	89	82,559
	Materials	2,210	-	2,210
	Purchase Services	29,797	-	29,797
	Other Expenses	8,567	-	8,567
	Incentives	538,442	-	538,442
	2007 Total	**661,485**	**89**	**661,574**
	Total	**1,232,815**	**8,663**	**1,241,478**

EASY UPGRADES

IDAHO POWER
An IDACORP Company

Easy Upgrades
April 1, 2009

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Easy Upgrades
April 1, 2009

Introduction

This paper will examine Idaho Power Company's Easy Upgrades Program (Program) activities, expenditures, and energy savings in 2007. Discussion on the Program's development, performance, and documentation will be provided.

Idaho Power's Easy Upgrades officially began in 2007 and is designed to provide incentives for energy-savings retrofits to commercial and industrial facilities. The Program offers a menu of incentives for retrofits that save energy in lighting, cooling, motors, building shell, or plug loads in existing commercial buildings or industrial facilities. Any size commercial or industrial facility in Idaho Power's service territory can qualify for incentives of up to $100,000 per site per year.

From 2006-2007 the Program costs were $710,613 paid from the Idaho Energy Efficiency Rider (Rider) account and $2,949 from Idaho Power operations and maintenance (O&M) budget for a total of $713,563. Through 2007 the Program has saved an estimated 5,183,640 kWh and has operated as a cost-effective Program in Idaho Power's commercial market sector. The following table provides the total costs and benefits associated with the Program. A detailed breakdown of the Idaho DSM Rider expense of the Program is included as Appendix I.

Easy Upgrades Program results for Idaho and Oregon jurisdictions:

		Costs		Benefits			Measure Life	Benefit/Cost Ratios	
Year	Participants	Total Utility Cost	Total Resource Cost	Annual Energy	Peak Demand	Energy Savings		Utility	Total Resource
	(number)	(dollars)	(dollars)	(kWh)	(kW)	(dollars)	Years		
2006	0	$31,819	$31,819						
2007	104	$711,494	$1,882,035	5,183,640	780				
Total	104	$743,313	$1,913,854	5,183,640	780	$2,634,352	12	3.54	1.38

Program Development

The Easy Upgrades Program began development in 2006 and was implemented in 2007. The first incentives paid occurred in 2007. It was designed as a menu driven Program similar to those offered by other utilities in the region.

Idaho Power commercial or industrial customers on Schedule 7 (Small General Service), Schedule 9 (Large General Service), Schedule 19 (Large Power Service) and Special Contract customers are eligible. Potential participants first assess their energy-saving opportunities by contacting an Idaho Power service representative, an equipment supplier, or a contractor. The Idaho Power customer next completes the preliminary application (pre-app) form and submits it with relevant worksheet(s), describing the location and planned scope of their project.
Upon Idaho Power's review and acceptance, the pre-app allows the customer up to 90 days to complete the project. For projects with expected incentive payments of more than $1,000, applicants must submit a pre-app prior to initiating the project. For smaller projects, customers may elect to skip the pre-app and only submit their final application for payment. These projects must have been completed no more than six months prior to submitting their application for payment.

Program Cost Effectiveness

As Idaho Power does with all energy efficiency programs, a cost-effectiveness analysis was developed for the Easy Upgrades Program. Idaho Power follows the cost-effectiveness methodology as described in the DSM Annual Report and the Company's Integrated Resource Plan (IRP). The most current description of this methodology can be found in the 2008 DSM Annual Report on page 11 and in the 2006 IRP Technical Appendix D on pages 62-73.

The cost-effectiveness model calculates the total cost to the utility including: incentives, Program administration and promotion, equipment installation and maintenance, and evaluation. The customer incentives are the largest cost to the Program.

The Company is able to calculate the value of the energy savings attributed to a Program by using end-use load shapes in conjunction with the five DSM alternative cost pricing periods described in the Technical Appendix of each IRP. For this Program, Idaho Power uses updated load shapes stated in the Nexant DSM Potential Study, which was published for Idaho Power in 2008. The following tables include the energy savings allocation used in the Easy Upgrades cost-effectiveness measure analysis.

Energy Savings Allocation for Commercial Lighting					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
8.80%	9.20%	5.80%	49.70%	26.40%	100.00%

Energy Savings Allocation for Commercial HVAC					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
19.70%	18.60%	10.50%	35.10%	16.20%	100.00%

Energy Savings Allocation for Commercial Refrigeration					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
6.90%	9.60%	7.70%	43.20%	32.50%	100.00%

Energy Savings Allocation for Commercial Motors					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
14.30%	14.30%	8.90%	39.60%	22.90%	100.00%

Energy Savings Allocation for Commercial Cooking					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
8.60%	9.30%	6.00%	49.10%	26.90%	100.00%

Once all inputs and assumptions are made, the benefits and costs associated with the Program are present valued based on Idaho Power's nominal discount rate.

Idaho Power currently uses two methods for calculating kilowatt hour savings impacts for Easy Upgrades measures. Where valid deemed data is available and is applicable to Idaho Power territory, Idaho Power uses deemed savings values on a per measure level. These deemed savings are calculated on a per unit (i.e. per lamp, square foot, linear foot) basis, and are multiplied by the number of total units for each project to determine total project energy savings. Deemed savings values are compiled from various sources around the region, including the Regional Technical Forum (RTF), the Database for Energy Efficiency Resources (DEER), the Northwest Energy Efficiency Alliance (NEEA), and the Consortium for Energy Efficiency (CEE). Deemed savings values are applied as specifically as possible to Idaho Power territory, adjusting for climate zone, operating hours and baseline practices.

For measures where deemed savings are not available, Idaho Power calculates savings on a per measure level using project specific inputs. These inputs include actual building operating hours, square footage, kW reduction, tonnage size or other appropriate unit measurements. For a

majority of the lighting measures and HVAC measures offered in the Program, this is the main method for calculating measure savings. The equation below shows an example for calculating the savings of measure L1, T8 light fixture.

kW Reduction = Pre-retrofit kW – Post-retrofit kW
Annual kWh Savings = (Building Operating Hours * kW Reduction) * # of lamps

Incentives offered through the Easy Upgrades Program are paid on a standard per unit basis by measure. Standard incentives are based on an assumed number of operating hours or other baseline assumptions. Through 2007, most lighting project incentives were calculated based on 3000 operating hours. As actual lighting operating hours become available through Program evaluation, incentive levels will be adjusted to best reflect actual building operating hours.

Incremental cost is defined as the additional cost to the customer for installing an energy efficiency measure instead of standard practice and/or code. Incremental measure costs are also calculated using a per unit deemed value. These costs assumed for planning purposes come from the same sources as mentioned above, and are again multiplied by the number of units to calculate a total incremental project cost. This cost is included as a component of the total resource cost, along with utility costs, less incentives paid. Project-specific cost data is collected as part of each Easy Upgrades application. The information collected will be used to re-assess the deemed values for various Program measures.

In 2007, lighting measures accounted for over 75% of the total savings achieved in the Easy Upgrades Program. In early 2008, a cost-effectiveness analysis using achieved Program savings and costs was performed on the lighting end use measures. The following table shows the results of the cost-effectiveness analysis. Measures with an 'NA' represent measures that had no achieved savings to date.

Easy Upgrades lighting measures cost-effectiveness summary:

Measure Name	Count	Savings (kWh)	Incentives Paid	Utility B/C Ratio	TRC B/C Ratio
1- or 2-lamp 4' T8 fixture	3,790	311,593	$18,950	4.96	1.19
3-lamp 4' T8 fixture	2,383	679,002	$23,830	6.79	2.76
4-lamp 4' T8 fixture	3,855	1,083,615	$57,375	5.40	2.52
2-lamp 8' T8 fixture	254	56,868	$2,540	5.97	2.22
2-lamp 8' T8 HO/VHO fixture	49	18,023	$1,470	4.07	1.88
4-lamp 4' T8 High Bay fixture	177	117,439	$10,620	3.78	2.20
6-lamp 4' T8 High Bay fixture	216	177,406	$16,200	3.76	2.18
4-lamp 4' or 8' T8 High Bay fixture	0	0	$0	NA	NA
1- or 2-lamp 4' T5 fixture	174	27,829	$1,305	5.80	1.87
3-lamp 4' T5 fixture	0	0	$0	NA	NA
4-lamp 4' T5 fixture	34	7,117	$680	3.64	1.08
1- to 3-lamp 4' T5 HO fixture	40	6,720	$400	5.02	1.43
2-lamp 4' T5 HO fixture	0	0	$0	NA	NA
3-lamp 4' T5 HO fixture	160	311,797	$6,400	8.58	4.24
4- or 6-lamp 4' T5 HO fixture	2,207	1,236,259	$164,925	2.82	1.66
Delamping fixtures bonus	1,604	237,197	$16,030	4.63	4.63
125–175W Pulse Start MH	13	5,144	$325	4.84	1.31
175–320W Pulse Start Metal Halide	0	0	$0	NA	NA
320–400W Pulse Start MH	100	107,888	$5,700	5.41	2.41
400–750W Pulse Start MH	42	113,246	$6,300	5.24	4.38
20–100W Ceramic MH	3	163	$30	2.14	0.50
120–320W Ceramic Metal Halide	0	0	$0	NA	NA
350W+ Ceramic Metal Halide	0	0	$0	NA	NA
Occ.Sensor, wall or ceiling mounted	258	130,755	$6,298	5.71	4.56
Photocell dimming control	2	1,296	$40	7.21	3.72
Central lighting control systems	4	83,351	$10,640	2.92	2.64
Auto-off time switch, 100-200W	4	2,628	$40	9.49	5.38
Auto-off time switch, > 200W	9	14,686	$360	7.99	5.27
Time clock control	3	3,188	$60	8.87	5.20
CFL lamp or fixture	4,905	1,174,505	$9,810	11.01	7.93
LED or equivalent exit sign	239	76,435	$2,985	6.42	2.70
LED or equivalent display sign lighting	51	407,674	$17,172	5.91	3.84

Other sectors of the Easy Upgrades measures include HVAC, motors, controls, plug load, and refrigeration. For these measures, deemed cost-effective savings and costs from regional sources including those mentioned earlier are used to calculate per unit savings and costs. The table on page 2 demonstrates the utility cost and total resource cost ratio for the entire Easy Upgrades Program through 2007, which includes all measures in the Program with reported savings for the year.

Program Evaluation

Since 2007 Easy Upgrades has conducted short transactional surveys on participants regarding customer satisfaction. As of December 2008, 81% of the Program participants surveyed "strongly agree" they received excellent value through Easy Upgrades, while 11% of the respondents "somewhat agree." Additionally, 86% of the survey respondents "strongly agree" that they received excellent service while 87% "strongly agree" their experience when dealing with Idaho Power employees was positive.

In 2008, upon completion of the review of the lighting measures offered in the Program, Idaho Power made some minor changes to the menu application. Among these changes is that metal halide measures were re-categorized on the application with minimum energy savings requirements applied. This change went into effect in 2009 and is expected to result in cost-effective measures offered in the Program.

By 2010 Easy Upgrades will have been operating for two and half years which will enable Idaho Power to have enough information to evaluate the Program. This evaluation is expected to evaluate the process and impacts of the Program and influence the Program offerings in 2011 and beyond.

Conclusion

Based on the success of the first year of the Easy Upgrades Program, Idaho Power expects the cost-effective Program will continue. The Program provides a way for commercial customers in Idaho Power's service territory to reduce their energy consumption. Easy Upgrades has demonstrated strong customer satisfaction and is highly utilized by commercial customers. It is expected the Program will continue to increase in participation and energy savings.

Appendix I, Idaho Rider Program Expense, Easy Upgrades

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2006	Labor	18,081	-	18,081
	Materials	96	-	96
	Purchase Services	9,020	-	9,020
	Other Expenses	3,041	-	3,041
	Incentives	-	-	-
	2006 Total	**30,238**	**-**	**30,238**
2007	Labor	89,168	2,949	92,118
	Materials	5,745	-	5,745
	Purchase Services	71,789	-	71,789
	Other Expenses	23,828	-	23,828
	Incentives	489,845	-	489,845
	2007 Total	**680,376**	**2,949**	**683,325**
	Total	**710,613**	**2,949**	**713,563**

A/C COOL CREDIT

IDAHO POWER
An IDACORP Company

A/C Cool Credit
April 1, 2009

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A/C Cool Credit
April 1, 2009

Introduction

This paper will examine Idaho Power Company's A/C Cool Credit (Program) in the Company's Idaho service territory. Discussion on the Program's development, performance, and documentation will be provided.

The purpose of the Program is to reduce electric demand on Idaho Power's system during summer peak weekday hours in the months of June, July and August. A/C Cool Credit is an optional, supplemental service that allows participating residential customers to voluntarily permit the Company to cycle their central air conditioner with the use of a direct load control device installed behind the customer's meter. In exchange for allowing the Company to cycle the central air conditioner, participating customers will receive a $7 monthly monetary incentive in the form of a credit applied to their bills during June, July and August.

Originally filed as a pilot in 2002, the Company proposed supplying customers with thermostats with cycling capability. In Order No. 29207 the Idaho Public Utilities Commission (IPUC) directed Idaho Power to supply customers with a thermostat and pay them an incentive of $10 per month or $30 per season. The pilot was evaluated by Summit Blue Consulting, Inc. in 2002 and 2003. In 2004, Idaho Power proposed to make the pilot a Program, install direct load control switches rather than programmable thermostats, and to change the incentive from $10 to $7 per month in order to maintain/achieve cost-effectiveness. On February 5, 2005 the IPUC approved the proposed changes in Order No. 29702.

From 2003 through 2007, the Program costs of the A/C Cool Credit Program were $4,878,578 paid from the Idaho Power Energy Efficiency Rider (Rider) account and $100,012 from the Idaho Power operations and maintenance (O&M) budget for a total of $4,978,589. Through 2007 the Program had a maximum enrollment of 13,692, resulting in a peak demand reduction of 10,762 kilowatts. The following table provides the total costs and benefits associated with the Program. A detailed breakdown of annual Idaho Rider expense of the Program from 2003-2007 is provided in Appendix I.

A/C Cool Credit Program results 2003-2007:

A/C Cool Credit		Costs		Benefits		Benefit/Cost Ratios	
	Participants	Total Utility Cost	Total Resource Cost	Peak Demand Reduction	Net Avoided Cost	Utility	Total Resource
Year	Number	(dollars)	(dollars)	(kW)	(dollars)		
2003	204	$275,645	$269,680	159	$9,021	0.03	0.03
2004	420	$287,253	$274,686	402	$23,572	0.08	0.09
2005	2,369	$754,062	$717,902	2,748	$161,397	0.21	0.22
2006	5,369	$1,235,476	$1,131,439	5,637	$363,278	0.29	0.32
2007	13,692	$2,426,154	$2,199,486	10,762	$693,833	0.29	0.32

Due to the high cost of the Program for equipment purchases and installation during the ramp up years, the A/C Cool Credit Program will not become cost-effective annually until 2010. The Program life (20 years) benefit/cost ratio is expected to be 1.38.

As a pilot and fully deployed Program, A/C Cool Credit has been reviewed on multiple occasions to validate the assumptions and benefits provided to Idaho Power. Customer satisfaction with the Program continues to be high and it has been successful at providing cost-effective peak electrical demand reduction for Idaho Power.

Program Development

The Program enables Idaho Power to directly address summer peaking requirements by reducing air conditioning load demand at critical high demand periods in the summer. The Program was initially deployed in Idaho and as of May 2008 available in Oregon. Control of the air conditioning units is achieved through the installation of individual radio or Power Line Carrier (PLC) controlled switches on customer equipment and is cycled on and off using a predetermined schedule.

Participation in the Program is measured by the number of participating customers. Customer enrollments and switch installations occur year round. The Program is predominately marketed by on-going direct mail campaigns. Enrollments generally decline in the winter and shoulder months, with an increase closer to summer. Customers can enroll in the Program by filling out and returning an enrollment card, by calling a toll-free number found on Idaho Power published documents, or by visiting the Company's website.

Most installations utilize a switch manufactured by Cooper Industries (formerly Cannon Technologies) in either the 5000 or the 5200 model. Both allow paging signal communications. Idaho Power leased YUKON, the software used to communicate with the switches, up until spring 2008 when Idaho Power acquired a license for the software.

The Program operated in a pilot phase for two summers using a programmable thermostat. The year 2005 was the first of operational implementation of radio controlled switches in Ada and Canyon counties in Idaho. 2005 also marked the inception of a pilot Program using PLC communications for direct load control participants in the Emmett Valley region of Idaho due to the Automated Metering Infrastructure (AMI) installed in the area.

Honeywell Utility Solutions is the contractor used for installations, removals and servicing of the switches. They also have customer service representatives available to handle incoming calls and schedule appointments. Customer service representatives from both Idaho Power and Honeywell Utility Solutions have received training to be knowledgeable regarding Program details, direct phone transfer capability, and notification of all cycling events.

The demand effects of this Program have been relatively stable over the past three years. On average, Idaho Power can expect 1.12 kW demand reduction per participating household per hour over the course of a cycling event.

Aside from peak electricity demand impact, the energy impact of cycling is relatively small. Analysis shows that energy use decreases on average of less than one kilowatt-hour (kWh) per participant due to cycling. A/C Cool Credit appears to shift most usage from cycling hours to non-cycling hours as expected. The net effect on energy use depends upon the cycling percentage and the outside temperature during the control event.

Since the Program was deployed the goal at full implementation has remained to be 40,000 participants.

Pre-Implementation Cost-Effectiveness

As Idaho Power does with all energy efficiency and demand response programs, a cost-effectiveness analysis was developed for A/C Cool Credit. Idaho Power follows the cost-effectiveness methodology as described in the Demand-Side Management (DSM) Annual Report and the Company's Integrated Resource Plan (IRP). The most current description of this methodology can be found in the 2008 DSM Annual Report on page 11 and in the 2006 IRP Technical Appendix D on pages 62-73.

The cost-effectiveness model calculates the total cost to the utility including: incentives, Program administration and promotion, equipment installation and maintenance, and evaluation. The customer incentive of $7 for each of the months of July, August, and September is the largest cost to the Program. The incentives paid on an annual basis at full Program implementation is estimated to equal $840,000. It is expected that Program administration and marketing will total approximately $660,000. The non-discounted total annual costs to Idaho Power at full participation are anticipated to be about $1,800,000.

The total expected Program costs and estimated total benefits results in a benefit/cost ratio of 1.38. However, due to initial startup costs during the Program's ramp up years the Program was not expected to become cost effective on an annual basis until 2010.

Idaho Power's marketing plan and implementation results for the Program have been described in great detail through the course of the DSM Annual Reports which are published in March of each year.

Program Performance

The A/C Cool Credit continues to perform as expected by the Company. Customer participation in the Program has continued to increase on an annual basis and the Program has proven successful for reducing peak summer demand on Idaho Power's electrical system. From 2003 through 2007 the Program has grown from a peak load reduction of less than 1 MW to over 10 MW. In 2008 the Program reported peak load reduction of 22.6 MW based on 20,195 installed switches. Idaho Power expects the Program will continue growing toward its participation goal of 40,000 enrolled customers.

Program Analysis and Validation

Since the Program's inception, A/C Cool Credit has been evaluated on several occasions. Idaho Power contracted with Summit Blue Consulting, Inc. to verify the average load reduction per participant. As a pilot in 2003 and 2004, Summit Blue completed an evaluation each year that included collection of logged data to identify the reduced run-time of participating customer's air conditioning units. Indoor and outdoor temperatures were also collected in conjunction with the run-time data. Summit Blue applied the information to a regression model used to estimate that average kW reduction per participant. The study was repeated in 2005 and again in 2006. Idaho Power currently uses the average peak load reduction per participant based on the analyses from 2004-2006 to determine the expected load reduction for cost-effectiveness analysis and reported peak demand reduction. The Summit Blue Reports were provided in Response No. 91 in Case No. IPC-E-08-10.

As part of the installation contract, Idaho Power receives a weekly quality assurance spreadsheet report from Honeywell (See appendix II). The Honeywell reports provide the metrics of switch installations, turndowns, and removals. These reports track the weekly, monthly and year-to-date installations compared to projected switch placement. They also report the current installation backlog and switch inventory. Idaho Power continually monitors that number of customers in the backlog to ensure their wait time isn't extreme. The number of installers varies with the seasons and work load. As marketing efforts increase and summer approaches the work load increases and additional trained installers can be utilized.

Other aspects of quality assurance performed by Honeywell and included in the weekly report are field and phone quality checks, safety observations and notifications, and incoming and outgoing phone calls. Finally, the report provides tracking of every marketing effort including: quantity of mailings sent, number received, customer response rate and conversion details.

Customer satisfaction with the Program is high based on the low drop-out rate. A review of utility service agreement end dates indicates less than one percent of A/C Cool Credit participants cancel enrollment due to dissatisfaction with the Program. In September and October of 2008 a sample of the participants in the Program received a survey by e-mail from Idaho Power, while the others received the survey through postal mail. (See appendix III). The survey was sent to 3,958 Program participants and had 1,671 respondents for a response rate of 42%. Results showed a high level of satisfaction with the Program, with high ratings in the Program application process, comfort, frequency of cycling, overall satisfaction with Program, and amount of information received. Most respondents indicated they chose to participate in the Program "to help reduce electrical usage on hot summer days," to "receive the bill credit," or both. An overwhelming majority of respondents indicated they would recommend the Program to friends or family.

Idaho Power has established protocols with Honeywell in the event a customer has a complaint regarding their participation in the Program. Typically, customer calls to Idaho Power's Customer Service Center are transferred to a Honeywell representative. If the issue cannot be resolved over the phone a technician is dispatched to the service point to assess the problem. The technician's actions will usually consist of replacing a problematic switch, removing the switch, or if the problem is not with the switch, recommend the customer contact an HVAC company of their choice. For a complete description of the customer issue process please see Appendix IV.

The annual cost-effectiveness of the Program is provided along with projected cost-effectiveness through 2015 in the following table. Due to the structure of the Program's costs and benefits, Idaho Power expects the Program to become cost-effective by 2010 and remain as a cost-effective demand response resource through the life of the Program.

A/C Cool Credit estimated cost-effectiveness:

		Costs		Benefits		Benefit/Cost Ratios	
Year	Participants	Total Utility Cost	Total Resource Cost	Peak Demand Reduction	DSM Alternative Cost	Utility	Total Resource
	(number)	(dollars)	(dollars)	(kW)	(dollars)		
2003	204	$275,645	$269,680	159	$9,021	0.03	0.03
2004	420	$287,253	$274,686	402	$23,572	0.08	0.09
2005	2,369	$754,062	$717,902	2,748	$161,397	0.21	0.22
2006	5,369	$1,235,476	$1,131,439	5,637	$363,278	0.29	0.32
2007	13,692	$2,426,154	$2,199,486	10,762	$693,833	0.29	0.32
2008	20,195	$2,702,265	$2,109,585	23,606	$1,521,489	0.56	0.72
2009*	31,000	$2,674,117	$1,855,841	37,555	$2,422,537	0.91	1.31
2010	38,000	$1,537,888	$697,888	42,920	$2,766,543	1.80	3.96
2011	40,000	$1,397,584	$557,584	42,920	$2,765,525	1.98	4.96
2012	40,000	$1,742,964	$542,964	42,920	$2,765,569	1.59	5.09
2013	40,000	$1,803,842	$603,842	42,920	$2,765,660	1.53	4.58
2014	40,000	$1,801,109	$601,109	42,920	$2,765,740	1.54	4.60
2015	40,000	$1,860,346	$660,346	42,920	$2,765,836	1.49	4.19

*Beginning 2009 all values are forecasted estimates. All estimates are non-discounted which differs from the discounted values presented in Response No. 96 in IPUC Case No. IPC-E-08-10.

Program Evaluation

Idaho Power expects to continue monitoring the Program's cost-effectiveness in a manner as described above. The Company will also continue utilizing Honeywell to provide quality assurance reports and documentation regarding the installation of switches.

As the Program expands Idaho Power will review the load reduction impacts of the Program. This is expected to be done in a method similar to the studies conducted by Summit Blue in 2003-2006. Idaho Power will install data loggers on a sample of participating customers' A/C units to verify the load reduction attributable to each unit. Once the load reduction impacts are verified, the cost-effectiveness analysis of the Program will be reviewed.

In 2007, two mitigation projects occurred prior to the start of the cycling season. The first incident that required mitigation involved a Honeywell installer whose work did not match what was reported. A plan to correct the problem was put in place when it was discovered. Quality checks were completed on all service calls completed by the installer. The vendor responsible increased resources to prevent interference with normal production plans. In total, 2,786 sites were visited. As a financial mitigation, Idaho Power received a credit from Honeywell to its contract invoice of $35,686.50.

The second incident involved a radio signal through the contract with Canon. The issue involved a signal intended for a limited number of switches that was accidentally received by all the switches, causing some to become inactive. The basis of the problem was determined, and a plan was put into place to correct the issue and prevent it from happening in the future. Each switch required a physical visit to reset and download information. This involved servicing over 7,000 switches. Canon provided cash reimbursement for missed cycling events, bill credits, customer information notifications, and removal and re-installation of non-working switches. The total reimbursement to Idaho Power from Canon was $84,780.

Due to the above issues, many switches were not operable for cycling at the start of June of 2007. In both cases, the vendors mitigated the problems. The unintended benefit of checking nearly all of the radio-controlled switches was that verification of these units was completed in a comprehensive way in a very short period of time.

Conclusion

The A/C Cool Credit Program has been successful in reducing summer peak demand as planned. Based on the Program's performance and projected cost-effectiveness, Idaho Power plans to continue the Program as a demand response resource.

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Appendix I, Idaho Rider Program Expense, A/C Cool Credit

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2003	Labor	60,457	41,393	101,850
	Materials	43,802	-	43,802
	Purchase Services	131,233	-	131,233
	Other Expenses	(7,205)	-	(7,205)
	Incentives	5,964	-	5,964
	2003 Total	**234,252**	**41,393**	**275,645**
2004	Labor	40,815	13,280	54,094
	Materials	99,986	-	99,986
	Purchase Services	119,006	-	119,006
	Other Expenses	1,600	-	1,600
	Incentives	12,567	-	12,567
	2004 Total	**273,973**	**13,280**	**287,253**
2005	Labor	45,791	34,855	80,645
	Materials	370,192	567	370,758
	Purchase Services	249,781	522	250,303
	Other Expenses	16,143	53	16,196
	Incentives	36,160	-	36,160
	2005 Total	**718,066**	**35,996**	**754,062**
2006	Labor	52,139	4,650	56,789
	Materials	545,744	-	545,744
	Purchase Services	519,295	-	519,295
	Other Expenses	9,611	-	9,611
	Incentives	104,037	-	104,037
	2006 Total	**1,230,826**	**4,650**	**1,235,476**
2007	Labor	89,419	4,692	94,111
	Materials	1,305,948	-	1,305,948
	Purchase Services	726,218	-	726,218
	Other Expenses	73,209	-	73,209
	Incentives	226,667	-	226,667
	2007 Total	**2,421,461**	**4,692**	**2,426,154**
	Total	**4,878,578**	**100,012**	**4,978,589**

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Appendix II, A/C Cool Credit Weekly Report

Idaho Power A/C Cool Credit Program Weekly Report Summary
Honeywell Solutions

Idaho Power A/C Cool Credit Program

To: **Idaho Power**

From: _____

Date: **9-Feb-09**

Program: **IPCO A/C Cool Credit Program**

Week Ending: **7-Feb-09**

Residential ***Backlog***

	Current Backlog
Total	1,407

Residential ***Production***

	Weekly Devices	Weekly Plan	Weekly Variance	MTD Devices	MTD Plan	MTD Variance	YTD Devices	YTD Plan	YTD Variance	Plan
Total	182	138	44	182	602	(420)	810	12,000	(11,190)	12,000

Comments:

Inventory

Inventory (PTD)	Currently Installed	Current Inventory
Twax Transponder	444	504
Cannon LCR 5200	17660	6959
Cannon LCR 5000	7411	1
Total	25515	7464

Comments:

Quality Checks:

	Weekly				
	Installs	Weekly QAs	Plan	Actual	Variance
Field QCs	182	9	5%	5%	0%
Phone QC	182	0	5%	0%	-5%

Safety Observation Visit Reporting

	Weekly Totals	MTD Total	YTDT
Total	0	0	3

Comments:

Safety Observation Notification Reporting

	Weekly Totals	MTD Total	YTDT
Total	29	29	139

Comments:

Calls

	Weekly	MTD Total	YTDT
Incoming	70	70	1574
Outgoing	75	75	342

Comments:

Appendix III, A/C Cool Credit Survey Results

A/C Cool Credit Survey, September-October 2008

- 1007 sent by email on 9/16/08, included link to complete survey on-line
- 2951 hardcopies mailed out in September, customer could fill out hard copy of survey and return in the included postage-paid envelope, or could use on-line link that was included.
- 1671 total responses were received
- 365 responses on-line
- 1306 responses by hardcopy

1. How did you learn about the A/C Cool Credit program?
   a. Newspaper 3.7%
   b. Radio 0.9%
   c. TV 4.1%
   d. Direct mail from Idaho Power 48.3%
   e. Idaho Power bill insert 57.8%
   f. Idaho Power Web site 1.3%
   g. Friends or family 7.6%

2. What was the main reason you decided to participate in the A/C Cool Credit program?
   a. Wanted to help reduce overall electrical usage on hot summer days 46.5%
   b. Wanted to earn the credit on my bill 28.2%
   c. Seemed like the right thing to do 25.4%

3. The amount of time from when you submitted your application until the switch was installed was:
   a. Longer than was expected 11.6%
   b. What was expected 49.7%
   c. Quicker than was expected 38.7%

4. How many days did you expect it to take from the time you submitted your application until the switch was installed?

5. Overall, how would you compare the temperature of your home this past summer relative to previous summers:
   a. Much warmer 2.2%
   b. Somewhat warmer 21.8%
   c. No difference 63.2%
   d. Somewhat cooler 11.7%
   e. Much cooler 1.0%

6. How much did the temperature of your home impact your comfort level this past summer?
   a. Not at all 63.3%
   b. Somewhat 29.1%
   c. Very much 7.6%

7. How many days would you estimate that Idaho Power cycled your air conditioning unit this past summer?
   a. 0-10 12.4%
   b. 11-20 9.4%
   c. 21-30 5.3%
   d. >30 4.6%
   e. Don't know 68.4%

8. Overall how satisfied are you with the A/C Cool Credit program?
   a. Very dissatisfied 9.6%
   b. Somewhat dissatisfied 4.1%
   c. Neither satisfied nor dissatisfied 14.0%
   d. Somewhat satisfied 16.8%
   e. Very satisfied 55.4%

9. How likely would you be to recommend the A/C Cool Credit program to a friend or family member?
   a. Not likely at all 1.8%
   b. Somewhat unlikely 2.5%
   c. Neither likely nor unlikely 9.1%
   d. Somewhat likely 25.0%
   e. Very likely 61.6%

10. What is it about the A/C Cool Credit program that would make you want to recommend it to a friend or family member?

11. What is it about the A/C Cool Credit program that would make you not want to recommend it to a friend of family member?

12. What are your thoughts on the amount of information you received about this program (i.e. enrollment brochure, door hanger, letters, etc.)?
    a. Received too much information 3.1%
    b. Received adequate information 90.7%
    c. Received too little information 6.2%

13. Please tell us any additional comments or suggestions you have about the A/C Cool Credit program.

14. May we use your name and comments in Idaho Power's communication efforts? (Without your authorization, your comments will remain anonymous.)
    a. Yes 56.6%
    b. No 43.4%

15. What is your 5-digit zip code?

16. Please identify your gender:
    a. Male 41.2%
    b. Female 58.8%

17. Please identify your age in one of the ranges below:
    a. Less than 25 2.1%
    b. 26-35 14.1%
    c. 36-50 18.4%
    d. 51-65 26.5%
    e. Greater than 65 38.9%

18. What is the last level of education you completed?
    a. Less than High School 2.3%
    b. High School diploma, GED or equivalent 14.6%
    c. Some college 27.9%
    d. As Associates or Bachelors degree 31.4%
    e. Some graduate school 6.8%
    f. Graduate degree 17.0%

19. How long have you been an Idaho Power customer?
    a. Less than 1 year 2.6%
    b. 1-5 years 19.4%
    c. 6-15 years 24.7%
    d. 16-25 years 14.1%
    e. Greater than 25 years 39.2%

20. Do you rent or own the residence that participated in the A/C Cool Credit program?
    a. Rent 5.5%
    b. Own 94.5%

Appendix IV, A/C Cool Credit Customer Complaint Process

Customer Issue Process:

1) Customer has a complaint
   a) Calls to Idaho Power are transferred to the Honeywell customer service center for resolution.

2) Honeywell determines what type of complaint
   a) If customer is too hot during cycling and wants to stay on program, Honeywell Customer Service Representative (CSR) will offer suggestions and options to see if there is a solution that will work for the customer. Example: a customer may have a programmable thermostat that could be set to start cooling a bit earlier in the day, such as at 3pm, rather than waiting until 5pm.
   b) If the customer is too hot during cycling and wants out of the program, the Honeywell CSR will remove the switch from the active cycling group, and schedule the switch to be removed. A Honeywell technician will visit the site and remove the switch, normally within the next few days. Removing the switch from the active group prevents it from cycling, even if another cycling event occurs.
   c) If the customer believes the switch or installation is causing a problem with the air conditioning or other equipment, the CSR will begin to troubleshoot the problem to see if it can be resolved over the phone. If the issue cannot be resolved over the phone, a Honeywell technician will be dispatched to the property as soon as possible.
      i) The Honeywell technician will determine if the switch is properly installed and operating correctly.
         (1) If an issue is found with the switch or installation, the technician shall correct the issue or remove the device according to the customer's wishes.
         (2) If the issue is not with the switch or installation, the technician shall inform the customer and suggest they contact the HVAC company of their choice.
      ii) If a Honeywell technician isn't available to visit the property in a reasonable amount of time, the customer will have the option of contacting their HVAC company of choice.
         (1) Service calls deemed to be caused by the Idaho Power switch shall be paid for by Idaho Power.
         (2) Service calls deemed to be caused by the installation of the switch shall be paid for by Honeywell.
         (3) All other service calls shall be the responsibility of the customer.
         (4) Invoices submitted to Idaho Power or Honeywell for payment will be investigated by Honeywell for verification.
   d) If the customer had not contacted Idaho Power or Honeywell prior to having an HVAC technician visit and if they believe the problem was caused by the switch or installation of the switch, they may submit the invoice directly to Idaho Power or Honeywell.
      (1) Service calls deemed to be caused by the Idaho Power switch shall be paid for by Idaho Power.
      (2) Service calls deemed to be caused by the installation of the switch shall be paid for by Honeywell.
      (3) All other service calls shall be the responsibility of the customer.
      (4) Invoices submitted to Idaho Power or Honeywell for payment will be investigated by Honeywell for verification.

Honeywell CSRs are available to answer phone calls on weekdays from 8 a.m. to 5 p.m. on non-event days, and from 8 a.m. to 8 p.m. on event days, excluding holidays. On weekends, holidays and after hours, customers have the option of either leaving a message for non-emergency situations (call returned the next business day), or for emergency situations they can be connected through to the on-call technician's phone.

HEATING & COOLING EFFICIENCY

IDAHO POWER.
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Heating and Cooling Efficiency
April 1, 2009

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Heating and Cooling Efficiency
April 1, 2009

Introduction

The residential Heating and Cooling Efficiency (H&CE) Program (Program) provides incentives for the purchase and proper installation of qualified high-efficiency heating and cooling equipment and services to Idaho Power residential customers. This Program has been available to Idaho customers since September 2007 and to Oregon customers since August 2008.

Objectives of the H&CE Program are acquiring kWh savings through the implementation of energy saving HVAC measures in the existing and new residential sector. Cash incentives are provided to residential customers and HVAC contractors who install eligible central air conditioners (CAC), heat pumps, and evaporative coolers. Incentives are also awarded for qualifying heat pump tune-ups and CAC tune-ups meeting Idaho Power's Program specifications. A participating HVAC company must perform all work, except for installation of evaporative coolers which are often homeowner installed.

From 2006 through 2007, the Program costs of Heating and Cooling Efficiency were $497,698 paid from the Idaho Power Energy Efficiency Rider (Rider) account and $3,846 from the Idaho Power operations and maintenance (O&M) budget for a total of $501,543. The total of utility costs including those paid in Oregon was $505,655. Through 2007 the Program resulted in energy savings of an estimated 1,595 kWh. The following table provides the total Program results for Idaho and Oregon jurisdictions. A detailed breakdown of the Idaho DSM Rider expense for this Program is included in Appendix I.

Heating and Cooling Efficiency Program results for Idaho jurisdiction:

		Costs		Benefits			Measure Life	Benefit/Cost Ratios	
Year	Participants	Total Utility Cost	Total Resource Cost	Annual Energy	Peak Demand	Energy Savings		Utility	Total Resource
	(number)	(dollars)	(dollars)	(kWh)	(kW)	(dollars)	Years		
2006	0	$17,444	$17,444						
2007	4	$488,211	$494,989	1,595					
Total	4	$505,655	$512,433	1,595		$24,317	18	0.0481	0.0475

The H&CE Program requires contractors to become "participating" companies. To do this, contractors in the Program must sign an agreement with Idaho Power. The participating companies must ensure their service technicians and installers attend required training on the proper installation of air conditioners and heat pumps. These companies must purchase and use TrueFlow® Meters to measure air flow, and adhere to Program specifications.

Idaho Power has contracted with two third-party firms to assist in Program operation. Portland Energy Conservation, Inc. (PECI) processes the paperwork and incentive payments. The second company, Honeywell, Inc. conducts scheduled quality assurance visits to approximately five percent of participants' homes to verify work performed.

Program Development

The Heating and Cooling Efficiency Program was added to the Idaho Power DSM portfolio in 2006. The activities in 2006 included research and analysis concerning Program design and preliminary cost-effectiveness. The Program's specific parameters were developed during July through September 2007 and launched to the HVAC contractor community in September. The reason for this was to allow contractors sufficient time to become familiar with the Program requirements, implement the required training classes, and develop a marketing plan that would be ready to officially kickoff the Program in March 2008 (prior to the tune-up and cooling seasons). During this time, over 230 contractors attended trainings sponsored by Idaho Power that included proper installation of heating and cooling equipment.

Program Performance

For 2007, the H&CE Program realized 1,595 kWh in energy savings. Idaho Power considers 2006 and 2007 development and ramp-up years for this Program. Through 2007, the Program had not resulted in being cost-effective, due to high startup costs and lower than expected participation. Subsequently, in 2008 Idaho Power proposed to the Energy Efficiency Advisory Group to change the Program and remove measures that had not performed as initially expected.

Program Cost Effectiveness

As Idaho Power does with all energy efficiency Programs, a cost-effectiveness analysis was developed for the H&CE Program. Idaho Power follows the cost-effectiveness methodology as described in the DSM Annual Report and the Company's Integrated Resource Plan (IRP). The most current description of this methodology can be found in the 2008 DSM Annual Report on page 11 and in the 2006 IRP Technical Appendix D on pages 62-73.

The cost-effectiveness model calculates the total utility cost and total resource cost including: incentives, Program administration and promotion, equipment installation and maintenance, and evaluation. For the preliminary cost-effectiveness analysis of the H&CE Program, Idaho Power relied primarily on information from PECI. This included incremental cost and energy savings data for the measures offered in the Program.

The Company is able to calculate the value of the energy savings attributed to a Program by using end-use load shapes in conjunction with the five DSM alternative cost pricing periods

described in the Technical Appendix of each IRP. For this Program Idaho Power uses updated load shapes stated in the Nexant DSM Potential Study, which was published for Idaho Power in 2008. The following tables include the energy savings allocation used in the H&CE cost-effectiveness measure analysis.

Energy Savings Allocation for H&CE					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
43.53%	37.74%	3.68%	12.31%	2.74%	100%

Once all inputs and assumptions are made, the benefits and costs associated with the Program are present valued based on Idaho Power's nominal discount rate. For the H&CE Program, the pre-implementation expected costs and estimated total benefits resulted in positive benefit/cost ratios from the total resource cost and utility cost perspectives. As previously discussed, the high startup costs and lower than expected participation impacted the cost-effectiveness of the Program. Idaho Power had expected that the high startup costs of Program administration would decline. However, it is believed by Idaho Power that these costs will remain consistent over the life of the Program. The following table provides the cost-effectiveness results based on the expected administration costs of the Program.

Measure	Measure Life	kWh/Yr (Net)	Utility Admin Costs	Incentive Amount	Participant Cost	DSM Alternative Cost	UC Benefit/Cost Ratio	TRC Benefit/Cost Ratio
13 SEER Install & Sizing, sf	18	277	$668	$50	$315	$438	0.61	0.45
Central AC 14 SEER, sf	18	318	$668	$150	$1,087	$518	0.63	0.29
Central AC 15 SEER, sf	18	573	$668	$250	$1,365	$934	1.02	0.46
Evaporative Cooler, Single Family	15	443	$167	$150	$0	$617	1.95	3.69
Evaporative Cooler, Manufactured Home	15	253	$167	$150	$0	$352	1.11	2.11
Heat Pump Upgrade, Tier 1, sf	18	2,206	$1,766	$200	$700	$2,581	1.31	1.05
Heat Pump Upgrade, Tier 2, sf	18	2,597	$1,766	$250	$1,100	$3,334	1.65	1.16
Heat Pump Replacement, Tier 1, sf	18	7,142	$1,766	$300	$1,650	$9,170	4.44	2.68
Heat Pump Replacement, Tier 2, sf	18	7,419	$1,766	$400	$2,050	$9,526	4.40	2.50
Central AC commissioning, sf	5	50	$668	$50	$50	$26	0.04	0.04
Central AC 15 SEER, sf, New Con	18	573	$668	$250	$556	$934	1.02	0.76
Central AC 14 SEER, sf, New Con	18	291	$668	$150	$278	$474	0.58	0.50
Water Source Heat Pump (Open Loop)	18	2,118	$1,766	$500	$600	$3,453	1.52	1.46
Water Source Heat Pump (Open Loop)	18	7,142	$1,766	$1,000	$5,550	$11,639	4.21	1.59
Water Source Heat Pump (Open Loop)	18	7,142	$1,766	$1,000	$5,550	$11,639	4.21	1.59
						Total Program	1.00	0.77

As noted above, analysis in 2008 indicated that several measures should be removed from the Program in 2009 to ensure cost-effectiveness. Idaho Power believes that making these changes will result in a cost-effective Program offering.

Program Evaluation

The quality assurance (QA) aspect of the H&CE Program has four purposes:

- Provide a mechanism for an objective look at participating contractor's work by use of a third party.
- Confirms kWh savings by verifying that the work on-site matches that of the application submitted by a participating contractor.
- Provides opportunities to give feedback and/or training to contractors, resulting in increased quality of HVAC installations in Idaho Power's service area.
- Provides field data and feedback to the H&CE for future Program evaluation purposes.

The QA process targets approximately five percent of participating customers. It is initiated when PECI sends selected participating customers a letter notifying them their home has been selected for a QA. PECI concurrently sends Idaho Power the list of QA customers, who in turn send this list to Honeywell. Honeywell schedules the QA appointment with the customer, completes a QA site visit form and submits the results to Idaho Power. Idaho Power forwards the results to PECI for inclusion in the Program's database.

Appendix I, Idaho Rider Program Expense, Heating and Cooling Efficiency

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2006	Labor	-	974	974
	Materials	3,691	-	3,691
	Purchase Services	11,718	-	11,718
	Other Expenses	238	-	238
	Incentives	-	-	-
	2006 Total	**15,647**	**974**	**16,621**
2007	Labor	58,872	2,871	61,744
	Materials	75,677	-	75,677
	Purchase Services	366,359	-	366,359
	Other Expenses	(19,456)	-	(19,456)
	Incentives	600	-	600
	2007 Total	**482,051**	**2,871**	**484,923**
	Total	**497,698**	**3,846**	**501,543**

APPLIANCE PROGRAM

Appliance Program
(Currently called the Home Products Program)
April 1, 2009

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Appliance Program
(Currently called the Home Products Program)
April 1, 2009

Introduction

The Home Products Program (Program), formerly the ENERGY STAR® Appliance Program, provides an incentive payment to Idaho Power residential customers for purchasing certain ENERGY STAR® qualified appliances, lighting, or other products. ENERGY STAR® is a government-backed program designating products as energy efficient. Appliances and products with the ENERGY STAR® qualification must meet higher, stricter efficiency criteria than federal standards.

All expenses for this Program through 2007 were for planning, research, and Program development. No incentives were paid during 2007. The total amount spent on the Program through 2007 was $8,746 from the Idaho Energy Efficiency Rider (Rider) account. Of this amount, $8,256 was for labor expenses while $490 was designated "other expenses", which included various employee business expenses such as meals and transportation. A detailed breakdown of the Idaho Rider expense of this Program is included in Appendix I.

Initially, clothes washers were the only products offered under this program. To qualify, the washer must have been purchased after April 1, 2008 for customers in Idaho and after May 21, 2008 for customers in Oregon. Washers must have a Modified Energy Factor of 1.72 or greater and a Water Factor of 8.0 or lower, which are the minimum qualifications for an ENERGY STAR® qualified clothes washer.

Program Cost Effectiveness

As Idaho Power does with all energy efficiency programs, a cost-effectiveness analysis was developed for the Home Products Program. Idaho Power follows the cost-effectiveness methodology as described in the Demand-Side Management (DSM) Annual Report and the Company's Integrated Resource Plan (IRP). The most current description of this methodology can be found in the 2008 DSM Annual Report on page 11 and in the 2006 IRP Technical Appendix D on pages 62-73.

The cost-effectiveness model calculates the total utility cost and total resource cost including: incentives, Program administration and promotion, equipment installation and maintenance, and evaluation. For the preliminary cost-effective analysis of the Home Products, Idaho Power relied primarily on information from the Northwest Power and Conservation Council's Regional Technical Forum (RTF). The deemed savings include the measure life (14 years), per-unit energy savings as a weighted average of combined Tier I and Tier II ENERGY STAR® qualified clothes washers (192 kWh), weighted incremental cost ($104), and net to gross factor (.8).

Other assumptions such as participation rate and Program costs were made by Idaho Power staff which utilized sources of information that include other utility companies, the US Department of Energy, ENERGY STAR® documents, professional organizations, and trade organizations.

The Company is able to calculate the value of the energy savings attributed to a Program by using end-use load shapes in conjunction with five DSM alternative cost pricing periods described in the Technical Appendix of each IRP. For this Program Idaho Power uses updated load shapes stated in the Nexant DSM Potential Study, which was published for Idaho Power in 2008. The following tables include the energy savings allocation used in the Home Products cost-effectiveness measure analysis.

Energy Savings Allocation for Home Products					
Summer On Peak	Summer Mid Peak	Summer Off Peak	Non-Summer Mid Peak	Non-Summer Off Peak	Total
6.49%	11.23%	5.13%	46.65%	30.50%	100%

Once all inputs and assumptions are made, the benefits and costs associated with the Program are present valued based on Idaho Power's nominal discount rate. In 2007 Idaho Power identified clothes washers as a cost-effective measure to offer in the Home Products program. During this time, Idaho Power also explored inclusion of ENERGY STAR® certified dishwashers, refrigerators, and freezers in the Program. However, these appliances did not pass cost-effectiveness tests during this planning period. Based on updated ENERGY STAR® requirements and revised incremental costs, ENERGY STAR® certified refrigerators, ceiling fans with light kits, and light fixtures were added to the Program in 2008.

The results of the expected cost-effectiveness for ENERGY STAR® qualified clothes washers are demonstrated in the following table.

Home Products Program, Clothes Washer Cost-Effectiveness		
Model Inputs		
Nominal Discount Rate		6.93%
Escalation Rate		3.00%
Loss Factor		10.90%
Measure Life (years)		14
Program Life (years)		12
Program Year		1
Estimated Participants (Units), first year		3,942
Estimated Program Energy Savings (kWh)		154,665,590
Annual Energy Savings (kWh), first year		224,338
Incentive		
ENERGY STAR® Clothes Washer Combined Tiers	$	50.00
Program Benefits/Costs		
Total Program DSM Alternative Cost	$	6,335,163
Program NPV (TRC)	$	3,018,395
Program NPV (UC)	$	2,860,081
Benefit/Cost Ratios		
TRC		2.10
UC		2.22

Program Evaluation

As part of the evaluation of the Home Products Program, Idaho Power collects a variety of data when an application for incentive payment is received. This information includes: make and model number of the clothes washer, where it was purchased, serial number, and price. Since its initial Program rollout, the Home Products Program has added refrigerators, ceiling fans with light kits, and light fixtures. Idaho Power staff process all incentive applications and verify that the appliances in the applications are ENERGY STAR® certified. Idaho Power plans to review the assumptions and the market penetration of the measures offered in the Home Products Program in 2009 to verify the ongoing cost-effectiveness and delivery of the Program.

Appendix I, Idaho Rider Program Expense, Home Products

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2007	Labor	8,256	69	8,325
	Materials	-	-	-
	Purchase Services	-	-	-
	Other Expenses	490	-	490
	Incentives	-	-	-
	2007 Total	**8,746**	**69**	**8,816**
	Total	**8,746**	**69**	**8,816**

BUILDING OPERATOR TRAINING

IDAHO POWER
An IDACORP Company

Building Operator Training
April 1, 2009

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Building Operator Training
April 1, 2009

Introduction

This paper will examine Idaho Power Company's Building Operator Training Program (Program) in the Company's service territory. Discussion on the Program's development, performance, and documentation will be provided.

The Program was designed to provide training for building operators of public and private schools, universities, and colleges within Idaho Power's service territory. The training was provided to help the facilities use energy more efficiently.

From 2003 through 2005, the Program costs were $94,572 paid from the Idaho Power Energy Efficiency Rider (Rider) account. During this period, the Program resulted in an estimated 2,909,167 kilowatt-hours (kWh) of energy savings. Table 1 provides the total costs and benefits associated with the Program. A detailed breakdown of the Idaho Rider expense of the Program is included as Appendix I.

Building Operator Training program results in Idaho and Oregon jurisdictions:

		Costs		Benefits			Measure Life	Benefit/Cost Ratios	
Year	Participants	Total Utility Cost	Total Resource Cost	Annual Energy	Peak Demand	Energy Savings		Utility	Total Resource
	(number)	(dollars)	(dollars)	(kWh)	(kW)	(dollars)	Years		
2003	71	$48,853	$48,853	1,825,000					
2004	26	$43,969	$43,969	650,000					
2005	7	$1,750	$4,480	434,167					
Total	104	$94,572	$97,302	2,909,167		$785,855	5	8.31	8.08

The Building Operator Training Program provided Idaho Power a cost effective demand-side management resource. However, the Program was discontinued in 2005 due to the development of new programs designed to provide energy efficiency measures to reach more customers within the commercial sector including schools.

Program Development

Idaho Power provided Building Operator Training for two years, 2003 and 2004, specifically to building operators of public and private schools, universities and colleges within the Idaho Power service territory. This training was provided at a time before any full-scale energy efficiency programs were available for Idaho Power commercial customers and at a time when school budgets were being curtailed. This training, which was also adopted and offered in the rest of the Pacific Northwest and in the Northeastern U.S., started in Boise by the Northwest Building Operators Association (NWBOA). The valuable expertise available locally coupled with the ease of implementation and the need expressed by the school operators helped enable Idaho Power offer this training. The Energy Efficiency Advisory Group (EEAG) supported Idaho Power providing this training. In 2004 Idaho Power began to focus resources and develop programs that directly incented customers to utilize energy efficiency measures. In 2004 resources were needed to develop the Custom Efficiency and the Building Efficiency programs. Since these new programs were eligible to a broader customer base including schools and universities, Idaho Power chose not to sponsor this customer-specific training.

Idaho Power would only pay the cost of the week-long training if participants completed all five days of the class and passed the certification test at the end of the class. Idaho Power verified the total count of building operators certified under this program using class rosters, and verified that each participant worked for a school, university or college within the service territory. One hundred and four participants took the class and met these requirements.

Program Performance

For each building operator completing the class and passing the certification test, it is estimated that .5 kWh per square foot of space managed by the building operator was saved annually for five years.

The participation and energy savings impacts are presented in the following table.

Building Operator Training estimated energy savings:

	Number of Participants	Annual Energy Savings	Annual Average Demand Reduction
Year	(number)	(kWh)	(aMW)
2003	71	1,825,000	0.21
2004	26	650,000	0.07
2005	7	434,167	0.05
Total	104	2,909,187	

Program Analysis and Validation

Savings estimate per square foot of space managed and life of savings

To determine energy savings for this Program Idaho Power relied on regional and national evaluations that were deemed valid to use for this Program. The Northwest Energy Efficiency Alliance (NEEA) sponsored and developed this Program and conducted analyses on both the process and savings impacts of this Program. NEEA reviewed and relied on national studies showing the cost-effective savings. The robustness of these studies was determined by Idaho Power to provide savings values applicable to the Idaho Program. Idaho Power was able to leverage their NEEA membership dollars and utilize NEEA analyses.

The savings assumption of 0.5 kWh saved annually per square foot (ft^2) was used initially by NEEA based upon a 2002 statistically triangulated study conducted by Research Into Action for the Northeast Energy Efficiency Partnership, included as Appendix II. This number was revalidated, and in fact recommended to increase to 1.2 kWh/ft^2 in a study by Summit Blue Consulting completed in 2003 for the Northwest Energy Efficiency Alliance and included as Appendix III. These are the studies utilized by Idaho Power to apply the 0.5 kWh savings to this Program. The measure life of five years was first estimated by the Research Into Action study and re-verified by the 2003 Summit Blue study. Idaho Power determined that the training in Idaho was very similar to the national and regional trainings enabling the Company to use the savings results. In addition, Idaho Power believes the evaluations mentioned above were robust and applicable to Idaho; therefore the Company used savings and measure life values reported.

A paper written for the 2003 Energy Program Evaluation Conference included as Appendix IV discussed the transferability of the findings discussed above to other Building Operator Training and Certification (BOC) trainings in northern climates. This study confirmed the validity of using these estimates in the Idaho Power Program.

NEEA has recently adjusted the 0.5 kWh/ft^2 savings downward to 0.4 kWh/ ft^2. However, this more recent information was not available to Idaho Power in 2003 when determining the cost-effectiveness of this Program.

Square footage managed by each building operator

The Research Into Action study referenced above found an average size facility space for each participant to be 681,804 ft^2, where the 2003 Summit Blue study indicates square footage numbers per participant may be as large as 234,850 ft^2 or as small as 50,000 ft^2. Because Idaho Power was offering the training only to schools, universities and colleges it was thought that the square foot assumption might differ from estimates in the other studies. In order to test these numbers, a small survey of participants was conducted by Idaho Power. The findings showed the average area managed by the building operators responding to the survey were over 250,000 ft^2. The data were captured only in spreadsheet form and no printed results are currently available. In order to be conservative, Idaho Power used 50,000 ft^2 per participant.

Since most schools do not operate during the summer months it was determined that there was no summer peak reduction due to this Program. Other Program benefits not quantified by Idaho Power include natural gas savings and water savings. These are quantified in the evaluations conducted by NEEA and the Northeast Energy Efficiency Partnership listed below.

Program Evaluation

Impact Evaluations

As discussed above, Idaho Power relied upon the following studies to substantiate the savings per ft^2 value and the measure life assumption:

1. Evaluation of the Building Operator Training and Certification (BOC) Program in the Northeast, conducted by Research into Action, for the Northeast Energy Efficiency Partnerships, Inc., September 6, 2002.
2. Findings and Report: Retrospective Assessment of the Northwest Energy Efficiency Alliance, Final Report, conducted by Summit Blue Consulting, for the Northwest Energy Efficiency Alliance, October 2003.
3. Education that Changes Behavior: The Impacts of the BOC Program, conducted by Research into Action and other consultants, for the 2003 Energy Program Evaluation Conference, Seattle.

Idaho Power Process Evaluation

In order to determine the overall satisfaction of participants and to determine generally what efficiency measures were being installed because of this training, Idaho Power hired McFain & Associates to conduct a phone survey in May 2003. McFain surveyed building operators who participated in the first sponsored class held November 2002. Key findings include: 100% of the participants reported they were satisfied with the course and 83% indicated they would probably or definitely attend additional trainings. Ninety-seven percent of the course participants reported they had changed their operating and maintenance procedures based on what they had learned during the training. The most common changes were in lighting change outs and scheduling. Participants also reported increased comfort due to this Program.

- Idaho Power Company School Building Operator Training Survey Results conducted by McFain & Associates Research, Inc, for Idaho Power Company, May 2003.

A copy of this evaluation was provided in the Technical Appendix of the 2004 DSM Annual Report and provided in the discovery room at Idaho Power for Case No. IPC-E-08-10.

More recent evaluations

For a more recent evaluation of savings assumptions used in this Program, NEEA published in their report *Long Term Monitoring and Tracking Report on 2005 Activities*, a review of Building Operator Certification Program savings. This study reviews previous savings estimations for this Program. This study is informative because it indicates that as a result of the training Program in the region, energy savings are still being realized and new participation in the training is positively impacting the region.

- Long Term Monitoring and Tracking Report on 2005 Activities, conducted by Summit Blue Consulting, for the Northwest Energy Efficiency Alliance, April 18, 2006.

A copy of Section 7, Building Operator Certification of this report, is attached at Appendix V.

In addition to the above mentioned evaluations relied upon by Idaho Power for this Program, NEEA conducted six Market Progress Evaluations through 2001. These reports can be found on the NEEA website: http://www.nwalliance.org/research/evaluationreports.aspx.

Appendix I: Idaho Rider Program Expense, Building Operator Training

Year	Expense Type	Idaho Rider	IPC O&M	Total Expense
2003	Labor	-	-	-
	Materials	-	-	-
	Purchase Services	-	-	-
	Other Expenses	-	-	-
	Incentives	48,853	-	48,853
	2003 Total	**48,853**	**-**	**48,853**
2004	Labor	-	-	-
	Materials	-	-	-
	Purchase Services	-	-	-
	Other Expenses	-	-	-
	Incentives	43,969	-	43,969
	2004 Total	**43,969**	**-**	**43,969**
2005	Labor	-	-	-
	Materials	-	-	-
	Purchase Services	-	-	-
	Other Expenses	-	-	-
	Incentives	1,750	-	1,750
	2005 Total	**1,750**	**-**	**1,750**
	Total	**94,572**	**-**	**94,572**

research/into/action inc

Final Report

EVALUATION OF THE BUILDING OPERATOR TRAINING AND CERTIFICATION (BOC) PROGRAM IN THE NORTHEAST

Funded By:

Northeast Utilities, National Grid, NSTAR, KEYSPAN Energy Delivery, Long Island Power Authority, and Unitil Corporation

Submitted To:

Funding Organizations and

Northeast Energy Efficiency Partnerships, Inc.

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Acknowledgements

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EXECUTIVE SUMMARY

OVERVIEW OF THE PROJECT AND PROGRAM

The Northeast Energy Efficiency Partnership (NEEP) is a regional non-profit organization supported by utilities, state government agencies, private foundations, and federal grants. It is committed to bringing affordable, energy-efficient products and services to the marketplace. In the fall of 1999, NEEP began its Resource-Efficient O&M Initiative, a market transformation effort to train operators in efficient building operations and management (O&M), establish recognition of and value for certified operators, support the adoption of resource-efficient O&M as the standard in building operations, and create a self-sustaining entity for administering and marketing the training in three years. NEEP and six northeastern utilities: KEYSPAN Energy Delivery, Long Island Power Authority (LIPA), National Grid, NSTAR, Northeast Utilities, and Unitil Corporation provided sponsorship for the Initiative. In April 2000, the five utilities operating in Massachusetts, Connecticut, and Rhode Island began offering their customers the Building Operator Training and Certification (BOC) program as part of the market transformation effort. The sponsors provided grants to NEEP to license the BOC curriculum from the Northwest Energy Efficiency Council (NEEC), its developer.

At the end of 2001, the second year of operation, six utility sponsors contracted with Research Into Action, Inc. and GDS Associates, Inc. to conduct an evaluation of the regional BOC market transformation efforts, focusing on the BOC 100 Series implementation, impacts, and marketing. The study combines elements of process evaluation, business plan evaluation, and market assessment. The evaluation covers the process, market, and impact issues of the program (Chapters 1 through 7) and makes recommendations for program improvements and for a long-term evaluation plan (Chapter 8).

PROGRAM STATUS AND KEY EVALUATION FINDINGS

In its first two years of operations (2000-2001), over 500 students enrolled in the BOC; over half of the students received certification. Enrollment and certification activity in 2001 was about double that of 2000. In 2001, four BOC 200 Series courses were taught in three utility service territories in Massachusetts, Connecticut, and New Hampshire.

The key evaluation findings from the regional market survey of nonparticipants and the analysis of the projected market for BOC training are the following:

- The market potential during the next three years for the BOC training is about 10,000 students. The market potential will grow as program awareness increases.
- Estimates for longer-term growth are about 14,500 facilities employing roughly 243,000 building operators.
- Awareness of the BOC among supervisors of building operators with no BOC experience has grown to 13% at the end of the second year of the program.
- Three-fourths of nonparticipants interviewed would consider sending staff to the BOC training – an average of 2.75 operators per facility.
- Average facility size for respondents willing to send staff to the BOC training is 340,000 square feet, with an average annual electricity consumption of 1.8 million kWh.
- Half of the supervisor respondents who said they were willing to pay a dollar amount indicated willingness to pay $1,200 or more.
- One-third of the supervisors of BOC students indicated a willingness to pay over $1,400.
- Half of the nonparticipating supervisors surveyed thought certification is important and have sent staff to receive certification in some area of building operations and maintenance.

Findings from the program influence and impact analysis indicate high levels of effectiveness and satisfaction:

- Ninety percent of the BOC students and students' supervisors say students have improved comfort, saved energy, or saved money in their facilities.
- One-third of students report the BOC training has helped them advance their career.
- Eighty percent of students and their supervisors reported being satisfied with the BOC training as a whole.

- Eighty percent of students and 90 percent of supervisors have recommended or would recommend the program.
- Fifty percent of students plan to take, or have taken, the BOC 200 Series.

Interviews with stakeholders regarding program strategy, marketing, administration, and instruction yield the following findings:

- Sponsors, staff, and instructors believe the 100-level series materials and program delivery meet students' needs.
- Communication among members of the Working Group is good.
- Each utility sponsor has employed a different set of marketing methods and has conducted their marketing with a different level of effort.
- Tools and systems used by program administration staff have been adequate for the tasks associated with delivering the program with utility marketing and sponsorship.
- The program database is difficult for staff to use.
- Program efforts are understaffed in comparison with the projected activity level; staffing allocated to marketing is especially low.
- The business plan does not address the lag between establishing relationships with organizations and obtaining students and revenue.
- The full market price has not been tested in the market place to date; students have paid discounted course fees.

CONCLUSIONS

The conclusions build on the findings and discuss the quality, direction, and progress of the BOC program:

- The BOC program has reduced electricity, gas, oil, and water consumption in the region. The annual resource savings from the average BOC student certified in 2000 or 2001 are:[1]
  - 238,490 kWh (demand savings were not estimated)
  - 930 MMBtu of oil or gas
  - 77,095 gallons of water
  - $20,000 in annual resource cost savings at resource prices current in Massachusetts from 2001.
- The program approach of offering certification in combination with training is a sound one.
- Students and their supervisors have indicated high levels of satisfaction with BOC training received.
- In the near term, the potential market is about 10,000 students, coming from about one-third of all C & I facilities in the region that have building operators on staff.
- Potential customers for the BOC are the larger facilities from all commercial and industrial activity sectors.
- It is likely that the market will bear a program cost of $1,400, although the current study is inconclusive.[2]
- The level of participant satisfaction, number of kilowatt-hours saved, and growth in market awareness for the NEEP 2000-2001 BOC program are similar to that for the Northwest Energy Efficiency Council (NEEC) 1999-2001 BOC program.

---

1 These annual savings are expected to flow for five years from the time of training.

2 The baseline study conducted for the Pacific Northwest indicated that the market would bear a cost of $1,200, but that study was conducted during a time of economic expansion, in contrast to the current study, and used a different survey instrument, which also may have some bearing on the difference in findings. Current plans are to offer the course at $1,400, which has not been tested.

- The program administration has met the challenge of supporting program activities in its first two years.
- The marketing activities have been highly successful, resulting in 13% market awareness and 518 enrolled students in two years.
- The current analysis suggests self-sustainability is not possible in the next one to three years, may not ever be possible, and likely is not desirable.
- Financial autonomy by 2003 is not feasible for the program. The program expenses have been estimated to fit within the identified funding sources and do not match the level of effort implied by the business plan.
- Marketing that is helped by, but not largely dependent on, the founding utilities is not feasible by 2003.
- The high levels of participant satisfaction, market interest, and resource savings indicate the program should move ahead.

RECOMMENDATIONS

1. **Rethink the desirability of the goal of "self-sustainability."** To date, the program's "place" or home has been with the utility sponsors. Marketing to date has associated the utility with the course.
2. **Both utilities and NEEP should market the program.** NEEP and the sponsors can best promote the program to different markets and by using different means. Utilities are reluctant to share their customer lists and, even were they to do so, NEEP cannot conduct the relationship marketing with these customers that the utilities can do. Both efforts are needed to reach a high level of market awareness in the next five years.
3. **Recognize that marketing to facility management associations is not likely to generate many students until the end of 2003, at the earliest.**
4. **Increase funding for the program by moving quickly to charging students the full fee.** Utility funding for the program should be *in addition* to course fees paid by participants, not a substitute. Utilities that want to demonstrate that they "stand behind" the program can offer a $100 rebate coupon.

5. **Have a uniform price throughout the region.** Subsidized course fees should be offered customers on an as-needed basis as warranted by criteria established by the Working Group.

6. **Sponsoring utilities should move to justify continued financial support on the basis of the resources saved in their jurisdiction from the successful operation of the program there.** Regional promotion is important. Utilities throughout the region should be encouraged to participate.

7. **NEEP should conduct an analysis of the FTE required to successfully offer the program to 435 students a year.** These activities include (1) delivering the program in disparate locations, (2) conducting the development activities associated with new geographical markets, enhanced course materials, marketing materials, and so forth, and (3) marketing the program. A reasonable estimate of the program's financial requirements should then be compared with the revenue stream expected from a uniform tuition of $1,400. NEEP should then approach the working group to determine how the sponsors can fund the shortfall. If program cost-effectiveness under a resource acquisition model precludes the sponsors from fully funding the shortfall, NEEP should determine the size of program (number of students) at which projected revenues and expenses balance.

8. **Staff the program at levels commensurate with the activities to be accomplished.** We estimate that a reasonable staffing level for the program in 2002 is:

    - 1-plus FTE for strategy and decision-making, marketing—including developing marketing materials and negotiating with potential sponsors—and enhancing the product. (The program manager full-time, plus some support.)

    - 1 FTE to deliver the program in Massachusetts, Connecticut, and Rhode Island—conducting scheduling of classes, arranging for all materials to be brought to the facility, providing attending the classes, maintaining the database, and related activities.

    - 1 FTE to deliver the program in each geographic area comparable in size and students to that of the initial three sponsors. The markets in Long Island (NY) and New Jersey might need 1 FTE now or by 2003

and each might need 1 FTE thereafter. The markets in New Hampshire, Vermont and Maine might need 1 FTE.

9. **Revise the program database to increase the efficiency of program administrative efforts.** Recommendations for revising the database are given in Appendix D.

10. **Market both the BOC 100 Series and the 200 Series as courses for line staff, as designed.** Position them as high-quality training for a *reasonable* price.

11. **Do not target contract O&M firms for marketing efforts.**

12. **Postpone new product development** (e.g., a customized course series) until after the core products (the two course series) have attained a secure place in the market.

13. **Ensure that goals regarding each party's responsibilities are observable or measurable.** It is not possible to identify which students came from what marketing effort and thereby allocate the accomplishment to a utility or to NEEP.

14. **Due to the consistency in findings between the Northeast and Northwest BOC 100 Series programs in impacts and participants satisfaction, these facets of the program can be accepted as sufficiently "proven."** That is, further research on these subjects would cost more than likely would be warranted by any changes in findings or improvement in accuracy. However, an evaluation of these facets would be useful if the program implementation or content significantly changes.

15. **Assess student and supervisor response to the BOC 200 Series.** Determine accuracy of staff and sponsor's current views that the 200 Series is too simple. If their views are accurate, determine the appropriate balance between the corrective actions of revising the course materials and marketing the course to less experienced operations staff (e.g., line staff instead of supervisors).

16. **Progress toward the resolution of the strategic issues raised herein (and discussed under the marketing concepts of product, price, promotion, positioning, place and measurement) should be assessed through subsequent evaluations.**

17. **The following performance indicators reflect the program's history of accomplishments to date and should be tracked in future evaluations and assessments of program activity and market transformation results.** The three resource savings indicators (for electricity, gas or oil, and water use) do not need to be re-estimated unless the content of the BOC training undergoes considerable change. Two other indicators—average square footage and average number of staff sent per organization—are also used in calculating program-wide savings. If tracking indicates that these numbers have changed by more than 10%, the formula for calculating program-wide savings should be adjusted to reflect the change in these values.

Table ES.1

BOC PROGRAM PERFORMANCE INDICATORS

PERFORMANCE INDICATOR	BASELINE RESULTS	EOY 2001 RESULTS
Market Awareness	0%	13%
Number of 100 Series Taught	0	21
Number of 200 Series Taught	0	4
Students Enrolled in 100 Series	0	518
Students Certified for 100 Series	0	268
Students Enrolled in 200 Series	0	67
Students Certified for 200 Series	0	19
Drop-Out Rate	NA	4% (7) in 2000 0 in 2001
States Participating	3	7
Utility Sponsors	6	15
Professional Association Sponsors	0	0
Institutions Giving Academic or CEU Credit for the BOC	0	1
Newsletters Published	0	4
Case Studies Published	0	0

Continued

PERFORMANCE INDICATOR	BASELINE RESULTS	EOY 2001 RESULTS
Average Number of Students per Class in 100 Series	0	21.3
Average Number of Students per Class in 200 Series	0	17
Planned Courses Cancelled Due to Lack of Registrants	NA	0
Average Number of Times Planned Start Date is Postponed	NA	Not tracked
Organizations Sending Staff to the BOC	0	143
Average Number of Staff Sent	0	1.4
Electric and Gas Utilities Sending Staff to the BOC	0	10
Average Size of Facility Space	NA	671,804 SF
Annual kWh Savings per Student per Square Foot of Space Student Operates	NA	0.5
Annual MBtu (Gas, Oil) Savings per Student per Square Foot of Space Student Operates	NA	1.95
Annual Gallons Water Savings per Student per Square Foot of Space Student Operates	NA	0.162

FINDINGS AND REPORT

RETROSPECTIVE ASSESSMENT OF THE NORTHWEST ENERGY EFFICIENCY ALLIANCE

Final Report

Prepared for:

Northwest Energy Efficiency Alliance

Ad Hoc Retrospective Committee

Chair – Mark Kendall, Oregon Office of Energy
Ken Keating, Bonneville Power Administration
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This report presents the results of the independent evaluation of market transformation accomplishments through Northwest Energy Efficiency Alliance (Alliance) efforts since 1997. This retrospective evaluation effort was initiated by an ad hoc committee appointed by the Alliance board of directors[1] for the primary purpose of determining whether the Alliance has transformed enough markets to justify the costs of the Alliance. This key question was investigated by looking at Alliance activities, and the role the Alliance has played in markets where the Alliance has spent significant resources over the past several years. This assessment of Alliance activities also takes into account the work of other organizations and their impact on energy efficiency markets to avoid double counting market impacts and effects. This evaluation was initiated in April 2003, and the work effort spanned approximately four months.

The evaluation team employed an interactive process with the ad hoc committee chairman and the executive director of the Alliance, as well as meetings with the committee at key project junctures to ensure that the evaluation was proceeding in a manner consistent with committee objectives. The team used the extensive body of material already available on Alliance project activities, including market assessments that were conducted on Alliance projects, market progress evaluation reports, computer models, and planning documents. Primary data collection activities focused on interviews with staff, evaluators, implementation contractors, market actors, and others to better understand program mechanisms and elicit alternative hypotheses regarding market changes.

E.1 Over-Arching Themes from this Assessment

The study team reviewed the information from the assessment and developed six over-arching themes that represent the high level findings. Each of these themes is addressed in greater detail in the concluding chapter of the main report.

[1] The ad hoc committee consisted of both Alliance board members and non-board representatives, as listed on the cover of this report.

THEME 1: The Alliance business culture is characterized by open communications, a focus on the planning and delivery of programs, and no discernable bias. The Alliance has developed a culture of adaptive management and continuous learning that has been communicated throughout the organization. Alliance personnel were open and direct in its communications with the study team. The project interviews with evaluators and implementers indicated that the Alliance worked with them to reach appropriate answers, and to continue to make the Alliance a "learning" organization.

THEME 2: The Alliance has been successful at transforming, or contributing to the transformation of markets. The study team reviewed Alliance program evaluations, and interviewed researchers who conducted program specific evaluations, as well as other regional stakeholders and market actors involved in energy efficient markets in the northwest. Based on the information gathered, the study team determined that the Alliance made substantive contributions to transforming regional markets for energy efficiency equipment and practices. Specifically, the MPERs addressing the Energy Star Windows program were compelling in their documentation of Alliance market influence in terms of the increase in the number of active manufacturers of high efficiency windows in the region. Both the MPERs and national data indicate market penetration of Energy Star windows in the Northwest are more than twice the national average. Interviews with industry experts also supported the contention that Alliance activities have permanently impacted the windows market.

Other markets where there was considerable evidence of market transformation included clothes washers and CFLs. For clothes washers, the market penetration of Energy Star washers in the NW are significantly higher the national average (see chapter 7). The market for CFLs changed more dramatically in the NW than other regions of the country, even when the West Coast energy crisis is considered (see chapter 3). The magnitude of the impact of the Alliance on these markets was a subject that not all market actors in the region agreed upon, but there was a more general agreement that permanent changes had taken place in these markets and were at least partially the result of Alliance activities.

THEME 3: Market Progress Evaluation Reports tended to focus on the program delivery process and on providing feedback for program design and implementation improvements. This met an immediate need for Alliance personnel responsible for program implementation, and these reports improved the delivery and implementation process. This trend towards process analyses and providing feedback for program improvement fits well with the Alliance's goal of adaptive management, but the estimates of impacts and the ability to substantiate claims of Alliance-induced market effects would have been enhanced by having the MPERs more directly address savings per unit and the issue of attribution within each study. In general, the MPERs were not structured to provide information on attribution or savings per unit for energy efficiency equipment (or applications) influenced by Alliance activities.

THEME 4: Cost-effectiveness analyses were difficult to replicate and the current processes used are cumbersome. Cost-effectiveness models and analysis efforts form the basis for projecting market impacts from programs under development by the Alliance and they are used as the basis for the Alliance claims of cost effectiveness as presented to the public in the MAR.

The initial pressures on the Alliance have been to develop and implement programs in the field. The study team commends this past focus, but is emphasizing the need for improvement in this area going forward. The magnitude of claims made by the Alliance as its portfolio of programs has grown will result in new challenges related to accountability that may not have been present (or needed) during the start-up phase. As a result, a more streamlined and transparent process for estimating and modeling program cost-effectiveness is needed.

The study team traced Alliance claims of energy savings as presented in the MAR and developed alternative scenarios, which were subsequently run through the CE models. These analyses resulted in lower estimates of overall Alliance impact claims as compared to the numbers reported in the 2002 MAR (from 134aMW to 98aMW). Most all of this adjustment came in one program – the ENERGY STAR® Residential Lighting program – with adjustments in other programs examined being much less significant. The numbers used in this adjustment are from the "low influence scenario" for CFLs (see Chapter 3).

THEME 5: Benefits of the Alliance have exceeded costs. Even with the study team's adjustment to estimated Alliance energy savings estimates, the analysis of program impacts shows the benefits from Alliance activities have exceeded its costs. In fact, the team analysis indicates a levelized cost for the Alliance portfolio of programs of between 0.83 and 1.17 cents per kWh, with a mean of 0.99 cents/kWh, when viewed from the Alliance perspective through the Venture period (see chapter 8 for additional detail on levelized costs).[2]

THEME 6: The regional approach of the Alliance is an asset and even greater leverage in program implementation can be gained in the future. The Alliance has developed an infrastructure of programs, relationships, and personnel that represents organizational capital that will be valuable in the future. Interviews with market actors indicated some diverse opinions regarding past efforts of the Alliance and the amount of energy savings that should be attributed to Alliance activities. Even taking those comments into account, there was a general consensus that the Alliance was able to undertake certain programmatic activities more efficiently on a regional basis than was possible through local efforts. The study team's review of programs selected for implementation by the Alliance indicated that most programs were well suited to implementation by a regional organization. In this respect, the Alliance was living up to its goal of focusing on market transformation projects that can best be addressed at a regional level.

[2] It should be noted that the study team analyzed four programs from a retrospective perspective. Other than making an adjustment to the future consumer replacement cost of CFLs, no estimates of *future* costs, or estimated future savings were modified from Alliance estimates. Neither did the study team analyze local utility costs, or consumer O&M costs related to the programs. The cost estimates used by the Alliance for regional costs other than their own could have an effect on the levelized cost from a TRC perspective.

E.2 Estimated Impacts of the Alliance – Energy Savings and Levelized Costs

A key question associated with the analysis is how the results of the investigation into alternative scenarios for the four programs affect the overall Alliance investment perspective. To address this issue, the levelized cost from the Alliance perspective through 2002 was used. The calculation used for this is:

$$\frac{\text{Total \$ spent to date on Alliance activities}}{\text{Levelized Alliance Savings to Date}}$$

Using the Alliance numbers from the 2002 MAR for the costs ($96M) and savings (134 aMW) for *all* Alliance activities produces a levelized cost of 0.7 cents/kWh.

The study team's analysis of the savings associated with the Energy Star Lighting, the Energy Star Windows, Building Operator Certification (BOC), and MagnaDrive programs – when combined with Alliance estimates of savings for other tracked programs - produces an average cumulative savings through 2002 of 98 aMW compared to the Alliance's original estimate of 134 aMW. This analysis is documented in Chapters 3 through 6 of the main report and uses the low CFL attribution scenario from Chapter 3. These adjusted numbers (when summed with Alliance estimates for other programs) produce a study team estimated total levelized cost for all the Alliance's activities of 0.99 cents/kWh, with a 90% probability that the cost is 1.17 cents/kWh or less, and a 10% probability that the cost is less than 0.83 cents/kWh. While this is an increase in the estimated levelized cost, it is still well below the avoided cost of power in the region.

E.3 Overall Value of the Alliance

The interviews conducted with stakeholders and market actors contained a set of questions that addressed the overall value of the Alliance. Questions addressed four areas of Alliance activities – Planning, Implementation, Evaluation, and Communication. The individuals interviewed are shown in Appendix A to this report. They include project implementers, project evaluators, utility program managers, retailers/trade allies, and other stakeholders. These questions were not asked of Alliance staff. The interviews with the evaluation personnel that conducted the MPERs was informative in that they were able to provide opinions based on their overall review of the programs and the interviews they had conducted with various market actors. The responses to these questions regarding the perceived value of the Alliance were combined with other information obtained from the review of reports, and interviews with Alliance staff. This process produced insights that the study team believes are useful for this assessment.

Overall Value: Impact of Alliance on Market Transformation. The interviews with stakeholders (excluding Alliance staff) indicated:

- A widely held belief that the Alliance is responsible for higher levels of market transformation than would have occurred had the Alliance not existed.
- That the Alliance had a significant impact on a number of markets for energy efficiency technology and their efforts on the energy efficient residential windows market in the Northwest is exemplary of a successful MT program.
- That the focus of the Alliance's market transformation efforts has been appropriate, i.e., the Alliance has done a good job of identifying and pursuing programs best addressed regionally. Also, the study team's reviews of the selection process and the programs implemented supported this finding. Examples include training programs such as builder operator certification (BOC), and projects targeted at manufacturers (e.g., Energy Star windows) as the types of programs whose implementation spans utility service territories and even state boundaries.

While the comments above represent the study team's findings based upon the interviews, there were other comments made that did not appear to be part of the *majority* view, but the study team believed that they were worth bringing to the attention of the Alliance and its Board for their consideration. Two such comments were:

- There was one dissenting opinion regarding the impacts of the Alliance on market transformation which was based upon the belief that baselines are dramatically understated, i.e., many market changes observed would have happened without the Alliance - due to other factors.
- Another individual expressed the opinion that while venture selection has been good overall, there was concern expressed about the recent selection process.

Overall Value: Alliance Tracking of Impacts. There was a general view among the stakeholders interviewed that impact estimates tended to be modestly high. Comments pertaining to this finding include:

- Several individuals expressed concerns about the Alliance claimed impacts for its efforts in residential lighting and this did show up in the bi-modal estimates of CFL sales influence used in the study team analysis in Chapter 3.
- The individuals interviewed indicated that while they generally believe the Alliance impact estimates were somewhat high, it was believed to be only a modest overstatement on the order of 10 percent or so on average.
- There was a perceived need to update baselines used to estimate program impacts more frequently.
- There is a need to test performance assumptions in the field rather than assume that actual performance matches predicted performance.
- Evaluators did not feel pressured by Alliance study sponsors to produce favorable numbers or results.

In addition to the sets of comments that are viewed as study team findings above, other comments that may be of interest to the Alliance and its Board are:

- Some of the Board members interviewed (and also other stakeholders) indicated that they were "trusting" a few knowledgeable "other" Board members to ensure unbiased impact evaluations since they had expertise in this area.
- Originally the MPERs were designed to look at entire markets, not just at project indicators and effects; but, over time, they have changed to focus on project effects and delivery processes and less on the overall market.

Overall Value: Organizational Effectiveness. A question was asked regarding how well the Alliance operated as a business organization. This was asked in the context of overall operational effectiveness compared to other organizations with which the individual being interviewed was familiar. Findings on this topic included:

- Only one interviewee rated the Alliance as "below average" as a business organization – other respondents rated the alliance as well above average (7 or 8 on a scale of 1 to 10) and, based on other organizational studies, this is a high rating and reflects favorably on how the Alliance operates.
- Planning was viewed as a strength of the Alliance.
- Communication to stakeholders was rated as very good.
- Importantly, Alliance staff was well respected by the majority of stakeholders interviewed.

Some other comments for consideration that were not viewed as findings are:

- Some concerns about recent trends in various areas (venture selection, accountability, and transparent accounting), but this was viewed as recent and not yet of great significance.
- The Alliance has faced recent challenges due to organizational changes in general, staff turnover and staffing patterns in particular.
- The Alliance's reputation among trade allies was raised as a "potential" concern – related to this concern was implementation contractor selection and their ability to relate to the concerns of trade allies and industrial customers in particular, and the implementation of an overall quality control process managed by the Alliance rather than its contractors to ensure that relations with key trade allies remained favorable.

E.4 Alliance Analysis Process and Issues Discussion

A central aspect of this assignment was to consider alternative hypotheses concerning the market effects of Alliance programs. In meetings with the Ad Hoc Retrospective Committee, this was termed the "But For" analysis and was meant to focus on determining the appropriate baseline against which Alliance activities should be measured. In other words, a best practices

determination of what would have happened in these markets if the Alliance programs had not been offered.

To address this question, a specific and targeted approach was developed to address alternative hypotheses and develop range estimates for both the baseline (i.e., what would have happened in the absence of the Alliance) and for "pivot" assumptions which focused on the assumptions or attributes of each program that had the greatest influence on estimates of program impacts. For lighting, pivot assumptions include the assumed operating hours per lamp, the savings per lamp installed, and installation rates. Each of these pivot assumptions was examined by the study team using a range of values that encompasses both a low and high scenario. The scenarios around these pivot assumptions were rolled up using a sampling framework to produce a range of likely impacts for each program and an associated likelihood of occurrence. The framework and approach to this "But For" analysis is documented in Chapter 2 and implemented in the detailed program analyses presented in Chapters 3 through 6. This process was used to produce the study team's estimates of Alliance impacts.

Three Alliance processes were central to the study team's efforts to dimension the impact of the Alliance on the markets for energy-efficiency technologies and services. This included the cost-effectiveness analysis process, the evaluation process as represented by the MPERs, and the annual Market Activity Report (MAR) which presents the Alliance's estimates of annual and cumulative impacts. Select issues are discussed with each of these processes, then a set of recommendations is provided.

The Alliance Cost-Effectiveness Model — The study team conducted a review of the Alliance Cost-Effectiveness (ACE) model as part of the assessment of the Alliance's claims, particularly the models used for the four programs the study team investigated in detail. Difficulties encountered by the study team point to a need to streamline the ACE modeling process.

Market Progress Evaluation Reports (MPERs) — In developing the review of the Alliance's accomplishments, the team reviewed a large number of the available Market Progress Evaluation Reports (MPERs). Since the objective of this assessment was to determine energy savings attributable to the Alliance and whether the Alliance has contributed to market transformation, the study team's review concentrated upon how the MPERs can be used to determine the program progress. As a general statement, most MPERs focused primarily on assisting the Alliance on project implementation feedback, with some verification of market effects and a limited review of the input assumptions to the ACE model. Expected savings per application associated with a project and the related assumptions used in the cost-effectiveness model were not researched or not researched at the same level of detail. Overall, the MPERs are a good process review of program delivery, but did not research project impacts as actively as might have been expected.

The Market Activities Report (MAR) — The need for accuracy in the CE analyses and the role of the MPERs depends in part on what the Alliance and its Board hopes to accomplish with the energy savings estimates that are attributed to the Alliance in its MAR. The MAR is widely viewed as the Alliance's definitive statement on what it believes it has accomplished. The language used in the MAR supports this assumption. For example in the recent 2002 MAR, it

states that "*For the reporting period January 1, 2002 to December 30, 2002, the Alliance has saved 45aMW, as depicted in Chart 1.*" In the next paragraph of the MAR Executive Summary it states that "*Total Savings of the Alliance since its inception in 1997 (exclusive of utility direct rebates) is 134aMW.*" The Alliance energy savings claims are very direct and unequivocal.

Given this, a question that must be addressed concerns the appropriate underpinning and evidence needed to ensure that these claims are viewed as credible by entities that work with and support the Alliance. The study team believes that it is important that the Alliance provide estimates of energy savings accomplishments, but there may be better approaches to bracketing and bounding the estimates than are currently used in the MAR. Even with that change, the MPERs should refocus a bit more on providing support for energy savings estimates.

E.5 Recommendations

A number of specific recommendations are made by the study team in this section. The recommendations are divided into five categories and are presented below.

Recommendation Area #1 — Cost-Effectiveness Models and Processes:

R1.1 – The Cost-Effectiveness spread-sheet models should be "cleaned-up" and a better documentation process implemented to avoid confusion in the future. The study team believes that several man-weeks devoted to this process could considerably enhance the transparency, and user-friendliness of these important tools and save labor hours down the road that might well make up for the short term costs of upgrading the CE process.[3]

R1.2 - Develop more specific processes to update and track assumptions used with direct links to sources of assumptions and referencing the MPERs that are tasked with reviewing the input assumptions for each project.

R1.3 - Board recognition of the complexity of this work element can help ensure that there is a reasonable review process for model results. The fact that a model is used does not, in itself, ensure that the outputs are appropriate.

Recommendation Area #2 — Use of scenario analysis and identification of pivot factors in reporting of Alliance accomplishments:

R2.1 - Evaluation and planning (e.g., the venture business plan) would benefit from the use of bounding scenario analyses and the identification of pivot factors. The portfolio committee discusses these factors when deciding whether a specific project should be undertaken, but these assumptions need to be documented and tracked over time. This would provide the following benefits:

[3] There is the additional concern of knowledge being concentrated among a few key staff, if for some reason those staff members were not available to the Alliance in the future.

- Large uncertainties on select pivot factors could be targeted in the MPER analyses to reduce these uncertainties.
- As the MPERs address these factors, better information can be incorporated into the CE analyses and they will better reflect the best available information as well as documenting current uncertainties.
- It would help determine the confidence in projected aMW accomplishments.

Recommendation Area #3 – Treatment of Project Baselines (Dynamic versus Static):

R3.1 – The baseline trend line for each Alliance project is determined in the planning process and not typically updated even when there have been substantial changes in the market. Outside factors such as changes in utility programs, prices, and energy shortages influence what would have happened without the Alliance program. As a result, baselines should be dynamic in that they should be re-evaluated every year and updated to reflect major market changes.

R3.2 - The baseline is one of the most influential and uncertain factors in producing any estimate of Alliance project effects. Best efforts are needed on baseline determination, despite the complexities and uncertainties.

Recommendation Area #4 – Trade Ally Relationships Going Forward:

R4.1 - Trade ally relationships are central to the Alliance objectives. Implementation contractors represent the Alliance to these important stakeholders and some contractors have proven to be a key factor in program success. Additional independent quality control processes should be implemented to ensure that good relations are consistently maintained.

Recommendation Area #5 – The Cost-Effectiveness Committee of the Board should revisit the way in which impacts are claimed and reported by the Alliance in public documents:

R5.1 - Guidance is needed on what "claimed aMW impacts" and "levelized cost" means in the context of the MAR:

- Should the MAR only focus on market share indicators?
- Or, are these estimates meant to represent a "best estimate" of aMW attributable to Alliance activities?
- Should estimates be given a degree of confidence and/or expressed as range estimates to reflect the uncertainties in the attribution process?
- Should the MAR estimates be supported by a specific ACE analysis to ensure consistency between savings estimates and levelized costs?

These positions have implications on Alliance credibility and also for resources allocated to evaluation efforts. In addition, this recognizes that all business decisions and venture analysis both within and outside of the area of energy efficiency investments are made with uncertainty,

and that precision in excess of what is used in the private sector to make good business decisions is not needed for the Alliance to successfully meet its objectives.

E.6 Final Comments

This section is designed to emphasize the important context in which these issues are discussed and the recommendations made. The assessment performed by the study team found that the Alliance provides value that exceeds its costs. Interviews with key stakeholders indicated that the Alliance:

- Operates well as a business organization,
- Is strong in planning,
- Communicates well, and
- Has impacted targeted markets.

The benefit-cost analyses conducted with the study team's revised numbers show that the benefits of the Alliance has exceeded its costs. Overall, it is the study team's opinion that the reasons for establishing the Alliance are still valid and provide strong rationale for continuation:

- Energy markets invariably cut across utility and jurisdictional boundaries, it makes most sense to pursue these (MT) efforts regionally; and,
- This regional approach by Alliance is an asset and can gain increased leverage by continuing its relationship building efforts with partners.

5 ANALYSIS OF BUILDING OPERATOR CERTIFICATION

5.1 Introduction to Program
5.2 Assessing Program Accomplishments
5.3 Assessment Findings

This chapter presents the in-depth evaluation of the Building Operator Certification (BOC) program. Section 5.1 provides a brief background on program goals, mechanisms, and activities. Section 5.2 describes the process used to evaluate and bound the impact estimates for the program, and compares the results with Alliance claims. Section 5.3 presents the findings that emerged from the assessment of the BOC program.

5.1 Introduction to Program

Training of building operators in the Northwest began in the 1980s, and the region's first Building Operator Training Certificate program was created in 1993. A number of regional organizations have contributed to the curricula and delivery of BOC program over the years. Beginning in 1996, the Alliance recognized the importance of this work and began funding the endeavor as operated by the NW Energy Efficiency Council (NEEC) and the Northwest Building Operators Association (NWBOA). The Alliance chose to provide major funding for the BOC program from 1997 through 2001. Beginning in 2002, the Alliance chose to provide limited funding for marketing and the development of continuing education curricula.[34] This fits well with the market transformation strategy of creating self-sufficient programs

The BOC program is designed to train commercial building operators and facility managers in effective operation and maintenance (O&M) techniques, including optimizing building systems to minimize energy use and increase occupant comfort. While O&M activities have been identified by numerous studies as critical elements of well-run commercial and industrial buildings, building maintenance staff have often historically been ill-informed regarding energy issues.

Currently, two BOC curricula are offered in the region. The NEEC program discussed above has a curriculum it began teaching in Washington in 1996. NEEC licenses its curriculum to partnering entities who deliver the BOC training in 12 other states. In Oregon, the partnering entity is the Northwest Energy Education Institute, which has been delivering the BOC since 1998. NEEC provides certification for students who complete BOC training using its curriculum, regardless of which entity implemented the curriculum. NWBOA has a curriculum that it teaches in Idaho and Montana. NWBOA provides certification for the building operators it trains.

[34] A more detailed history of the program is available in "Regional Building Operator Certification Venture – MPER #7", Research Into Action, September 2001.

The program strategy is to establish a sustainable O&M training environment for Northwest building operators. Program delivery mechanisms are described briefly above, and can be summarized as:

- Develop curriculum and secure accreditation for training designed to provide the skills required to optimize building performance.
- Work through several regional organizations to deliver qualified training.
- Create a model where participants cover the costs of training.

Specific progress indicators for the program include:

- Established and sustained an industry led, voluntary competency based certification process that is recognized and valued by building operators and employees.
- Secured accreditation and recognition from institutions, employers and facility oriented associations.
- Increased non-Alliance income; solicited sponsorships and co-marketing opportunities with facility associations, utilities, and large employers.
- Conducted ongoing market research to identify additional opportunities for certification.
- Developed and offered two or more levels of training.

Total Alliance savings claimed through 2002 for the program are 15.3 aMW, and over 1200 building operators were certified between 1997 and 2001.

5.2 Assessing Program Accomplishments

This section assesses the accomplishments of the BOC program in terms of measurable performance metrics. Based on the MAR, the evaluation team defines these metrics to be the program's electricity savings (in aMW), its cost-effectiveness from the Alliance's perspective and the total resource perspective, and the levelized cost (from both perspectives). As discussed in Section 2.3, the assessment involves determining the key assumptions underlying the program's assumed accomplishments, developing alternative hypotheses based on these assumptions, and running these scenarios within the Alliance Cost-Effectiveness (ACE) model[35] to determine their impact. The sections below present a detailed discussion of these steps. This is followed in Section 5.3 by the results of this assessment.

[35] CE-BOC-C97-0250MPER7-MAR-2002-5yr.xls, run date April 2, 2003.

5.2.1Pivot Assumptions

As was the case for the other programs the evaluation team investigated, the first step in assessing the quantitative impacts of the BOC program is determining the key assumptions required for quantifying the chosen metrics. While there are many assumptions involved in assessing a program, the evaluation team restricted its attention to those inputs that are subject to a relatively high degree of uncertainty or had a significant impact on the outcome of impact estimates. For BOC, the pivot assumptions are:

- The square footage of facility controlled by each participant.
- The savings per square foot associated with this training.
- The lifetime (persistence) of measures installed or actions taken.

Once the evaluation team had determined these pivot assumptions, the next step in the analysis was to develop and quantify alternative hypotheses for these assumptions. This task is discussed in the next section.

5.2.2Alternative Hypotheses

After identifying the pivot assumptions associated with the BOC program's accomplishments, the next step is to identify both meaningful alternatives to these assumptions, as well as their likely occurrence (i.e., their probability distribution). This section presents the values for the alternative hypotheses and the source of this information. Overall, the goal was to gather and use the best available information on the identified pivot assumptions.

Square Footage

Initial program planning data used a value of 50,000 square feet per facility to estimate potential program impacts. Subsequent surveys with building operators and supervisors in the NW put the average facility size an order of magnitude higher. Program evaluators used survey data, combined with a 'uniqueness factor' that took into account facilities sending more than one operator for training. This resulted in the ACE model for this program assuming that each participant is responsible for maintaining 234,850 square feet. Additional information gathered during the retrospective evaluation work indicates that this number may be too large, and that the current participant population can reasonably be expected to affect estimated savings for about 50,000 square feet.[36] Some interview subjects indicated they believed the higher number used for previous estimates was reasonable. Therefore, the evaluation team developed an alternative assumption that has a mean value halfway between these two values (i.e., 142,424 square feet). The probability distribution was chosen so that a majority of the values would lie between the two estimates.

Savings per Square Foot

The Alliance assumed that certification results in a savings of 2.5% of a building's electricity use. This implies a savings per square footage number of 0.5 kWh/SF. The study team's research

[36] "Education that Changes Behavior: The Impacts of the BOC Program", Marjorie McRae, Jane Peters, Elizabeth Titus, and Tom Rooney, International Energy Program Evaluation Conference Proceedings, August 2003.

suggests that certification can be expected to produce a higher level of savings, in the 5-10% range, implying savings as high as 2.0 kWh/SF.[37] Therefore, the distribution for this pivot assumption has a mean value of 1.2 kWh/SF, and spans the range from 0.5 kWh/SF to 2.0 kWh/SF.

Measure Lifetime

The ACE model for the BOC program assumes that the average lifetime for energy efficiency actions and measures undertaken because of operator certification is 5 years. The evaluation team's review of other certification programs and interviews with instructors suggest that this is probably a good average estimate, but the measure lifetime may be slightly higher for a number of actions taken by participants. Therefore, the evaluation team used an average of 5.7 years.

Exhibit 5-1 summarizes the above values the evaluation team assumed for the pivot assumptions as well as the value for these assumptions used by the Alliance in their cost-effectiveness model.

Exhibit 5-1: Pivot Assumptions, BOC

Assumption	Alliance	Team
Square Footage per Participant	234,850	142,424
Savings per Square Foot	0.5 kWh/SF	1.2 kWh/SF
Measure Lifetime	5 years	5.7 years

5.3 Assessment Findings

This section reviews the results of the simulation of the Alliance Cost-Effectiveness model using the above alternative hypotheses on the pivot assumptions. Following the structure of the MAR, the evaluation team focuses on the impact of these alternative hypotheses on three main areas:

- The cumulative savings (aMW) associated with the program.
- The levelized cost (cents/kWH) from the Alliance and total resource perspective.
- The cost-effectiveness ratio, also from the Alliance and total resource perspective.

To determine these impacts, the evaluation team used the ACE model appropriate for this program, and altered the input assumptions as discussed above.[38] Using a Monte Carlo simulation tool, @Risk, the evaluation team ran 5000 simulations of the ACE model which pulled observations randomly from the distributions developed for the pivot assumptions. Since

[37] A number of sources were considered, including "Rebuild America" website data that indicate estimated energy savings of 10-20% can be achieved through efficient O&M practices. The Alliance's own *Building Performance Systems* project overview states 'studies indicate existing commercial building operating performance could be improved from 5-15% through enhanced O&M practices alone'. One case study presented at an ASHRAE conference in 1997 demonstrated O&M savings of 22.5%. While these numbers reflect significantly larger savings than the BOC program estimated, interviews did not support using that larger number. The evaluation team chose numbers between the conservative estimate of 2.5% used by the Alliance and some of the cited studies.

[38] CE-BOC-C97-025-MPER7-MAR-2002-5yr-Summary.xls with a run date of April 2, 2003

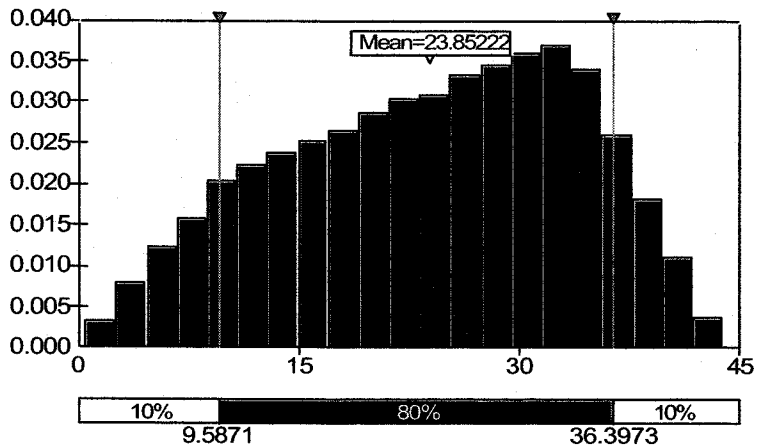
this is a retrospective review of the Alliance's performance, the evaluation team discusses only the implication of these alternative hypotheses up to the venture period, as defined by the Alliance.

5.3.1 Cumulative Savings

The impact of these alternative scenarios on the cumulative to 2002 aMW savings due to the BOC program is presented in Exhibit 5-2. These alternative hypotheses result in a cumulative savings of 24 aMW, which is significantly larger than the Alliance's estimate of 15.3 aMW. The Savings at Risk at the 80% quantile is approximately 14 aMW.

Exhibit 5-2

Distribution for 2002 aMW savings/F74



5.3.2 Levelized Cost

Exhibit 5-3 presents the resulting average levelized costs from the Alliance and Total Resource perspective for the BOC program under alternative scenarios. As was the case in for cumulative savings, the scenarios produce, on average, a significantly lower levelized cost.

EXHIBIT 5-3: AVERAGE LEVELIZED COST, BOC

LEVELIZED COST (cents/kWh)	Alliance[39]	Team
Alliance Perspective		
Venture + Post Period	-0.22	-0.23
Venture Period Only	0.11	-0.06
TR Perspective		
Venture + Post Period	0.12	0.07
Venture Period Only	0.48	0.40

[39] Source: 2002 Market Activities Report, Northwest Energy Efficiency Alliance.

5.3.3Cost-Effectiveness

Finally, Exhibit 5-4 presents the resulting average cost-effectiveness from the Alliance and total resource perspective for BOC program. As before, the alternative hypotheses result in a higher cost-effectiveness index for this program than the one developed by the Alliance.

Exhibit 5-4: Average Cost-Effectiveness, BOC

COST-EFFECTIVENESS INDEX	Alliance[40]	Team
Alliance Perspective		
Venture + Post Period	15.1	25.5
Venture Period Only	5.0	8.5
TR Perspective		
Venture + Post Period	4.9	8.3
Venture Period Only	2.9	4.8

5.3.4Qualitative Findings

Overall, the BOC program is indicative of a program that makes good use of regional resources. The development of curricula and accreditation that is recognized regionally (and to some degree nationally) has value that an independently developed local program would not. Building operators move from one facility to another, and the growing acceptance of BOC certification as a qualification for building staff is a good metric for determining transformation in this marketplace. Targets based on acceptance of certification as a basis for hiring could be used to define an exit strategy for the Alliance.

The program leverages its dollars well, and participants now cover most program costs through registration fees.

Further market penetration of the training could be achieved through additional co-marketing of training with utilities, professional organizations, and organizations that operate public facilities.

While there is a relatively high degree of uncertainty around the energy efficiency actions taken by participants *as a result of* the training, the cost associated with measuring actual before and after energy intensities at participant and nonparticipant facilities is likely not warranted.

[40] Source: Ibid.

Education That Changes Behavior: The Impacts of the BOC Program

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ABSTRACT

The Building Operators Training and Certification (BOC) Program is an educational course for commercial and industrial building operators and facility managers that is now offered in sixteen states. This paper discusses a methodology used to estimate energy impacts from the training program. A key component of the method—surveys of students and nonparticipating building operators about their operational activities—was used twice for BOC programs in two disparate locations and obtained similar impacts. Because of this congruence of findings, supported by results from other aspects of the methodology, the paper proposes that other entities in northerly climates that implement the program as designed can use these estimated savings as likely, providing a good approximation of the actual program savings. Electricity savings are estimated to be 0.5 kWh per square foot of facility affected; gas savings are 1.95 MBtu per square foot. Further research is underway to identify an upper limit to the square footage affected by a single student, under the assumption that there is a limit to the building systems that one operator can influence.

Introduction

The Building Operators Training and Certification (BOC) Program is an educational course for commercial and industrial building operators and facility managers. It teaches building personnel how to operate and maintain building systems for optimal performance, energy-efficiency, and occupant comfort. This paper discusses a methodology used to estimate energy impacts from the educational program. A key component of the method—surveys of students and nonparticipating building operators about their operational activities—was used twice for BOC programs in two disparate locations and obtained similar impacts. Because of this congruence of findings, supported by findings from other aspects of the methodology, we argue that savings from the program can be "deemed," that is, taken as given for the BOC program when it is implemented as designed.

Description of the BOC Program

The Building Operators Training and Certification program educates building operators and facility managers of nonresidential facilities. Building operations and maintenance activities have long been identified as critical components for the efficient operation of commercial and industrial buildings. Yet, building operations and maintenance staff are often among the least educated about energy issues and among the least valued of staff in a company. These conditions led professionals interested in increasing energy efficiency to wonder how operations and maintenance staff could receive training and education that would increase their capabilities, their estimation of the importance of their work and their valuation by the market.

The Northwest Energy Efficiency Council (NEEC), extending efforts initiated by the Washington State Energy Office and the Idaho Building Operators Association, developed a training and

certification series for building operators. The first of the series is Level 1 training, which comprises nine days over a seven-month period. The seven day or two-day long courses are:

- Building Systems Overview
- Energy Conservation Techniques
- HVAC Systems and Controls
- Energy Efficient Lighting
- Building Maintenance Codes
- Indoor Air Quality
- Facility Electrical Systems

Level 2 courses and certification are available for students wishing to further their training.

The NEEC BOC course is now offered in sixteen states. Detailed impact evaluations have been conducted in two regions: the Pacific Northwest (for the Northwest Energy Efficiency Alliance, "the Alliance") and the Northeast (for the Northeast Energy Efficiency Partnership, "NEEP").

Estimating the Impact of Training Programs

Estimating the impact of educational programs is difficult at best. For starters, the evaluator is attempting to measure a change in behavior. A simple equipment replacement program can use engineering estimates of the energy consumption differential between the two types of equipment, and assume that behavior—use of the equipment—stays fairly constant before and after the equipment change.

The evaluator does not know exactly what behaviors will change as a result of education and training, or even how they will change. A program such as the BOC, with over 50 hours of class time, delivers a vast amount of information. In addition, while a portion of its content might be "cookbook" style—*do X, do Y*—most of the course material endeavors to give students an understanding of building equipment and teaches them how to think about the equipment and make good decisions.

Next in the list of difficult evaluation conditions is that each student enters with a different background. These differences can be seen to affect the potential upside gain of the training—that is, the course might generate more energy savings from students who previously did no efficiency actions than from students who did some. On the other hand, one's background affects one's current learning. Perhaps students already familiar with energy efficiency gain the most from the course because they better understand the presentation and already have a habit of taking some action.

Finally, all of us, including students, are hard-pressed to identify whether we take a specific action because of a specific information source. Advertisers know this and also know the limitations of a single source of information. Advertising professionals recommend that firms get their message out multiple times, using multiple media, and multiple expressions of the message. For educational programs, it is hard for students to identify whether their subsequent behavior is because they were taught something, or whether their educational experience simply became part of the many experiences out of which their actions arose. Effective training builds on a base of what the student already knows, hoping to expand their ability to work with that information, but rarely presenting something that is clearly "new" or unknown to the student prior to the course.

Another difficulty that besets all behavior research, not simply the evaluation of education and training programs, is the potential for social desirability bias and measurement error. Social desirability bias occurs when respondents portray themselves in a good light, responding in a way that conforms to the expectations of the group to which the respondent belongs or identifies (Dillman 1978). As Dillman (2000) points out, "even very ordinary questions that seem, on the surface, to have little social desirability" can generate inaccurate answers.

Social desirability bias can occur in data when the possible responses to a question vary in their connotations to the respondents. When some response options carry positive connotations and others carry either neutral or negative connotations, respondents may be inclined to give the response that they feel has positive connotations or that they assume has such connotations for the interviewer.

Related to education and training programs, the potential for social desirability bias can complicate evaluation approaches that might ask respondents questions such as: "Do you use what you learned in the training (McRae 2002)?"

Methodology Used in BOC Impact Assessment

We came at the problem of estimating BOC impact from different directions, using a "triangulation" approach. We estimated the impact and influence of the BOC program from five sources of information:

- A survey of Pacific Northwest BOC students and nonparticipants that explored the extent to which each group undertook specific building operation efficiency activities. We combined these behavior measurements with engineering estimates of the savings per square foot attributable to each activity.
- A similar survey of Northeast BOC students and nonparticipants that explored the extent to which an expanded set of efficiency actions were undertaken.
- Engineering estimates of the energy savings from building retrocommissioning.
- Engineering estimates of the energy savings of the BOC program developed by the Alliance when it made its decision to fund the program.
- Students' self-reports of whether and how the BOC training affected their building operations practices.

Estimates Obtained from Two Surveys of Operator Actions

In two separate projects in the Northwest and the Northeast, we surveyed BOC students and nonparticipating building operators from the same region. In all surveys, respondents were asked detailed questions about specific energy-efficiency practices. The student surveys also sought to assess student satisfaction with the training, and the nonparticipant surveys sought to develop estimates of the market potential for the program.

We performed the first of the two studies for the Northwest Energy Efficiency Alliance. Through surveys conducted in 2001, we talked with students who had received BOC training sometime from 1997 to 2000. We asked BOC students and nonparticipants whether they repaired the gaskets on air handler doors, checked the condition of damper seals, confirmed economizer operations by checking the mixed air temperature or by some other method, cleaned heating and cooling coils, and undertook lighting retrofit or modifications. For each of these activities, we had previously obtained, from a review of the efficiency literature, engineering estimates of the savings associated with the activity.

A greater proportion of BOC students than nonparticipants reported conducting these activities on a regular basis. By taking the proportion of students undertaking each activity in excess of the proportion of nonparticipants, and multiplying the rate by an engineering estimate of the savings that accrues to the activity, we estimated that BOC students, compared with nonparticipants, save 0.14 kWh per square foot of space from these five actions.

We conducted the second study in the Northeast in 2002 for NEEP. We talked with students who had taken the BOC series in 2000 or 2001. We refined the question phrasing we had used in the Northwest and added additional electricity-saving measures, as well as gas- and water-saving measures. All respondents were questioned if they had conducted one of the energy-saving activities within the last

six months. We also asked the percentage of the equipment or floorspace that was affected by the activity. We estimated that BOC students, compared with nonparticipants, save 0.18 kWh per square foot of space from nine electricity-saving measures. We also estimated savings of 1.95 MBtu per square foot from two activities and 0.16 gallons of water per square foot from unspecified, self-reported activities.

Retrocommissioning and BOC Planning Impact Estimates

Commissioning a building is the process of fine-tuning all of the electro-mechanical systems in a newly constructed building so that their performance, including their influence on each of the other systems, is optimal. Retrocommissioning applies the process to existing buildings. As defined by the American Council for an Energy Efficient Economy (ACEEE), it is the practice of re-tuning and recalibrating major systems in existing commercial buildings.

Table 1 compares the scope and impact of retrocommissioning activities with the scope and impact of the efficiency actions the second (NEEP) BOC survey addressed. An ACEEE-published work (Suozzo & Nadel 1998) estimates that retrocommissioning generates about 1.2 kWh in savings per square foot. The efficiency measures that produce those savings are diverse, relating to every electrical end use involved in building operations. The estimate of BOC student savings from just nine electric efficiency actions is about 15% of the savings retrocommissioning generates. The situation for oil and gas savings is considerably different. The two gas and oil measures explored for the BOC program address the major gas- and oil-using equipment in a building, and correspond with a savings estimate that is 75% of that estimated for retrocommissioning.

Table 1. Comparison of Retrocommissioning Scope and Impact with the Scope of the BOC Measurements and Their Associated Impact

Equipment Fuel Type	Scope of Retro-commissioning Measures	Estimated Impact of Retro-commissioning	Scope of Measured BOC Activities	BOC Activities As Proportion of Retro-commissioning Estimates
Electricity-Powered	Highly diverse, numerous	1.2 kWh/sf	9 measures	15%
Gas- and Oil-Powered	Primarily boilers and furnaces	2.6 MBtu/sf	Boilers and furnaces	75%

From the triangulation perspective, the MMBtu savings from the survey approach appears to provide a reasonable estimate of the gas and oil impacts from the BOC training, yet not for electricity. The survey estimate from nine efficiency measures understates the behavioral change from the nine-day BOC program, while the estimate from retrocommissioning is too high to use, as retrocommissioning is considerably more thorough than we would expect the actions of the average student to be. And retrocommissioning requires considerably more expertise than we would expect the average student to have.

For the electricity savings, a third perspective in the triangulation approach is available from the work done by the Alliance in its initial analysis of the BOC program's cost-effectiveness. When the Alliance considered funding the program, it reviewed engineering simulations and available data on

maintenance activities to estimate the program's likely impact. Based on these simulations and expert opinion, the Alliance predicted a program impact of 0.5 kWh per square foot.

The value of 1.2 kWh/sq ft for savings related to retrocommissioning as reported by Suozzo and Nadel (1998) is well referenced and believed to be a conservative estimate as compared with other values reported. For example, results from Sacramento Utility District's (SMUD) retrocommissioning pilot program in May 1999, found that even with the installation of high-efficiency equipment during the construction process, retrocommissioning savings were readily available as soon as a few years after building occupancy. Savings associated with retrocommissioning were calculated using the DOE-2 building energy simulation tool. Resulting values from SMUD's program showed savings for four sample buildings ranged from 6.7 kWh/sq ft to 0.5 kWh/sq ft, with an average of 3.3 kWh/sq ft. Similarly, Texas A&M found average savings from retrocommissioning that exceeded 20% of total building energy use (Suozzo & Nadel 1998).

Students' Self-Reported Actions and Program Influence

The last information source in the triangulation approach is the students' own assessment of the program and its influence. In both the Pacific Northwest and the Northeast, students expressed high satisfaction with the program and its usefulness. Students' supervisors expressed similar views, as shown in Table 2.

Table 2. BOC Impact on Students' Job Performance, As Assessed by Students and Supervisor

Knowledge Gained From BOC Leads To:	Percent of Students*		Percent of Supervisors*	
	Northwest (n=107)	Northeast (n=49)	Northwest (N=50)	Northeast (n=12)
Improved Job Performance	87%	NA	70%	NA
Saved Money	78%	69%	72%	100%
Saved Energy	75%	78%	74%	90%
Improved Occupant Comfort	75%	76%	78%	83%
No Influence on Performance, Comfort, Money or Energy	8%	6%	8%	8%

* Respondents answering "don't know" were treated as "no" responses.

In the second study (in the Northeast) we refined our questions to students about if and how the BOC training changed their behavior. About 40% of students thought they both engaged in new activities and conducted other activities with greater frequency as a result of what they learned in the course (see Table 3).

Table 3. Application of Concepts Taught in BOC Classes

Application of BOC Training	Northeast Students (n=49)
Uses or Applies Methods and Concepts from BOC Classes	90%
Performs New Activities Not Performed Prior to Taking BOC Classes	57%
Does Some Activities More Regularly or Frequently Now Than Prior to Taking BOC Classes	57%
Does Both New Activities and Some Activities More Frequently	39%

Although the responses shown in both Tables 2 and 3 are potentially subject to social desirability bias, they strongly suggest that BOC students believe they engage in more efficiency actions subsequent to taking the course than they did previously. This, in turn, supports the findings from the detailed questions on efficiency actions that BOC students perform.

Finally, the first study survey (in the Northwest) asked about behaviors related to energy efficiency for which we did not have engineering estimates of savings available. First, we explored whether they had undertaken nine specific actions. For each of these nine, a greater proportion of BOC students than nonparticipants conducted the behaviors on a regular basis. These activities are in addition to the five activities for which savings estimates were available. Second, we asked the BOC students open-ended questions about lighting and other efficiency actions they had taken since completing the BOC training, and which they credited with saving energy or money or improving comfort. The majority of students named one or more actions they had taken in addition to those explored in the closed-ended questions.

Estimated Program Impact Based on Triangulation of Findings

To recap the findings in the reverse order from which we presented them: most BOC students and their supervisors believe the BOC training resulted in them saving energy. Most BOC students stated they perform new activities or conduct previously undertaken activities more frequently as a result of the training.

Detailed questioning of students in the Northwest resulted in an estimate of 0.14 kWh savings per square foot from five activities taught in the BOC; students undertook an additional nine energy-related activities more frequently than nonparticipants, yet savings estimates were not available for these activities. A revised line of questioning for students in the Northeast resulted in an estimate of 0.18 kWh savings per square foot from nine activities—and 1.95 MBtu savings from two activities—taught in the BOC. At the same time, the reader must also recognize that the BOC savings exceed those we were able to estimate from a handful of activities.

Retrocommissioning, with estimated savings in excess of six times the savings estimated for the surveyed activities, provides an upper limit to the impact of the BOC program. It involves many of the activities and principles of the BOC, but is conducted by someone who has:

- Greater expertise than the typical BOC student,
- Time dedicated solely to the task (in contrast to students' primary task of operating the building),

- Purview of the whole building (as opposed to, perhaps, one or two systems or areas of the building operated by a single individual), and
- Full management support to implement whatever adjustments are needed.

The electricity savings estimate developed for the Alliance at the outset of the program—0.5 kWh per square foot—appears to best fit the available evidence: that some effect is occurring that we know is likely to be at least two times higher than we have estimated from survey questions, but unlikely to be six times higher.

We conclude that the BOC program results in electricity savings of roughly 0.5 kWh per square foot affected by the participating building operator.

Reliability of BOC Impact Assessment

We believe the values presented in this paper provide a good approximation of the impact that other northerly utilities and agencies will obtain from the program operated in a manner consistent with NEEC's program design.

In very rough terms, the two impact evaluations described in this paper each cost an amount equivalent to the tuition of approximately 50 BOC students. We suggest that the electricity and Btu impacts of this program are known with sufficient reliability that further refinements to the estimate are not warranted by the cost of such research.

We suggest that utilities might consider assuming the electricity savings from the BOC training to be 0.5 kWh per square foot affected by the student. We make this judgment based on the findings from two BOC programs operating at different times, with different instructors. The building stock and weather conditions also vary between the regions where the program was offered, although both climates are northerly. We also make this judgment through a triangulation process that looked at the problem from different perspectives. While only one of the two studies produce a Btu savings estimate, that estimate—of 1.95 MBtu per square foot affected by the student—is also supported by the triangulation process.

Future Research

One important area of further research into the impact of the BOC program remains. How large of an area—in square feet—can one trained building operator be reasonably assumed to affect? The studies conducted in the Northwest and Northeast both sought to understand the square footage for which the average student was responsible, but the results were unsatisfactory. We asked the students the size of their facilities and the proportion of the facility they worked on. For the latter question, the response was typically "all of it." While that may be true in some sense, the average facility sending students to the two BOC programs was huge—over 600,000 square feet. It seems highly improbable that one trained building operator can uniformly improve building efficiency by 0.5 kWh per square foot throughout the facility. If so, that would amount to 300,000 kWh in annual savings.

And what are we to assume when two or more building operators come from a single facility, each claiming to work on the whole facility?

The estimates of 0.5 kWh and 1.95 MBtu per square foot represent an achievable potential for the entire facility were the entire building operations staff to take the BOC. However, the savings accruing to a single operator needs to be capped, or so it appears from the research to date.

A close scrutiny of the data suggests that a cap of 50,000 square feet might be reasonable, however the supporting data are weak. This figure will serve as our initial hypothesis in research being initiated on the BOC program in another part of the country. In addition, one of the sponsors of the Northeast study is conducting a small-sample follow-up investigation of this topic.

This issue of the reach of a single student remains to be settled before the BOC savings estimates can confidently be applied on a deemed basis.

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LONG TERM MONITORING AND TRACKING REPORT ON 2005 ACTIVITIES

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7. BUILDING OPERATOR CERTIFICATION

7.1 Introduction

Building Operator Certification (BOC), which was funded by the Alliance from 1997 through 2003, was offered as a professional development program that teaches facility managers, building operators, maintenance personnel and others who monitor commercial building controls how to reduce energy and resource consumption in the facilities they operate. The effort was intended to achieve lasting improvement in the energy-efficient operation and maintenance of commercial buildings by developing a market for educated and certified building operators. Now that the BOC curriculum and delivery mechanism have been established, BOC continues to be offered *without* Alliance assistance through the Northwest Energy Efficiency Council (NEEC) and the Northwest Building Operators Association (NWBOA). The program offerings include an initial set of courses that constitute Level 1 curriculum, while Level 2 is comprised of a second set of somewhat more advanced courses.

7.2 Approach to Energy Savings Estimation

According to Summit Blue's review of the ACE model, the energy savings impact of the BOC venture is based on the number of operators receiving certification and a series of assumptions regarding the size of the facilities and the percentage of energy consumption that is reduced. Specifically, energy savings for a given calendar year are calculated as follows:

Annual Energy Savings (kWh/year or therms/year) =
- (1) Number of operators certified within the past five years
- x (2) Square footage per operator
- x (3) Electricity or gas consumption per square foot of participating facilities
- x (4) Savings from certification (as a percentage of electricity or gas consumption).

where:

Number of operators certified within the past five years is based on NEEC and NWBOA records. Measure Life is assumed to be five years, implying that savings are only counted for five years, beginning in the year of certification.[28] If a student receives a Level 2 certification or a certification renewal, then the Measure Life extends for five years from the most recent date of certification.

Square footage per operator is the average number of square feet of building space that is managed by operators receiving certification.

Electricity or gas consumption per square foot of participating facilities is based on a office buildings and schools, which are among the most common facilities participating in the BOC training.

Savings from certification (as a percentage of electricity or gas consumption) is a measure of the reduction in facility energy consumption resulting from operator certification.

[28] The five year measure life is taken from the ACE model and is the same as that used in a recent evaluation of the Northeast Energy Efficiency Partnerships' BOC program. See *Impact and Process Evaluation Building Operator Training and Certification (BOC) Program*, RLW Analytics, June 2005.

7.3 Findings

This M&T update report is based on certification records from NEEC and NWBOA through 2005.[29] NEEC continues to record the names, basic contact information, square footage, and certification dates (including Level 1, Level 2, and renewal). The following discussion provides a summary of the analysis conducted to determine a best estimate of each key input variable to the energy savings calculations.

7.3.1 Number of Operators Certified within the Past Five Years

7.3.1.1 Measure Life

As described in the Approach to Energy Savings Estimation above, a key input to the energy savings calculation for a given calendar year is the number of operators who received certification within five years (i.e., the assumed measure life) of the year in question. The current measure-life assumption of five years is regarded by the Summit Blue team to be a reasonable figure (see Footnote). Furthermore, as discussed in the 2004 M&T report, Summit Blue has concluded that it is appropriate to extend the energy savings benefits attributable to a student's involvement in the program for five years from the date of the most recent certification/renewal activity.

7.3.1.2 Number of Certified Operators Contributing to Savings Estimates

Given the assumption of a five-year measure life, the number of certified operators for whom savings are counted for 2005 can be determined by reviewing the latest certification or renewal date on record. All students who received their initial certifications in 2001 or later are automatically considered "within the measure life" of the program during 2005.[30] Additionally, any student who received initial certification prior to 2001 but who received a Level 2 certification or a certification renewal during or after 2001 is also considered to contribute to on-going energy savings.

According to NEEC records, 118 students in the Northwest received their initial certifications in 2005, and 419 new students were certified between 2001 and 2004. Furthermore, more than half of the 298 NEEC students who received their initial certification between 1997 and 2000 subsequently obtained a Level 2 certification, or a renewal, or both during or after 2001. In fact, 688 students, or 82% of the 835 students receiving certification from NEEC, received their latest certification or renewal during or after 2001. Given the assumed five-year "measure life," this means that 835 NEEC students are considered to still be contributing to energy savings at their facilities.

Assuming a similar rate of secondary certifications, it is estimated that 244 out of the 324 NWBOA students (75%) received their latest certification or renewal since 2001.[31] Between the two programs,

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[29] NEEC maintains a database of new and renewed certifications that was provided directly to Summit Blue Consulting for this analysis. Certification tallies for NWBOA were obtained from Andy Eckman of the Alliance via email February 9, 2006.

[30] Initial certification for the vast majority of students was Level 1. However, 30 students received Level 2 certification between 2000 and 2005 without having first completed the Level 1 coursework.

[31] It is assumed that the percentage of students receiving Level 2 certification or certification renewal is the same for NWBOA students as it is for NEEC students (actual determinations are only possible for NEEC, which has data specific to individual students, rather than just annual totals). The fact that only 75% of NWBOA students received their latest certification/renewal since 2001, compared to 82% of NEEC students, reflects that fact that a greater percentage of NWBOA students participated prior to 2000 and thus a greater percentage are now beyond the five-year measure lifetime.

energy savings are being achieved by 932 students in 2005. Table 7-1 presents figures for both NEEC and NWBOA,[32] disaggregated according to the following:

- New student certifications in 2005
- New student certifications between 2001 and 2004
- Students who received initial certification prior to 2001 but who received a renewal and/or Level 2 certification between 2001 and 2005.

Table 7-1. Number of Certified Operators for Whom Energy Savings are Counted for 2005

Category	NEEC	NWBOA	Total
New student certifications in 2005	118	36	154
New student certifications between 2001 and 2004	419	178	597
Students with initial certification prior to 2001 who renewed or received Level 2 certification between 2001 and 2005	151	30	181
Total	**688**	**244**	**932**
These numbers reflect all certified operators who are still within the five-year measure life in 2005.			

The same method described above was used to determine the number of certified operators for whom energy savings can be counted in each year from 2001 to 2004 (see Table 7-2).

Table 7-2. Number of Certified Operators for Whom Energy Savings are Counted, 2001-2004

	2001	2002	2003	2004
Number of Operators	541	748	853	863

7.3.2 Other Inputs to Energy Savings Estimation

As described above in Section 7.2, the inputs to the calculation of energy savings include not only the number of students certified in recent years, but also the following:

- Square footage of building space managed by BOC students
- Electricity and gas consumption per square foot of buildings managed by BOC students
- Savings achieved through operator certification.

A summary of the assumptions used for these parameters is presented below. For a discussion of how these assumptions were derived, see *Long-Term Monitoring and Tracking of Building Operator Certification and Energy Star Residential Windows*, Summit Blue Consulting for the Northwest Energy Efficiency Alliance, March 2005.

[32] Data for NEEC certifications was provided by Teresa Squillace. Data for NWBOA certifications for 2001 through 2005 were provided by Andy Ekman of the Alliance; NWBOA certification data for 1997 through 2000 were presented in aggregate in Market Progress Evaluation Report, Regional Building Operator Certification, No. 7, Research Into Action, Inc. for Northwest Energy Efficiency Alliance, September 2001, p. 96.

Square Footage per Operator

The review of BOC program data for the 2004 M&T Report and in the final MPER both suggest that a facility size of 355,000 square feet (ft^2) per operator receiving certification is appropriate for the energy savings analysis. Analysis of the updated data through 2005 supports the continued use of this figure, which applies to all operators receiving certification, regardless of the year in which they were certified.[33]

Energy Consumption per Square Foot of Participating Facilities

The most recent ACE model input value of 16 kWh/ft^2 for the annual electricity consumption at participating facilities is an appropriate value for use in the savings analysis. This value was proposed by the Alliance in March 2004, it was based on recently published data, and it is consistent with values for multiple relevant building types and from multiple sources. Annual gas consumption at participating facilities is assumed to be 0.32 $therms/ft^2$.[34]

Savings from Operator Certification

The current ACE model input value of 0.4 kWh/ft^2 for the annual electricity savings resulting from operator certification is based on estimated savings of 2.5% of a facility's total electricity consumption and on the annual consumption rate of 16 kWh/ft^2 (discussed above). This savings rate is reasonable, and may even be a bit conservative. A 2002 evaluation of the BOC program in the Northeast used a value of 0.5 kWh/ft^2, and a 2003 "retrospective" evaluation of Alliance programs by Summit Blue Consulting recommended use of a savings rate of 1.2 kWh/ft^2.[35] A more recent evaluation in the Northeast, based on a survey of BOC participants, found savings of 0.35 kWh/ft^2.[36] Other recent evaluations of BOC programs in California and Wisconsin were focused more on process issues and did not address explicit savings impacts.[37] Given the available information, the savings rate of 0.4 kWh/ft^2 is used in this analysis.

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[33] According to the raw data provided by students, the average square footage per facility is slightly higher through 2005 (492,000 ft^2) than it was through 2004 (446,000 ft^2). However, as discussed in detail in the 2004 M&T report, the raw data "exclude size data for many large organizations and facilities for which operators were not able to provide estimates." In recognition of this fact, the current analysis uses the MPER value of roughly 645,000 ft^2 per facility, the same as that used for the 2004 M&T report. Furthermore, through 2005 there were roughly 1.8 students per unique facility, virtually unchanged from the value through 2004. Therefore, the square footage managed *per student* (as opposed to *per facility)* remains at approximately 355,000 ft^2.

[34] For discussion the electricity usage assumption, see *Long-Term Monitoring and Tracking of Building Operator Certification and Energy Star Residential Windows,* Summit Blue Consulting for the Northwest Energy Efficiency Alliance, March 2005. The gas usage assumption of 0.32 $therms/ft^2$ is the average of the weighted normalized energy-use intensities derived from data from *Assessment of the Commercial Building Stock in the Pacific Northwest: Market Research Report,* Report #04-125, Kema-Xenergy, Inc. for Northwest Energy Efficiency Alliance, March 8, 2004. The EUI figure and accompanying analysis were provided by Jeff Harris, Northwest Energy Efficiency Alliance, via email with spreadsheet attachment, January 30, 2006.

[35] See *Evaluation of the Building Operator Training and Certification (BOC) Program in the Northeast,* Research Into Action, Inc. for Northeast Energy Efficiency Partnerships, Inc., September 6, 2002, p. 57. Also see *Findings and Report: Retrospective Assessment of the Northwest Energy Efficiency Alliance, Final Report,* Summit Blue Consulting for Northwest Energy Efficiency Alliance, October 2003, p. 5-4.

[36] RLW Analytics for NEEP; see Footnote 35.

[37] See *Evaluation of the 2002 Statewide Building Operator Certification and Training Program,* Study ID #428, Research Into Action, Inc. for Pacific Gas & Electric Company, November 30, 2003. Information on the Wisconsin BOC evaluation is from personal communication with Ingo Bensch, Senior Project Manager, Energy Center of Wisconsin, February 25, 2005.

Analogous to electricity savings, gas savings from operator certification are assumed to be 2.5% of a facility's total gas consumption. Based on the assumed energy-use intensity of 0.32 therms/ft^2, discussed above, average annual gas savings are estimated at 0.0080 therms/ft^2 (0.80 MBtu/ft^2). The recent evaluation of the BOC program in the Northeast assumes a similar savings value of 0.74 MBtu/ft^2, accounting for savings from both natural gas and oil.[38]

7.3.3 Estimate of Annual Energy Savings

As described in Section 7.2, the ACE model calculates energy savings as follows:

Annual Energy Savings (kWh/year or therms/year) =

(1) Number of operators certified within the past five years
x (2) Square footage per operator
x (3) Electricity or gas consumption per square foot of participating facilities
x (4) Savings from certification (as a percentage of electricity or gas consumption).

Based on the values discussed above, cumulative electricity savings in the Northwest from BOC-certified students are estimated to be growing steadily, from approximately 77 GWh in 2001 to 132 GWh in 2005. Based on these figures, average megawatt savings have increased from roughly 8.8 aMW in 2001 to 15.1 aMW in 2005 (see Table 7-3). Incremental savings in 2005 were approximately 1.1 aMW.

Table 7-3. Electricity Savings from BOC-Certified Students, 2001-2005

	2001	2002	2003	2004	2005
Number of Certified Operators[a] (A)	541	748	853	863	932
Square Feet per Operator (B)	355,000 ft^2				
Electricity Consumption (C)	16 kWh/ft^2				
Savings Percentage (D)	2.5%				
Cumulative Electricity Savings (MWh) E= (A*B*C*D)	76,858	106,250	121,159	122,575	132,320
Cumulative Electricity Savings (aMW) (E / 8760 hours)	8.8	12.1	13.8	14.0	15.1
Incremental Electricity Savings (aMW) ($E_{Year} - E_{(Year-1)}$)	8.8[b]	3.4	1.7	0.2	1.1

[a] The value for Number of Certified Operators is a cumulative value that reflects all operators receiving initial certification within the prior five years, plus those certified more than five years prior but who subsequently received Level 2 or renewal certification within the prior five years.

[b] The value for incremental savings in 2001 reflects all savings from program inception through 2001.

[38] The NEEP BOC program evaluation (see Footnote 35) assumes savings of 5% and 10% for boiler maintenance and HVAC control, respectively, much higher than the 2.5% assumed in this M&T analysis. However, the NEEP evaluation is based on a survey of participants, not all of whom performed each possible activity. As a result, the overall savings rates across all participants are very similar between the two programs.

The increase in savings from 2004 to 2005 is due to the fact that 154 new students based in the Northwest were certified in 2005, and 231 were recertified (via Level 2 or renewal). Seventy-one of the students receiving these secondary certifications received their initial Level 1 certifications prior to 2001, and many therefore would have been considered beyond the "measure life" of their BOC training were it not for the secondary certification.[39] All of these certifications are accounted for above in Table 7-1 and Table 7-2, which show the 932 certified operators for whom energy savings are counted in 2005.

Using the energy savings equation and the assumptions discussed above, cumulative gas savings from BOC-certified students are estimated at 1.5 million therms in 2001, increasing to 2.6 million therms in 2005 (Table 7-4).

Table 7-4. Gas Savings from BOC-Certified Students, 2001-2005

	2001	2002	2003	2004	2005
Number of Certified Operators[a] (A)	541	748	853	863	932
Square Feet per Operator (B)	355,000 ft^2				
Electricity Consumption (C)	0.32 therms/ft^2				
Savings Percentage (D)	2.5%				
Cumulative Gas Savings (millions of therms) E= (A*B*C*D) / 10^6	1.5	2.1	2.4	2.5	2.6
Incremental Gas Savings (millions of therms) ($E_{Year} - E_{(Year-1)}$)	1.5[b]	0.6	0.3	0.1	0.1

[a] The value for Number of Certified Operators is a cumulative value that reflects all operators receiving initial certification within the prior five years, plus those certified more than five years prior but who subsequently received Level 2 or renewal certification within the prior five years.

[b] The value for incremental savings in 2001 reflects all savings from program inception through 2001.

7.4 Conclusions/Recommendations

The BOC programs that the Alliance supported in the late 1990s and into 2000 have continued to train building operators in the Pacific Northwest, resulting in increased energy efficiency of facility operations. As new students complete the certification requirements, the cumulative impact of the program continues to grow. This growth is supported by the fact that half of all students receiving Level 1 certification subsequently attain their Level 2 certification or demonstrate their continued commitment to the BOC principles through continuing education and certification renewal.

[39] NEEC records the dates of Level 1 and Level 2 certification, plus the most recent renewal. Fifteen of the 71 students who were beyond their initial five-year measure life in 2005 had received their Level 2 certifications between 2001 and 2004, and so their savings would still be counted in 2005 even if they did not subsequently renew their certifications in 2005. Some of the others may have renewed between 2001 and 2004, but the NEEC database would have replaced these records with their 2005 renewals. There were no reported Level 2 certfications or renewals in the NWBOA program.

Some of the key findings from this 2005 update include the following:

- In 2005, 154 students in the Northwest received their initial certifications, and another 231 previously certified students received their Level 2 certifications or renewed their existing certifications.
- Due to the high rate of Level 2 certifications and renewals, 82% of all NEEC students in the Northwest certified since 1997 are still considered to be achieving energy savings at the buildings that they manage (i.e., 82% have received certification or renewal since 2001, which is the most distant year for which the five-year "measure life" would still apply in 2005). Using the same criteria, it is estimated that 75% of all NWBOA students are still within their "measure life."
- Electricity savings achieved by BOC-certified students are estimated at 8.8 aMW in 2001, increasing to 15.1 aMW in 2005. Gas savings from BOC are estimated at 1.5 million therms in 2001, increasing to 2.6 million therms in 2005.

The 2004 M&T Report discusses a variety of considerations for future M&T analysis, including refinement of the square footage estimate, treatment of Level 1 versus Level 2 certification, and a variety of other issues. Specific observations and recommendations stemming from the current M&T analysis are as follows:

- In order to further refine energy savings estimates, a comprehensive study would likely be required that measured building energy consumption over a period of a year or more. The study would need to measure savings from participant buildings before and after certification of the building operators and/or measure savings from a control group of buildings whose operators did not receive BOC training. Such a study would be more costly than what the Alliance has been allocating to the M&T efforts thus far. However, it might be worth investigating jointly funding a BOC savings study with other organizations operating BOC programs.
- Energy savings resulting from Level 1 and Level 2 certifications are treated the same in the ACE model and in this M&T analysis. There is little data to suggest how dual savings estimates might be employed to better refine the estimates. An evaluation of the BOC program in the Northeast suggests that "somewhere in the range of 75%-85%" of the total savings is generated as a result of the Level 1 training. The evaluation also highlights some of the non-energy benefits from the BOC program such as improved occupant comfort and indoor air quality that might be worth investigating.
- The number of new Level 1 certifications is the most variable factor affecting the energy savings estimate. As such, it is recommended that certification data be collected annually from both NEEC and NWBOA. It is also recommended that future M&T analyses consider some of the options, discussed in the 2004 M&T report, for refining estimates of the square footage managed per BOC-certified student.

INDIRECT PROGRAM EXPENSES

IDAHO POWER.
An IDACORP Company

Indirect Program Expenses, DSM Overhead, and Other Administration
April 1, 2009

Idaho Power charges indirect program expenditures, demand-side management (DSM) overhead, and other administration expenses into four general cost categories: labor, materials, purchased services, and other expenses. From 2002 through 2007 these Idaho DSM Rider (Rider) expenses totaled $1,229,287, or approximately 4% of total Rider expenses. During this same time frame the total indirect overhead expenses increased from about $123,000 to approximately $577,000 annually.

The increase in DSM indirect overhead expenditures is mainly due to the rapid growth of the DSM programs through 2007 resulting in increased labor expenses. This growth has necessitated increased labor costs as additional support and analytical staff has been added to the Customer Relations and Energy Efficiency (CR&EE) department over the years. Overall, the labor expenses charged to the DSM rider as an indirect expense account for about 2.9% of total DSM rider expenses.

In 2002, the CR&EE department only had two staff members supporting energy efficiency programs; however, neither charged to the Rider. By the middle of 2003, an economic analyst was hired and was responsible for performing cost-effectiveness analysis on the DSM programs, financial reporting, and general departmental support. During this time, the indirect DSM administration work order was created and the economic analyst began charging to this accounting string.

By the end of 2004, a departmental assistant was hired to assume the support responsibilities from the economic analyst. The departmental assistant also began performing more of the financial responsibilities of the department. In 2006 the duties of the departmental assistant were split between a clerk and financial analyst position. Additionally, the department leader, which had been historically paid out of the Company's operations and maintenance (O&M) budget, was split into two positions: a customer research and analysis leader currently paid from O&M, and a DSM program leader currently paid from the Rider. As programs and projects increased due to Idaho Power's enhanced commitment to energy efficiency, it was determined that the Company required an additional graphic designer. By the end of the 2006, the economic analyst, clerk, financial analyst, DSM program leader, and graphic designer were charging most of their time to the indirect overhead work order.

In 2007 a marketing strategist, advertising coordinator, and energy efficiency evaluator were hired to assist in improving energy efficiency and demand response program efforts. An additional graphic designer was hired by the Corporate Communications department so that two full time equivalents (FTE) could be dedicated to DSM; however, at this time the graphic designers began charging most of their time directly to the respective DSM programs.

The materials category generally includes office supplies and equipment purchases that are not directly tied to an individual program. These costs account for about 0.1% of total DSM rider expenses.

Purchased services through 2007 totaled $275,176 and accounts for approximately 1% of total DSM rider expenses and generally includes work performed by consultants, contractors, temporary staffing, etc. Examples include a DSM Potential Study completed in 2004 (partially paid in 2003), an overhaul of the DSM summary reporting database in 2005, a new residential construction survey in 2006, an end-use survey and appliance standards assessment in 2007, and memberships in the Northwest Power and Conservation Council's Regional Technical Forum, and E Source.

Other expenses generally include employee business expenses such as travel, meals, transportation, and lodging for the positions mentioned above; and office administration expenses such as software licenses. The total for this category through 2007 is $84,314 which is about 0.3% of the total DSM rider expenses.

The Indirect DSM Overhead expenses include special accounting entries made each month. As noted in the Company's response to Request No. 89 in Case No. IPC-E-08-10, special accounting entries are "non-program payroll, onecard accruals and reversals, and other accounting corrections. These entries occur automatically with the previous month's accrual being reversed the following month. Because these entries occur monthly, a balance will always appear annually as these corrections cross years.

In the response to Request No. 89, the Company used the ENERGY STAR® Lighting Program as an example of a cross year correction. The large entry in "Other Expenses" in 2002 and 2003 in the Indirect Program Expenses, DSM Overhead, and Other Administration work orders is directly related to that same cross year correction. In 2002, several advertising expenses for the Lighting Program were incorrectly charged to O&M. In December 2002, a correction was submitted to move the dollars out of O&M and into the Rider. Since the CR&EE department tracks program expenditures through work orders as noted in Idaho Power's response to the Idaho Public Utilities Commission DSM Audit Request No. 1, dated February 4, 2009, the O&M expenditures still appeared in the Lighting Program but the correction moved dollars into the Rider and appeared as a special accounting entry. This error was corrected in January 2003 with the special accounting entry to the Rider being reversed and the O&M charges in the Lighting Program being moved to the Rider.

The following table provides an annual breakdown of indirect DSM expenses from 2002-2007.

Indirect Program Expenses, DSM Overhead, and Other Administration Idaho DSM Rider Only							
Year	2002	2003	2004	2005	2006	2007	Total
Labor		$33,537	$50,748	$101,390	$199,355	$451,911	$836,942
Materials	$236	$85	$5,057	$25,853	($2,867)	$4,491	$32,856
Purchased Services	$1,550	$41,199	$82,970	$29,052	$55,913	$64,492	$275,176
Other Expenses	$121,311	($116,455)	$3,702	$14,603	$4,914	$56,239	$84,314
Indirect Overhead Total	$123,098	($41,634)	$142,477	$170,899	$257,315	$577,133	$1,229,287
Idaho Rider Expenses	$240,576	$707,380	$1,147,509	$4,533,878	$8,844,913	$13,487,460	$28,961,716
Indirect Percent of Total DSM Rider	51%	-6%	12%	4%	3%	4%	4%

COST-EFFECTIVENESS

them learn about saving electricity in their homes and helped them try some of the ways to save energy in their homes.

Cost-Effectiveness

Idaho Power considers cost-effectiveness the primary screening tool prior to DSM program implementation. Most of Idaho Power's energy efficiency programs are preliminarily identified through the IRP planning process. In this process, specific programs or potential energy savings are screened by sector to determine if the levelized cost of these programs is less than supply-side resource alternatives. If they are shown to be less costly than supply-side resources from a levelized cost perspective, the hourly shaped energy savings is subsequently included in the IRP.

Prior to the actual implementation of energy efficiency or demand response programs, Idaho Power analytical staff creates cost-effectiveness models to assess whether a specific potential program design will be cost effective from the perspective of Idaho Power and its customers. Incorporated into these models are inputs from various sources in order to use the most current and reliable information available. When possible, Idaho Power staff leverages the experiences of other companies in the region, or throughout the country, to help identify specific program parameters. This is typically accomplished through discussions with other utilities' program managers and research staff. Idaho Power also uses electric industry research organizations, such as E Source, Edison Electrical Institute (EEI), Consortium for Energy Efficiency (CEE), American Council for an Energy Efficient Economy (ACEEE), Advanced Load Control Alliance (ALCA), Association of Energy Service Professionals (AESP), Energy Insights, and others, to identify similar programs and their results.

For other assumptions, including estimated costs, savings, and net-to-gross ratio estimates, Idaho Power relies on sources such as the Northwest Power and Conservation Council, the Regional Technical Forum (RTF), NEEA, E Source, the Database for Energy Efficiency Resources (DEER), the Energy Trust of Oregon (ETO), Bonneville Power Administration (BPA), third-party consultants, and other regional utilities. Idaho Power uses a cost-effectiveness model to perform sensitivity analyses in order to determine optimal program designs. The remaining inputs used in the cost-effectiveness models are obtained from the IRP process. The Technical Appendix of Idaho Power's most recent IRP is the source for the financial assumptions, including the discount rate and inflation rate. The IRP is also the source of the DSM alternative costs, which is the value of energy savings and demand reduction resulting from the DSM programs. These DSM alternative costs vary by season and time-of-day. The DSM alternative energy costs are based on either projected fuel costs of a peaking unit or forward market prices as determined by Idaho Power's power supply model, AURORAxmp® Electric Market Model. The avoided capital cost is based on a gas-fired simple-cycle turbine.

For its cost-effectiveness methodology, Idaho Power relies on the Electric Power Research Institute End Use Technical Assessment Guide (TAG) and the California Standard Practice Manual. Idaho Power primarily uses the Total Resource Cost (TRC) test and the Utility Cost (UC) test to develop benefit cost (B/C) ratios to determine the cost-effectiveness of DSM programs. As defined in the TAG and California Standard Practice Manual, the TRC and UC tests are most similar to supply-side tests and provide a useful basis to compare demand-side and supply-side resources. Idaho Power determines cost-effectiveness on a measure-by-measure basis and a program basis. To be consistent with the IRP, program life B/C ratios for A/C Cool Credit and Irrigation Peak Rewards are calculated over a 20-year period. In order for a measure or a program to be considered cost-effective, it must have B/C ratios greater than one for both the TRC and UC tests.

Idaho Power may choose to launch a pilot or a program to evaluate estimates or assumptions in the cost-effectiveness model. Following implementation of a program, cost-effectiveness models are reviewed as new inputs from actual program activity become available, such as actual program expenses, savings, or participation. If measures or programs are determined to not be cost-effective after implementation, the program or measures are reexamined.

A new addition to the 2008 DSM report is the presentation in Appendix 4 of the UC and TRC B/C ratios using actual cost information over the life of the program through 2008. These B/C ratios are provided as a measure of cost-effectiveness for all Idaho Power energy efficiency or demand response programs currently being offered where energy savings and demand reduction is realized.

Program Evaluation

Program evaluation is an important facet of Idaho Power's DSM operational activities. Idaho Power relies on evaluation by third-party contractors, internal analyses, and regional studies to ensure the ongoing cost-effectiveness of programs through validation of energy savings and demand reduction. The results of Idaho Power's evaluation efforts are used to enhance or initiate program changes when warranted. In 2008, Idaho Power developed a comprehensive evaluation plan for its energy efficiency programs and commenced evaluations for several programs and measures, including Building Efficiency, ENERGY STAR® Homes Northwest, Rebate Advantage, Energy House Calls, and the Attic Insulation pilot.

As part of its evaluation efforts, Idaho Power is actively participating in several regional studies to identify and promote emerging technologies that may further enhance opportunities for new program deployment. Some examples include 1) the Distribution Efficiency Initiative, which is a study managed by NEEA to determine efficient ways to design and operate distribution feeders through voltage regulators, 2) a regional study to evaluate the energy-savings potential of ductless heat pumps, and 3) efforts to measure the impacts of light-emitting diode (LED) lighting. Other regional analyses in which Idaho Power actively participated include the Commercial Building Stock Assessment and market progress evaluations.

DSM Annual Report Structure

The structure of the remaining portion of this report is based on customer sectors (categorized by residential, commercial/industrial, and irrigation). The description of each sector is followed by information about each program in that sector. Each program section includes a general program description, annual activities, and future plans. A chart at the beginning of each program section contains 2008 and 2007 program metrics in tabular format. Following the sector and program sections of the report are descriptions of Idaho Power's activities in Market Transformation, Other Programs and Activities, and Idaho Power's Regulatory Initiatives. The appendices follow the written sections and contain tabular information on the 2008 expenses and savings, as well as historic information for all energy efficiency and demand response activities at Idaho Power.

DSM SCREENING CRITERIA

DSM Analysis and Screening Criteria

DSM Program Development

In November 2004, Quantum Consulting of Berkeley, California, (now Itron Inc. of Oakland, California) completed a study for Idaho Power assessing the energy savings potential within the residential and commercial sectors. The study served as the basis for the residential and commercial retrofit program options analyzed in this IRP. The Company filed the Quantum study with the IPUC in December 2004 as an addendum to the 2004 IRP. In order to meet the guidelines of the 2006 IRP, the study output was later expanded with support from Quantum for program extension from 10 to 20 years of utility operation.

The assumptions and energy estimates that support the industrial efficiency program extension were developed internally by Idaho Power's engineering staff. The industrial program expansion and the residential and commercial retrofit program options were each designed to maximize the potential energy benefits of the resource while remaining cost-effective from a total resource perspective.

All DSM program options analyzed as part of the 2006 IRP included the following cost components:

- Administrative costs
- Marketing and advertising costs
- Incentive payments
- Participant costs

Once the program design and costing phase was completed, each new program was put through a series of static screening analyses prior to being introduced into the dynamic IRP portfolio analysis in Aurora.

Screening Criteria

DSM screening criteria are designed to assess a program's potential to maximize benefits at the lowest cost for all stakeholders. In addition to the strategic criteria listed in Chapter 5 of the 2006 IRP Plan, key screening elements are:

- Programs will be **cost-effective**. From a total resource perspective, estimated program benefits must be greater than estimated program costs.
- Programs will be **customer-focused**. From the participants' perspective, programs will offer real benefits and value to customers. The Idaho Public Utilities Commission stated in Order No. 29026, "It is our hope that the programs created by the DSM rider will empower customers to exercise control over their energy consumption and reduce their bills."
- Programs will be **equitably distributed**. From the customers' perspective, programs will be selected to benefit all groups of customers. Over time, programs will be offered to customers in all sectors and in all regions of the company's service territory.
- Programs will be as close to **earnings-neutral** as possible. From the utility's perspective, programs will be selected to minimize the negative impact on shareowners.

These criteria are used as guidelines in selecting a new program or initiative. A program that doesn't meet all of these criteria is not excluded from consideration, but would have to be further evaluated for other valued characteristics. Ultimately, all programs must be cost-effective in order to be considered as ordered by the IPUC.[1]

Static Cost-Effectiveness Analysis

The cost-effectiveness analysis is the primary focus of the screening criteria. The static cost-effectiveness analysis of DSM programs at Idaho Power is performed using the methods described in the EPRI End-Use Technical Assessment Guide Manual as well as The California Standard Practices Manual: Economic Analysis of Demand-side Programs and Projects.[2] The proposed DSM programs considered for inclusion into the 2006 IRP are evaluated from Utility Cost Test and Total Resource Cost test perspectives.

Total Resource Cost Test (TRC)[3]

The TRC test is a measure of the total net resource expenditures of a DSM program from the point of view of the utility and its customers as a whole. Costs include changes in supply costs, utility costs, and participant costs. (Transfer payments between customers and the utility are ignored).

The following are the calculations performed by this test:

Net Present Value: A net present value of zero or greater indicates that the program is cost-effective from the total resource cost perspective.

Benefits-Cost Ratio: A benefit-cost ratio of 1.0 or greater indicates the program is cost-effective from the total resource cost perspective.

Levelized Cost: This measurement makes the evaluation of potential demand-side resources comparable to that of supply side resources. The cost stream of DSM resource (in this case, the stream of utility costs and participant costs) is discounted and then divided by the stream of discounted kW or kWh that is expected from the program.

Utility Cost Test[4]

The Utility Cost test is a measure of the total costs to the utility to implement a DSM program.

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[1] IPUC Order No. 29026, May 20, 2002

[2] www.cpuc.ca.gov/static/energy/electric/energy+efficiency/rulemaking/std+practice+manual.doc

[3] EPRI End-Use Technical Assessment Guide (End-Use TAG), Volume 4: Fundamentals and Methods, Barakat and Chamberlin, Inc, April 1991

[4] EPRI End-Use Technical Assessment Guide (End-Use TAG), Volume 4: Fundamentals and Methods, Barakat and Chamberlin, Inc, April 1991

The following are the calculations performed by this test:

Net Present Value: A net present value of zero or greater indicates that the program is cost-effective from the Utility Cost perspective.

Benefits-Cost Ratio: A benefit-cost ratio of 1.0 or greater indicates the program is cost-effective from the Utility Cost perspective.

Levelized Cost: This measurement attempts to put demand side resources on equal ground with supply-side resources. As with supply-side resources, the cost stream of DSM resource is discounted and then divided by the stream of kW and kWh that is expected from the program.

Payback: Number of years required for the energy benefits to equal the participants' costs for a program.

DSM Analysis Calculation Definitions

Net Present Value: Calculated as the discounted stream of program benefits minus the discounted stream of program costs using the Company's weighted average cost of capital (WACC) for resource planning.

$$\sum_{T=1}^{N} \frac{\text{Program Benefits}}{(1+\text{WACC})^{t-1}} \quad \text{(minus)} \quad \sum_{T=1}^{N} \frac{\text{Program Costs}}{(1+\text{WACC})^{t-1}}$$

Where: N = the total number of years, t = the incremental year, and WACC = the Company's weighted average cost of capital.

Benefits-Cost Ratio: Calculated as the discounted stream of program benefits divided by the discounted stream of program costs.

$$\sum_{t=1}^{N} \frac{\text{Program Benefits}}{(1+\text{WACC})^{t-1}} \div \sum_{t=1}^{N} \frac{\text{Program Costs}}{(1+\text{WACC})^{t-1}}$$

Levelized Costs: The present value of total costs of the resource over the life of the program in the base year divided by the discounted stream of energy or demand savings, depending on how the resource size has been defined.

$$\sum_{T=1}^{N} \frac{\text{Program Costs}}{(1+\text{WACC})^{t-1}} \div \sum_{T=1}^{N} \frac{\text{Energy Savings}}{(1+\text{WACC})^{t-1}}$$

Payback: Number of years from the initial program participation to the point at which the cumulative benefits exceed the cumulative undiscounted costs for participants.

Incremental Costs: The additional cost incurred by choosing to select one option over another.

Total Installed Cost of Energy Efficient Option
– Total Installed Cost of a Non-Energy Efficient Option
= Incremental Cost

Program Benefits Calculations

To quantify the "benefit" portion of the calculation five costing periods were created for the year that are consistent with the IPUC approved rate schedule 19 tariff rate pricing periods. Each costing period contains a price that reflects the alternative cost of energy and capacity at the associated time period. The alternative cost represents the cost of energy resources that would most likely be the alternative at that time period. Each time segment has a different alternative cost associated with it depending on the expected price for that period.

Two methodologies were developed, at the request of the IRPAC, to evaluate the potential benefits associated with alternative supply costs: peak oriented (gas turbine) and baseload oriented (thermal plant) resource alternatives.

The peak alternative resource methodology employs five costing periods for each year to reflect the market dynamics impacting costs associated with different times of the day or seasonally. Each costing period contains a price that reflects the alternative cost of energy and capacity at the associated time period. The alternative cost represents the cost of energy resources that would most likely be an alternative including peak plant or the market cost of energy depending upon the load profile associated with the program. Each time segment has a different alternative cost associated with it depending on the expected price for that period. The baseload alternative utilized the capacity and variable cost associated with a thermal (coal plant) alternative which applied to all hours of the year.

The results of the analyses showed all programs to be cost-effective under both the peak and the baseload alternative resource cost methodologies. All programs showed greater benefits associated using the peak resource alternative, however, the industrial efficiency program showed the showed highest benefits using the baseload analysis. This benefit differential is attributable to the unique seasonal load profiles associated with each program.

The following tables illustrate the time of day and time of year costing period definitions used in the peak static program screening analysis:

SUMMER SEASON June 1 through August 35								
Hour	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Holiday
1	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
2	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
3	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
4	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
5	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
6	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
7	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
8	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
9	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
10	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
11	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
12	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
13	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
14	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
15	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
16	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
17	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
18	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
19	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
20	SMP	SONP	SONP	SONP	SONP	SONP	SMP	SMP
21	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
22	SMP	SMP	SMP	SMP	SMP	SMP	SMP	SMP
23	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP
24	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP	SOFP

SOFP = Summer Off-Peak

SMP = Summer Mid-Peak

SONP = Summer On-Peak

NON-SUMMER SEASON September 01 through May 31								
Hour	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Holiday
1	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
2	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
3	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
4	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
5	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
6	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
7	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
8	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
9	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
10	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
11	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
12	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
13	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
14	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
15	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
16	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
17	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
18	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
19	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
20	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
21	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
22	NSOFP	NSMP	NSMP	NSMP	NSMP	NSMP	NSMP	NSOFP
23	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP
24	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP	NSOFP

NSOFP = Non-Summer Off-Peak

NSMP = Non-Summer Mid-Peak

Market prices were developed within Aurora using the Preferred Portfolio as a resource basis (May Aurora_2006IRP_P3_hrly_zone_prices_20yr So Idaho). The values beyond 20 years are extended by escalating the final year of the forward market price schedule for the additional years needed for the analysis using the Company's escalation rate of 3.0% for capital investments.

The costing period prices are calculated using the following method:

- NSMP = Average of heavy load prices in January–May and September–December.
- NSOFP = Average of light load prices in January–May and September–December.
- SOFP = Average of light load prices in June–August.
- SMP = Average of heavy load prices in June–August.
- SONP = IPC variable energy and operating cost of a 162 MW Simple-Cycle Gas Turbine
- Annual = IPC variable energy and operating cost of thermal coal plant

The following table shows the schedule of variable and market alternative costs used to calculate the benefit value of each program in the static analysis:

	Alternative Energy Cost					
	IPC Variable Peak Cost $/KW	Seasonal Market Price Forecast ($/MWh)				IPC Variable Base Load $/KW
Year	SONP	SMP	SOFP	NSMP	NSOFP	Annual
1	$91.08	$68.57	$51.54	$77.61	$65.59	$15.93
2	$95.30	$69.89	$51.61	$78.95	$65.64	$15.91
3	$88.97	$65.98	$48.07	$68.96	$55.61	$15.80
4	$88.12	$66.39	$48.52	$68.15	$55.39	$15.80
5	$67.14	$50.43	$37.03	$52.75	$42.31	$15.27
6	$67.81	$55.93	$41.28	$54.30	$42.99	$15.43
7	$68.94	$67.85	$50.72	$64.61	$51.51	$31.14
8	$71.25	$71.71	$54.18	$68.18	$54.33	$31.84
9	$73.30	$74.02	$56.01	$70.06	$56.05	$32.88
10	$75.73	$78.45	$59.19	$74.07	$59.74	$33.43
11	$78.91	$82.40	$62.08	$78.96	$63.83	$34.43
12	$82.37	$90.38	$66.94	$86.37	$69.54	$35.34
13	$85.26	$92.36	$70.70	$90.27	$72.64	$36.43
14	$89.35	$98.01	$75.25	$95.24	$76.92	$37.61
15	$92.64	$102.92	$79.15	$100.11	$80.34	$38.67
16	$86.04	$97.28	$75.60	$94.42	$76.63	$39.40
17	$89.19	$104.05	$80.51	$101.25	$81.28	$40.54
18	$93.13	$108.84	$84.94	$105.87	$85.53	$41.53
19	$95.86	$114.48	$90.26	$111.23	$90.19	$42.77
20	$99.47	$120.35	$96.05	$118.21	$95.55	$44.00
21	$93.36	$123.96	$98.93	$121.75	$98.42	$45.23
22	$97.22	$127.68	$101.90	$125.40	$101.37	$49.65
23	$100.74	$131.51	$104.95	$129.17	$104.41	$51.20
24	$104.46	$135.46	$108.10	$133.04	$107.55	$52.82
25	$108.97	$139.52	$111.35	$137.03	$110.77	$54.49
26	$110.64	$143.71	$114.69	$141.14	$114.10	$57.01
27	$112.32	$148.02	$118.13	$145.38	$117.52	$58.85
28	$114.01	$152.46	$121.67	$149.74	$121.04	$60.75
29	$115.71	$157.03	$125.32	$154.23	$124.68	$62.79
30	$117.42	$161.74	$129.08	$158.86	$128.42	$64.84

Fixed plant costs were combined with the variable costs for developing total alternative costs. For the peak alternative, a 162MW Simple Cycle Combustion Turbine plant was used as the cost basis, for the baseload alternative, a coal thermal plant served as the cost basis. The levelized capacity cost factors applied were $64.92/KW (peak) and $247.52(baseload).

DSM program analysis includes the assumption that the energy savings will continue beyond the measure life time period for each program participant. This assumption is based on the principle that it is reasonable to assume that once a person participates in the program, they will not revert back to a less efficient behavior after the measure life expires. As a result, the energy savings schedule for each program shows a ramp-up period followed by a sustained maximum level for the entire analysis period. In the 2004 IRP the total period for analysis was 20 years. For the 2006 IRP this period was 30 years.

Dynamic Modeling

The results of the levelized cost analysis showed that the proposed DSM programs had sufficiently lower costs than all but the geothermal supply-side resources. This result allowed the DSM portfolio to be included in the dynamic modeling (Aurora simulation model) as a fixed resource for all supply-side alternative portfolio analyses. This approach differs from the analysis in the 2004 IRP where the programs were introduced in an equivalent manner as were the supply-side resources to determine the beneficial impacts to the overall resource portfolio.

The following tables show the annual costs and energy savings associated with the DSM programs.

Energy Savings
MWh (Net of Transmission Losses)

Year	All Programs	Residential Retro	Commercial Retro	Industrial Expansion
2006				
2007	23,280	6,462	8,817	8,000
2008	64,753	20,639	24,451	19,663
2009	158,607	60,980	58,301	39,327
2010	244,160	99,554	85,615	58,990
2011	320,054	134,876	106,525	78,653
2012	387,019	165,874	122,828	98,316
2013	446,812	192,391	136,441	117,980
2014	499,130	214,746	146,741	137,643
2015	544,700	233,456	153,938	157,306
2016	585,249	249,083	159,197	176,970
2017	604,010	248,180	159,197	196,633
2018	624,520	248,987	159,237	216,296
2019	645,510	249,796	159,754	235,960
2020	666,299	250,483	160,193	255,623
2021	686,887	251,047	160,554	275,286
2022	707,270	251,486	160,835	294,949
2023	727,346	251,738	160,996	314,613
2024	747,319	251,926	161,116	334,276
2025	767,085	251,989	161,157	353,939
2026	786,749	251,989	161,157	373,603
2027	786,749	251,989	161,157	373,603
2028	786,749	251,989	161,157	373,603
2029	786,749	251,989	161,157	373,603
2030	786,749	251,989	161,157	373,603
2031	786,749	251,989	161,157	373,603
2032	786,749	251,989	161,157	373,603
2033	786,749	251,989	161,157	373,603
2034	786,749	251,989	161,157	373,603
2035	786,749	251,989	161,157	373,603
2036	786,749	251,989	161,157	373,603

Average Peak Reduction
aMW (Net of Transmission Losses)

Year	All Programs	Residential Retro	Commercial Retro	Industrial Expansion
2006				
2007	2.7	0.7	1.0	0.9
2008	7.4	2.4	2.8	2.2
2009	18.1	7.0	6.7	4.5
2010	27.9	11.4	9.8	6.7
2011	36.5	15.4	12.2	9.0
2012	44.2	18.9	14.0	11.2
2013	51.0	22.0	15.6	13.5
2014	57.0	24.5	16.8	15.7
2015	62.2	26.7	17.6	18.0
2016	66.8	28.4	18.2	20.2
2017	69.0	28.3	18.2	22.4
2018	71.3	28.4	18.2	24.7
2019	73.7	28.5	18.2	26.9
2020	76.1	28.6	18.3	29.2
2021	78.4	28.7	18.3	31.4
2022	80.7	28.7	18.4	33.7
2023	83.0	28.7	18.4	35.9
2024	85.3	28.8	18.4	38.2
2025	87.6	28.8	18.4	40.4
2026	89.8	28.8	18.4	42.6
2027	89.8	28.8	18.4	42.6
2028	89.8	28.8	18.4	42.6
2029	89.8	28.8	18.4	42.6
2030	89.8	28.8	18.4	42.6
2031	89.8	28.8	18.4	42.6
2032	89.8	28.8	18.4	42.6
2033	89.8	28.8	18.4	42.6
2034	89.8	28.8	18.4	42.6
2035	89.8	28.8	18.4	42.6
2036	89.8	28.8	18.4	42.6

July Peak Reduction
aMW (Net of Transmission Losses)

Year	All Programs	Residential Retro	Commercial Retro	Industrial Expansion
2006				
2007	4.4	1.9	1.5	1.1
2008	15.8	9.1	4.1	2.6
2009	44.7	29.7	9.8	5.2
2010	70.6	48.3	14.4	7.9
2011	91.8	63.4	17.9	10.5
2012	110.4	76.6	20.7	13.1
2013	126.6	88.0	22.9	15.7
2014	140.5	97.5	24.7	18.3
2015	152.3	105.5	25.9	20.9
2016	162.5	112.2	26.8	23.6
2017	165.1	112.2	26.8	26.2
2018	167.7	112.1	26.8	28.8
2019	170.7	112.4	26.9	31.4
2020	173.6	112.6	26.9	34.0
2021	176.5	112.8	27.0	36.7
2022	179.2	112.9	27.0	39.3
2023	181.9	113.0	27.1	41.9
2024	184.6	113.0	27.1	44.5
2025	187.2	113.0	27.1	47.1
2026	189.9	113.0	27.1	49.8
2027	189.9	113.0	27.1	49.8
2028	189.9	113.0	27.1	49.8
2029	189.9	113.0	27.1	49.8
2030	189.9	113.0	27.1	49.8
2031	189.9	113.0	27.1	49.8
2032	189.9	113.0	27.1	49.8
2033	189.9	113.0	27.1	49.8
2034	189.9	113.0	27.1	49.8
2035	189.9	113.0	27.1	49.8
2036	189.9	113.0	27.1	49.8

Utility Costs
(000's–2006 dollars)

Year	All Programs	Residential Retro	Commercial Retro	Industrial Expansion
2006				
2007	$3,679	$1,363	$1,408	$908
2008	$6,437	$2,860	$2,102	$1,475
2009	$19,281	$10,728	$4,723	$3,830
2010	$19,186	$10,793	$4,608	$3,785
2011	$18,753	$10,517	$4,529	$3,707
2012	$18,067	$9,898	$4,539	$3,631
2013	$17,854	$9,148	$4,655	$4,050
2014	$16,424	$8,382	$4,078	$3,964
2015	$14,923	$7,663	$3,379	$3,880
2016	$14,336	$7,021	$3,064	$4,251
2017	$5,414	$750	$505	$4,159
2018	$5,274	$750	$454	$4,069
2019	$5,104	$713	$409	$3,982
2020	$5,343	$675	$368	$4,300
2021	$5,212	$675	$331	$4,206
2022	$5,051	$638	$298	$4,115
2023	$4,895	$600	$268	$4,027
2024	$4,745	$563	$241	$3,941
2025	$4,947	$525	$217	$4,205
2026	$4,797	$488	$196	$4,114

Total Resource Cost
(000's–2006 dollars)

Year	All Programs	Residential Retro	Commercial Retro	Industrial Expansion
2006				
2007	$7,349	$2,992	$3,037	$1,320
2008	$15,496	$5,448	$4,562	$5,486
2009	$33,912	$16,185	$10,002	$7,725
2010	$32,708	$16,210	$8,931	$7,567
2011	$30,965	$15,693	$7,894	$7,378
2012	$29,068	$14,651	$7,223	$7,195
2013	$27,843	$13,405	$6,927	$7,511
2014	$25,318	$12,142	$5,852	$7,324
2015	$22,796	$10,962	$4,693	$7,142
2016	$21,407	$9,913	$4,077	$7,418
2017	$9,508	$1,550	$725	$7,233
2018	$9,044	$1,367	$622	$7,054
2019	$8,612	$1,193	$538	$6,880
2020	$8,630	$1,048	$469	$7,113
2021	$8,305	$956	$412	$6,938
2022	$7,985	$854	$363	$6,767
2023	$7,691	$768	$321	$6,602
2024	$7,426	$699	$286	$6,441
2025	$7,525	$638	$255	$6,632
2026	$7,282	$583	$228	$6,470

DSM Portfolio Options–2006 IRP

	Savings *			Present Value Costs (000s)		Levelized Costs		B/C Ratio		Payback **
	aMW	Summer Peak MW	Annual Energy MWh	Utility Cost	TRC Cost	UC ($/kWh)	TRC ($/kWh)	UC	TRC	
Residential Existing	29	113	251,926	$63,768	$96,372	$0.03	$0.04	4	2.6	3
Commercial Existing	18	27	161,157	$31,903	$54,381	$0.02	$0.04	4.3	3.1	3.4
Industrial Expansion	43	47	373,603	$48,334	$88,856	$0.02	$0.04	3.9	2.2	3.4
Total	90	187	786,686	$144,005	$239,609					

* Based on Cumulative Savings in 2025
** Based on December 2005 Rate Schedule