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IDAHO POWER®
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DEMAND-SIDE MANAGEMENT

2018 ANNUAL REPORT

MARCH 15 • 2019

SUPPLEMENT 2: EVALUATION

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Evaluation and Research Summary

Idaho Power considers program evaluation an essential component of its demand-side management (DSM) operational activities. The company contracts with third-party contractors to conduct impact, process, and other evaluations on a scheduled and as-required basis.

Third-party contracts are generally awarded using a competitive bid process managed by Idaho Power's Corporate Services. In some cases, research and analysis is conducted internally and managed by Idaho Power's Research and Analysis team within the Customer Relations and Energy Efficiency (CR&EE) department. Third-party evaluations are specifically managed by the company's energy efficiency evaluator.

Idaho Power uses industry-standard protocols for its internal and external evaluation efforts, including the *National Action Plan for Energy Efficiency—Model Energy Efficiency Program Impact Evaluation Guide*, the *California Evaluation Framework, the International Performance Measurement and Verification Protocol* (IPMVP), the *Database for Energy Efficiency Resources*, and the Regional Technical Forum's (RTF) evaluation protocols.

The company also supports regional and national studies to promote the ongoing cost-effectiveness of programs, the validation of energy savings and demand reduction, and the efficient management of its programs. Idaho Power considers primary and secondary research, cost-effectiveness analyses, potential assessments, impact and process evaluations, industry best-practice analyses, and customer surveys as important resources in providing accurate and transparent program savings estimates. Recommendations and findings from evaluations and research are used to continuously refine Idaho Power's DSM programs.

In 2018, Idaho Power contracted with Tetra Tech MA to conduct three program impact evaluations and one program process evaluation, DNV GL to conduct a program savings determination analysis, Resource Action Programs to conduct two program summary analyses, and Aclara to conduct one program summary analysis. Impact evaluations were performed for Energy Efficient Lighting, Multifamily Energy Savings Program, and the Custom option of the Commercial and Industrial Energy Efficiency Program. A process evaluation was performed for the Multifamily Energy Savings Program and a savings determination analysis was conducted for the Shade Tree Project. Program summary analyses were performed for the Energy-Savings Kit Program, the Energy Wise Program, and the Home Energy Reports pilot project. Idaho Power conducted internal analyses of the 2018 demand response events for A/C Cool Credit, Irrigation Peak Rewards, and Flex Peak Program.

Throughout 2018, Idaho Power administered several surveys regarding energy efficiency programs to measure customer satisfaction. Some surveys were administered by a third-party contractor; other surveys were administered by Idaho Power either through traditional paper and electronic surveys or through the company's Empowered Community online survey.

An evaluation schedule and final reports from all evaluations, research, and surveys completed in 2018 are provided in *Supplement 2: Evaluation*.

Evaluation Plan

Energy Efficiency 2010–2020 Program Evaluation Plans

Program Evaluation Schedule[1]	2010			2011			2012			2013			2014			2015[3]			2016			2017			2018			2019			2020		
	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other	Impact	Process	Other
Residential Programs																																	
Energy House Calls		✓		✓																								✓	✓				
ENERGY STAR® Homes Northwest											✓		✓																				
Heating & Cooling Efficiency Program		✓					✓				✓											✓	✓										
Rebate Advantage				✓															✓	✓											✓		
Weatherization Solutions for Eligible Customers							✓				✓				✓												✓						
Weatherization Assistance for Qualified Customers							✓				✓				✓												✓						
Residential Energy Efficiency Education Initiative		✓																			✓												
Shade Tree Project	N/A[2]													✓													✓						
Home Energy Audit	N/A													✓								✓											
Educational Distributions	N/A																														✓	✓	
Simple Steps, Smart Savings™	N/A																														✓		
Multifamily Energy Savings Program	N/A																								✓	✓							
Home Energy Reports	N/A																										✓					✓	
Residential New Construction Pilot Program	N/A																											✓	✓				
Commercial/Industrial Programs																																	
New Construction		✓					✓												✓				✓					✓					
Custom Projects		✓		✓									✓	✓									✓		✓								
Retrofits		✓					✓				✓								✓				✓					✓					
Irrigation Programs																																	
Irrigation Efficiency Rewards		✓									✓			✓					✓	✓											✓		
Demand Response Programs																																	
A/C Cool Credit						✓		✓				✓			✓			✓			✓			✓			✓			✓			✓
Flex Peak Program						✓					✓							✓			✓			✓			✓			✓			✓
Irrigation Peak Rewards						✓						✓			✓			✓			✓			✓			✓			✓			✓

[1] Does not include Green Motors or Oregon Residential Weatherization.

[2] N/A indicates program not yet in existence.

[3] Energy efficiency programs evaluated in 2015 have since been eliminated or combined into another program.

ENERGY EFFICIENCY ADVISORY GROUP NOTES

The following pages include notes from EEAG meetings held on February 8, May 1, August 9, and October 20, 2018.

Energy Efficiency Advisory Group (EEAG)
Notes dated 2/8/2018

Present:

Pete Pengilly*-Idaho Power
Tina Jayaweera-Northwest Power & Conservation Council
Stacey Donohue–Idaho Public Utilities Commission
Jim Hall-Bodybuilding.com
Diego Rivas–Northwest Energy Coalition
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Connie Aschenbrenner-Idaho Power
John Chatburn–Office of Energy & Mineral Resources
Sid Erwin–Idaho Irrigation Pumpers Association

Not Present:

Kent Hanway-CSHQA
Ken Robinette–South Central Comm. Action Partnership
Nadine Hanhan–Public Utility Commission of Oregon

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Tracey Burtch*–Idaho Power
Shelley Martin–Idaho Power
Billie McWinn*–Idaho Power
Gary Grayson–Idaho Power
Todd Greenwell–Idaho Power
Chellie Jensen–Idaho Power
Rachelle Farnsworth-Idaho Public Utilities Commission
Dan Johnson (on phone)-Avista
Becky Arte-Howell-Idaho Power
Denise Humphreys-Idaho Power
Dave Angel*-Idaho Power
Becky Andersohn-Idaho Power
Roger Lawless*-Idaho Power
Gina Powell-Idaho Power
Sheree Willhite-Idaho Power
Mindi Shodeen-Idaho Power
Phil DeVol-Idaho Power
Brandon Capps-Idaho Public Utilities Commission
Annie Meyer*–Idaho Power
Theresa Drake–Idaho Power
Andrea Simmonsen–Idaho Power
Debra Leithauser*-Idaho Power
Cheryl Paoli–Idaho Power
Zeke VanHooser-Idaho Power
Chris Pollow–Idaho Power
Rob Ord-Idaho Power
Brittany Nixon-Idaho Power
Kevin Keyt-Idaho Public Utilities Commission
Donn English-Idaho Public Utilities Commission
Jared Hansen-Idaho Power
Adam Richins-Idaho Power
Brad Iverson-Long-Idaho Public Utilities Commission
Dylan Martin-Idaho Power
Tasha Tolley-Idaho Power
Johan Kalala-Kassanda-Idaho Public Utilities Commission
Tonja Dyke-Idaho Power
Katie Pegan-Office of Energy and Mineral Resources

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:30am

Rosemary started the meeting with introductions of members and guests. Pete expressed appreciation for members of EEAG and their time. All the savings shown in the presentations is preliminary. The upcoming dates for EEAG meetings are: May 1st, August 9th, and October 30th. There were no comments on the November 1st, 2017 meeting notes.

9:35 am Transmission & Distribution Deferral Benefits—Dave Angell

Dave addressed the group regarding the ongoing analysis of transmission & distribution deferral benefits. He initially presented to EEAG on this topic in August of 2016. The following points were presented by Tina Jayaweera and Dave Angell:

- An action item that came from The Northwest Power and Conservation Council's (NWPCC) Seventh Power Plan was to improve the methodology of valuing energy efficiency's ability to defer transmission and distribution. In August of 2017 regional utilities were asked to share with the NWPCC how they were estimating this value. There were ten utilities present and they all had different methodologies. The goal of that meeting was to find a method that would work on a regional level.

- Idaho Power's deferral calculation is based on the present value of capital expenses that are approved by officers and board members. The approvals are for the current year but can span three years. A larger percentage of projects are infrastructure replacement. Originally Idaho Power analyzed energy efficiency benefits out seven years. The feedback was that benefits should have longer than a seven-year life, so calculations will be done for twenty years.

- Tina discussed Idaho Power's involvement in working with the NWPCC. Capital growth varies depending on what is happening in the economy. The NWPCC is looking at broader periods that take in to account the boom and bust cycles. All utility methodologies will be slightly different but the NWPCC will have a regional value to work with.
- The purpose is to apply a fair value of transmission and distribution deferral to determine the cost effectiveness of energy efficiency. Idaho Power will update their methodology and continue to support development of a regional approach with understanding that the company's own methodology will be used in the future. Idaho Power will present at the IRP and will come back to EEAG again.

There were questions and comments around the average age of Idaho Power's infrastructure, average growth rates and average prices, the value of looking at past and future data regarding the assessment of capital spending.

10:05 am -Residential Programs—Billie McWinn

Billie's presentation of the residential programs gave an overview of each program, the differences, and what category they fall in to: direct install, incentives, giveaways, buy-downs, and behavioral. Preliminary participation and year-end savings for each program was provided.

- Overall 2017 savings for residential programs is up 56% from 2016

- In the last three years, there have been seven new residential programs and six new offerings within existing residential programs.

- Twelve Multifamily projects were completed in 2017. Costs are lower when all units in a complex are done in one day rather than scheduling one at a time. Idaho Power personnel, the contractor, and a representative from the site first walk-through the complex and determine what needs to be done. They then order product and schedule a time to come back and install the items in each unit. One member commented that maybe there could be some efficiencies by combining the walk-through and installation into one visit rather than two.

- There is a finite number of manufactured homes in Idaho Power's service area that can participate in the Energy House Calls program. The company is regularly sending out direct mail. Marketing this program will continue for as long as it is cost-effective. One member suggested having the targeted marketing piece mention "your neighbors have participated in this program, now's the time to take advantage of it." Billie pointed out that contractors are commenting that direct installs are decreasing because customers have received and installed items from the Energy Savings Kit.

- In 2018, a smart strip will be an available measure added to the Home Energy Audit program. One member asked about follow up with customers after an audit is performed. A report is sent to the customer and the auditor calls them.

- At the last meeting, Idaho Power presented the new HVAC tune-up coupon offering in the Easy Savings program. This launched in November of 2017.

- The Residential New Custom Home pilot is expected to launch March 2018 in Idaho and April 2018 in Oregon. This offering will replace the Energy Star® program.

- The Shade Tree Project will expand into Twin Falls for 2018. This year the company is expecting to start realizing energy savings from this project.

- Billie passed around the new residential customer kits. These kits will be sent to customers who have a brand-new account with Idaho Power.

- Billie spoke to the group about Energy Savings Kits used for giveaways at high bill calls or events. These are the same as the non-electric mail by request kits and asked if EEAG is in favor of continuing to support the savings from these giveaway kits? Being that the interactions are targeted to a more engaged customer, the consensus of the group was favorable for continuing as is.

10:15 am-Break

10:25 am- Resume Residential presentation

- Kathy presented updated numbers regarding future lighting savings from those discussed at the November 2017 EEAG meeting. Jennifer Light of the Regional Technical Forum (RTF) will provide an update on lighting savings at the next meeting.

- Billie presented new findings related to showerheads offered in the Simple Steps, Smart Savings program. This was in response to a request at the November meeting where EEAG suggested the Company should consider market indicators before deciding on whether to continue offering the measure in the program. Based on the findings, the group felt that the company should continue offering the showerheads in the program.

There were questions and comments about looking at incentives on items for smart homes, including the RTF on analysis findings of Smart Thermostats, and make sure to check in with NEEA before removing Smart Sense showerheads from Simple Steps, Smart Savings program.

11:40 am C/I & Irrigation Programs—Quentin Nesbitt

Quentin provided preliminary savings and participation for the Commercial, Industrial, and Irrigation programs. Generally, all the programs in the commercial & industrial sector can be categorized under incentive and the cohorts fall under behavioral savings.

- The driver for measure updates in 2018 are based on the update of building codes and standards.
- The Technical Reference Manual update will be completed in the spring of 2018.
- Idaho Power took suggestions and feedback from EEAG and developed the Commercial Energy Saving Kits. There will be three kits that are targeted to three small business customer types; restaurants, offices, and retail.
- The amount of capital projects generated from the Wastewater and Water Cohorts has increased. Quentin thanked EEAG for their input on expanding this offering to the eastern region. He passed around informational collateral for the cohorts.
- Idaho Power is now sending out a welcome packet to new irrigation customers. This packet informs customers about the agriculture representatives and the current programs. At the last meeting, Quentin asked for feedback on an idea for a dealer incentive. The feedback from EEAG was that it wasn't a good idea. One member has since reached out and provided input and ideas on how to achieve better installation rates.

There was a question about whether Idaho Power is looking at a whole building approach in the New Construction Program. Idaho Power offers a whole building approach through energy modeling and the custom portion of its program. There was also a question about Dedicated Outdoor Air Systems (DOAS). Idaho Power is currently evaluating DOAS as an incentive measure for the New Construction program. Idaho Power currently offers technical Lunch & Learn training on DOAS systems through the Integrated Design Lab, however the Company does not claim savings for trainings. One member thanked Idaho Power for the continuation and expansion of the Wastewater & Water Cohort offering. Due to new regulations on the horizon, this will be very helpful for these customers.

Quentin and Billie presented information on the types of communication devices each demand response program uses. Billie provided preliminary information regarding a limited number of non-communicating devices identified in the residential DR program. Billie discussed that a new testing device was available that would help determine the cause of some communication issues. She asked for input on how the Company should proceed with non-communicating devices and the consensus was to continue with testing of the devices before any changes to participation were made. Billie will bring a testing process plan to the group in May.

12:30 Lunch

1:15 Meeting Reconvened

1:15 pm-Customer Solutions Advisor Activities—Roger Lawless

Roger presented the Customer Solutions Advisor (CSA) activities and how they support energy efficiency efforts. The CSA's make outbound calls to commercial customers and irrigation customers, and as a part of those calls they discuss Idaho Power's energy efficiency programs. They also respond to Home Energy Report inquiries, actively working with customers to update their My Account information to improve the accuracy of the reports or addressing other concerns or questions.

1:32 pm-My Account/Customer Touchpoints—Todd Schultz

Todd updated EEAG on Customer Care Initiatives, My Account registration redesign and energy efficiency promotion within My Account. One member suggested targeting those customers who have viewed energy efficiency pages with specific information. EEAG appreciates the work Idaho Power has done on text alerts and the improvements made to My Account.

1:57 pm-2017 Preliminary Energy Savings Results/Financials—Pete Pengilly

Pete briefly highlighted Appendix 1, the 2017 DSM Expenses and Preliminary Energy Savings by program. He presented the 2017 Preliminary Energy Savings Portfolio results.

- The company will receive preliminary savings numbers from NEEA at the end of February.
- Energy efficiency savings for 2017 was the highest it's been since 2010.

There were comments that the company does a good job exploring future program offerings.

2:20 pm-Marketing—Debra Leithauser, Tracey Burtch, Annie Meyer

Debra Leithauser introduced herself as the new Director of Corporate Communications and gave a brief history of how marketing has changed over time. Annie and Tracey presented an update on marketing activities since the last EEAG meeting. The following points were presented:

- The company's marketing tactics were shown in how they fall within the marketing funnel.
- At the last EEAG meeting, the group requested more information on how marketing tactics drive participation in programs. Information from a survey was provided to show the percentage of residential customers are familiar with energy efficiency programs and the overall improvement of customers who feel that their energy efficiency needs are met.
- Idaho Power is now participating in a new earned media opportunity in Twin Falls. A new energy saving habits video was played.

There were questions and comments regarding direct mailings, using My Account as a platform to engage customers rather than using direct mail, and ideas on what is done in other organizations to track people that have engaged with them; databases, social media, direct mailings, and events.

2:56-Break

3:12 pm-Wrap Up/Open Discussion

- The morning agenda was very full. Didn't find the My Account or CSA information relevant to the meeting.
- It was a very interesting meeting. We learned a lot about the programs today which helps new members.

- Appreciate the topics presented this morning as it was very helpful for new members and attendees. The afternoon session was good. All the broad-based stuff; text alerts, My Account, and marketing is the information that the group has been asking for. It's nice to see good program results under difficult market conditions.

- Enjoyed the entire meeting including; marketing and social media. It is interesting to see how the company is driving people to My Account and how it will translate into energy savings.

- The morning session was content heavy. Appreciated how the residential presentation was categorized. I enjoy the evaluation presentations and look forward to seeing M&V results.

- The customer topics fit with today's topics and tied in nicely. It would be nice to see a deeper dive into how it connects. Appreciated being able to go over the programs in more detail. There has been a marketing presentation at every meeting so maybe that can be cut back to every other time.

- The EEAG meetings have changed for the better and the presentations have become more meaningful.

Rosemary opened the discussion to the group. There were comments and questions about building codes and that there will be more opportunity for people to stay engaged, discussion around the Energy Imbalance Market and what that means for energy efficiency, what Idaho Power plans to regarding the lowered energy savings numbers for lighting and how the group can focus their efforts to find new and interesting ways to drive people to programs, allowing more space on the agenda for brainstorming ideas, and a suggestion to have someone from NEEA speak at a future EEAG meeting.

Theresa addressed the group and expressed appreciation for everyone's contributions and feedback. She thanked the group for their recognition of 2017 results. The company took recommendations that EEAG made throughout the year and has incorporated them. The company is committed to pursuing all cost-effective energy efficiency and is looking to EEAG to assist it in those endeavors.

3:51 Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Notes May 1, 2018

Present:

Kent Hanway-CSHQA
Ken Robinette–South Central Comm. Action Partnership
Stacey Donohue*–Idaho Public Utilities Commission
John Chatburn–Office of Energy & Mineral Resources
Connie Aschenbrenner–Idaho Power
Haley Falconer-City of Boise Public Works Department
Diego Rivas-Northwest Energy Coalition-on phone
Don Strickler–Simplot
Tina Jayaweera-Northwest Power & Conservation Council-on phone
Selena O'Neal-Ada County Operations
Sid Erwin–Idaho Irrigation Pumpers Association
Pete Pengilly*-Idaho Power

Not Present:

Jim Hall-Bodybuilding.com
Ben Otto-Idaho Conservation League
Nadine Hanhan–Public Utility Commission of Oregon

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Tracey Burtch*–Idaho Power
Shelley Martin–Idaho Power
Billie McWinn*–Idaho Power
Gary Grayson–Idaho Power
Todd Greenwell–Idaho Power
Chellie Jensen–Idaho Power
Jerry Peterson-Division of Building Safety
Denise Humphreys-Idaho Power
Randy Thorn-Idaho Power
Phil DeVol-Idaho Power
Tonja Dyke-Idaho Power
Sheree Willhite-Idaho Power
Cassie Koerner-Idaho Public Utilities Commission
Mark Rehley*-Northwest Energy Efficiency Alliance
Craig Williamson*-DNV-GL
Mike Alvarado-Bonocore
Cory Read–Idaho Power
Ariel Minter–Idaho Power
Andrea Simmonsen–Idaho Power
Annie Meyer*-Idaho Power
AJ Freeman–Idaho Power
Dan Axness-Idaho Power
Chris Pollow–Idaho Power
Kevin Keyt-Idaho Public Utilities Commission
Brittany Nixon-Idaho Power
Bryan Wewers-Idaho Power
Lynn Tominaga-Idaho Irrigation Pumpers Association
Mindi Shodeen-Idaho Power
Katie Pegan-Office of Energy and Mineral Resources
Yao Yin-Idaho Public Utilities Commission
Jennifer Light*-Northwest Power and Conservation Council
Shawn Bodmann*-DNV-GL
Sonexay Sengmany-City of Boise

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin-RBCI

Meeting Convened at 9:38 am

Pete started the meeting with housekeeping and emergency items, introduction of two new members; Hayley Falconer and Selena O'Neal, EEAG members and guests. There were no comments or questions on the February notes. Pete stated that due to the timing of the earnings release, the financial information will not be presented at this meeting. Those documents will be emailed to members later in the week. Tracey Burtch provided two updates regarding account and outage alerts.

9:44 am-2017 Evaluations—Craig Williamson & Shawn Bodmann-DNV GL

Craig introduced himself and Shawn. Several programs were evaluated during 2017, based on program year 2016. The three Commercial and Industrial programs had process evaluations. An impact and process evaluation were done for Residential Heating & Cooling Efficiency (H&CE) and the Residential Home Energy Audits (HEA) had an impact evaluation. Craig and Shawn covered the evaluation objectives, method highlights, and detailed findings for each program.

There were questions and comments regarding the benchmarking of program incentives, the evaluation schedule for programs, tracking or testing of the effectiveness of marketing, and how and when the evaluation findings get incorporated into programs.

11:20 am-Idaho Public Utilities Commission—Stacey Donohue-Idaho Public Utilities Commission

Stacey provided an overview of the Idaho Public Utilities Commission (IPUC). Her presentation covered the history of the IPUC, who it regulates, what the regulatory compact is, what the role of the commission is, how regulatory cases are processed (including the roles of interveners and the Commission staff, and how the IPUC makes its decisions). Stacey also discussed the IPUC's role regarding demand side management (DSM).

Connie briefly explained the differences between energy efficiency program management in the Company's Oregon and Idaho jurisdictions. In Oregon, Idaho Power must file tariff schedules and receive approval from the Public Utility Commission of Oregon on program changes. In Idaho, the Company is not limited by tariff schedules; however, it files an annual prudence determination with the IPUC for authority to recover program costs from customers. The Company appreciates the valuable input received from members of EEAG.

12:00 Lunch

1:00 Meeting Reconvened

1:00 pm-Regional Technical Forum Overview—Jennifer Light-Regional Technical Forum

Jennifer provided an overview of the Regional Technical Forum (RTF). It included the origins of the RTF, the role of the RTF and its organization, what functions the RTF performs, the structure of the Subcommittees, and the processes of measurement development.

Jennifer also focused on residential lighting and the key parameters that are used to establish savings. The presentation included the current practices and market data for establishing baseline savings, estimating savings over time, and the inclusion of federal standards.

Idaho Power helps fund the RTF and has a representative on the RTF.

2:01 pm NEEA, Emerging Technology, and RETAC—Mark Rehley-NEEA

Mark provided information on the Northwest Energy Efficiency Alliance (NEEA), the vision and mission of NEEA and their role on behalf of the numerous companies in the northwest region that they work with. Their work is mostly done with manufactures and supply chains and not with end users. Their goal is to look for products that deliver the same value while also using less energy and eventual market transformation.

Mark explained the Regional Emerging Technology Advisory Committee (RETAC) was established in 2010 and provides a regional view, a consistent approach to research and development, and provides product readiness assessment.

Idaho Power has representation on the RETAC and has since its inception.

3:17 pm Programs Update—Quentin Nesbitt & Billie McWinn

Commercial/Industrial Programs:

Energy Saving Kits for Businesses:

All Idaho EEAG members received a small office energy saving kit for use at their respective office buildings. These kits were developed with input from EEAG to target Idaho Power's small business customer, and in addition to the small office kit, a kit for restaurants and small retail were created (the contents of the kit vary by type). The program will be launching in a week, and generally small business customers are contacted by the company's Customer Solutions Advisors and Customer Representatives. Kits include surveys and flyers providing information on Idaho Power's energy efficiency programs. Information gathered from the surveys along with savings numbers from the RTF will be used for cost effectiveness.

School Cohort:

EEAG was asked for input if Idaho Power should continue with year two of the School Cohort. EEAG expressed appreciation that the company is looking at ways to improve and continue this program. A comment was made that the Boise School District was happy to participate in this cohort and are looking forward to year two. The consensus of EEAG was that Idaho Power should continue the School Cohort for year two.

C&I Energy Efficiency Program:

Quentin presented some changes for prescriptive measures that will be made to the commercial & industrial programs that are based on code changes, savings, measure costs, market acceptance, and cost effectiveness.

Residential Programs:

Billie led a discussion on the A/C Cool Credit program non-communicating switches and provided an update on the Home Energy Reports.

At the EEAG meeting in February the group discussed a limited number of non-communicating devices that were identified in the A/C Cool Credit program, and Billie committed to bring back a plan for testing the non-communicating devices. She provided detailed information of the testing protocol, which would result in participant removal as a last resort, and asked for feedback from EEAG on the new protocol.

There were questions and comments regarding the current process to work with customers on non-communicating devices and the process the company goes through to determine unknown causes. EEAG was in favor of Idaho Power moving forward with the new protocol.

4:22 pm-Wrap Up/Open Discussion

- It was a long day filled with great presentations. The educational presentations were great. These presentations would be great for new members.
- There was a lot of great information which helps the group to help Idaho Power work on finding cost effective savings.
- The variety of educational topics were appreciated.
- It was a great day for new members to start because of the updates and educational material.
- Great educational presentations. Thanks to all the out of town presenters for speaking to the group, it’s great to have the experts explain what their organizations do.
- The program content was informational and helped the group understand what the organizations do. These topics would be a great “boot camp” to help get new members up to speed.
- Appreciated the educational topics and getting updates on what has happened since the last meeting.

4:40 pm Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Notes dated 8/9/2018

Present:

Kent Hanway-CSHQA
Ken Robinette–South Central Comm. Action Partnership
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition (on phone)
Lynn Tominaga–Idaho Irrigation Pumpers Association
Nadine Hanhan–Public Utility Commission of Oregon (on phone)
Jim Hall-Bodybuilding.com
Selena O'Neal-Ada County Operations
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Scott Pugrud–Office of Energy & Mineral Resources
Connie Aschenbrenner–Idaho Power
Pete Pengilly*-Idaho Power
Tina Jayaweera-Northwest Power & Conservation Council
Haley Falconer-City of Boise Public Works Department

Not Present:

Sid Erwin–Idaho Irrigation Pumpers Association

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Annie Meyer*–Idaho Power
Shelley Martin–Idaho Power
Billie McWinn*–Idaho Power
Gary Grayson–Idaho Power
Todd Greenwell–Idaho Power
Chellie Jensen–Idaho Power
Sheree Willhite-Idaho Power
Royce Davis*-City of Boise
Don Reading-Industrial Customers of Idaho Power
Rachelle Farnsworth-Idaho Public Utilities Commission
Paul Goralski-Idaho Power
Mindi Shodeen-Idaho Power
Katie Pegan-Office of Energy & Mineral Resources
Kevin Keyt-Idaho Public Utilities Commission
Krista West-Idaho Power
Grant Black-Idaho Power Student Intern
Cassie Koerner-Idaho Public Utilities Commission
Anna Kim-Public Utility Commission of Oregon (on phone)
Cory Read–Idaho Power
Theresa Drake–Idaho Power
Andrea Simmonsen–Idaho Power
Randy Thorn-Idaho Power
Cheryl Paoli–Idaho Power
Zeke VanHooser-Idaho Power
Chris Pollow–Idaho Power
Bill Carr*-Suez Water Company
Rito Reynoso-Metro Community Services
Peter Richardson-Industrial Customers of Idaho Power
Jerry Peterson-Division of Building Safety
Brittany Nixon-Idaho Power
Zach Waterman-Sierra Club
Adam Richins-Idaho Power
Mary Hacking-Idaho Power
Tonja Dyke-Idaho Power
Denise Humphreys-Idaho Power
Bentley Erdwurm-Idaho Public Utilities Commission

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi* (Idaho Power)

Meeting Facilitator: Rosemary Curtin-RBCI

Meeting Convened at 9:34am

Pete started the meeting with introduction of members and guests, safety, and housekeeping He informed the group that Ken Robinette will no longer be a member of EEAG. Ken was recently appointed to the Department of Energy's State Advisory Board by the Secretary of Energy, Rick Perry. Pete presented Ken with an appreciation gift for his 16 years of service to the EEAG.

9:46 Am-Preliminary Cost Effectiveness—Kathy Yi

Kathy presented a high-level view of program cost-effectiveness and will provide a more in-depth presentation at the October meeting. She provided a brief explanation of the different cost-effectiveness tests, a DSM alternate cost comparison, and the anticipated changes that may impact programs in 2019.

There were questions and discussion about alternative costs, and whether the company includes capacity benefits in its calculations. Kathy answered that in addition to alternative costs, the company applies a load shape and anything that has savings during peak hours is given a capacity value.

10:42-Programs—Billie McWinn and Quentin Nesbitt

Residential Programs:

Billie provided an update on year-to-date savings for each program and led a discussion on the Home Energy Reports and Multifamily Direct Install program. She provided an update on the Home Energy Reports which included first year savings and the objectives for year two. The attrition rates for year one were due to move-in's and move-outs, and overall the program had high customer satisfaction. The Multifamily Direct Install program timeline was discussed. A process and impact evaluation are being done on this program in 2018.

There were questions and comments asking if Idaho Power has received feedback from customers on the Thermostatic Showerheads and how to use them. A suggestion was made to have the evaluators ask customers if they like the showerheads and if they are still installed.

Commercial/Industrial/Irrigation programs:

Quentin provided preliminary year-to-date savings and participation for the Commercial, Industrial, and Irrigation programs.

- **New Construction**

  Program changes have been filed in Oregon and the company anticipates a Commission order by August 15th. There was discussion around using signage for Idaho Power programs at job sites and some of the barriers associated with that.

- **Retrofits**

  This portion of the program also will change with the Oregon filing. Some incentives are being lowered so there is a push by some contractors to get projects in before program changes are implemented. The program has seen quite a few large non-lighting projects, especially among a few large industrial customers, but lighting continues to comprise most of the savings for retrofits.

- **Energy Saving Kits**

  The Customer Solutions Advisors are completing outbound calls to all new business customers to introduce them to Idaho Power, the company's energy efficiency programs, and the Energy Saving Kits. A specific list of Idaho Powers smallest office, retail, and restaurant customers are also specifically being called to promote the Commercial Energy Savings Kits. There was some discussion on how long the company thought it would take to call these customers. Quentin estimated that it would be done by the end of the year.

- **Custom Projects**

  There was a question about how often the same customer participates with a different facility vs. a customer participating for the first time. Quentin answered that the majority of participation is the same customer with a different location or facility. An example was given of a project that was in the planning stage for 10 years prior to being completed. There are a lot of people and decisions that go into completing upgrade projects.

- **Demand Response**

  Quentin provided an overview of the season and preliminary savings estimates for the Flex Peak, AC Cool Credit, and Irrigation Peak Rewards programs and explained how the nomination process works for Flex Peak in response to an EEAG member question. There was some discussion around an online dashboard for real time data. Idaho Power is working on a system to provide interval data for all large customers but not real time data. Customers can get real time data through KYZ output from the Idaho Power meter and put it into their own software systems.

- **Irrigation Efficiency**

  There are some reduced savings assumptions from the Regional Technical Forum (RTF) for the menu portion of this program. The company may have more information to present at the next meeting.

12:00 Lunch

1:00 pm-Municipal Water Supply Optimization Cohort —Bill Carr-Suez Water Co and Royce-City of Boise

Quentin introduced Bill Carr of Suez and Royce Davis of the City of Boise. They spoke about their participation in the water supply cohort with Idaho Power. They gave a background of their systems, spoke to the barriers and challenges they encountered, the successful projects they accomplished, and lessons learned.

There were comments and questions about reduction in water usage, how they overcame the barriers within their companies, and how capital projects were processed through Idaho Power's incentive programs. EEAG members thanked Idaho Power for running these cohorts and thanked Bill and Royce for sharing their experiences and how it impacts operations.

2:00 pm-Marketing Update—Annie Meyer

Annie updated the group on the latest marketing efforts since the last EEAG meeting. She highlighted the marketing funnel and how it relates to the company's Spring Awareness Campaign. She also provided definitions for the terms: Reach, Frequency, and Impressions which provided context for the company's ads on network TV, radio, and digital. She also highlighted the changes to marketing collateral based on feedback that EEAG provided.

There were comments and questions about how many customers read the company's newsletter, Connections, having a pop-up on the company's website encouraging people to read Connections, creating a pop-up ad to target a customer who is looking to compare their current months' usage to last year, and a request to get the click thru rate for programs and unique number of users to that site.

Annie then spoke to the group about the upcoming fall pledge. She asked EEAG members to form small groups to brainstorm ideas for simple low-cost or no-cost actions customers can pledge to save energy and money. Rosemary explained the expectations of the breakout session and split the members into two groups. She asked for one person from each group to report out once the exercise was complete.

Stacey Donohue reported for her group, their ideas were: line dry clothes, install timers on outdoor lights, use an Insta-pot (old pledge listed crockpot), close blinds on hot days, open on cold days, replace your 5 most used light bulbs w/LED, use a robot vacuum, program thermostat.

Scott Pugrud reported for his group, their ideas were: increase a/c by 2 degrees, use outdoor light sensors, take a seven minute or less shower, install low flow showerhead, change air filter, sign up for energy saving kit, hang dry clothes, check temperature on hot water heater, unplug cell phone charger when not in use.

3:15 pm-Wrap-up/Open discussion

- This was the right sized agenda, liked diving deeper on just a couple topics
- Enjoyed the cohort presentation and encourage Idaho Power to consider other areas to continue that model. A presentation on the Integrated Resource Plan (IRP) that has been adopted.
- Thank you for the cohort presentation. It was very useful to hear customer perspectives. An IRP presentation would be helpful.
- Appreciated the cohort presentations.
- Would like to see more examples like the successes of the cohorts.
- Thank you for the newspaper insert. Idaho Power does a great job with marketing.
- It was interesting to hear about the decision makers and those on the ground trying to get projects done. It was good to hear about the example of it taking 10 years to get a project done. Similar examples like those would be good to hear about.
- The cohort presentation was good and hearing about the people on the ground that were able to get things done.
- It is intriguing to see Idaho Power and Suez working together, are there plans for Idaho Power, Intermountain Gas and Suez to work more together?
- The multi-family project is interesting. From a city perspective, it can be a challenge to provide service. It will be interesting to see how the city can leverage this program.
- Looking forward to the cost-effectiveness discussion and to discuss the end goal of programs once the market has been transformed.

3:45 pm-Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Notes dated October 30th, 2018

Present:

Kent Hanway-CSHQA
Jim Hall-Bodybuilding.com
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition (on phone)
Connie Aschenbrenner–Idaho Power
Anna Kim–Public Utility Commission of Oregon
Haley Falconer-City of Boise
Selena O'Neal-Ada County Operations
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Scott Pugrud–Office of Energy & Mineral Resources
Sid Erwin–Idaho Irrigation Pumpers Association
Pete Pengilly*-Idaho Power
Tina Jayaweera-Northwest Power & Conservation Council

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Tracey Burtch*–Idaho Power
Shelley Martin–Idaho Power
Billie McWinn*–Idaho Power
Gary Grayson*–Idaho Power
Todd Greenwell–Idaho Power
Chellie Jensen–Idaho Power
Lisa Grow-Idaho Power
Adam Richins-Idaho Power
Donn English-Idaho Public Utilities Commission
Phil DeVol-Idaho Power
Kevin Keyt-Idaho Public Utilities Commission
Katie Pegan-Office of Energy & Mineral Resources
John Chatburn-Office of Energy & Mineral Resources
Braden Jensen-Idaho Farm Bureau Federation
Cory Read–Idaho Power
Theresa Drake–Idaho Power
Andrea Simmonsen*–Idaho Power
Becky Andersohn*-Idaho Power
Cheryl Paoli–Idaho Power
Zeke VanHooser-Idaho Power
Chris Pollow–Idaho Power
Darrel Anderson*-Idaho Power
Brian Buckham-Idaho Power
Tonja Dyke-Idaho Power
Dan Axness-Idaho Power
Cassie Koerner-Idaho Public Utilities Commission
John Anderson-Idaho Power
Krista West-Idaho Power
Butch Otter-Governor of Idaho

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:30am

Rosemary started the meeting with introduction of members and guests. There were no questions or comments on the August 8th notes.

9:35 am-Report out on Smart Saver Pledge—Andrea Simmonsen

Andrea updated the group on the status of the Smart Saver Pledge. It runs from October 1st thru November 20th. At the August meeting EEAG members worked in groups to help Idaho Power come up with new low or no-cost items to use in the pledge. Andrea informed the group that four out of the five items came from that break out session. She also explained the different avenues Idaho Power has communicated the pledge with customers. As of today, October 30th, there have been over 4,000 entrants. In prior pledge campaigns, the average has been about 1,000.

Follow-up Items

Quentin and Billie provided information on follow-up items from the August 9th meeting.

1. **When the Customer Solutions Advisors (CSA) are making outbound calls, what do customers see on their caller id?** Quentin stated that If they have subscribed to caller ID they will see "Idaho Power Company" on their phone. If they don't have that feature they will just see the phone number and not the name.

2. **A comment was made about sending out a postcard to our list of customers that are being contacted by the CSA**. Quentin stated that rather than a postcard, the Company is sending out a letter.

3. **A question was asked if Idaho Power has seen increased sign-ups for My Account from customers that receive a Home Energy Report.** Billie stated that there is no significant difference between the sign-up rates for the treatment group versus the control group.

9:48 am 2019 Preliminary Cost Effectiveness Results—Kathy Yi

Kathy provided an overview of the different tests that Idaho Power uses to determine cost-effectiveness and shared updated preliminary cost-effectiveness results for 2018 and 2019. She also highlighted the changes in the numbers that were presented during the August EEAG meeting. (Kathy's presentation will continue after Governor Butch Otters Award Presentation)

10:00 am-Award for Excellence in Energy Efficiency—Governor Butch Otter

The Governor presented Darrel Anderson and Idaho Power with the Governor's Award for Excellence in Energy Efficiency, recognizing the Company's efforts and leadership in energy efficiency. Darrel Anderson thanked the Governor and stated that Idaho Power is very proud and honored to accept this award. Darrel recognized how Idaho Power benefits from a group like EEAG who assists the Company in its pursuit of energy efficiency. In 2017, enough energy was saved to power 17,000 homes for one year. Darrel thanked the Governor again and accepted the award on behalf of Idaho Power customers and employees.

Preliminary Cost-Effectiveness presentation continued

Kathy highlighted some of the issues facing the Heating & Cooling Efficiency program and the Residential New Construction Pilot. Idaho Power is not making any major changes to the programs and if there are any changes it will be to improve the cost-effectiveness.

There were questions and comments regarding avoided costs and if energy efficiency is part of those calculations. A question about whether ductless heat pumps pass the Utility Cost Test (UCT) and the Participant Cost Test (PCT) by themselves, the assumptions for baseline savings for ductless heat pumps, and percentage of new residential construction that would be eligible for the new construction pilot incentive. Idaho Power will provide the answers and information at the next EEAG meeting.

Break-10:47am

10:59 am-Irrigation Efficiency Savings—Quentin Nesbitt

Quentin explained the Irrigation Efficiency Rewards program and the two types of incentives available to customers: the custom option and the menu option. Earlier this year, the Regional Technical Forum (RTF) voted to accept the reduced savings on the irrigation hardware /menu measures. Quentin provided examples of past measure savings methodology, Idaho Power's understanding of the RTF new methodology, and the modified methodology that Idaho Power is purposing to use for 2019. Quentin asked EEAG for input on using the modified methodology.

There were questions and discussion of several topics, including: how and when the original savings methodology was established, the frequency of sprinkler package replacement, if Idaho Power is mandated to use the RTF savings numbers, crop values and savings assumptions, and evaluation strategy.

Quentin explained Idaho Power is not mandated to use RTF savings, but because they are available they are highly valued. If the Company doesn't use those savings numbers, Idaho Power's regulators may expect it to provide rationale for why they were not used.

The majority of EEAG members were supportive of Idaho Power using the modified savings methodology for 2019 and reporting back to EEAG on any further research that is done. One member did not support Idaho Power using the modified savings. It was stated that the RTF savings assumptions may have been misapplied by Idaho Power.

12:05 Lunch

12:48 Meeting Reconvened

12:48 pm-2017 Idaho Prudence Order Overview—Connie Aschenbrenner

Connie provided an overview of how Idaho Power manages its programs in Idaho vs. Oregon. In Oregon, programs and incentives are approved by the OPUC and included in schedules contained within the Company's tariff. An annual cost-effectiveness review is performed. In Idaho, there are no energy efficiency program tariff schedules that are approved by IPUC. Rather, the Company applies for a prudence determination on what was spent the previous year. She highlighted the 2017 prudence filing timeline and the comments that were filed. The Company felt that today's meeting and a future meeting would be the best opportunity to address the Idaho Commission order directing the Company address each of the topics raised by parties during the case with the EEAG.

Topic #1- "**Not over-emphasize the results of its empowered community surveys when designing programs for all of its customers."**

Becky Andersohn provided the background and function of the empowered community. It is an online panel made up of residential customers. Idaho Power established this community because it is a low-cost opportunity to receive feedback from customers fast. It is not intended to replace Idaho Power's regular surveys but used as an overall Company resource. It is not the sole source of customer feedback. Some surveys are used for energy efficiency topics and some are used for other Company issues.

Once a year the community is reviewed and members that aren't active participants are given one last chance to participate. If they don't, they are removed from the pool of participants. Community members also have the option to opt out of a survey when they receive it.

Billie provided examples of the types of questions asked in a survey for energy efficiency.

Rosemary asked the group if Idaho Power is using the empowered community appropriately, and if not, how it should be used going forward.

There was discussion and questions regarding other resources that the Company uses to make program decisions, the reason this topic was part of the comments in the Commission's order, and that moving forward the Company needs to be clearer on the multiple sources of information and how it uses the empowered community surveys.

Topic #2- "Include attic insulation in the multifamily housing program."

Billie briefly discussed the current offerings and qualifications for the Multifamily Energy Savings program. The Company explored adding windows, wall insulation, attic insulation, and floor insulation into this program. There were two combinations that passed cost effectiveness with conditions: attic insulation and floor insulation. Idaho Power stated that from a Company perspective it is a good idea to add attic insulation to the program, but not floor insulation because it requires a more invasive test (drilling holes in floors) and chances of a building meeting the criteria are slim.

Rosemary asked the group if Idaho Power should include attic insulation as an option into the multifamily housing program.

There was discussion and questions regarding cost sharing between Idaho Power and a building owner, if the incentive would cover the insulation, if the Company looked at low e window attachments, and cost effectiveness. In general, EEAG was in favor of the Company including attic insulation into this program.

Topic #3- "Expand cohort group partnerships with municipalities and school districts."

Quentin explained the different cohorts that Idaho Power has offered in its service territory and the timelines of each and the status on how Idaho Power has continued or expanded each of the cohorts. Quentin also explained there is no real industry standard in determining cost effectiveness for the cohorts. Idaho Power is engaged with other utilities and the RTF to establish protocol around how to determine cost-effectiveness.

Rosemary asked EEAG for their thoughts on the cohorts.

There was discussion and questions regarding the cost of cohorts to the Company, how to determine cost effectiveness, the success of the cohort model and how to continue it in other industries such as data centers or correctional facilities. In general, EEAG encouraged Idaho Power to continue with the cohort model, providing they are cost effective.

Topic #4- "Explore small business design options"

Quentin presented that Idaho Power currently has programs that small business customers can and do participate in: Commercial & Industrial Efficiency program which has measures for New Construction, Retrofits, and Custom projects for all sizes of business customers. Idaho Power also recently launched the energy savings kits for its smallest customers. Quentin explained basic details of the current Commercial & Industrial program and showed current program participation by customer size.

Quentin also stated that Idaho Power is initiating a request for proposal (RFP) for a small business direct install program. This will enable the Company to determine cost effectiveness and potential structure and overlap of an offering.

Rosemary asked the group for their thoughts on a small business option.

There was discussion and questions regarding the RFP and when the responses would come in, a pay for performance model, the challenges of a building owner vs. building tenant and how to market to each type of customer. There was support from EEAG in looking into additional options for small businesses.

Topic #5- "Consider a more frequent evaluation schedule and follow industry norm of two to three years for both impact and process evaluations for each program."

Gary Grayson discussed Idaho Power's current evaluation strategy and goals. He explained the several types of evaluations, the timing, and schedule of those evaluations. He explained that a variety of vendors are used year after year for evaluations for transparency

Rosemary asked for the groups thoughts.

There was discussion and questions regarding economies of scale, amortizing evaluation expenses, showing the cost effectiveness of a program with and without the cost of the evaluation included, industry standards for evaluation frequency, and Idaho Power providing a forward-looking schedule for program evaluations.

Topic #6- "Explore opportunities to engage customers in energy efficiency when they sign up for MyAccount."

Tracey walked the group through the steps a customer would take when registering for My Account. Step four was recently added to the registration process, asking if the customer wanted to receive information about Company news and energy efficiency. Currently, pop-ups are related to alerts but next month they will be related to energy efficiency

There was discussion and questions regarding the frequency of pop-ups, how the Company interacts with customers who are engaged thru My Account and push them toward program participation and saving energy, the use of how-to videos. In general, EEAG agreed that this topic will be an ongoing discussion at future EEAG meetings.

4:30 pm-Meeting Adjourned.

NEEA MARKET EFFECTS EVALUATIONS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
Building Commissioning Long-Term Monitoring and Tracking: 2017 Square Footage and Market Penetration Update	Commercial	The Cadmus Group	NEEA	Market Assessment
Commercial Windows Attachment (SGS) Initiative	Commercial	Navigant	NEEA	Market Assessment
Drive Power Initiative Long Term Monitoring and Tracking (LTMT) Report and ACE Model Assumption Update	Industrial	The Cadmus Group	NEEA	Market Assessment
Emerging Technology Quarterly Report	All	NEEA	NEEA	Quarterly Report
Emerging Technology Quarterly Report	All	NEEA	NEEA	Quarterly Report
Emerging Technology Quarterly Report	All	NEEA	NEEA	Quarterly Report
Energy Efficiency Through Windows	Residential	Arrow G Consulting	NEEA	Qualitative Research
Heat Pump Clothes Dryers in the Pacific Northwest – Abridged Field & Lab Study Report	Residential	NEEA	NEEA	Analysis
NEEA CRE Standard Evaluation: Final Report	Commercial	TRC Energy Services	NEEA	NEEA Assessment
NEEA Residential Furnace Fan Standard Evaluation: Final Report	Residential	TRC Energy Services	NEEA	NEEA Assessment
Northwest Ductless Heat Pump Initiative Market Progress Evaluation Report 6	Residential	The Cadmus Group	NEEA	Market Assessment
Northwest Ductless Heat Pump Initiative: Market Progress Evaluation #7	Residential	The Cadmus Group	NEEA	Market Assessment
Northwest Heat Pump Water Heater Initiative Market Progress Evaluation Report #4	Residential	Cadeo Group	NEEA	Market Assessment
Reduced Wattage Lamp Replacement: Market Intervention Strategies, Market Size and Next Steps	Commercial	Cadeo Group	NEEA	Market Assessment
Residential Building Stock Assessment II, Manufactured Homes Report 2016 2017	Residential	The Cadmus Group	NEEA	NEEA Assessment
Residential Building Stock Assessment II, Multifamily Buildings Report 2016 2017	Residential	The Cadmus Group	NEEA	NEEA Assessment
Residential Building Stock Assessment II, Single-Family Homes Report 2016 2017	Residential	The Cadmus Group	NEEA	NEEA Assessment
Secondary Glazing System (SGS) Moisture Analysis and Validation	Residential/ Commercial	Berkeley National Lab	NEEA	Analysis
Water Heater Market Characterization Report	Residential	Russell Research	NEEA	Market Assessment

Report titles appearing in blue are links to the online versions of the reports. A PDF of this supplement can be found at idahopower.com/ways-to-save/energy-efficiency-program-reports/.

INTEGRATED DESIGN LAB

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
2018 Task 1: Foundational Services	Commercial	IDL	Idaho Power	EE Assistance & Education
2018 Task 2: Lunch and Learn	Commercial	IDL	Idaho Power	EE Training & Education
2018 Task 3: BSUG	Commercial	IDL	Idaho Power	EE Training & Education
2018 Task 4: New Construction Verifications	Commercial	IDL	Idaho Power	EE Verifications
2018 Task 5: Tool Loan Library	Commercial	IDL	Idaho Power	EE Assistance & Education
2018 Task 6 (1.6): Thermal Energy Savings Tool*	Commercial	IDL	Idaho Power	EE Assistance & Education
2018 Task 7: Building Energy Analytics Case	Commercial	IDL	Idaho Power	EE Research
2018 Task 8: Measuring Indoor Performance at Educational Facilities	Commercial	IDL	Idaho Power	EE Research

*Task 6 was numbered 1.6 in 2018.

2018 Task 1: Foundational Services

Summary of Projects

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:
Idaho Power Company

Author:
Elizabeth Cooper

Report Number: 1801_001-01

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While the recommendations in this report have been reviewed for technical accuracy and are believed to be reasonably accurate, the findings are estimates and actual results may vary. All energy savings and cost estimates included in the report are for informational purposes only and are not to be construed as design documents or as guarantees of energy or cost savings. The user of this report, or any information contained in this report, should independently evaluate any information, advice, or direction provided in this report.

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Acronyms and Abbreviations

AIA	American Institute of Architects
ASHRAE	American Society of Heating, Refrigeration, and Air-conditioning Engineers
BEQ	Building Energy Quotient
BOMA	Building Owners and Managers Association
EMS	Energy Management System
HID	High Intensity Discharge
IDL	Integrated Design Lab
IPC	Idaho Power Company
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
Op-Ed	Opinion Editorial
TI	Tenant Improvement
UI	University of Idaho

1. Introduction

The University of Idaho Integrated Design Lab (UI-IDL) provided technical assistance in 2018 for energy efficiency building projects through the Foundational Services task. This program, supported by Idaho Power Company (IPC), offered three phases of assistance from which customers could choose. A marketing flyer, developed in prior years, outlining the three phases is shown below. Phase I includes projects with budgets less than $2,000, Phase II is limited to projects from $2,000 to $4,000, and Phase III is any project with a budget greater than $4,000.

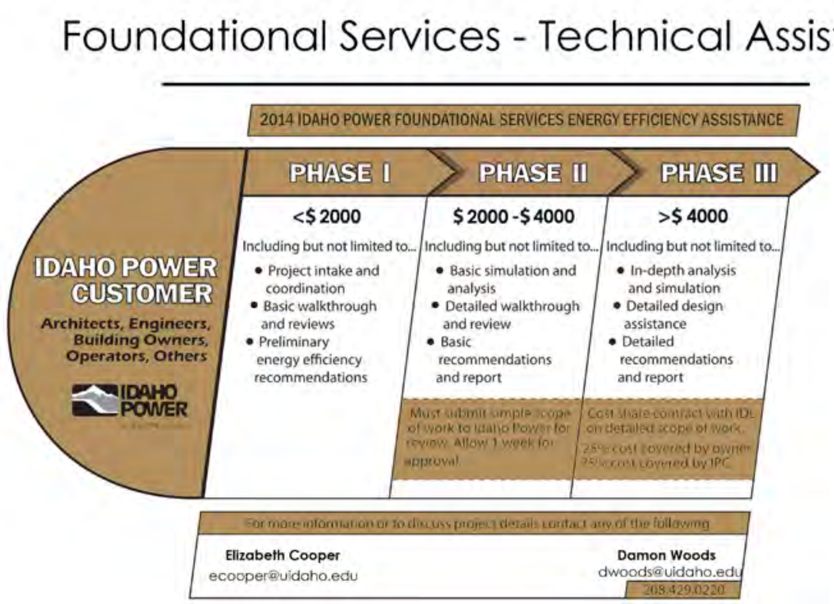

Figure 1: Foundational Services Flyer Outlining Phases

The Foundational Services program was marketed at numerous events and to multiple organizations in 2018, which included all IDL Lunch and Learn series presentations and BSUG presentations to local architecture and engineering firms, ASHRAE, AIA, and local government.

2. Project Summary

In addition to sixteen on-going projects from 2017, thirty new projects were submitted for technical assistance through the Foundational Services program in 2018. Projects ranged from short phone call consultations to detailed building simulations and Level 2 Energy Analyses. Building owners, property managers, building operators, architects, design engineers, utility customer representatives, government staff, energy management staff, program administrators, and contractors contacted the IDL. In total, there were sixteen Phase I projects, six Phase II projects, and one Phase III project (proposed), and seven projects that were proposed for potential future work. The full list of projects is shown in the appendix below. Details on Phase II projects are included in the individual project reports submitted to IPC and are included as Appendix B. Eleven of the projects were for work to be completed in existing buildings, and twelve were for new construction projects. The remaining projects were not building specific. There was an increase in the number of projects identified from 2017 to 2018. In 2018, the IDL assisted with approximately 250,000 square feet of buildings.

Table 1: 2018 Foundational Services Project Summary

Project Type	Size	NEW/EXISTING	Location
Planning	-	-	-
Office	30,000	New	Meridian
Educational	-	New	Boise
Mixed-use	-	New	Boise
Mixed-use	-	New	Boise
Civic/government	3,600	New	Homedale
Civic/government	9,000	New	Boise
Church	2,400	Existing	Boise

Review	-	-	-
Civic/government	24,145	New	Boise
Civic/government	10,000	Existing	Boise
Educational	-	New	Boise/Nampa
Civic/government	15,000	Existing	Boise
Civic/government	-	-	Boise
Educational	15,000	Existing	Boise
Hotel	12,500	Existing	Riggins
Planning	-	-	-
Educational	-	New	Boise
Medical	-	new/existing	Boise/McCall
Mixed-use	-	New	Boise
Industrial	100	Existing	Salmon
Educational	-	-	-
Office	14,215	Existing	Meridian
Office	4,000	New	Meridian
Office	1,344	Existing	Payette
Civic/government	10,000	Existing	Boise
Civic/government	15,000	Existing	Boise
Office	30,000	Existing	Boise
Civic/government	1,500	Existing	Boise
Industrial	-	-	-

INTEGRATED DESIGN LAB
University of Idaho

2018 Task 2: Lunch and Learn

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:
Idaho Power Company

Authors:
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Dylan Agnes

Report Number: 1801_002-01

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An IDACORP Company

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Acronyms and Abbreviations

AIA	American Institute of Architects
Arch	Architect(ure)
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCGCC	Boise Green Building Code
BESF	Building Energy Simulation Forum (Energy Trust of Oregon)
Bldg.	Building
BOMA	Building Owners and Managers Association
CSI	Construction Specifications Institute
Cx	Customer Experience
DOE	Department of Energy
Elec.	Electrical
EUI	Energy Use Intensity
GSHP	Ground Source Heat Pump
HVAC	Heating, Ventilation, and Air Conditioning
IBOA	Intermountain Building Operators Association
IBPSA	International Building Performance Simulation Association
IDL	Integrated Design Lab
IECC	International Energy Conservation Code
IES	Illuminating Engineering Society
IPC	Idaho Power Company
LEED	Leadership in Energy & Environmental Design
LED	Light Emitting Diode
M&V	Measurement and Verification
Mech.	Mechanical
Mgmt.	Management
NCARB	National Council of Architectural Registration Boards
TBD	To Be Determined
UI	University of Idaho
USGBC	U.S. Green Building Council
WBS	WELL Building Standard

1. 2018 Summary and Cumulative Analysis

Table 1: 2018 Lunch and Learn Summary

	Date	Title	Presenter	Group / Location	Attendees
1	03/23	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Elizabeth	Engineering Firm 1	4
2	04/13	Daylight Performance Metrics for Human Health, Productivity, and Satisfaction	Elizabeth	Architectural Organization 1	10
3	04/13	Daylight in Buildings: Getting the Details Right	Elizabeth	Architectural Organization 1	8
4	04/27	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Elizabeth	Architectural Firm 1	14
5	06/05	Daylight Performance Metrics for Human Health, Productivity, and Satisfaction	Elizabeth	Architectural Firm 2	7
6	06/14	Radiant Heating and Cooling Design	Damon	Engineering Firm 2	13
7	06/20	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Elizabeth	Architectural Firm 2	8
8	06/21	Daylight in Buildings: Getting the Details Right	Elizabeth	Architectural Firm 1	6
9	07/12	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Elizabeth	Engineering Firm 2	6
10	08/02	Daylight in Buildings: Getting the Details Right	Elizabeth	Architectural Firm 3	10
11	08/07	Radiant Heating and Cooling Design	Damon	Architectural Firm 4	9
12	08/08	Hybrid Ground Source Heat Pump System	Damon	Architectural Firm 5	3
13	08/21	Chilled Beams	Damon	Architectural Firm 4	6
14	08/23	Daylight Performance Metrics for Human Health, Productivity, and Satisfaction	Elizabeth	Engineering Firm 3	18
15	08/30	Daylight Performance Metrics for Human Health, Productivity, and Satisfaction	Elizabeth	Architectural Firm 6	9
16	09/05	Radiant Heating and Cooling Design	Damon	Architectural Firm 5	2
17	09/06	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Elizabeth	Architectural Firm 3	3
18	09/17	VRFs & Heat Pumps	Elizabeth	Engineering Firm 3	5
19	10/09	Chilled Beams	Damon	Architectural Organization 1	48
20	10/30	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Elizabeth	Architectural Firm 6	5
					194

Table 1 above summarizes all Lunch and Learn presentations given in 2018. The statistics in this section are cumulative for the 20 presentations. At each presentation participants were asked to sign in and fill out an evaluation form. Presentations were judged on a scale of 1 to 5, please see table 2. Participants were also given the opportunity to provide hand written responses.

Table 2: Evaluation Form Scale

Evaluation	1	2	3	4	5
In general, today's presentation was:	Not Useful		Somewhat Useful		Very Useful
The content of the presentation was:	Too Basic		About Right		Too Advanced
Please rate the following parts of the presentation: Organization, Clarity, Opportunity for Questions, Instructor's Knowledge of Subject Matter, and Delivery of Presentation	Needs Improvement		Good		Excellent

Table 3: Overall Attendance Breakdown

Architect:	136	Electrician:	
Engineer:	10	Contractor:	
Mech. Engineer:	12	Other:	6
Elec. Engineer:	7	None Specified:	23
Total (In-Person):	**194**		

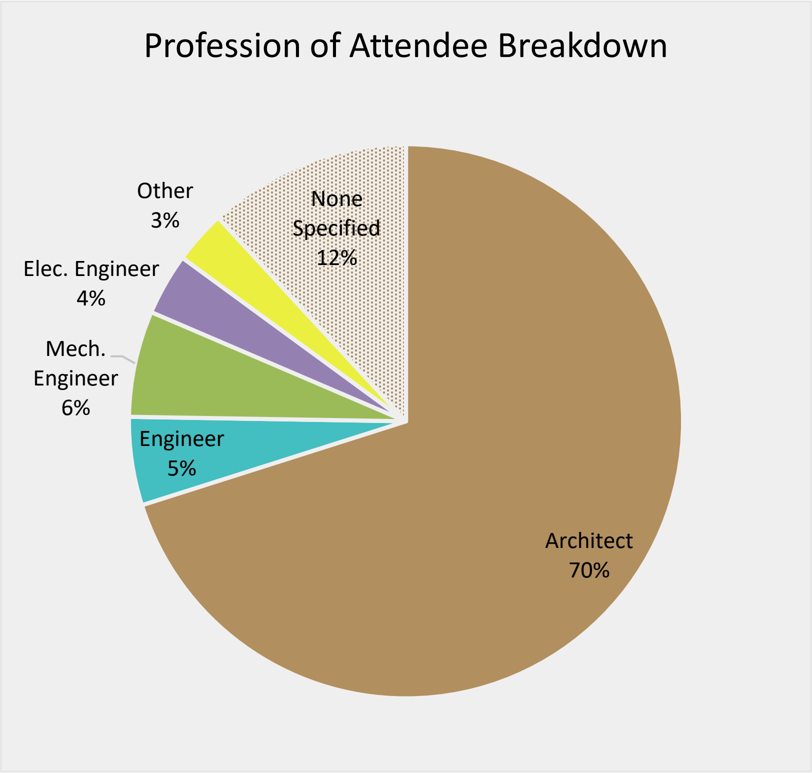

Figure 1: Attendee Profession

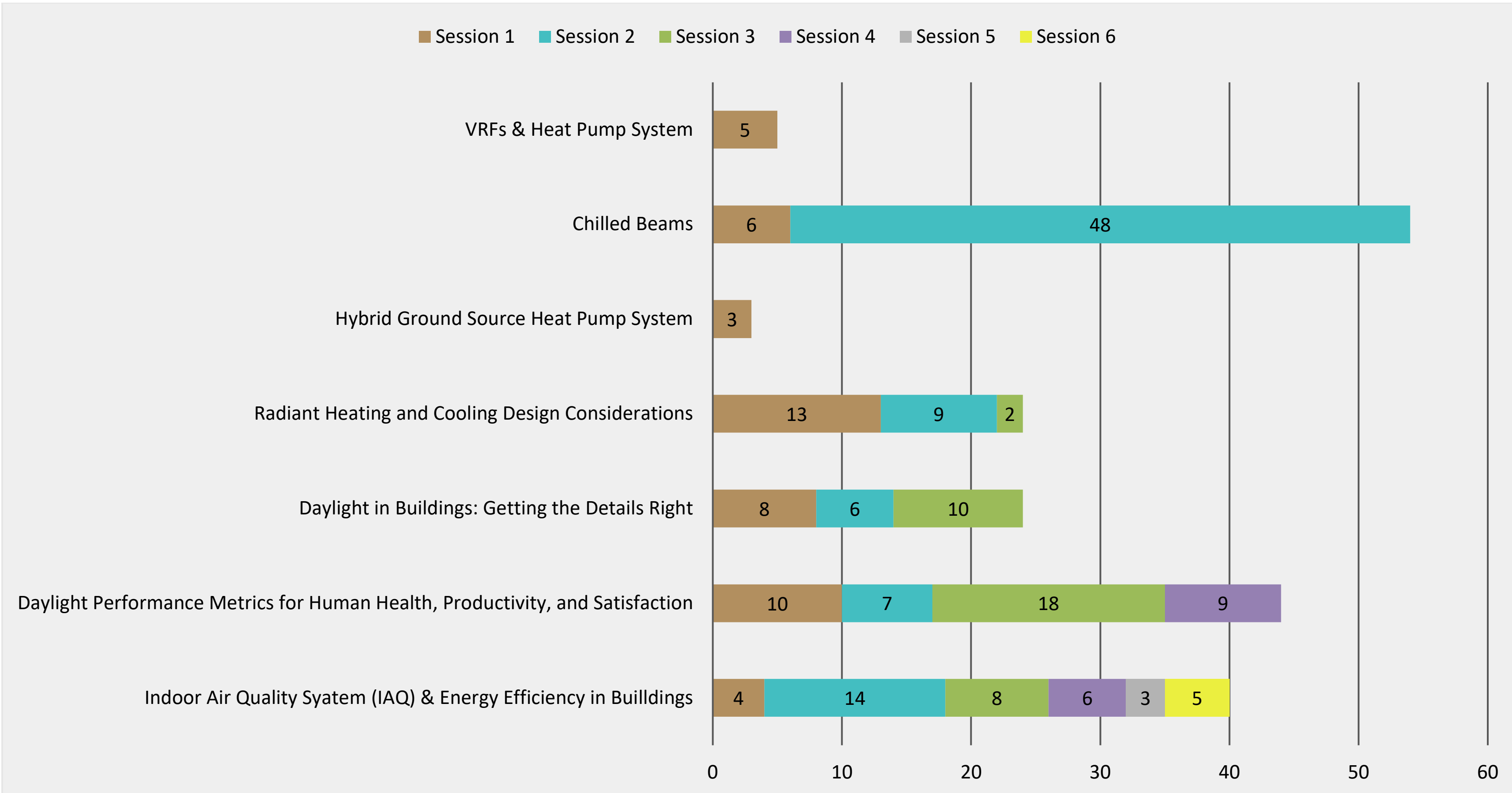

Figure 2: Attendee Count by Title and Number of Session

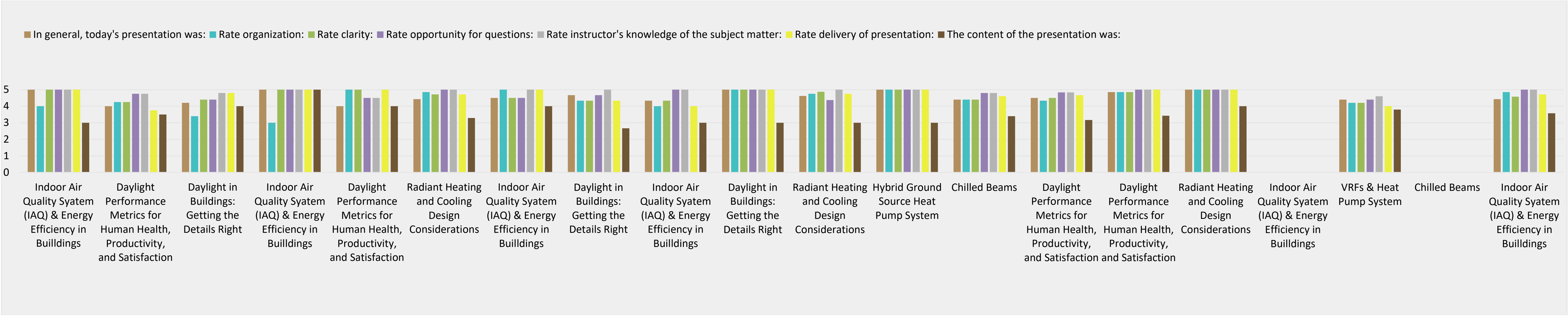

Figure 3: Average Evaluations by Session Title

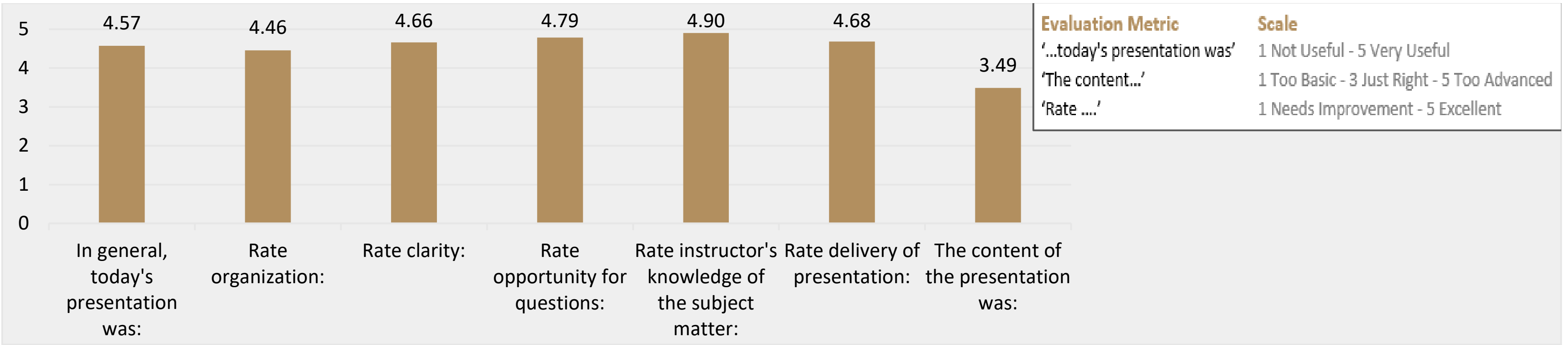

Figure 4: Overall Averages of Evaluations for all Sessions

2. Session Summaries

After each lunch and learn session, an evaluation form was requested from each participant. The feedback was used to improve future sessions. The feedback received from participants is generally constructive criticism used to keep sessions updated but also to propose other potential topics and questions to the Integrated Design Lab.

2.1 Session 1: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (03/23/2018)

Title: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings.

Description: In an effort to make buildings operate in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	03/23/18
Location:	Engineering Firm 1 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:		Electrician:	
Engineer:		Contractor:	
Mech. Engineer:	4	Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**4**		

2.2 Session 2: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction (04/13/2018)

Title: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction.

Description: Daylight can breathe light and life into our buildings. Daylight can also make our buildings healthier and more energy efficient. However, designing effective, comfortable, and daylit buildings remains outside the capabilities of most designers. This session will discuss the impacts of daylight on humans in the built environment, the metrics associated with effective daylighting, and the tools available for designing daylight spaces with these metrics. It will highlight both the physical and psychological effects of daylight on the human visual and biological system and what can be feasibly achieved in terms of positive impacts upon worker productivity and improved user satisfaction through high quality daylighting design. It will explain the basis for daylighting metrics and how to utilize them in daylight and lighting design as well as capabilities of simulation tools to generate them, the effect of assumptions about blinds operation, implications for daylight performance and visual comfort, and the limitations of the metrics. Examples from real spaces present us with actionable knowledge about synthesizing the light of place with the specific needs of human activity as well as inform an intuitive understanding of the metrics and corresponding criteria**.**

Presentation Info:

Date:	04/13/18
Location:	Architectural Organization 1 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	10	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**10**		

2.3 Session 3: Daylight in Buildings: Getting the Details Right (04/13/2018)

Title: Daylight in Buildings: Getting the Details Right.

Description: This session is intended to instruct on the process of creating high quality and comfortable day-lit spaces focuses on getting the details right. After the schematic design is formed to appropriately deliver daylight to the important surfaces within a space, there are several details that can make or break the overall success of the project. This presentation discussed several details, ranging from interior surface colors and reflectance, to interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. The presentation introduces concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight.

Presentation Info:

Date:	04/13/18
Location:	Architectural Organization 1 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	8	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**8**		

2.4 Session 4: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (04/27/2018)

Title: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings**.**

Description: In an effort to make buildings operate in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	04/27/2018
Location:	Architectural Firm 1 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:		Electrician:	
Engineer:	14	Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**14**		

2.5 Session 5: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction (06/05/18)

Title: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction.

Description: Daylight can breathe light and life into our buildings. Daylight can also make our buildings healthier and more energy efficient. However, designing effective, comfortable, and daylit buildings remains outside the capabilities of most designers. This session will discuss the impacts of daylight on humans in the built environment, the metrics associated with effective daylighting, and the tools available for designing daylight spaces with these metrics. It will highlight both the physical and psychological effects of daylight on the human visual and biological system and what can be feasibly achieved in terms of positive impacts upon worker productivity and improved user satisfaction through high quality daylighting design. It will explain the basis for daylighting metrics and how to utilize them in daylight and lighting design as well as capabilities of simulation tools to generate them, the effect of assumptions about blinds operation, implications for daylight performance and visual comfort, and the limitations of the metrics. Examples from real spaces present us with actionable knowledge about synthesizing the light of place with the specific needs of human activity as well as inform an intuitive understanding of the metrics and corresponding criteria**.**

Presentation Info:

Date:	06/05/2018
Location:	Architectural Firm 2 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	1
Elec. Engineer:		None Specified:	
Total (In-Person):	**7**		

2.6 Session 6: Radiant Heating and Cooling Design (06/14/18)

Title: Radiant Heating and Cooling Design.

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building facade reduces loads to levels achievable by radiant systems. This integration between the disciplines has a direct relationship to the performance of the system and comfort of the building, which is not always so closely related in more typical forced-air systems. Key design decisions must be made early in the design process to ensure the feasibility and performance of radiant systems down the road. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different strengths, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	06/14/2018
Location:	Engineering Firm 2- Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:		Electrician:	
Engineer:	4	Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	9
Total (In-Person):	**13**		

2.7 Session 7: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (06/20/18)

Title: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings.

Description: In an effort to make buildings operate in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	06/20/2018
Location:	Architecture Firm 2 - Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	8	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**8**		

2.8 Session 8: Daylight in Buildings: Getting the Details Right(06/21/18)

Title: Daylight in Buildings: Getting the Details Right

Description: This session is intended to instruct on the process of creating high quality and comfortable day-lit spaces focuses on getting the details right. After the schematic design is formed to appropriately deliver daylight to the important surfaces within a space, there are several details that can make or break the overall success of the project. This presentation discussed several details, ranging from interior surface colors and reflectance, to interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. The presentation introduces concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight.

Presentation Info:

Date:	06/21/2018		
Location:	Architectural Firm 1 – Boise, ID		
Presenter:	Elizabeth Cooper		

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**6**		

2.9 Session 9: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (07/12/18)

Title: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings.

Description: In an effort to make buildings operate in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	07/12/2018		
Location:	Engineering Firm 2 – Meridian, ID		
Presenter:	Elizabeth Cooper		

Attendance:

Architect:		Electrician:	
Engineer:	4	Contractor:	
Mech. Engineer:		Other:	1
Elec. Engineer:		None Specified:	1
Total (In-Person):	**6**		

2.10 Session 10: Daylight in Buildings: Getting the Details Right (08/02/18)

Title: Daylight in Buildings: Getting the Details Right.

Description: This session is intended to instruct on the process of creating high quality and comfortable day-lit spaces focuses on getting the details right. After the schematic design is formed to appropriately deliver daylight to the important surfaces within a space, there are several details that can make or break the overall success of the project. This presentation discussed several details, ranging from interior surface colors and reflectance, to interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. The presentation introduces concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight.

Presentation Info:

Date:	08/02/2018
Location:	Architectural Firm 3 –Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	10	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**10**		

2.11 Session 11: Radiant Heating and Cooling Design (08/07/18)

Title: Radiant Heating and Cooling Design.

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building facade reduces loads to levels achievable by radiant systems. This integration between the disciplines has a direct relationship to the performance of the system and comfort of the building, which is not always so closely related in more typical forced-air systems. Key design decisions must be made early in the design process to ensure the feasibility and performance of radiant systems down the road. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different strengths, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	08/07/2018
Location:	Architectural Firm 4 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	7	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	2
Total (In-Person):	**9**		

2.12 Session 12: Hybrid Ground Source Heat Pump System (08/08/2018)

Title: Hybrid Ground Source Heat Pump System.

Description: The initial cost of ground-source heat pump systems can be substantially higher than conventional systems, limiting it as a design option. This presentation will highlight how, with a hybrid GSHP system it is possible to optimize the overall system life-cycle cost by reducing the initial cost, while still maintaining the low operating cost of a GSHP system. It will discuss how, to reduce initial costs, peak loads should be carefully calculated and minimized during the design phase, the GSHP system should be sized based on coincidental building loads with the use of simulation software, and the system components, including the ground heat exchanger and additional central plant equipment, should be sized to optimize life-cycle costs using appropriate economic assumptions.

Presentation Info:

Date:	08/08/2018
Location:	Architectural Firm 5 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	3	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**3**		

2.13 Session 13: Chilled Beams (08/21/18)

Title: Chilled Beams.

Description: How to incorporate chilled beams into building design: the costs, the energy savings, and the impacts on the architectural program and HVAC system.

Presentation Info:

Date:	08/21/2018
Location:	Architectural Firm 4 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	3	Electrician:	

Engineer:		Contractor:	
Mech. Engineer:		Other:	2
Elec. Engineer:		None Specified:	1
Total (In-Person):	**6**		

2.14 Session 14: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction (08/23/18)

Title: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction.

Description: Daylight can breathe light and life into our buildings. Daylight can also make our buildings healthier and more energy efficient. However, designing effective, comfortable, and daylit buildings remains outside the capabilities of most designers. This session will discuss the impacts of daylight on humans in the built environment, the metrics associated with effective daylighting, and the tools available for designing daylight spaces with these metrics. It will highlight both the physical and psychological effects of daylight on the human visual and biological system and what can be feasibly achieved in terms of positive impacts upon worker productivity and improved user satisfaction through high quality daylighting design. It will explain the basis for daylighting metrics and how to utilize them in daylight and lighting design as well as capabilities of simulation tools to generate them, the effect of assumptions about blinds operation, implications for daylight performance and visual comfort, and the limitations of the metrics. Examples from real spaces present us with actionable knowledge about synthesizing the light of place with the specific needs of human activity as well as inform an intuitive understanding of the metrics and corresponding criteria**.**

Presentation Info:

Date:	08/23/2018
Location:	Engineering Firm 3 – Meridian, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:		Electrician:	
Engineer:	1	Contractor:	
Mech. Engineer:	7	Other:	
Elec. Engineer:	7	None Specified:	1
Total (In-Person):	**18**		

2.15 Sessions 15: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction (08/30/18)

Title: Daylight Performance Metrics for Human Health, Productivity, and Satisfaction.

Description: Daylight can breathe light and life into our buildings. Daylight can also make our buildings healthier and more energy efficient. However, designing effective, comfortable, and daylit buildings remains outside the capabilities of most designers. This session will discuss the impacts of daylight on humans in the built environment, the metrics associated with effective daylighting, and the tools available for designing daylight spaces with these metrics. It will highlight both the physical and psychological effects of daylight on the human visual and biological system and what can be feasibly achieved in terms of positive impacts upon worker productivity and improved user satisfaction through high quality daylighting design. It will explain the basis for daylighting metrics and how to utilize them in daylight and lighting design as well as capabilities of simulation tools to generate them, the effect of assumptions about blinds operation, implications for daylight performance and visual comfort, and the limitations of the metrics. Examples from real spaces present us with actionable knowledge about synthesizing the light of place with the specific needs of human activity as well as inform an intuitive understanding of the metrics and corresponding criteria**.**

Presentation Info:

Date:	08/30/2018
Location:	Architectural Firm 6 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	3
Total (In-Person):	**9**		

2.16 Session 16: Radiant Heating and Cooling Design (09/05/2018)

Title: Radiant Heating and Cooling Design.

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building facade reduces loads to levels achievable by radiant systems. This integration between the disciplines has a direct relationship to the performance of the system and comfort of the building, which is not always so closely related in more typical forced-air systems. Key design decisions must be made early in the design process to ensure the feasibility and performance of radiant systems down the road. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different strengths, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	09/05/2018
Location:	Architecture Firm 5 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	2	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**2**		

2.17 Session 17: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (09/06/2018)

Title: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings.

Description: In an effort to make buildings operate in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	09/06/2018
Location:	Architecture Firm 3 – Boise, ID
Presenter:	Elizabeth Cooper

Attendance:

Architect:	3	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**3**		

2.18 Session 18: VRFs & Heat Pumps (09/17/18)

Title: VRFs & Heat Pumps.

Description: Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho’s climates. Including ERVs with DOAS.

Presentation Info:

Date:	09/17/2018
Location:	Engineering Firm 3 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	3	Electrician:	
Engineer:	1	Contractor:	
Mech. Engineer:	1	Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**5**		

2.19 Session 19: Chilled Beams (10/09/2018)

Title: Chilled Beams

Description: How to incorporate chilled beams into building design: the costs, the energy savings, and the impacts on the architectural program and HVAC system.

Presentation Info:

Date:	10/09/2018
Location:	Architecture Organization 1 –Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	43	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	5
Total (In-Person):	**48**		

2.20 Session 20: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (10/30/2018)

Title: Indoor Air Quality (IAQ) and Energy Efficiency in Buildings.

Description: In an effort to make buildings operate in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	10/30/2018

Location:	Architecture Firm 6 – Boise, ID		
Presenter:	Elizabeth Cooper		

Attendance:

Architect:	4	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	1
Total (In-Person):	**5**		

3. Future Work

Feedback was gathered from the 79 Lunch and Learn evaluations received throughout 2018. The comments from these were valuable in defining possible future Lunch and Learn topics and informed the list of suggestions below.

Potential Future Topics:

- Envelope Design to meet energy code
- Natural Ventilation, Passive Heating & Cooling
- Update on LEED
- Photocontrols Basic & Advanced
- Absorption Cooling Technologies and Applications
- Thermal Comfort and its Implications in Building Design
- Drain Recovery Technologies

With the Lunch and Learn task, attendance at each session is determined mainly by the size of the firm or organization that is hosting. However, there may still be opportunities for increasing attendance. One suggestion would be to encourage the hosting entity to invite others who would find the information relevant such as, consultants or owners they work with.

2018 Task 3: BSUG

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:

Idaho Power Company

Author:

Dylan Agnes

Elizabeth Cooper

Report Number: 1801_003-01

Prepared by:
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IDL Director:
Elizabeth Cooper

Author:
Dylan Agnes
Elizabeth Cooper

Prepared for:
Idaho Power Company

Contract Number:
JKB168

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1. Acronyms and Abbreviations

AIA	American Institute of Architects
App	Application
ARUP	London based multi-discipline firm
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCVTP	Building Controls Virtual Test-Bed
BEMP	Building Energy Modeling Professional
BESF	Building Energy Simulation Forum (Energy Trust of Oregon)
BIM	Building Information Modeling
BOMA	Building Owners and Managers Association
BSME	Bachelor of Science in Mechanical Engineering
BSUG	Building Simulation Users' Group
CBECS	Commercial Building Energy Consumption Survey
Comm	Commercial
Elec.	Electrical
HePESC	Heat Pump Energy Savings Calculator
HVAC	Heating, Ventilation, and Air Conditioning
IBPSA	International Building Performance Simulation Association
IDL	Integrated Design Lab
IPC	Idaho Power Company
LBNL	Lawrence Berkeley National Laboratory
LEED	Leadership in Energy & Environmental Design
M. Arch	Masters of Architecture
ME	Mechanical Engineer(ing)
Mech.	Mechanical
MEP	Mechanical, Electrical, and Plumbing
MS Arch	Masters of Science Architecture
NCARB	National Council of Architectural Registration Boards
RDA	Revit Daylighting Analysis
TMSF	Twenty-Mile-South-Farm
TMY	Typical Meteorological Year
UDC	Urban Design Center
UI	University of Idaho
USGBC	U.S. Green Building Council

2. Introduction

The 2018 Idaho Power scope of work for the Building Simulation Users' Group (BSUG) task included planning, organization and hosting of six meetings, recording attendance and evaluations, archiving video of the presentations, and maintaining the BSUG 2.0 website.

3. 2018 Summary and Cumulative Analysis

In 2018, six sessions were coordinated and hosted. Sessions are summarized below with details in the following sections.

Table 1: Overall Summary of Sessions

Date	Title	Presenter	Presenter Company	RSVPs		Attendees	
				In-person	Online	In-person	Online
2/22	Sensor Suitcase	Michael Brambley & Sammuel Graham	PNNL & Green Path	13	41	12	17
3/22	Code Compliance through Energy Modeling	Rebecca Reel	Noresco	9	38	10	13
4/26	Energy Modeling Workflow – Creating Energy and Daylight Simulations from CAD	Damon Woods & Dylan Agnes	IDL	15	58	10	21
5/24	Energy Modeling for LEED v4 in Open Studio	Taylor Roberts	Group 14	10	52	11	19
10/25	Modeling Tools to Inform Early Design	Justin Shultz	EYP	6	26	5	15
12/12	ASHRAE Co-Meeting	Drury Crawley	BID	4	-	24	-
			Total:	**57**	**215**	**72**	**85**
				272		**157**	

3.1 2018 Attendance

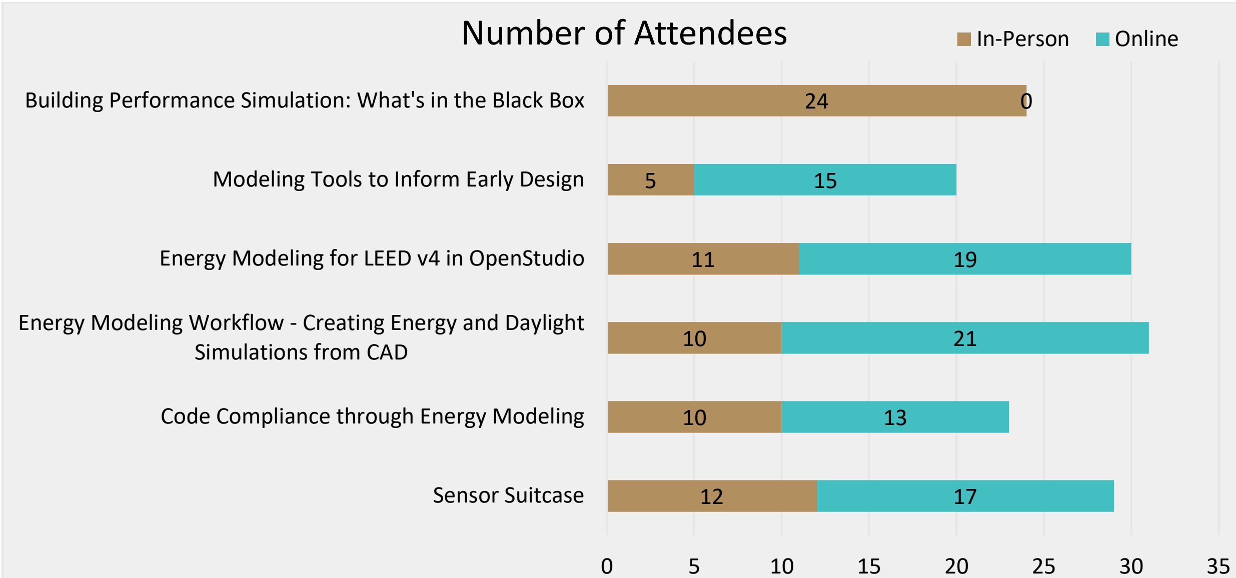


Figure 1: Attendee Count by Session and Type

Table 2: Overall Attendance Breakdown

Architect:	20	Electrician:	
Engineer:	62	Contractor:	
Mech. Engineer:	9	Other:	3
Elec. Engineer:		None Specified:	70
Total (In-Person):	**72**		
Total (Online):	**85**		
Total (Combined):	**157**		

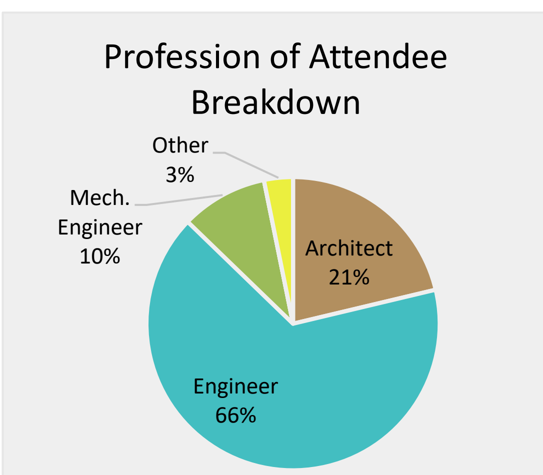


Figure 2: Attendee Profession Breakdown

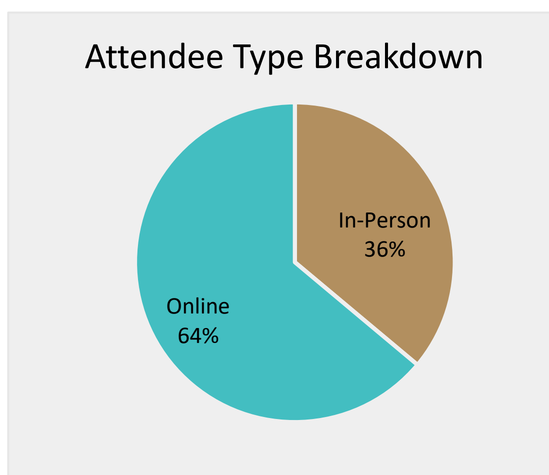


Figure 3: Attendee Type Breakdown

3.2 2018 Evaluations

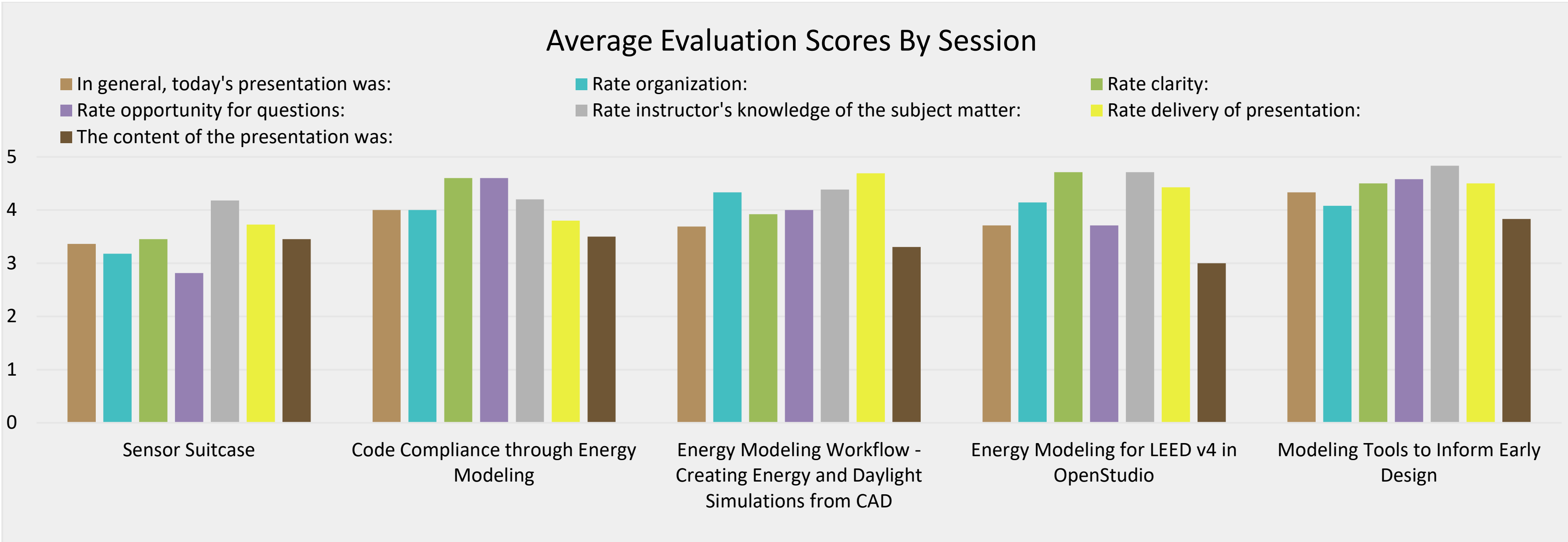
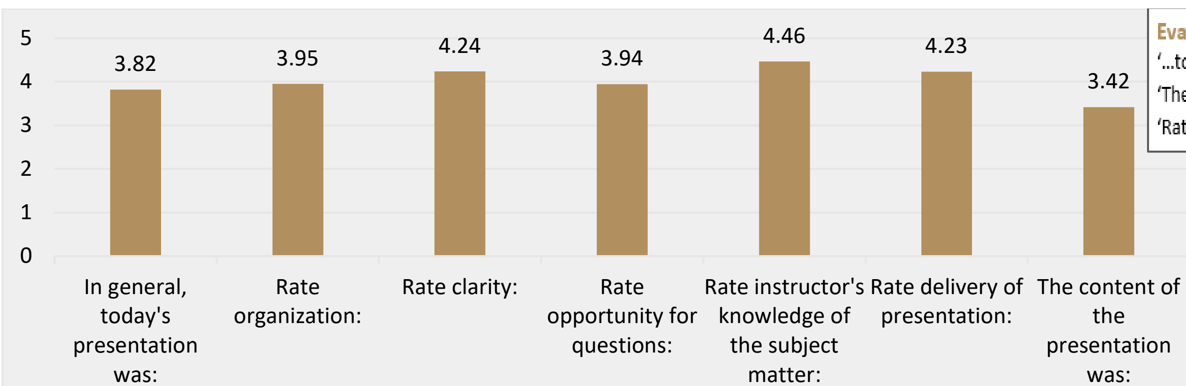


Figure 4: Average Evaluations by Session



Evaluation Metric	Scale
'...today's presentation was'	1 Not Useful - 5 Very Useful
'The content...'	1 Too Basic - 3 Just Right - 5 Too Advanced
'Rate ....'	1 Needs Improvement - 5 Excellent

Figure 5: Average Evaluation Scores for All Sessions

4. Session Summaries

4.1 Session 1: Sensor Suitcase (02/28/18)

Title: Sensor Suitcase

Date: 02/28/18

Description: The Sensor Suitcase is a portable diagnostic toolkit with sensors that gather information about how a building operates. The result of a collaborative effort by PNNL, Lawrence Berkeley National Laboratory (LBNL), and Oak Ridge National Laboratory (ORNL), it serves as a tool to simplify and streamline the retro-commissioning process by enabling non-experts to identify energy-saving operational changes, while keeping the costs of this service low. Total energy cost savings for retro-commissioning are estimated to be 15 percent. The service provider enters a commercial building with the sensor suitcase and a tablet computer. The tablet, on which the suitcase software application is installed, wirelessly communicates with the suitcase to guide the service provider/user through sensor installation. Sensors are placed in designated locations, some on lighting fixtures, others near thermostats, and still others on rooftop HVAC systems. Once installation is complete, the user exits the building site, leaving the sensors in place for 4-6 weeks. When the sensors are configured during the installation process, data that identifies the building, the location at which the sensor is installed (e.g., the room name or number), and the type of measurement being taken – such as temperature of air coming out of a register, or when lights are on or off – are stored on the sensor. Throughout the measurement period, the sensor collects sensed data. At the end of the measurement period, the user simply collects the sensors and places them back into slots in the suitcase, from where the data are transferred to a computer for analysis. The user-friendly software then provides an output of recommended actions for reducing energy use, including expected costs savings.

Presenter: Michael Brambley & Samuel Graham

Attendance:

Architect:	2	Electrician:	
Engineer:	6	Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	21
Total (In-Person):	**12**		
Total (Online):	**17**		
*If 'Other' was noted:			

Evaluation Highlights (What attendees found most valuable):

- Explanation of the use of the product.
- Having the presenter live feed to the webinar and the slides up simultaneously was really nice.
- Learning about the suitcase, and the possibilities to use it for POE studies.

4.2 Session 2: Code Compliance through Energy Modeling (03/22/18)

Title: Code Compliance through Energy Modeling

Date: 03/22/18

Description: Have you submitted an energy model to a building department to demonstrate code compliance? Now you can. In their goal to increase energy conservation the City of Boulder, CO is requiring new commercial construction projects to exceed ASHRAE 90.1-2010 by 30%, and 14% for residential projects. Explore the progression of the energy code in the City of Boulder, examine the current code, and dive into three examples from a single site exploring the range of project aspects from multi-family residential, new construction, renovation, and addition. The presentation will cover specific code language, the challenges of energy modeling for a new code requirement, modeling guidelines utilized to create a model for code compliance, results from three different project examples, and a summary of thoughts on code compliance energy simulation.

Presenters: Rebecca Reel

Attendance:

Architect:	2	Contractor:	
Mech. Engineer:	10	Other*:	2
Elec. Engineer:		None Specified:	9
Total (In-Person):	**10**		
Total (Online):	**13**		
*If 'Other' was noted:	Accounting, Performance Design		

Evaluation Highlights (What attendees found most valuable):
- The presenter card about, and you could tell loved energy modeling. That energy and excitement makes a good presentation
- Design Work Flow and Methodology
- Great examples and important to hear what is happening on the leading edge.
- Progressiveness of Boulder

4.3 Session 3: Energy Modeling Workflow – Creating Energy and Daylight Simulations from CAD Drawings (04/26/18)

Title: Energy Modeling Workflow – Creating Energy and Daylight Simulations from CAD Drawings

Date: 04/26/18

Description: This presentation is for anyone who wants to know how to take an Autodesk (Revit & AutoCAD) based project and turn it into a preliminary study to inform early design, or for more detailed analysis through OpenStudio or Radiance software. Dylan Agnes and Damon Woods from IDL will cover what information is needed for an energy and/or daylighting model. We will share lessons we've learned and recommendations for anyone who is looking to gain LEED credits for their project or just a better sense of the energy or lighting impacts of different design iterations. This talk is intended for anyone who is just beginning energy modeling, as well as experienced users. For experienced modelers, we will share tips and tricks that we use at the lab to make the process as simple and robust as possible. The need for energy modeling, and controls/standards for daylighting and electric lighting, is growing due to the requirements of standards such as LEED, and is now required in some jurisdictions. The IDL aims to encourage more architects and engineers in Boise to provide energy and daylighting modeling in house. This presentation aims to answer your questions, prevent headaches for new users, and remove the mystery of getting from plans to energy and daylight findings.

Presenter: Damon Woods & Dylan Agnes

Attendance:

Architect:	5	Electrician:	
Engineer:	8	Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	18
Total (In-Person):	**10**		
Total (Online):	**21**		
*If 'Other' was noted:			

Evaluation Highlights (What attendees found most valuable):

- Good resource for getting into Radiance later
- How the daylight simulations could be linked to, and integrated with, the CAD drawings output.

4.4 Session 4: Energy Modeling for LEED v4 in OpenStudio (05/24/18)

Title: Climate Design Tools

Date: 06/28/17

Description: USGBC's Leadership in Energy and Environmental Design (LEED) helped push energy efficiency in commercial buildings far beyond minimum code requirements. The latest version, LEED v4, is continuing to advance energy efficiency with the adoption of ASHRAE 90.1-2010 Appendix G for baseline modeling. In order for whole building simulations to accurately inform design teams, the code must be correctly reflected in the energy model. This presentation will address several potential issues with using OpenStudio for LEED v4 energy modeling and provides solutions and best practices for practitioners. These issues include; several of the defaults in OpenStudio do not comply with ASHRAE, some requirements in ASHRAE are not explicitly identified leaving modelling these parameters up to interpretation, and there are program-specific issues in meeting the ASHRAE requirements.

Presenter: Taylor Roberts

Attendance:

Architect:	4	Electrician:	
Engineer:	9	Contractor:	
Mech. Engineer:		Other*:	2
Elec. Engineer:		None Specified:	15
Total (In-Person):	**11**		
Total (Online):	**19**		
*If 'Other' was noted:	Energy Modeler, Energy Consultant		

Evaluation Highlights (What attendees found most valuable):
- Info about New LEED standard

4.5 Session 5: Modeling Tools to Inform Early Design (10/25/18)

Title: Modeling Tools to Inform Early Design

Date: 10/25/18

Description: Designing high performance buildings requires an integrated design process. Design teams are looking for building performance analysis to inform the ever evolving design and time is critical in this process. This session will highlight analysis tools that work seamlessly with design tools allowing for timely analysis results. Case studies will also be shared to demonstrate how these tools were applied in the design process.

Presenter: Justin Shultz

Attendance:

Architect:	5	Electrician:	
Engineer:	7	Contractor:	
Mech. Engineer:		Other*:	1
Elec. Engineer:		None Specified:	7
Total (In-Person):	**5**		
Total (Online):	**15**		
*If 'Other' was noted:	Sustainability consultant		

Evaluation Highlights (What attendees found most valuable):
- Examples that the presenter gave - real case studies.
- References to the software tools for each early design analysis performed
- The number of energy modeling tools available
- the variety of case studies and informative results

4.6 Session 6: Building Performance Simulation – What's in the Black Box (12/12/18)

Title: Building Performance Simulation – What's in the Black Box

Date: 12/12/18

Description: Over the last 50 years, building simulation has evolved into a powerful tool for evaluating the energy performance of potential or existing buildings. Building simulation allows easy comparison of the energy and environmental performance of many hundreds of design or retrofit options. This presentation provides an overview of building performance simulation fundamentals and history, Building Information Modeling, what's in the black box of key simulation programs, as well as comparing underlying simulation methods.

Presenters: Drury B. Crawley

Attendance:

Architect:	2	Electrician:	
Engineer:	22	Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	
Total (In-Person):	**24**		
Total (Online):			
*If 'Other' was noted:			

Evaluation Highlights (What attendees found most valuable):

- No Evaluations were collected – Joint session with ASHRAE.

5. Website Maintenance and Statistics

The Google site "BSUG 2.0" was maintained and updated monthly. Each month, details about the upcoming presentation were posted to the 'UPCOMING EVENTS' page. These pages also included links to both webinar and in-person registration. Monthly emails linked to these pages as well as directly to the registration sites. If the monthly session included a webinar recording, the video was edited and posted to the YouTube channel with a link from the BSUG 2.0 website.

Between January 1, 2018 and December 18, 2018, total page views summed to 709 with unique page views at 586 for 323 total sessions at the site. Of the 323 sessions, 14 (4.33%) of the sessions were by users in Idaho. Below are charts showing a summary of website activity for the most popular pages, as well as for the site as a whole.

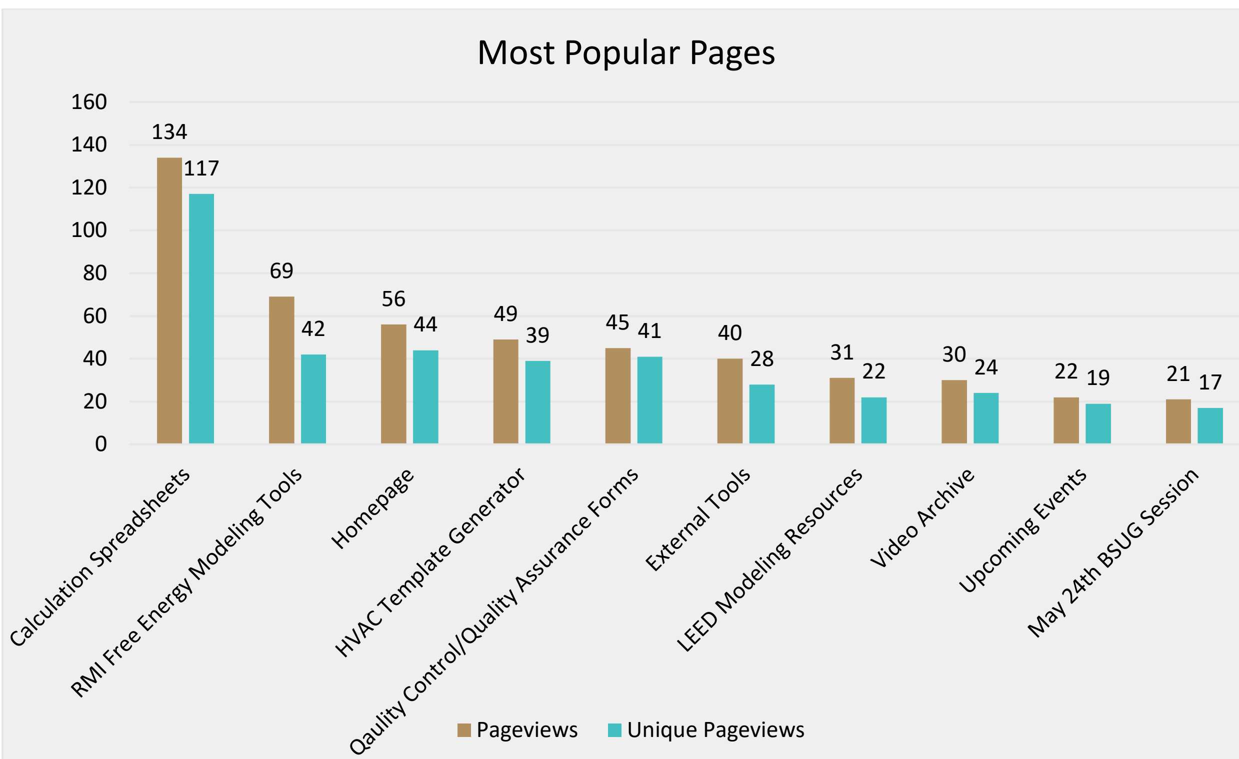


Figure 6: Number of Page Views for the Ten Most Popular Pages in 2018

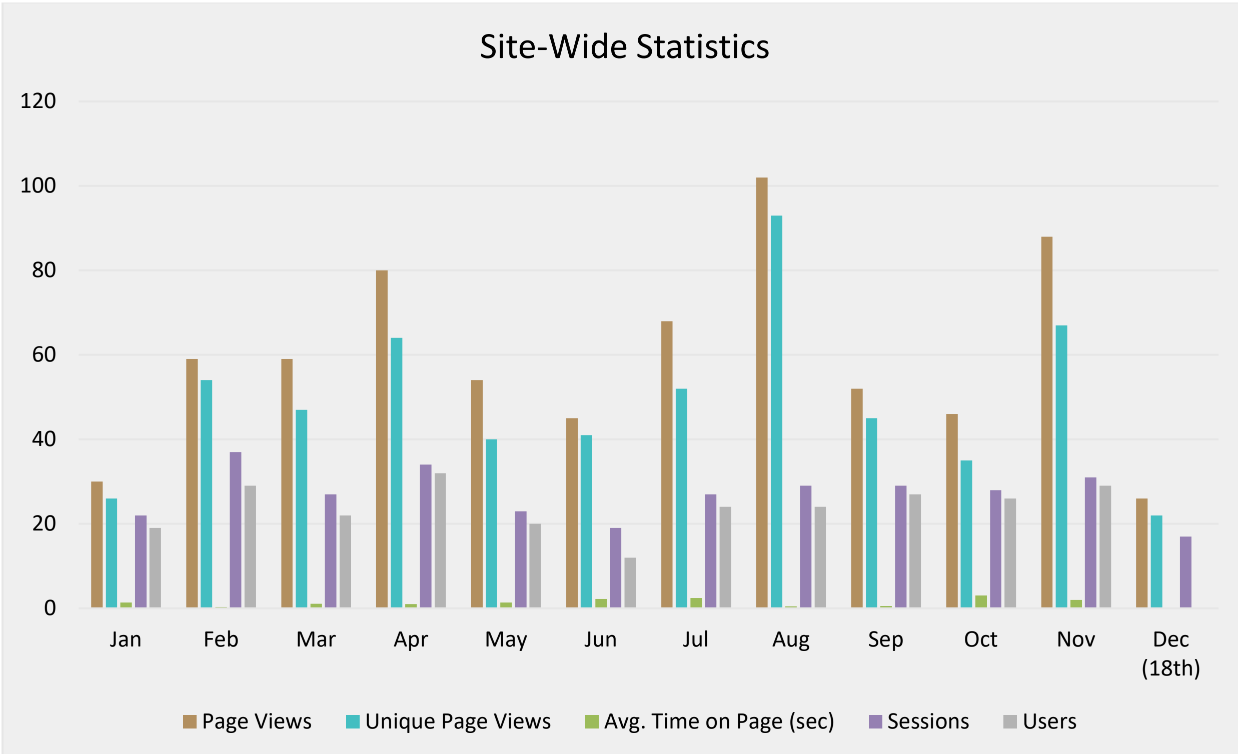


Figure 7: Monthly Site-Wide Statistics

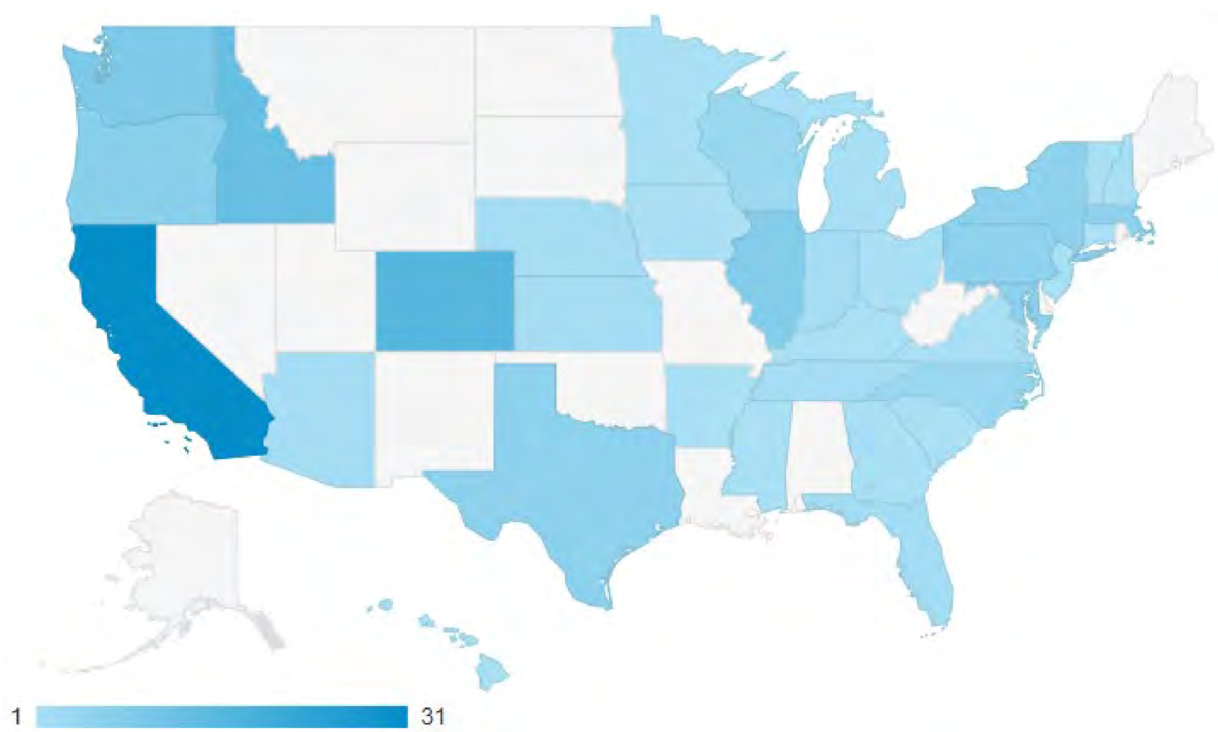
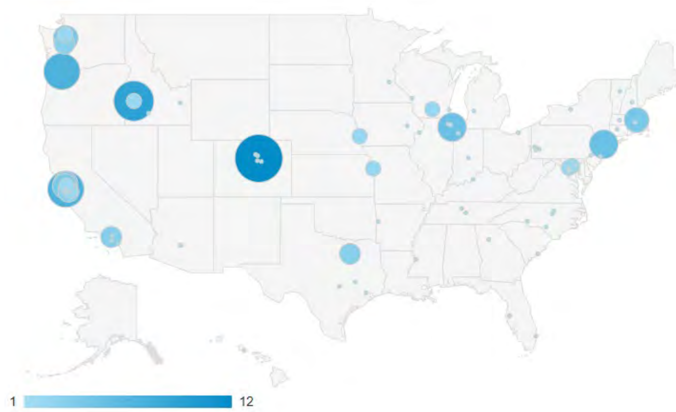


Figure 8: Heat Map of All U.S. Sessions in 2018



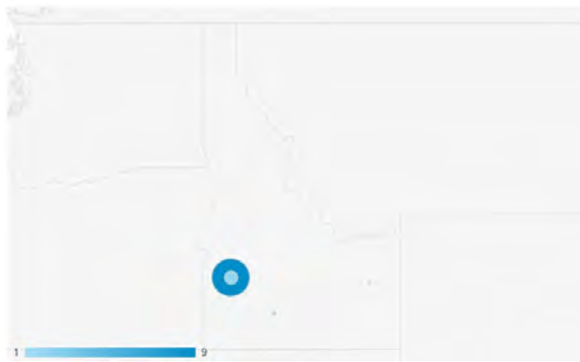


Figure 9: Bubble Maps of All Sessions and Idaho in 2018

6. Other Activities and Suggestions for Future Improvements

We saw an increase in average attendance for each session this year gaining 39 in-person (54%) for overall attendance from 2017. Additionally, we saw an increase in online attendance by 44 online-attendees (51%) from last year even though we offered one less webinar. This year was successful for the BSUG task with 6 sessions completed and 157 total attendees – 72 in-person and 85 online. Feedback was provided by attendees via the evaluation forms, 53 of which were collected. These offered a starting point for determining future improvements to the program. Such as, reviewing and revising the mailing list, advertise with ASHRAE and AIA, host joint session with ASHRAE or AIA, and lastly creating physical flyers to hand out at lunch and learns.

2018 Task 4: New Construction Verifications

Summary of Projects

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:

Idaho Power Company

Author:

Elizabeth Cooper

Report Number: 1801_004-01

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3. 2018 Photo Controls Review Projects.. 3

Acronyms and Abbreviations

AC	Air Conditioning
NCV	New Construction Verification
HVAC	Heating, Ventilation, and Air Conditioning
IDL	Integrated Design Lab
IPC	Idaho Power Company
UI	University of Idaho
VRF	Variable Refrigerant Flow

1. Introduction

The University of Idaho Integrated Design Lab (UI-IDL) had two roles for the New Construction Verification (NCV) task in 2018. The primary role was to conduct on-site verification reports for approximately 10%, typically twelve to fifteen, of projects that participated in Idaho Power Company's (IPC) New Construction Program. The verified projects were randomly selected from the entire pool of projects, and at least four projects were required to be outside the Boise/Meridian/Eagle/Kuna area. The secondary role was to review the photo controls design and function for every project whose application included incentive L3: Daylight Photo Controls within the New Construction Program. Once each review was concluded, a letter of support for the incentive was submitted to Idaho Power. This review and letter are intended to increase energy savings and quality of design through the inclusion of additional design and commissioning recommendations.

2. 2018 New Construction Verification Projects

The UI-IDL completed twelve New Construction Verification projects in 2018. A detailed report for each project was submitted to IPC, including claimed and actual installation for each specific incentive the project applied for. All of the projects reviewed in 2018 were finalized and paid in 2018 but resided under the 2016 program format. The specific incentives for this program are outlined in Table 1.

Table 2 summarizes the twelve projects and respective qualified incentive measures which were verified by UI-IDL. For the projects listed, more than 41% were conducted outside the Boise area.

Table 1: 2016 New Construction Program Specific Incentives

Lighting	L1	Interior Light Load Reduction
	L2	Exterior Light Load Reduction
	L3	Daylight Photo Controls
	L4	Occupancy Sensors
	L5	High Efficiency Exit Signs
Air Conditioning	A1	Efficient Air-Cooled AC & Heat Pump Units
	A2	Efficient VRF Units
	A3	Efficient Chillers
	A4	Air Side Economizers
	A5	Direct Evaporative Coolers
	A6	Evaporative Pre-coolers on Air-cooled Condensers
Building Shell	B1	Reflective Roof Treatment
Controls	C1	Energy Management Control System
	C2	Guest Room Energy Management System
	C3	HVAC Variable Speed Drives
	C4	Kitchen Hood Variable Speed Drives
	C5	Onion/Potato Shed Ventilation Variable Speed Drives
Appliances with Electric Water Heating	W1	Efficient Laundry Machines
	D1	EnergyStar Undercounter Dishwashers
	D2	EnergyStar Commercial Dishwasher
Refrigeration	R1	Head Pressure Controls
	R2	Floating Suction Controls
	R3	Efficient Condensers
Other	P1	Smart Strip Power Strips

Table 2: Project Summary

IPC Project #	Facility Description	Location	Incentive Measures	UI-IDL Site-Visit Date
16-033	Industrial	Caldwell, ID	L1, L2	11/05/18
16-064	Educational	Star, ID	L1, L2, L3, L4, L5, A1, A5, B1, C1, C3, W1, D1, D2	11/02/18
16-068	Industrial	Meridian, ID	L1, L4	07/12/18
16-107	Warehouse	Gooding, ID	L1, L4, L5	07/31/18
16-234	Industrial	Eagle, ID	L1, L5, A1	10/26/18
16-245	Manufacturing	Emmett, ID	L1, L5	12/13/18
16-303	Other – Dairy	Twin falls, ID	L1	07/31/18
16-306	Other – Misc.	Boise, ID	L1	08/03/18
16-344	Retail	Boise, ID	L1	07/30/18
16-380	Office Building	Boise, ID	L1, L5	12/11/18
16-391	Retail	Garden City, ID	L1, L5	12/10/18
16-392	Warehouse	Caldwell, ID	L1, L2, L5	11/05/18

3. 2018 Photo Controls Review Projects

In 2018, the UI-IDL received at least eight inquiries regarding the New Construction photo controls incentive review. Documentation was received and final letters of support were submitted to IPC for photo controls incentive applications for five of these projects including offices, schools, mixed-use, industrial, and civic buildings.

2018 Task 5: Tool Loan Library

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:

Idaho Power Company

Authors:

Dylan Agnes

Elizabeth Cooper

Report Number: 1801_005-05

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Contract Number:
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Acronyms and Abbreviations

AC	Air Conditioning
AIA	American Institute of Architects
AHU	Air Handling Unit
Amp	Ampere
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BOMA	Building Owners and Managers Association
BSU	Boise State University
CO2	Carbon Dioxide
CT	Current Transducer
Cx	Commissioning
DCV	Demand Control Ventilation
EE	Energy Efficiency
EEM(s)	Energy Efficiency Measure(s)
fc	Foot-Candle
HVAC	Heating, Ventilation, and Air Conditioning
IAC	Industrial Assessment Center
IBOA	Intermountain Building Operators Association
IDL	Integrated Design Lab
Int.	International
IPC	Idaho Power Company
kW	Kilowatt
kWh	Kilowatt-Hour
M&V	Measurement and Verification
OSA	Outside Air

PG&E	Pacific Gas and Electric Company
PPM	Parts Per Million
RPM	Rotations Per Minute
RTU	Rooftop Unit
TLL	Tool Loan Library
TPS	Third Party Service
UI	University of Idaho
USGBC	U.S. Green Building Council
Verif.	Verification
VOC	Volatile Organic Compound
3P	Third Party

1. INTRODUCTION

The Tool Loan Library (TLL) is a resource supported by Idaho Power Company (IPC) and managed by the University of Idaho Integrated Design Lab (UI-IDL). The TLL at the UI-IDL is modeled after the Lending Library at the Pacific Energy Center, which is supported by Pacific Gas and Electric (PG&E). In the past years interest in these types of libraries has grown. Recently, the Smart Building Center which is a project of the Northwest Energy Efficiency Council has started a lending library and they cite other lending libraries spanning a large range of tools, including non-energy efficiency related tools. Equipment in the library is tracked via excel, website databases, and in the Energy Resource Catalog that is being redesigned and reviewed by the Idaho Power marketing team.

The primary goal of the TLL is to help customers with energy efficiency (EE) needs, through the use of sensors and loggers deployed in buildings of various types. Loans are provided to individuals or businesses at no charge to the customer. Over 900 individual pieces of equipment are available for loan through the TLL. The equipment is focused on measuring parameters to quantify key factors related to building and equipment energy use, and factors which can affect worker productivity.

The loan process is started when a customer creates a user account at idlboise.com. The customer the has access to the tool loan portal where they fill out a tool loan proposal form. This form is found on the TLL webpage (http://www.idlboise.com/tool-loan-library). When completing a tool loan proposal, the customer includes basic background information, project and data measurement requirements, and goals. When a proposal is submitted, UI-IDL staff members are alerted of a pending proposal via email. The customer and a staff member communicate to verify and finalize equipment needs. An approval email is sent and tools are picked up at the UI-IDL or shipped at the customer's expense.

2. Marketing

Marketing for the TLL was done at various UI-IDL and IPC activities throughout 2018, as well as on the UI-IDL website. The flyer layout was unchanged from 2013: it is in Figure 1 and Figure 2 below. After submitting several drafts for approval it is now being redesigned and reviewed by Idaho Power marketing team. The Energy Resource Catalog is intended to be a complete listing of all tools available to Idaho Power customers, but also, as an in-house reference to assist Architects and Engineering in deciding if a tool would be beneficial to the project. The TLL was promoted in presentations given by the UI-IDL staff, including the Lunch and Learn series and lectures to professional organizations.

The TLL flyer and program slides direct potential users to the TLL website for more information about the library. The main UI-IDL website hosts the TLL portal where customers can submit proposals to request tools, all online. In 2018, the TLL home page had 2,045 visitors.

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University of Idaho

TOOL LOAN LIBRARY

The Tool Loan Library is a free resource managed by the University of Idaho-Integrated Design Lab (UI IDL) available to Idaho Power Company customers to support energy efficiency, demand response, or demand reduction projects. Loans are free of charge for people working on projects in the Idaho Power Company service territory.

The Library has a large variety of tools to capture many parameters for both data logging and on-site spot readings.

TOOL TYPES / PARAMETERS

- Power (kW)
- Energy (kWh)
- Power Factor
- Voltage
- Solar flux (W/m^2)
- Plug loads (120V)
- RPM
- Current
- Flow-liquids
- Gas-(CO_2 ppm)
- Flow-Natural Gas
- Ultrasonic Leak Detection
- Temperature
- Relative Humidity
- State Logging-Light
- State Logging-Magnetic
- Air Velocity
- Air Pressure
- Sound Level
- Gas-VOC
- Light Level (lux,fc,ca)
- Thermal Imaging Camera
- Air Balance Equipment

306 S. 6th Street
Boise, ID 83702
ph: 208.429.0220
fx: 208.343.0001
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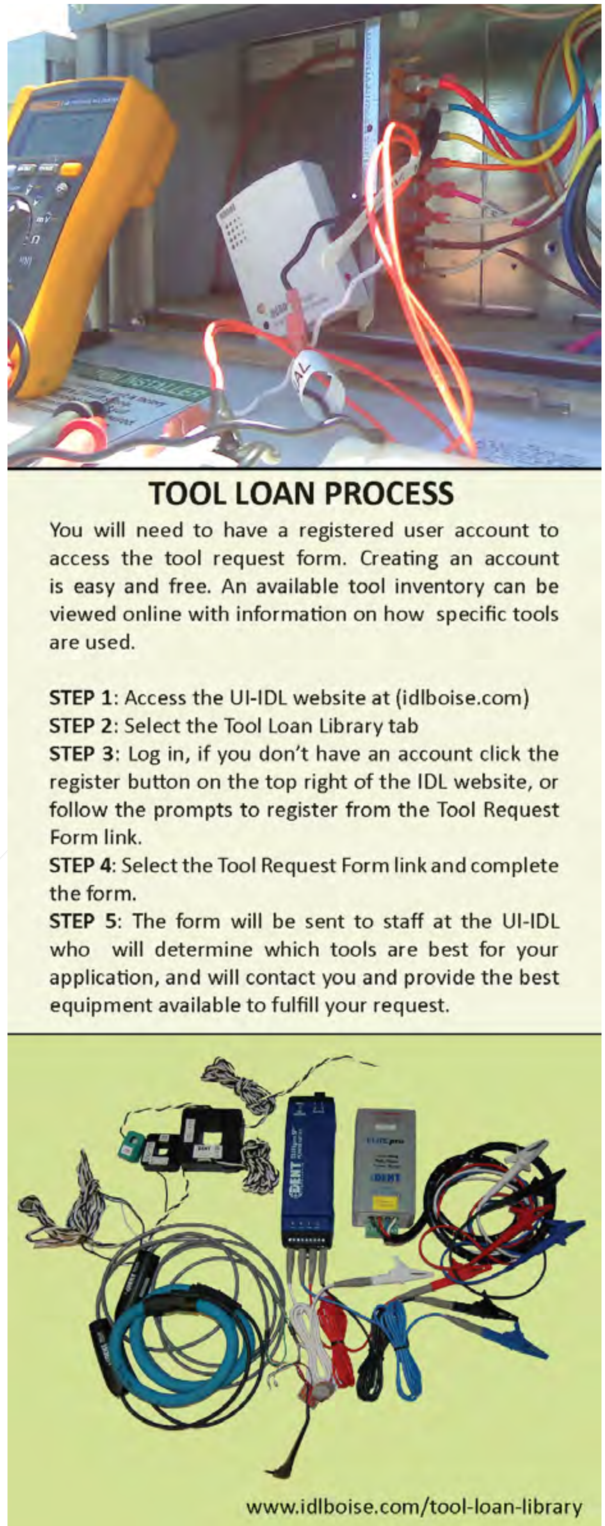
Figure 1: TLL Flyer Front



TOOL LOAN PROCESS

You will need to have a registered user account to access the tool request form. Creating an account is easy and free. An available tool inventory can be viewed online with information on how specific tools are used.

STEP 1: Access the UI-IDL website at (idlboise.com)
STEP 2: Select the Tool Loan Library tab
STEP 3: Log in, if you don't have an account click the register button on the top right of the IDL website, or follow the prompts to register from the Tool Request Form link.
STEP 4: Select the Tool Request Form link and complete the form.
STEP 5: The form will be sent to staff at the UI-IDL who will determine which tools are best for your application, and will contact you and provide the best equipment available to fulfill your request.

www.idlboise.com/tool-loan-library

Figure 2: TLL Flyer Back

3. New Tools & Tool Calibration Plan

In 2018, twenty new tools were added to the TLL to replace old data logging models as well as a new FLIR thermal camera that is portable with an external power supply for extended periods of use. In addition, the FLIR E50bx thermal imaging camera was calibrated during the third quarter.

Equipment items included in the tool loan program are typically distributed with a manufacturer guaranteed calibration period between 1 and 3 years. While many items may remain within recommended tolerances for years after the guaranteed calibration period ends, verifying the item is properly calibrated after initial and subsequent periods is recommended. Calibration services are available on most tools, sometimes from the manufacturer, and from various certified calibration services nationwide.

Third party (3P), certified tool calibration is ideal, but an extensive 3P calibration program would be expensive. Based on research and pricing from quotes, formal calibration would be cost prohibitive for much of the library tools. In several cases, cost of calibration can well exceed 30% of the item cost. As a certified calibration is typically only valid for 1-2 years, an alternative measurement and verification plan for most sensors and loggers is recommended. This will be possible with most of the tool loan inventory. A few exceptions to this must be made on a case by case basis to allow for factory calibration of items that cannot be compared or tested in any other way. An example of one item in this category would be the Shortridge Digital Manometer and Air-Data Multimeter which would have to be recalibrated by the manufacturer.

The IDL will perform the following to ensure items are within specified calibration tolerances:

1. Equipment will be cross-checked against new equipment of the same type for accuracy in a test situation where data is logged. The IDL plan would cross-check older items against multiple newer items at the end of each calibration period (i.e. every two years) to ensure readings are within specified tolerances.
2. Those items found to be out of tolerance will be assessed for factory re-calibration or replacement.

Calibration tracking columns have been added to an inventory spreadsheet which will allow the IDL to determine which items are due for calibration testing. Updates to calibration and references to testing data will be maintained in the inventory spreadsheet and has been expanded to include tool use, quotes, and budget estimates.

4. 2018 Summary Of Loans

In 2018, loan requests totaled 38 with 34 loans completed, 4 loans are on-going. The third quarter had the highest volume of loans at 12 total. Loans were made to 14 different locations and 22 unique users and 11 new TLL users. A wide range of tools were borrowed, as listed in Figure 8. The majority of tools were borrowed for principle investigations or audits, although loans were also made for determining baselines before EEMs were implemented. Tools were borrowed to verify these EEMs as well.

Table 1 and the following figures outline the usage analysis for TLL in 2018.

Table 1: Project and Loan Summary

	Request Date	Location		Project	Type of Loan	# of Tools Loaned
1	1/11/2018	Boise	ID	EWDC	Audit	7
2	1/11/2018	Burley	ID	AOTP	Audit	34
3	2/5/2018	Emmett	ID	IGCLNGP	Audit	1
4	2/9/2018	Lewiston	ID	TCMS	Verification of EEMs	1
5	2/15/2018	Nampa	ID	DTBA	Audit	3
6	2/23/2018	Canyon County	ID	CSFS	Audit	4
7	2/26/2018	Boise	ID	NRCS	Baseline measurement of EEMs	1
8	4/1/2018	Boise	ID	IPDM	Audit	1
9	3/20/2018	Nampa	ID	SFTH	Audit	1
10	3/21/2018	Meridian	ID	SLLDD	Baseline measurement of EEMs	3
11	4/24/2018	Boise	ID	PCJD	Audit	24
12	5/9/2018	Garden City	ID	ESS	Audit	2
13	5/16/2018	Boise	ID	SDAS	Audit	1
14	6/12/2018	Boise	ID	HHSSU	Verification of EEMs	1
15	6/21/2018	Boise	ID	AOTP2	Audit	20

16	8/10/2018	McCall	ID	CADW	Baseline measurement of EEMs	8
17	7/13/2018	Boise	ID	OTYDW	Baseline measurement of EEMs	34
18	7/24/2018	Salmon	ID	GCA	Verification of EEMs	1
19	7/30/2018	Boise	ID	CCS	Audit	1
20	7/31/2018	Boise	ID	OTP	Audit	34
21	8/17/2018	Boise	ID	HWP	Audit	8
22	8/28/2018	Lewiston	ID	IRCBC	Audit	1
23	9/6/2018	Idaho City	ID	EAAC	Audit	3
24	9/11/2018	Boise	ID	BCCC	Audit	2
25	9/18/2018	Meridian	ID	RTSA	Audit	44
26	9/19/2018	Boise	ID	MCPBAP	Baseline measurement of EEMs	17
27	9/19/2018	Boise	ID	KCEA	Audit	2
28	10/19/2018	Burley	ID	IEP	Audit	45
29	11/1/2018	Ketchum	ID	JCS	Audit	4
30	11/6/2018	Boise	ID	UICBC	Verification of EEMs	20
31	11/7/2018	Boise	ID	MFPB	Baseline measurement of EEMs	29
32	11/19/2018	Boise	ID	IPAR	Audit	1
33	11/21/2018	Burley	ID	INTI	Verification of EEMs	1
34	11/19/2018	Boise	ID	FPPEA	Audit	2
35	12/6/2018	Boise	ID	CPL	Audit	1
36	12/7/2018	Twin Falls	ID	IURH	Audit	10
37	12/10/2018	Caldwell	ID	CLA	Verification of EEMs	7
38	12/17/2018	Twin Falls	ID	CWLDC	Audit	8

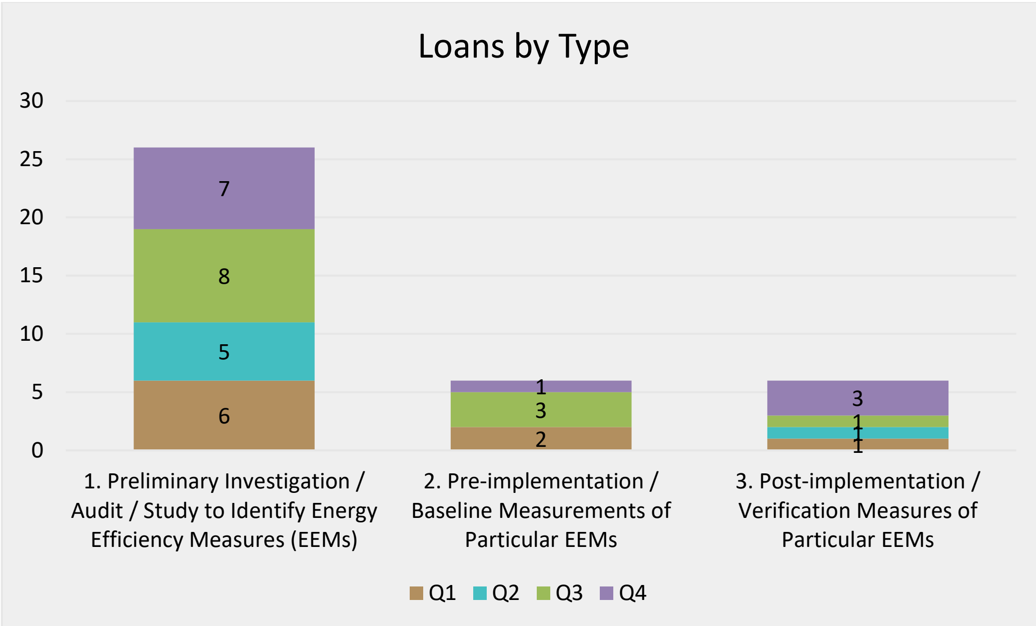


Figure 3: Loans by Type

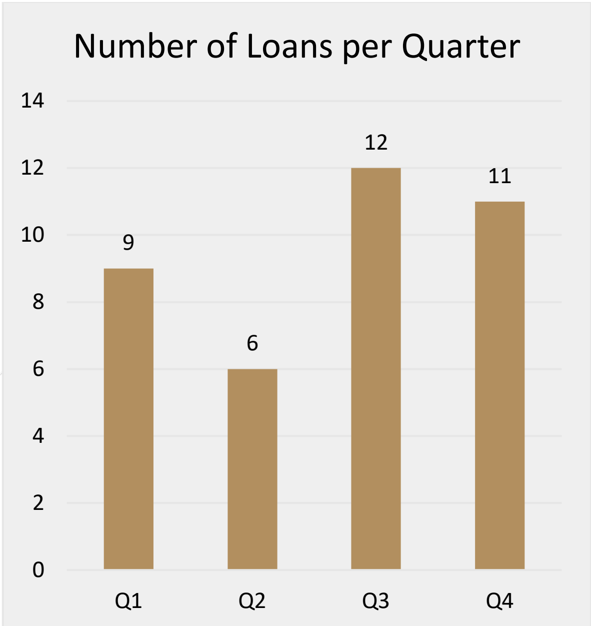


Figure 4: Number of Loans per Quarter

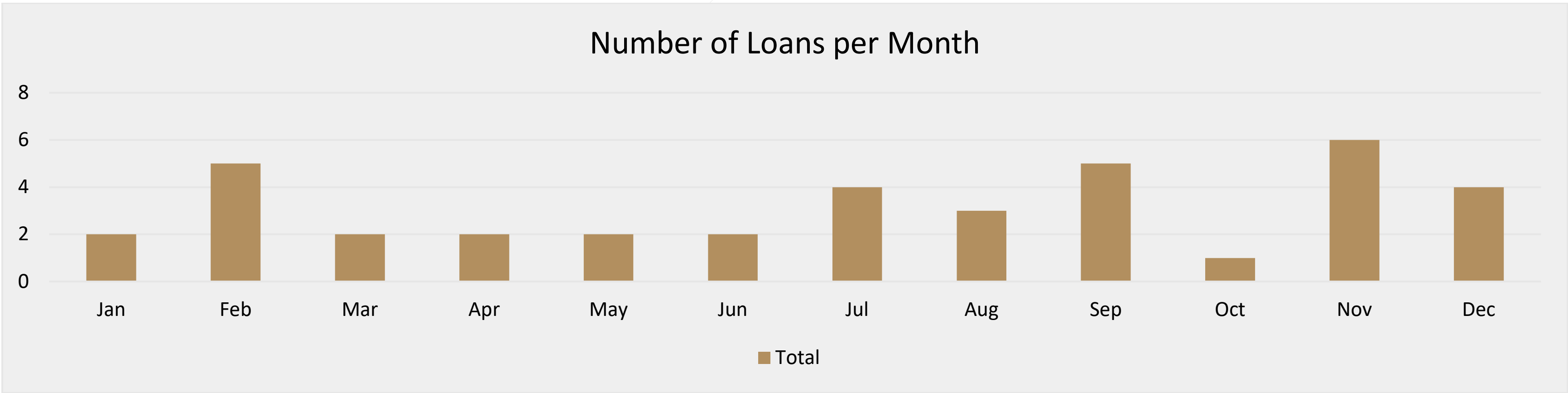


Figure 5: Number of Loans per Month

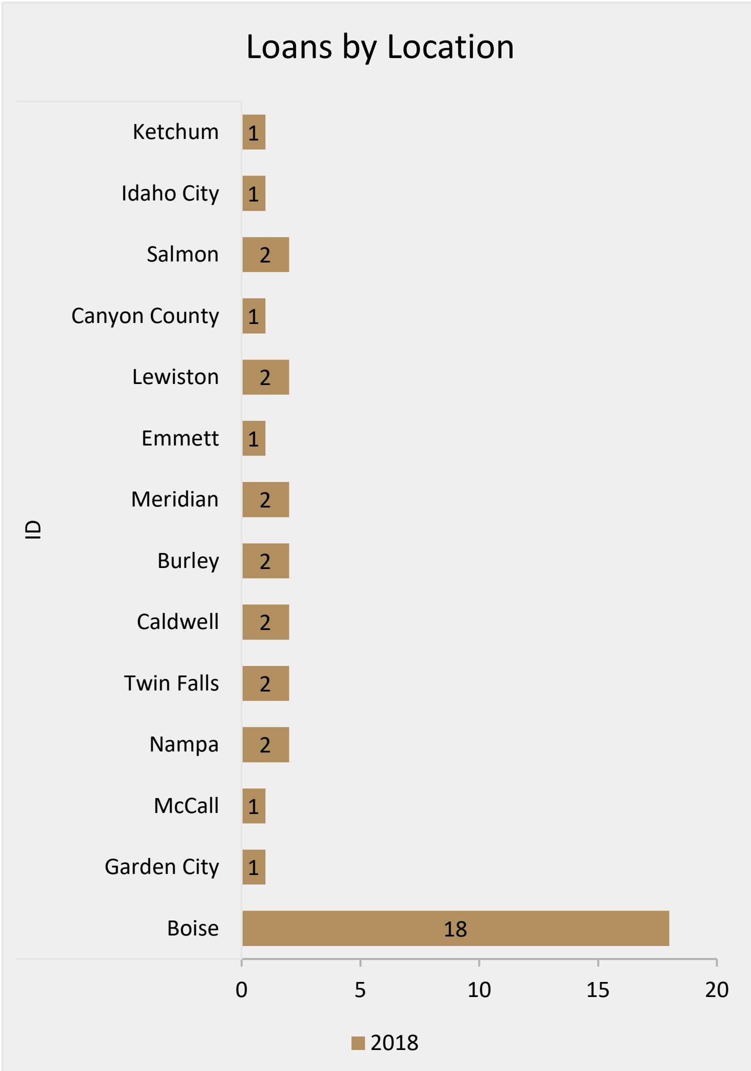


Figure 6: Number of Loans by Location

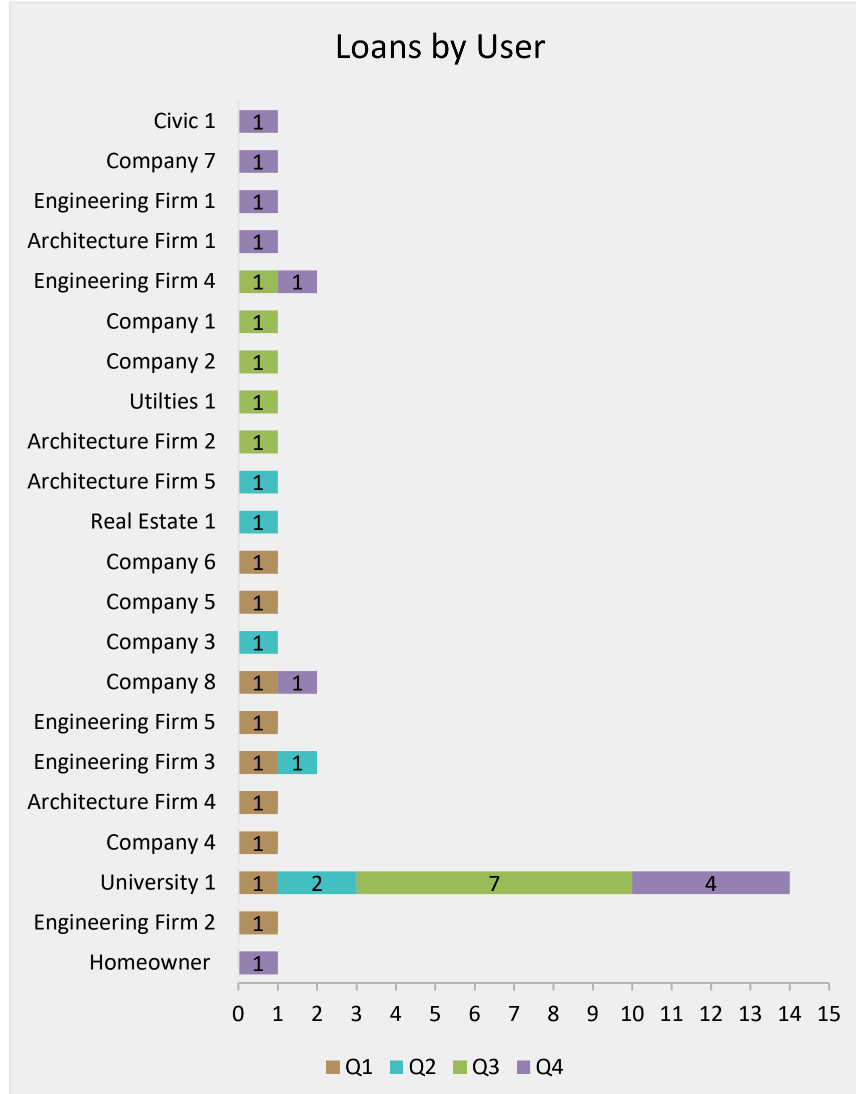


Figure 7: Number of Loans by User

TOTAL TOOLS LOANED: **390**	Q1=55	Q2=49	Q3=155	Q4=131

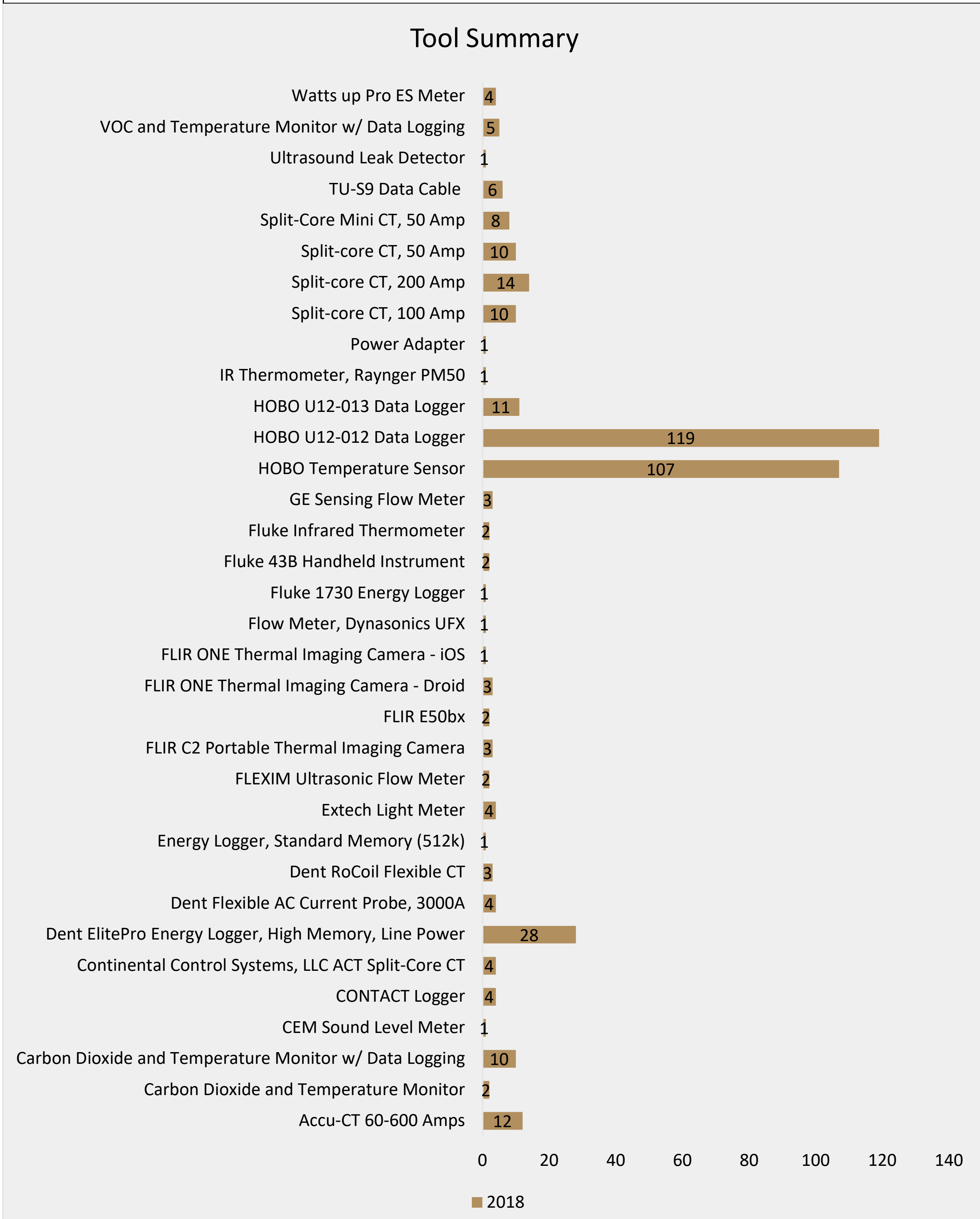


Figure 8: Summary of Tools Loaned

5. Appendices

APPENDIX A: Equipment List

The equipment in the library is tracked via excel, website, and in the soon completed ERL Catalog.

2018 Task 1.6: Thermal Energy Savings Tool

Summary of Progress

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:

Idaho Power Company

Authors:

Damon Woods

Report Number: 1801_010-06

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5277

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Acronyms and Abbreviations

GSHP	Ground-Source Heat Pump
HP	Heat Pump
IDL	Integrated Design Lab
IPC	Idaho Power Company
TEST	Thermal Energy Savings Tool
UI	University of Idaho
VRF	Variable Refrigerant Flow
WSHP	Water-Source Heat Pump

1. Introduction

The 2018 Thermal Energy Savings Tool (TEST) development task was a continuation of work done by the University of Idaho Integrated Design Lab (UI-IDL) for Idaho Power Company (IPC). The original tool development began in 2013 and continued through 2016. Over the years, the tool has grown in its capabilities. Initially, a Heat Pump Energy Savings Calculator (HePESC) spreadsheet was developed in 2013, which was capable of hourly load calculations, energy consumption estimates using regression curves from simulation, and simple cost calculations. Details on 2013 effort, progress, and methods can be found in the IDL technical report number 1301_010-01, "*2013 Heat Pump Calculator – Development and Methodology*." The tool now incorporates several climate design tools and has been improved over time. Tool improvements have included the following:

2014 – Methods verified and user feedback incorporated

2015 – Residential space-type added

2016 – Climate design tools and new weather files included

2017 – Outreach, education, and customization provided for users

2018 – Code defaults updated and continued maintenance and outreach

Details of the 2018 outreach and improvements are outlined in this report.

2. Outreach and Education

Outreach was the main focus of the 2017 task. Outreach continued in 2018, but was not the main emphasis of the task. Even so, there were several new inquiries and tool downloads. The IDL included information on the TEST in many of the Lunch and Learn presentations delivered at architecture and engineering firms in Idaho. Whenever a user requested access to the tool, the IDL sent the TEST spreadsheet through the service WeTransfer as it is too large to attach in a traditional email. A disclaimer is included with each tool download that makes clear that the tool does not guarantee savings and that the user is responsible for verifying their own calculations. Rather than sending out the tool based on individual requests, the goal for next year is for the IDL to host the tool online when the new IDL website is launched. Once there, the tool will be available for free download by those who create an account with IDL and agree to the disclaimer. Tool requests were received from the following organizations in 2018:

- A municipality
- A university
- An engineering consulting firm
- A utility research organization

3. Code Updates

One of the requests the lab received last year was to update the code defaults in the TEST spreadsheet. While a user may manually edit any of the numbers within the tool, there are default numbers provided for insulation, glazing properties, and lighting levels. These defaults had been referenced to ASHRAE 90.1-2007. These defaults have now been updated to the IECC 2015 code cycle to make it current with Idaho's commercial energy code requirements for new construction. Since the tool is primarily designed for iterating potential new construction designs, this reduces the user's time in updating the default values used. These included U-Values, F-Factors, Glazing SHGCs, power densities, and lighting requirements.

In 2017, IDL provided users the ability to define custom curves for heating and cooling equipment. The functionality of this feature has been improved. There are still ways that the tool could be customized and improved. For example, for heat-pump selections, there could be a cut-off for low temperature operation so that the equipment is not over-sized. Some of the tool's features could also be streamlined depending on the desired function. No major adjustments are planned for 2019, but the lab will continue to fix any errors users may identify and maintain its functionality. In its current form, the TEST spreadsheet remains effective at demonstrating the energy impacts of early-design decisions and presents these implications with clear and engaging graphics.

4. References

A. Nezamdoost, E. Cooper and D. Woods, *Using a passive design toolset to evaluate low-cost cooling strategies for an industrial facility in a hot and dry climate*, Energy and Buildings, Vol. 159, pp. 319-331, Jan 2018. https://doi.org/10.1016/j.enbuild.2017.11.011

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Wilson, E., Metzger, D., Hrowitz, S., and Hendron, R. (2014). 2014 Building America House Simulation Protocols. National Renewable Energy Laboratory, Technical Reprot NREL/TP-5500-60988

5. Appendices

Appendix A: Code Updates

Project :

Climate: Boise Air Terminal

Code Cycle: IECC 2015/90.1-2013

GENERAL BUILDING INFO

Building Location:	Boise, ID
Building Use:	Office
Total Building Area (ft^2):	23500
Floor-to-Floor Height (ft):	10
Exposed Bldg Perimeter (linear ft)	314
Cooling Design Day Temp. (°F):	95
Heating Design Day Temp. (°F):	8
Number of Bedrooms:	3

Key Setpoints

Occupied Heating Setpoint (°F):	70
Unoccupied Heating Setback (°F):	64
Occupied Cooling Setpoint (°F):	76
Unoccupied Cooling Setback (°F):	82

Hours of Operation

Default Office Schedule Summary:

8a-5p, M-F. Low use Sat, vacant Sun.

View Other Schedules for Reference

Custom Schedule?: No

*Please click the hyperlink above to input a Custom Schedule.

**Custom schedule is required for Health, Assembly, or Other building use types.

ENVELOPE INPUTS

Code U-values of assemblies/glazing.

Construction Class: Heavy no carpet

Representative constructions

Floor Type: slab on grade

F-Factor: 0.52

Roof slope (degrees): 0

Roof azimuth (degrees

	Total Area (ft^2)	U-Value (Btu/hr-ft^2-°F)	Envelope Heat Rate (Btu/hr-°F)	Glazing Area (ft^2)	Glazing U-Value (Btu/hr-ft^2-°F)	Glazing SHGC	Percent Shaded
(All vert. walls)		0.055			0.42	0.32	0%
North	3800	0.055	162.8	840	0.42	0.32	0%
South	3800	0.055	162.8	840	0.42	0.32	0%
East	2480	0.055	96.3	730	0.42	0.32	0%
West	2480	0.055	96.3	730	0.42	0.32	0%
NW	0	-	0.0	0	-	-	0%
NE	0	-	0.0	0	-	-	0%
SW	0	-	0.0	0	-	-	0%
SE	0	-	0.0	0	-	-	0%
Roof	5890	0.032	188.5	0	-	-	0%
Floor	5890	0.033	163.3		(Btu/hr-°F)	**(Btu/hr)**	
Totals	24340		870	3,140	1,319	101,997	

Figure 1: Code cycle and default values updated and changes underlined in red

HePESC - Loads Results

PEAK LOAD RESULTS

Normalized Loads Table:

Component	Htg Load (Btu/hr-°F)	Cooling Load (Btu/hr-°F)
Envelope	356	356
Glazing (Cond)	60	60
Ventilation	151	151
Infiltration	43	43

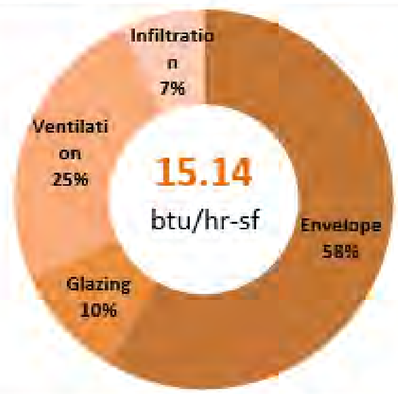
Internal Gains Summary Table:

Component	Htg Load (Btu/hr)	Cooling Load (Btu/hr)
Glazing (Solar)	n/a	13,577
People	n/a	1,200
Lights	n/a	7,592
Plug Loads	n/a	6,398

Peak Loads Summary (at Design Day Temps):

Component	Htg Load (Btu/hr)	Cooling Load (Btu/hr)
Envelope	22,078	6,766
Glazing	3,720	14,717
Ventilation	9,387	2,877
Infiltration	2,663	816
People	n/a	1,200
Lights	n/a	7,592
Plug Loads	n/a	6,398

Peak Heating Load:



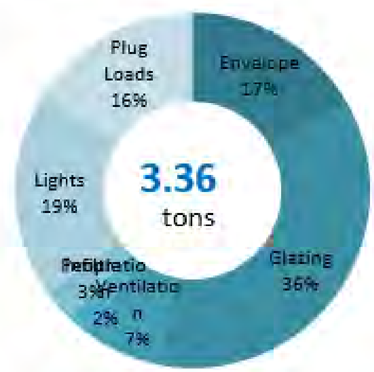
Non-Coincident Peak Heating Breakdown:

37,848	btu/hr
15.14	btu/hr-sf
11.09	kw

Coincident Peak Heating:

45,855	btu/hr
18.34	btu/hr-sf
13.44	kw

Peak Cooling Load:



Non-Coincident Peak Cooling Breakdown:

40,365	btu/hr
16.15	btu/hr-sf
3.36	tons
743.22	sf/ton

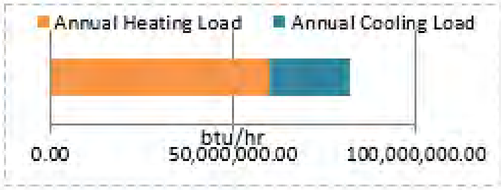
Coincident Peak Cooling:

28,203	btu/hr
11.28	btu/hr-sf
2.35	tons
1063.71	sf/ton

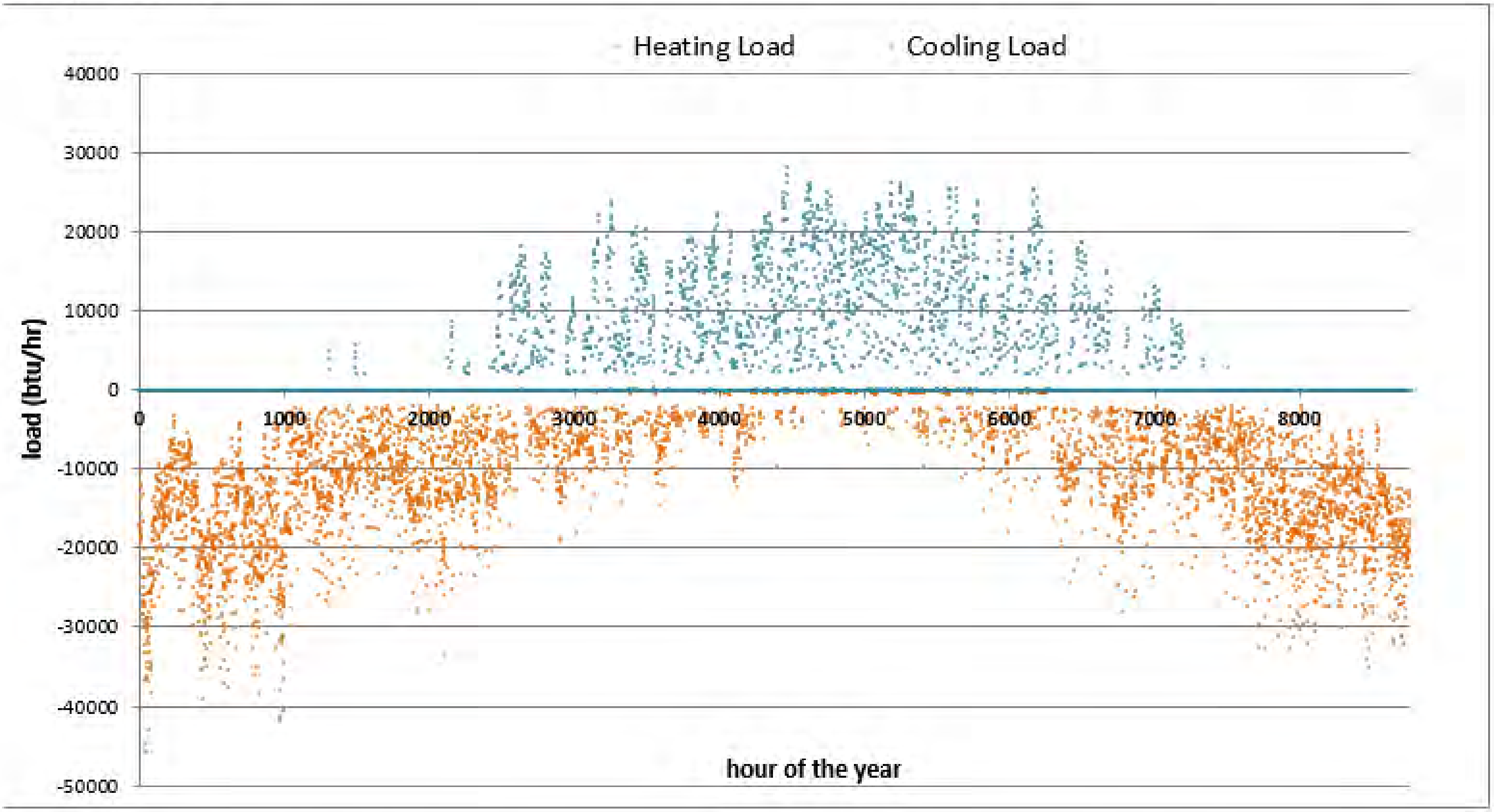
HePESC - Loads Results

HOURLY LOADS:

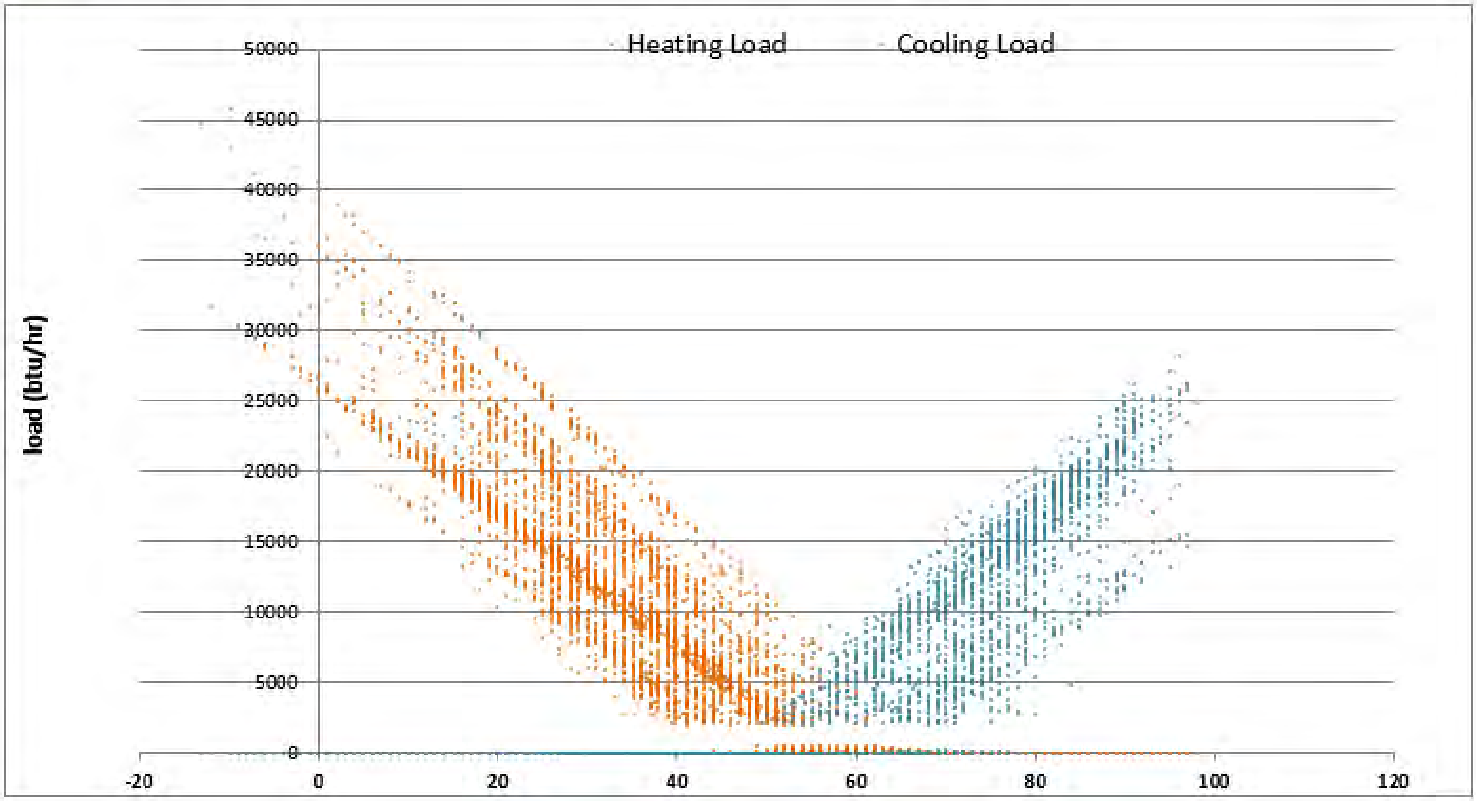
	btus	kBtu	kWh	Therms	%of total
Annual Heating Load	59,987,783	59,988	204,687	600	73%
Annual Cooling Load	21,787,747	21,788	74,343	218	27%
Total Annual Load	81,775,530	81,776	279,030	818	100%



Hourly Load Profile



HePESC - Loads Results



INTEGRATED DESIGN LAB
University of Idaho

HePESC - Results Summary

IDAHO POWER
An IDACORP Company

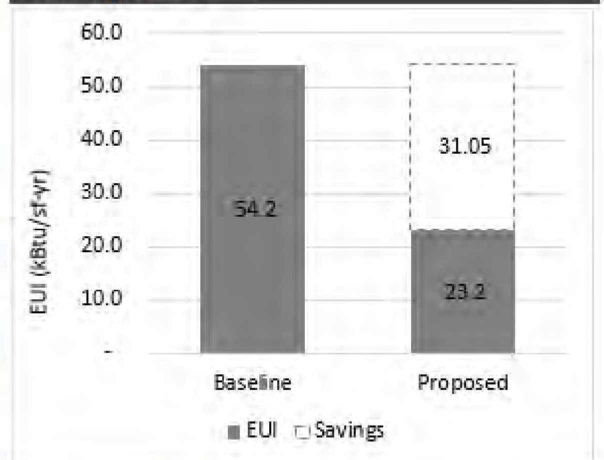
Final Comparison Stats

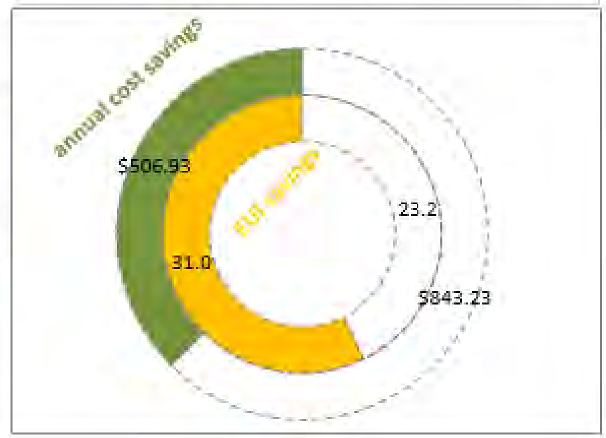
Syst B+P | Baseline System = Furnace - Gas | posed System = Heat Pump variable sp | Iteration:

Item	Units	Baseline	Proposed	Savings Value	Savings %
EUI	kBtu/sf-yr	54.2	23.2	31.0	57.3%
Total Energy	kBtu	135,516	57,891	77,625	57.3%
Energy (by fuel)	kWh	15,555	16,966	-1,412	-9.1%
Energy (by fuel)	therms	824	0	824	100.0%
Total Cost	$	$1,350	$843	$507	37.5%
Cost (by fuel)	kWh $	$773	$843	-$70	-9.1%
Cost (by fuel)	therm $	$577	$0	$577	100.0%

Item	Units	Baseline	Proposed	Incr Cost	Smp Payback
Capital Cost	$	$14,044	$7,004	-$7,040	Immediate
LCCA Savings	$	$13,638			

Summary Charts





HePESC - Advanced Design Strategies

PASSIVE COOLING & NATURAL VENTILATION

Objective: Use natural outdoor air movement and pressure differentials to reduce cooling and ventilation loads.

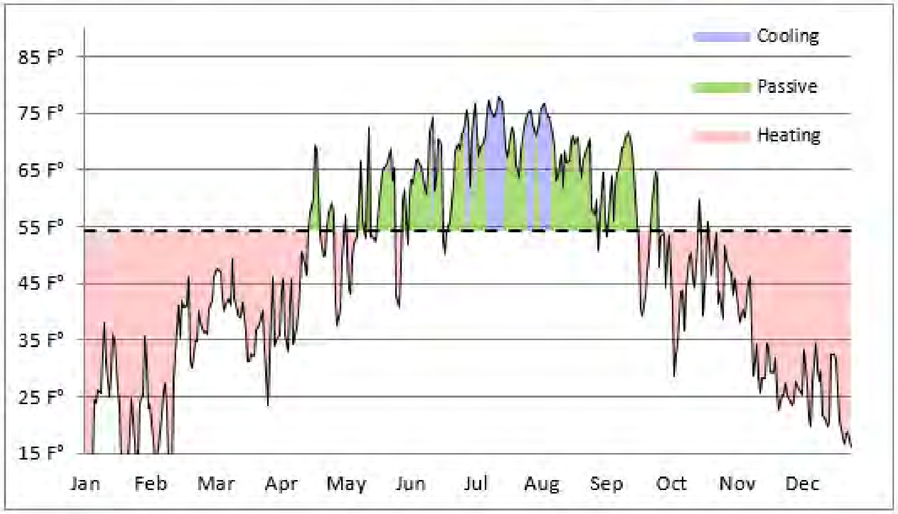
Benefits: Reduction in fan and cooling energy, longer equipment life, potential equipment downsizing or elimination, greater connection to the

Simple Balance Point Feasibility Study

Average Operation (hrs/day):	7.98
Potential HG Rate (Btu/hr):	28,766
Qi (Btu/hr):	9,562
Heat Loss Rate (Btu/hr-°F):	610
Balance Point (°F):	54.3

Setpoints

Occupied Cooling Setpoint (°F):	76
Unoccupied Cooling Setback (°F):	82
emperature difference allowed (°F):	3
Lowest Temp. allowed for open windows (°F):	64



Results

# of Hours with Potential for Passive Strategy:

1,977	23%

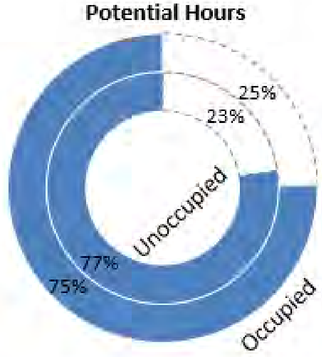
# of Hours During Occupied Times:

1,167	25%

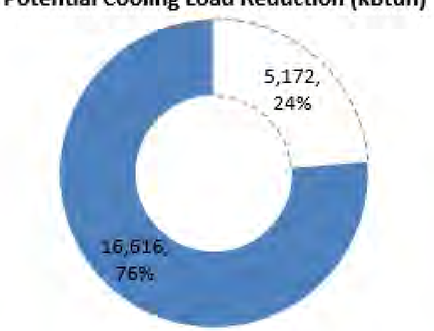
Sum of Potential Cooling Load Reductions (kBtuh)

5,172	24%

Potential Hours



Potential Cooling Load Reduction (kBtuh)



Implementation in this Tool:

HePESC - Advanced Design Strategies

CROSS VENTILATION

Objective: To passively cool a building by capturing the prevailing winds during the summertime and channeling them through a space

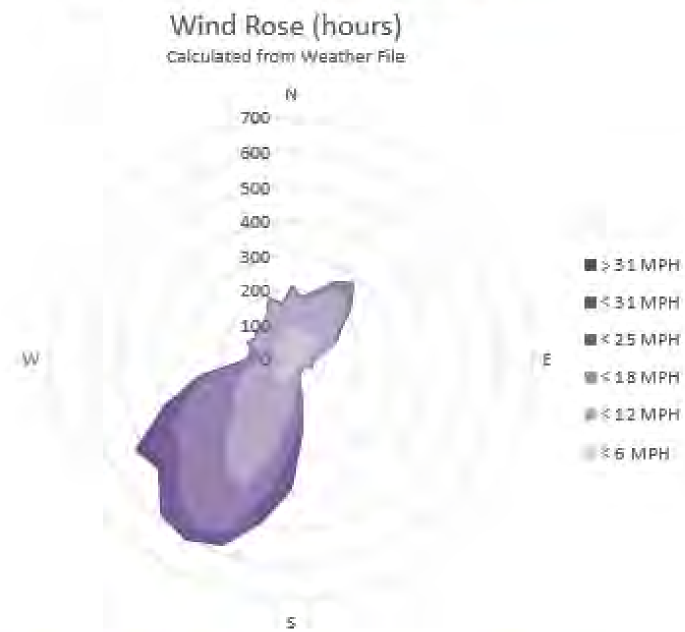
Benefits: Reduction in fan and cooling energy, longer equipment life, potential equipment downsizing or elimination, greater connection to the outdoors.

Inputs:

Cv Effectiveness Factor:	0.35
Area of openings for analysis (ft2):	150
Effective opening factor:	0.45
Area of operable opening (ft2):	67.5
Wind speed reduction factor:	0.5

Façade	Glazing Area (ft2)
North	75
South	75
East	75
West	75
NW	0
NE	0
SW	0
SE	0

Wind Rose Analysis Period: **All Months**



Results

# of Hours with Potential for Cross Ventilation:

707	8%

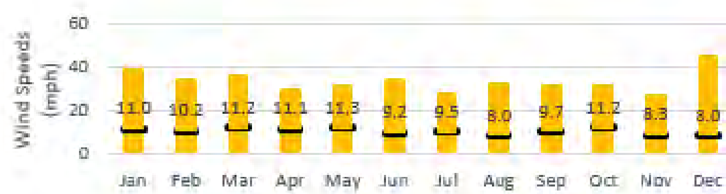
# of Hours During Occupied Times:

510	11%

Sum of Potential Cooling Load Reductions (kBtuh)

4,403	20%

Implementation in this Tool:



2018 Task 7: Building Energy Analytics Case Study

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:

Idaho Power Company

Authors:

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Report Number: 1801_010-07

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Acronyms and Abbreviations

ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BAS	Building Automation System
CBECS	Commercial Building Energy Consumption Survey
DDC	Direct Digital Controls
DOE	Department of Energy
EMS	Energy Management System
EUI	Energy Use Index
HVAC	Heating, Ventilation, and Air Conditioning
IAQ	Indoor Air Quality
IEQ	Indoor Environmental Quality
IDL	Integrated Design Lab
IPC	Idaho Power Company
UI	University of Idaho
VAV	Variable Air Volume

1. Introduction

The 2018 Idaho Power scope of work for the Building Energy Analytics Case Study was to identify potential savings from the implementation of a new type of energy management software. Several companies are promoting new software capabilities that monitor many control points within a building. Some examples of these analytic software packages include SkySpark, EnergyCap and BuildingIQ. These data analysis software packages can overlay traditional Building Automation Systems (BAS) or Energy Management Systems (EMS).

The analytic software does not directly control any building equipment. Instead, its primary use is to filter through the many control signals and identify potential operational problems within the building. This continuous monitoring has the potential to help maintain building commissioning and limit performance degradation through the building's life.

The first part of the IDL task included identifying a case study – a site that was considering adding an analytics system within 2018. The IDL team worked with the facility owners and control teams to document any implementation issues. The last step of the project was to identify whether the installation of the analytics software led to any operational changes and to estimate potential savings resulting from those changes.

2. Executive Summary

The use of energy analytics software at two case study sites proved key to identifying several energy efficiency measures and equipment faults. However, its full potential can only be realized when there is an existing DDC system, and a party that is dedicated to monitoring the system and follows through on communicating issues with the facilities team. The IDL project in 2018 shed light on both the strengths and weaknesses of building energy analytics.

Energy analytics systems work well in the following areas:

- Quickly calculating and tracking annual energy performance
- Understanding baseline energy operations and energy signatures
- Identifying operational anomalies

Energy Analytics do not work well in the following situations:

- Buildings with pneumatic controls or non-DDC systems
- Buildings without a trained operator dedicated to monitoring the system
- Building teams without a clear communication line between the analytics team and the operations team.

3. Case Study Identification

The IDL team identified a set of buildings linked to a campus meter as an initial case study. The campus had several advantages for selection as a case study. The facilities manager had seen a presentation on the capabilities of energy analytics and was eager to have it implemented. The campus also included a set of several different buildings which had the potential to provide a view on how effective the SkySpark program would be in generating savings within several different building types.

A limited version of the SkySpark software had been implemented at the site in 2017. The IDL team met with the controls contractor and the facilities manager to do a walk-through of the site and identify how the SkySpark program could be expanded to improve the energy performance at the site. The initial SkySpark set-up only included monitoring of each of the power meters at the buildings. Since the whole campus is billed by IPC on one central meter, the SkySpark software helped the facilities team better understand the energy patterns for individual buildings at the site.

3.1 Case Study 1 – A Campus

The campus includes an overnight facility, several maintenance buildings, a medical wing, and offices. SkySpark was used to quantify the annual energy use at each of the sub-metered sites. Information about each building was included in the Department of Energy (DOE) EnergyStar program to determine an Energy Star score from 0-100. This helped the facility managers at the complex identify particular areas on which to focus. Several of the buildings were grouped with other meters so no scores could be given to those structures. Information on the main buildings for which data was available are shown in Table 1.

Table 1: Annual energy use information collected through SkySpark

Building	Area [ft^2]	EUI [$kBtu/ft^2$]	Energy Star Score Estimate
Shop	2,414	225	4
Vehicle Maintenance	5,247	23	N/A
Housing 1	10,980	40	N/A
Medical Unit	24,607	57	69
Office 1	26,673	77	17
Office 2	45,276	121	N/A
Housing 2	167,610	91	N/A

Of the buildings listed in Table 1, three had remarkably high EUI's with correspondingly low EnergyStar scores, which indicated poor performance. These included the shop, office 2, and housing 2. The research team examined each of these in detail by using data from SkySpark.

The shop is a very small maintenance shop with heavy equipment and is used to repair items around the campus. It is open from Monday to Saturday but is not in continuous use. It is a workshop/repair space with a gas furnace and a DX rooftop unit that is controlled by a programmable thermostat. The building has a welding shop inside that is rarely used. When there is welding, there are large exhaust fans that run to maintain adequate indoor air quality. When SkySpark was used to plot the energy use, the typical profile of the shop showed times of very high use during the day, but little to no use at night. These high readings indicate simply that welding was occurring within the shop which skewed the typical energy one would expect. No operational changes were recommended for this site.

The Office 1 building functions as a set of offices for many of the campus employees and personnel. While it has perimeter heating, there is no interior heating and the core can become quite cold. The perimeter heating is driven by pneumatic controls and there is no central management of the HVAC system. This building's operational hours are M-F 8-5 with little to no weekend use. The poor comfort and high energy use of this building as identified by SkySpark should make it a campus priority for controls and HVAC upgrades.

The Office 2 building serves as the main intake and processing facility at the campus. The heating and cooling is provided by a Variable Air Volume (VAV) system with electric reheat. The data collection system at the site is in its 3rd generation and overlays some much older legacy equipment. This building includes a lab which has a walk-in cooler and several freezers. Without a more detailed walkthrough and limited details from the controls, it is unknown what makes this building such a high energy consumer although the labs and operational hours of the facility may be contributing factors.

Operational changes for much of the rest of the complex are limited as many of the operations are governed by housing standards for fresh air, setpoints, and lighting times. The air handlers for these buildings must remain on at all hours to maintain fresh air for the occupants. The external lighting has recently been upgraded to LED's. Interior pod lighting upgrades to LEDs are currently underway.

While the SkySpark software was helpful for sub-metering at the campus, many of the controls were tied to a legacy system without a central Energy Management System interface. The old age and autonomous setup of the existing controls limited the information that could be viewed or accessed by a building analytics software. Therefore the team shifted the focus away from the campus as a case study and towards a new building.

3.2 Case Study 2 – a Government Office

The facility selected for the second case study was completed in 2002 and it has 356,000 ft^2 of conference rooms and offices. The building is heated by a geothermal system and cooled by multi-staged chillers. The major pumps and motors are equipped with VFDs and the building has fully Direct Digital Controls (DDC). In 2004, the building was EnergyStar certified, with a score of 83. Since the DOE has updated the metrics with the latest CBECS data, the facility no longer qualifies for certification – it no longer performs 75% better than most other buildings of the same age and type. This performance degradation is exactly what an energy analytics program like SkySpark is intended to correct.

The team met with the facility manager, the controls contractor, and a SkySpark provider to look at the possibility of installing SkySpark at the site. A stand-alone modem was installed at the site to beta-test the equipment so that several hundred points at the site could be mapped to SkySpark without a full installation cost to the owner. This modem was installed by a SkySpark vendor who was able to map many of the control points in the building very quickly. That modem is still in operation at the site, but it is due for removal in January 2019.

4. Results

4.1 Findings at the Campus

The first way that the energy analytics system was put to use at the campus was to provide the annual energy consumption at each of the campus buildings as shown earlier in Table 1. This allowed the campus energy specialist to identify which buildings to focus on for energy retrofits and informed the industrial survey implementation plan that is now underway at the site to retrofit and update existing equipment.

Unfortunately, much of the campus control system still relies on legacy hardware and pneumatic controls, which severely limits the capabilities of an analytics system. A building analytics system like SkySpark requires access to many clearly defined digital control points to be effective at identifying operational anomalies. Without such, it is only able to provide sub-metering and some energy signature analysis. Several of the graduate students at IDL worked with the SkySpark data to identify energy signatures and operation times for the individual campus buildings as shown in Appendix A. However, without regular communication with the facilities managers or training in the analytics software, the usefulness of this exercise was limited.

4.2 Findings at the Government Office

The facility in the second case study had a full DDC system in place and so mapping the control points on the SkySpark system was intuitive and relatively quick (within a few days) for a knowledgeable installer. Using proprietary code within the analytics software, the SkySpark provider was able to see a list of immediate operational schemes that might be causing issues. These included chiller over-cycling, high loop temperatures, and poor economizer operation. The analytics commissioning team shared these findings with the controls team. The controls team noted that some of the automated analytics had misdiagnosed some problems. The analytics software code from the commissioning team assumes several control points are associated with standard pieces of equipment like chillers. However, the controls at this site did not include several of these control points which showed up as static values. This interaction highlighted the need for close coordination between the controls contractor and the analytics provider to understand these possible discrepancies.

While several operational changes were discussed at the meeting including looking into the chiller cycling and loop temperatures, no further actions were taken that IDL is aware of. There was limited coordination between the controls provider and the facilities management at the site during the time of this project. Without a clear line of communication or personnel dedicated to following up, the information was not acted upon.

5. Conclusion

While each case study showed the potential for building analytics to be an asset, neither project was able to realize its full capabilities. Energy analytics in software such as SkySpark can be powerful tools for keeping buildings commissioned and operating efficiently. They provide both an overall image of performance by calculating Energy Use Indices (EUIs) and estimating savings by including weather normalization features. However, to target the performance of specific pieces of equipment, the software must be deployed at a site with a DDC system, and set up in close coordination with the controls contractor. After installation, it is key to have personnel who are trained in how to use the software dedicated to regularly checking in on the system and are in regular communication with the facilities team at the site. The IDL team found that in both of these case studies, there was an abundance of data, but few resources dedicated to analysis or implementation.

At the campus, the installation was limited by the age of the controls at the site. The analytics software was helpful at providing baseline energy signatures. The analytics helped to inform the retrofit implementation plan at the site. The IDL team provided only a small amount of assistance in going through the data. However, the facilities team had limited time resources available to spend on such analysis.

At the government office, the analytics software was installed quickly and was able to immediately identify several operational changes to improve energy efficiency. However, some of the analytics must be tuned specifically to each building to eliminate phantom anomalies from unused control points. This is best done by close coordination with the controls contractor. Lastly, although several items were identified, without dedicated personnel to follow-up on the analytics report, it is unknown if any actions were taken.

The IDL team found that it is not enough to merely install analytics software and expect savings. There must be three elements in place for energy analytics to be successful. The software must be installed at an appropriate building – one with a DDC system and properly labeled control points. The installation must be carried out by a knowledgeable team who can coordinate with the controls contractor for the site. Most importantly, there must be someone within the team whose job it is to follow up on the analytics reports and to coordinate with the facilities manager to implement the operational changes. Sometimes these follow-up services are provided by those who install the analytics software, and sometimes they are not. If the correct elements are in place, the IDL team believes that energy analytics could be very effective at preventing building performance degradation and maintaining building commissioning. If one of the preceding conditions is missing, then the analytics software will likely underperform its energy savings potential.

6. Appendices

Appendix A: Initial findings from IDL analysis of SkySpark data at the campus

1. Building 1
    a. There is a minimum of 20kW of lighting and plug loads on at all times. This is a significant amount of power – it might be worth a nighttime walkthrough to verify that all of the nighttime loads are necessary.
    b. Team should follow-up on nighttime HVAC power/setbacks during unoccupied periods by cross-referencing the expo schedule.

2. Building 2
    a. Max load 124 kW, minimum of 72 kW
    b. Operational schedule is M-F 8-5 (little to no weekend use). Perimeter heating only with pneumatic controls.
    c. Upgrades: improve supply air temperatures as internal offices can become quite cold – perhaps with an ERV.

3. Building 3
    a. An old housing unit now used for training. It has only a very small load: 8 kW max, 3.3 kW min.
    b. Recommendation: a slightly smaller load on the weekend indicates about 1kW of equipment is left on at night during the week.

4. Building 4
    a. Maximum 57kW (3pm-5pm), Minimum 39kW (3am).
    b. This is a 24-hour facility, so no walk-through was performed and there are no recommendations at this time.

5. Building 5
    a. The shop has irregular use Mon – Saturday.
    b. The facilities manager is in the shop regularly and keeps an eye out for equipment left on. A programmable thermostat manages the furnace and DX rooftop unit. No recommendations at this time.

6. Building 6
    a. The maintenance shop has 4-5 bays that are in operation M-F 8-5 PM
    b. The maximum load is 12 kW, with a minimum of 0 kW, so if in the future a load appears at night, it is an indication that equipment has been left on.

7. Building 7
    a. Residential building of approximately 100 occupants – vacant during the day and has one washer and one dryer. Maximum 28 kW (weekends around 4:00pm) minimum of 10 kW at night. No walkthrough performed and no recommendations at this time.

8. Building 8
    a. All on standards for fresh air, thermostats and lighting. AHUS are on 24/7 to maintain fresh air.
    b. Since the operation and schedule is so regulated, there are few efficiency recommendations at this time. The largest benefits are likely to be lighting upgrades to LED (underway) and ensuring the AHUs are maintained and replaced with high-efficiency equipment when possible as these see heavy use.

9. Building 9
    a. This is a 10x10 unit with AC installed to keep the equipment in a safe operating range.
    b. Facilities suspected there may be a ghost load – possibly tapped into by a prior construction project
    c. IDL should perform further analysis to quantify the AC unit power and operation (the tower load should be steady).

10. Building 10
    a. Max load 950 kW, minimum of 680 kW.
    b. There was some discrepancy between the main line and the total of the other loads indicating some power is being used that is not accounted for. IDL will study the data to verify this, but it may require a site visit from an IPC representative.

Other Notes:

a) The team should identify good baseline operation for reference
b) A back-up generator test is performed every Thursday morning from 6-7 am.
c) A new transformer that arrived in April should smooth out some of the power signature irregularities. The team should run a comparison to verify this improvement.

INTEGRATED DESIGN LAB
University of Idaho

2018 Task 8: Measuring Indoor Performance at Educational Facilities

Summary of Effort and Outcomes

Idaho Power Company External Year-End Report

December 31, 2018

Prepared for:
Idaho Power Company

Authors:
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Report Number: 1701_003-01

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Acronyms and Abbreviations

ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
CBECS	Commercial Building Energy Consumption Survey
DOE	Department of Energy
HVAC	Heating, Ventilation, and Air Conditioning
IAQ	Indoor Air Quality
IEQ	Indoor Environmental Quality
IDL	Integrated Design Lab
IPC	Idaho Power Company
LEED	Leadership in Energy & Environmental Design
PMV	Predicted Mean Vote
PNNL	Pacific Northwest National Laboratory
PPD	Percentage of Population Dissatisfied
TMY	Typical Meteorological Year
UI	University of Idaho

1. Introduction

The Integrated Design Lab (IDL) proposed a task to Idaho Power Company (IPC) on Measuring Indoor Performance at Educational Facilities. The purpose of this task was to determine the effectiveness of HVAC systems at providing adequate conditioning in typical secondary school classrooms. The data was used to quantify energy savings that could be achieved through operational changes without adversely affecting occupant comfort. Four classrooms at two separate high schools were intensively monitored for several weeks. The measurements from these classrooms were used to extrapolate cooling required in the schools during the spring and fall when the buildings are still using air conditioning. Department of Energy (DOE) prototype models of the schools were used to show how adjustments to the HVAC operations could reduce peak loads and overall energy consumption at typical Idaho high schools while maintaining high thermal and environmental quality for the students.

2. Summary of Findings

Most classrooms measured in this project were over-cooled. They fell below the recommended comfort parameters as specified by ASHRAE Standard 55. Enhancing thermal performance of the classrooms will save on unnecessary cooling and could increase student productivity. The classrooms could be brought into compliance by raising the cooling setpoint by 4^{o}F. Adjusting the default thermostat setpoint is estimated to save an Idaho school $4 per student in annual energy bills. Raising the cooling setpoint will save the utility an estimated 60 kWh of electrical energy per student and reduce electrical demand by 30 Watts per student.

3. Thermal Performance Analysis

Thermal performance is defined by ASHRAE Standard 55[1]. This standard includes air temperature, air velocity, relative humidity, mean radiant temperature, occupant clothing and activity levels. Based on these readings, one may estimate whether most occupants would be comfortable in that environment. The standard uses two metrics for gauging compliance: the Predicted Mean Vote (PMV) and the Percentage of People Dissatisfied (PPD). Both PMV and PPD are related through a series of equations. The PMV is an estimate of comfort on a sliding scale with -3 being very cold, 0 being comfortable, and +3 being too warm. Standard 55 specifies that occupants should be within $\pm$ 0.5 PMV for the space to be considered comfortable. The PPD is another way of predicting comfort by estimating the percentage of people in the room who are satisfied with the thermal environment. If more than 20% of people are predicted to be unsatisfied (a PMV greater than 0.5), then the space is considered uncomfortable.

It is important to note that these metrics are based on environmental conditions as inputs to a series of equations – not based on people's opinions. While testing on human subjects was used to develop these original comfort standards in the 1970's, no occupant surveys were conducted during this project. The comfort numbers provided in this report are merely predictions of what most people would state their comfort to be when in that environment.

---

[1] ASHRAE, "ASHRAE, ANSI/ASHRAE Standard 55-2013. Thermal Environmental Conditions for Human Occupancy," American Society of Heating Refrigerating, and Air-Conditioning Engineers, Inc., Atlanta, 2013.

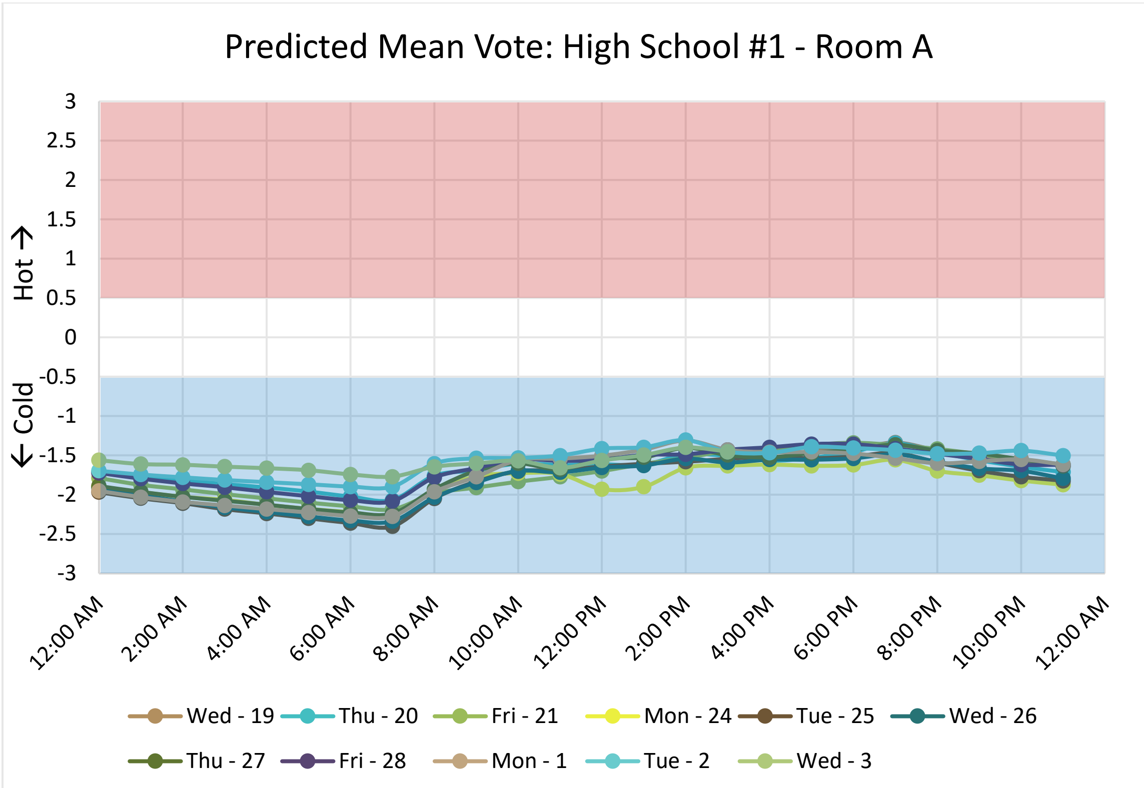
While a thermostat is often used as a proxy for thermal comfort, it misses the nuance of many other interacting features – most importantly the mean radiant temperature. The Mean Radiant Temperature (MRT) is the average of the surrounding surface temperatures and has nearly twice the impact on comfort than air temperature. Most thermostats do not incorporate the surface temperatures and therefore many HVAC systems over-cool the rooms they are meant to condition, which wastes energy.

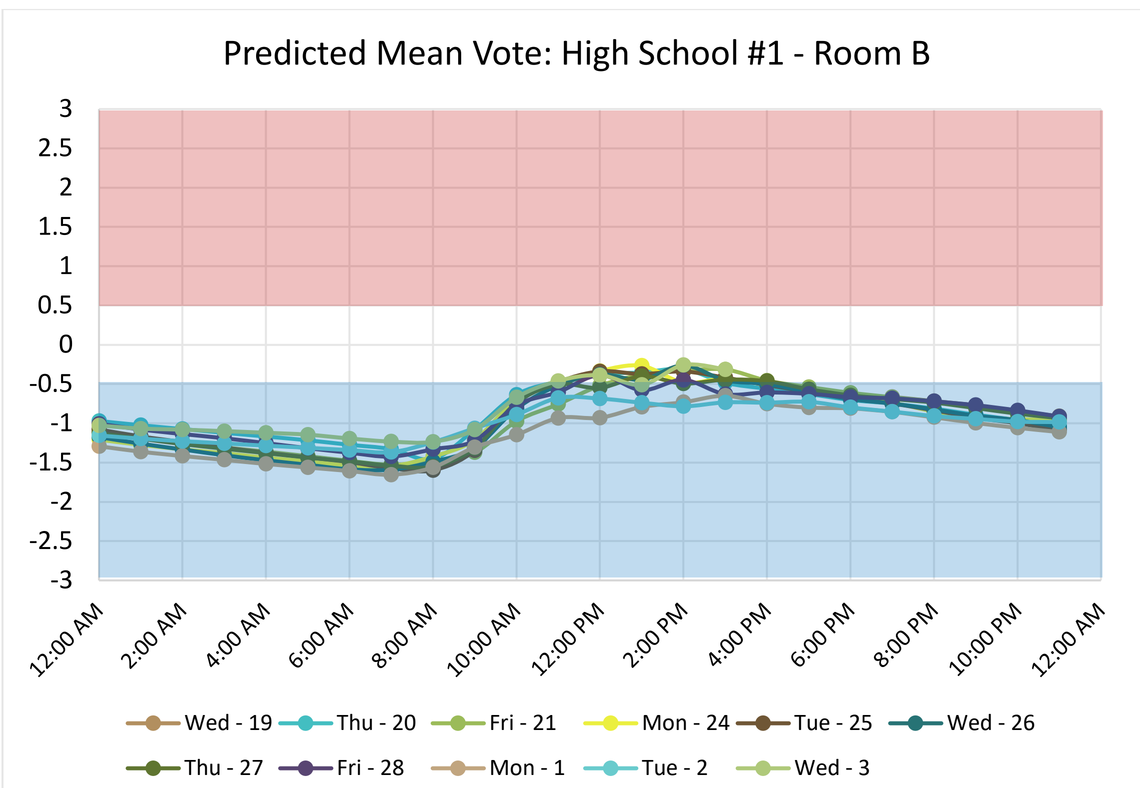
The PMV calculations were based on the set of equations laid out in ASHRAE Standard 55. The equations can be strung together in computer code and within the standard, these equations are listed in the language of BASIC. This code was re-written in Excel so that time-series graphs could be produced for this project. The equations include several assumptions and measurements. The equation inputs are listed in Table 1.

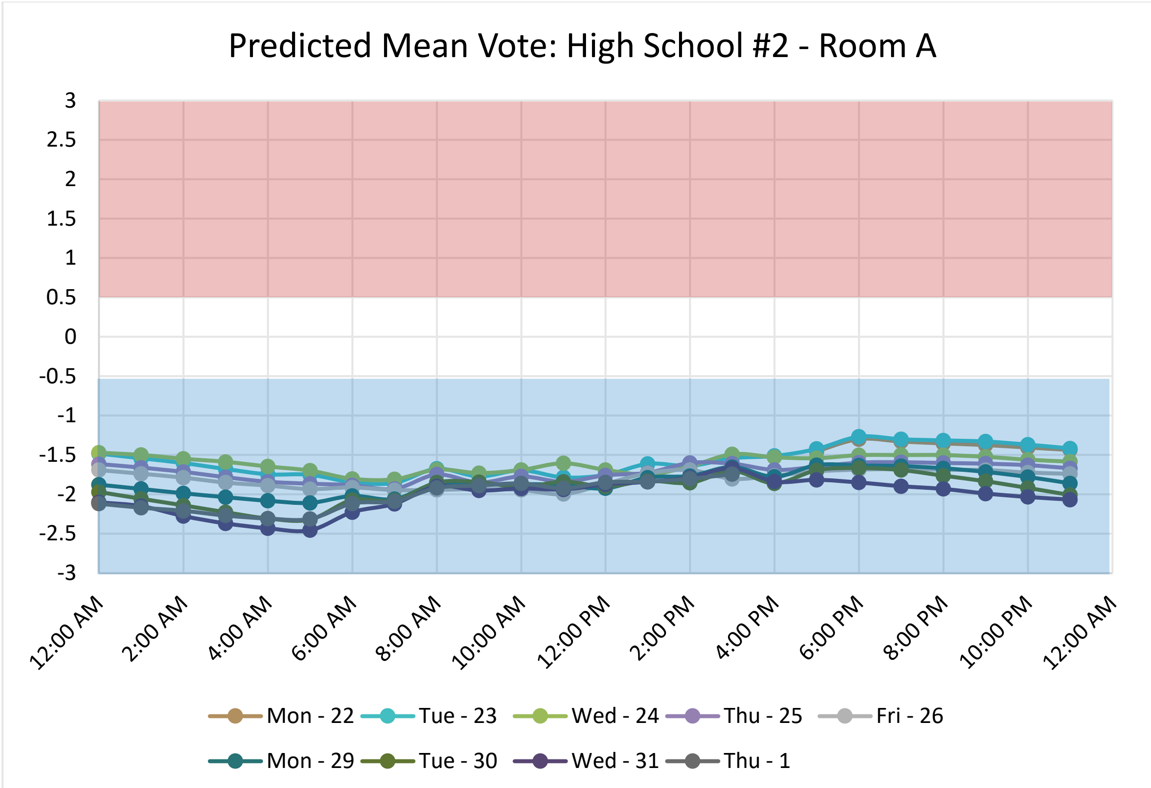
Table 1: Measurements used to estimate comfort level in classrooms

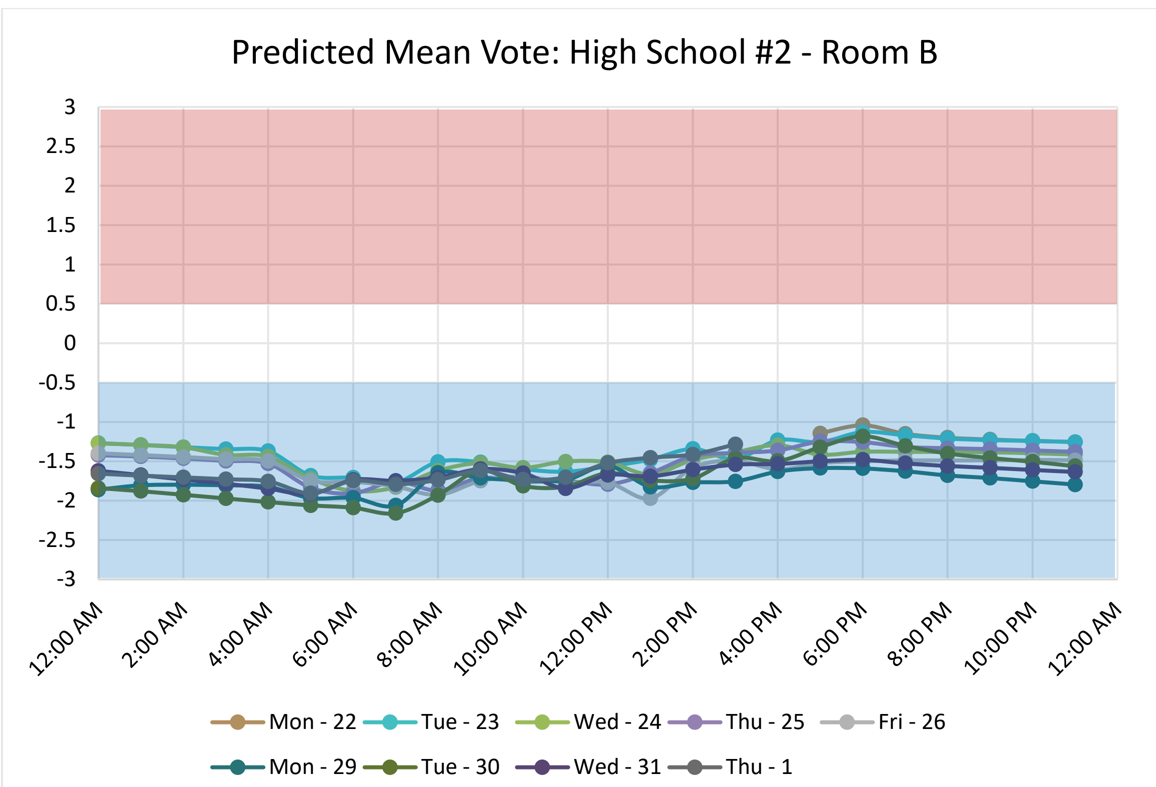
Input	Value	Meaning
Activity Level	1.1 [Mets]	Sitting and writing
Clothing Level	0.5 [Clo]	Shoes, socks, pants, and short-sleeved shirt
External Work	0 [Mets]	No weight-lifting
Air Velocity	20 [ft/min]	Default indoor velocity based on ASHRAE 55
Dry Bulb Air Temperature	Measured [°F]	Air temperature
Relative Humidity	Measured [%]	Relative humidity
Mean Radiant Temperature	Measured [°F]	Average of surface temperatures

The thermal performance as measured at four classrooms in two high schools is shown in the following figures. In each graph, the PMV is shown along the vertical axis. Any measurements above 0.5 are considered too warm (as indicated by the red bars) and measurements below -0.5 are considered too cold (as indicated by the blue bars).


Predicted Mean Vote: High School #1 - Room A
Hot →
← Cold
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
12:00 AM
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
12:00 AM
Wed - 19
Thu - 20
Fri - 21
Mon - 24
Tue - 25
Wed - 26
Thu - 27
Fri - 28
Mon - 1
Tue - 2
Wed - 3


Predicted Mean Vote: High School #1 - Room B
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
12:00 AM
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
12:00 AM
Wed - 19
Thu - 20
Fri - 21
Mon - 24
Tue - 25
Wed - 26
Thu - 27
Fri - 28
Mon - 1
Tue - 2
Wed - 3


Predicted Mean Vote: High School #2 - Room A
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
12:00 AM
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
12:00 AM
Mon - 22
Tue - 23
Wed - 24
Thu - 25
Fri - 26
Mon - 29
Tue - 30
Wed - 31
Thu - 1


Predicted Mean Vote: High School #2 - Room B
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
12:00 AM
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
12:00 AM
Mon - 22
Tue - 23
Wed - 24
Thu - 25
Fri - 26
Mon - 29
Tue - 30
Wed - 31
Thu - 1

3.1 2018 Evaluations

Every classroom that was measured indicated generally cold conditions. These cold conditions persisted even though the measurements were taken during the fall at a time when the outdoor air temperature rose above the balance point each day and the buildings were in cooling mode. In Figure 1, the outdoor temperature is shown on the same graph as the indoor temperature.

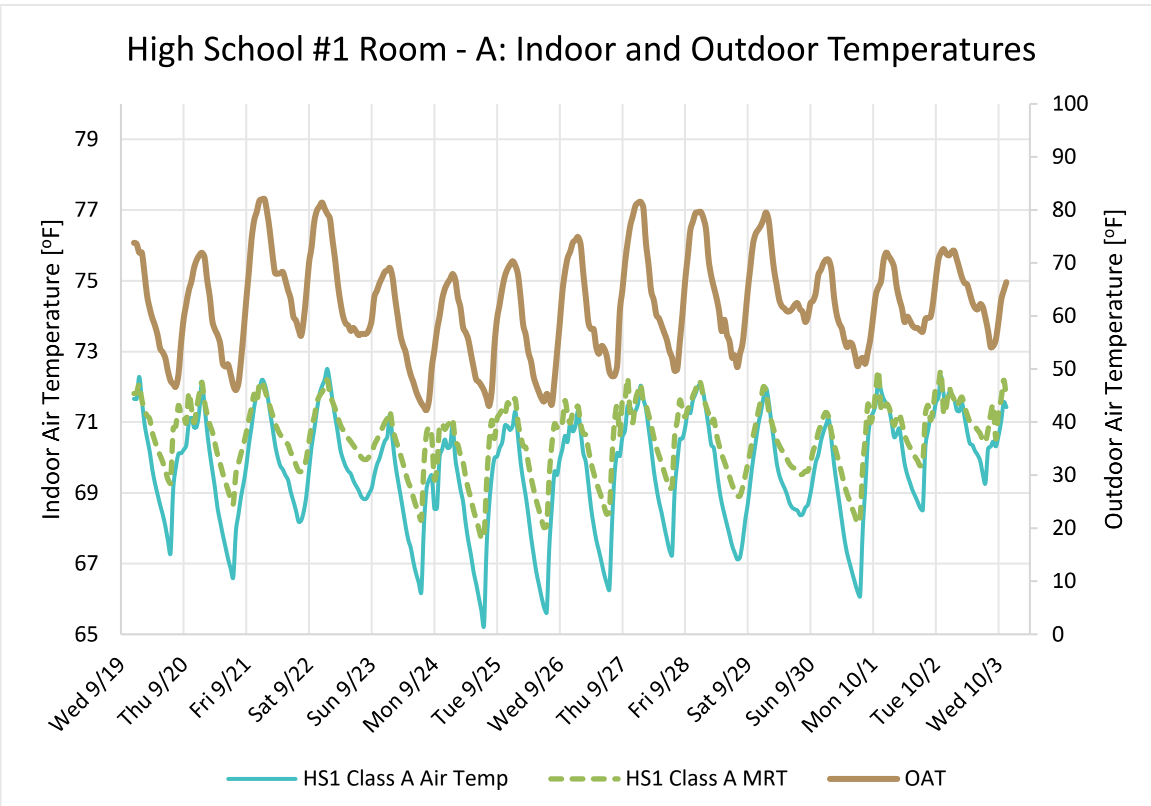


Figure 1: The measured air and surface temperatures of a classroom at one of the high schools

During the measurement period, the outdoor temperature regularly rose above 70°F and even up to 80°F, while the indoor temperature peaked at 72°F. The peaks of the indoor air temperature are staggered showing that the air conditioning system is active.

4. Prototype Models

4.1 Matching Setpoints and Conditions

Since each of the classrooms measured showed a tendency towards overcooling, the IDL team proposed raising the cooling setpoints. The team used an energy model to estimate the savings from the setpoint adjustments. The model was a DOE prototype for a secondary school constructed to 90.1 – 2004 code standards. An image of the model is shown below.

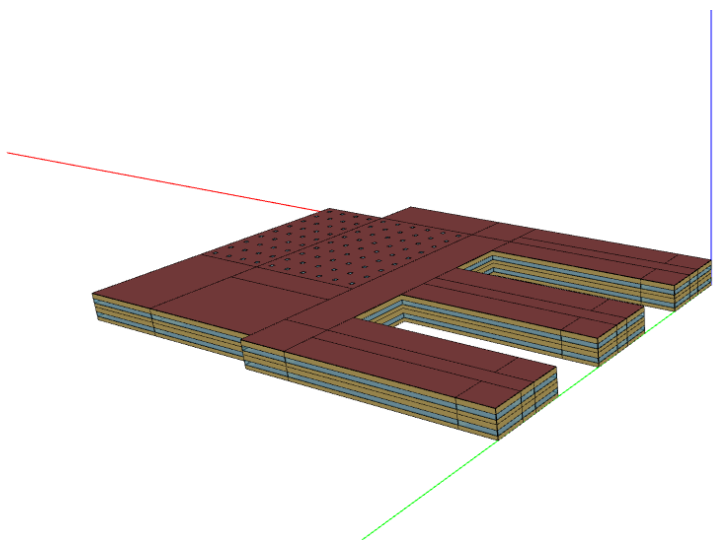


Figure 2: The DOE prototype model used to estimate energy savings

This model is used as a representation for a generic high school in Idaho. It is based on data collected by the Commercial Building Energy Consumption Survey (CBECS) data and the specific energy model was produced by Pacific Northwest National Lab (PNNL). Since this model is a stand-in for a generic high school, it was not calibrated for a specific building monitored in this project. These DOE prototype models by PNNL have been used in the development of energy codes around the country. The measurements taken at the classrooms formed the baseline setpoints. The average recorded indoor cooling setpoints were between 70°F – 72°F.

One example is shown in Figure 3, where the temperature falls during the occupied period and rises when unoccupied. This indicates that the classroom is being cooled between about 6:00 AM – 4:00 PM.

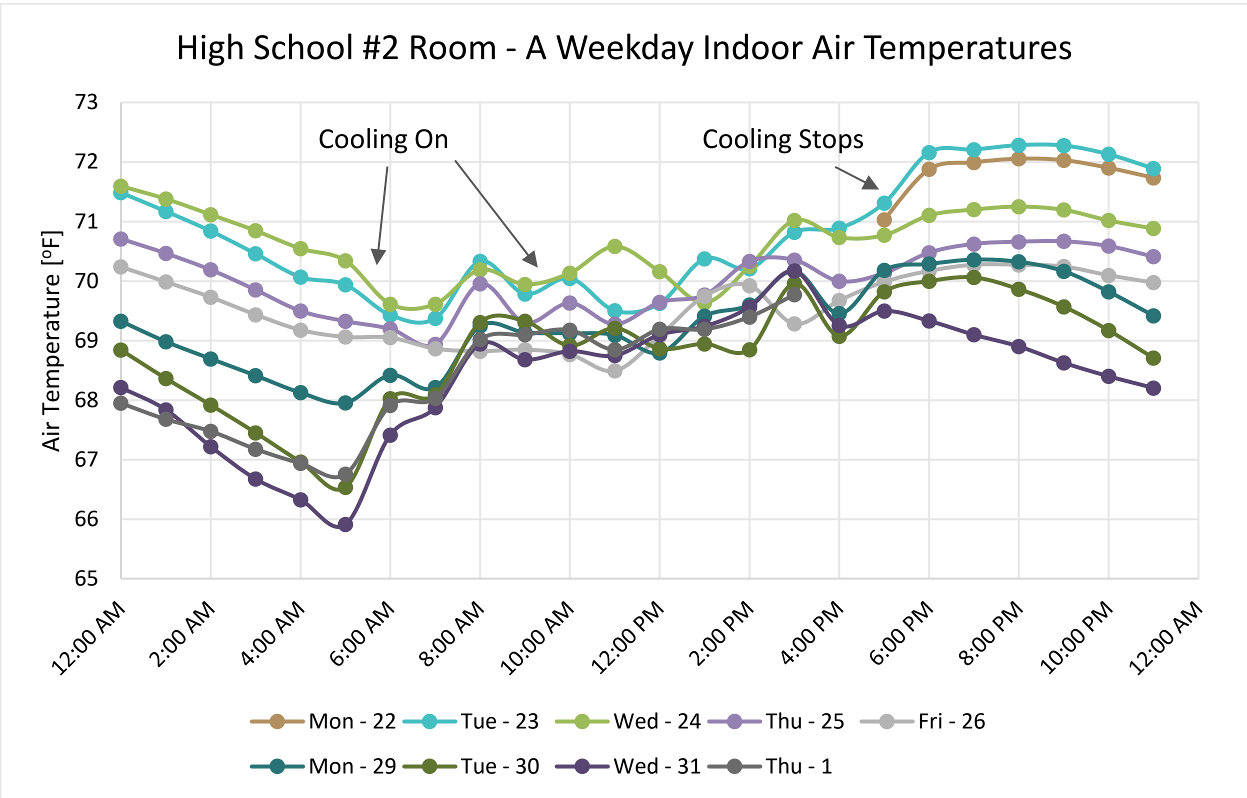


Figure 3: The average indoor air temperatures recorded at one of the high school classrooms

Three of the classrooms had similar thermal profiles to what is shown in Figure 3 with setpoints near or below 72ºF and low comfort performance. Only one classroom that was measured showed times when the indoor conditions rose into the comfort zone as defined by Standard 55. This was at High School #1 in Classroom B. This room has a much higher cooling setpoint of 76ºF-78ºF as shown in Figure 4.

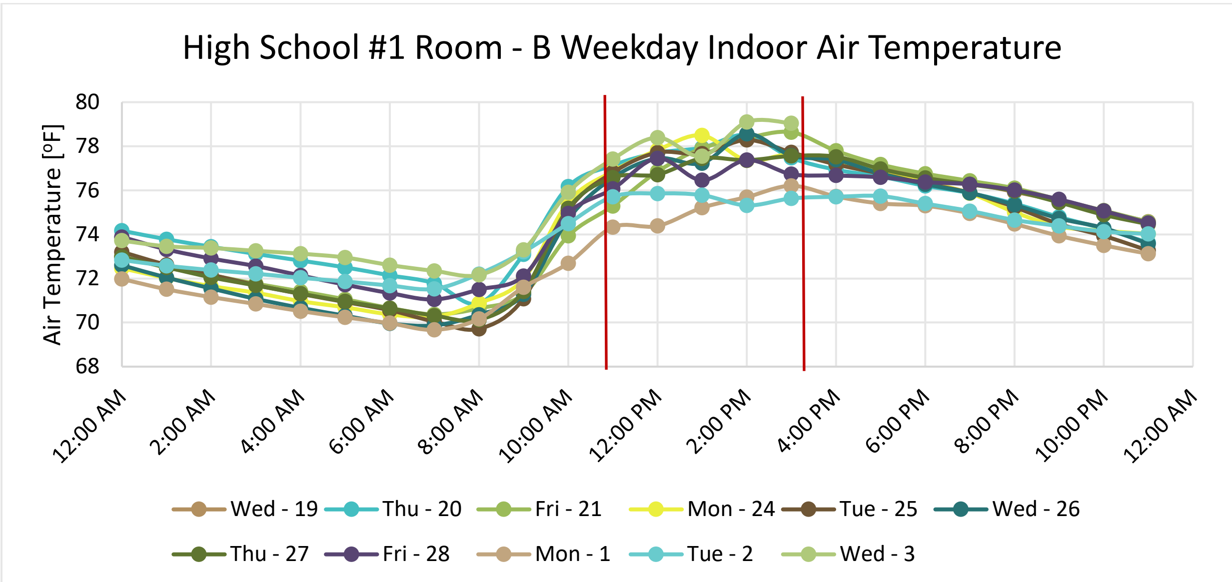


Figure 4: The indoor temperatures measured at the one classroom that showed thermal comfort

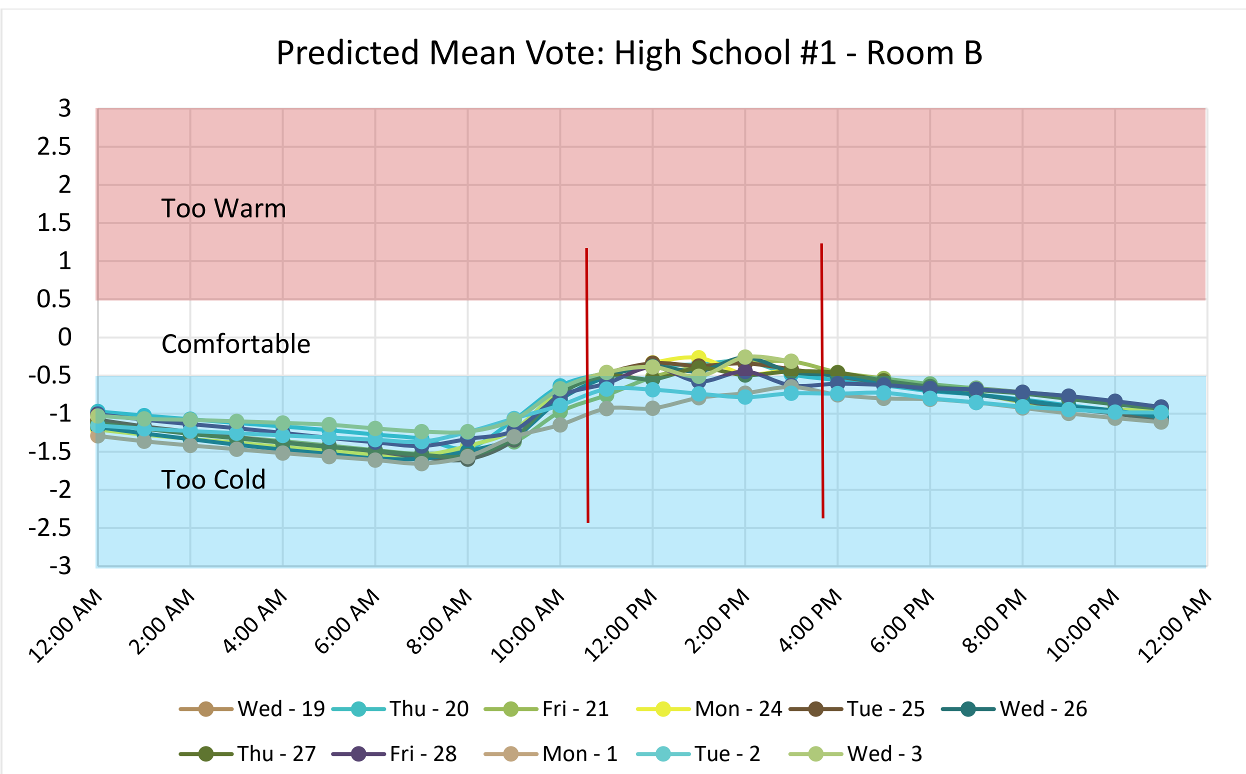


Figure 5: The comfort metrics for the classroom with higher setpoints

The measurements at this particular classroom, as shown in Figure 4 and Figure 5, formed the basis for the proposed change in setpoints. The classroom only approached the thermal comfort range once the indoor temperature reached above 75°F. Another observation was that the average surface temperatures started out cooler and rose throughout the afternoon. This meant that in the morning, the space could have a higher air temperature and maintain the same level of thermal comfort because the cool surfaces in the morning offset the higher air temperature. The proposed setpoint is contrasted with the original setpoint observed in the rest of the classrooms as shown in Figure 6.

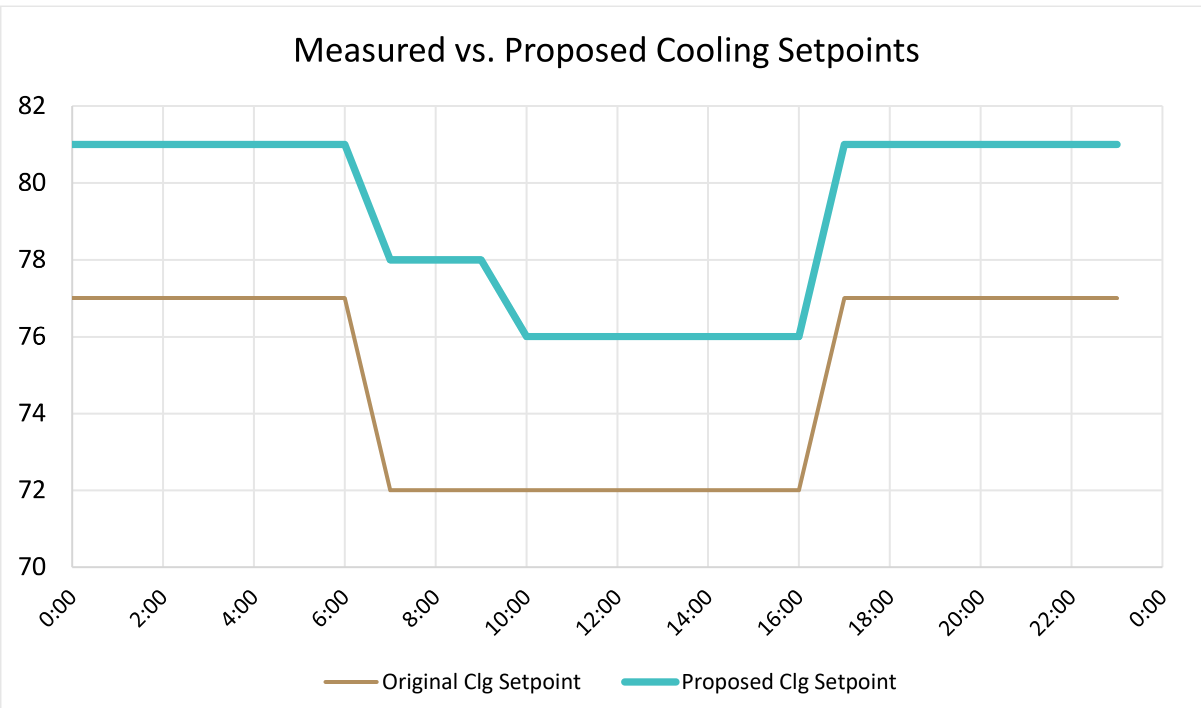


Figure 6 Proposed adjustment for the cooling setpoint in classrooms to improve thermal comfort

The adjustment to the cooling setpoint is to raise the original setpoint at the schools by 4°F from 72°F to 76°F with a 5°F setback and a staggered start to the cooling to account for the low surface temperatures in the space. This improved both the predicted energy savings and the occupant comfort in the model.

5. Results

Raising the cooling setpoint by 4ºF is expected to increase comfort in the classrooms and save on annual energy consumption. Since each school is unique and ranges by size, the prototype model was used as a stand-in for a generic high school in southern Idaho run for a Typical Meteorological Year (TMY). To provide a common metric between schools, the savings are estimated per student. The energy savings calculated are shown in Table 2.

Table 2: Energy simulation results of setpoint adjustment

Category	Annual Estimated Savings
Electricity Cost	$4.44/student
Electricity Consumption	63 kWh/student
Electricity Demand	0.03 kW/student

6. Conclusions and Future Steps

The measurements showed that clear energy efficiency improvements could be made through simple operational adjustments. While both high schools were in Southern Idaho, neither school was part of the IPC Schools Cohort and so there is room for them to further connect with IPC's energy efficiency initiatives. The readings for each site will be sent back to the science teachers and facilities managers at each school. Adjustments to the setpoints may be implemented at any point and could potentially begin saving energy as soon as April of this coming year. The adjusted setpoints not only improve energy performance but also increase comfort, making a strong case for the facilities managers to implement these changes and maintain these new setpoint guidelines to reduce occupant complaints.

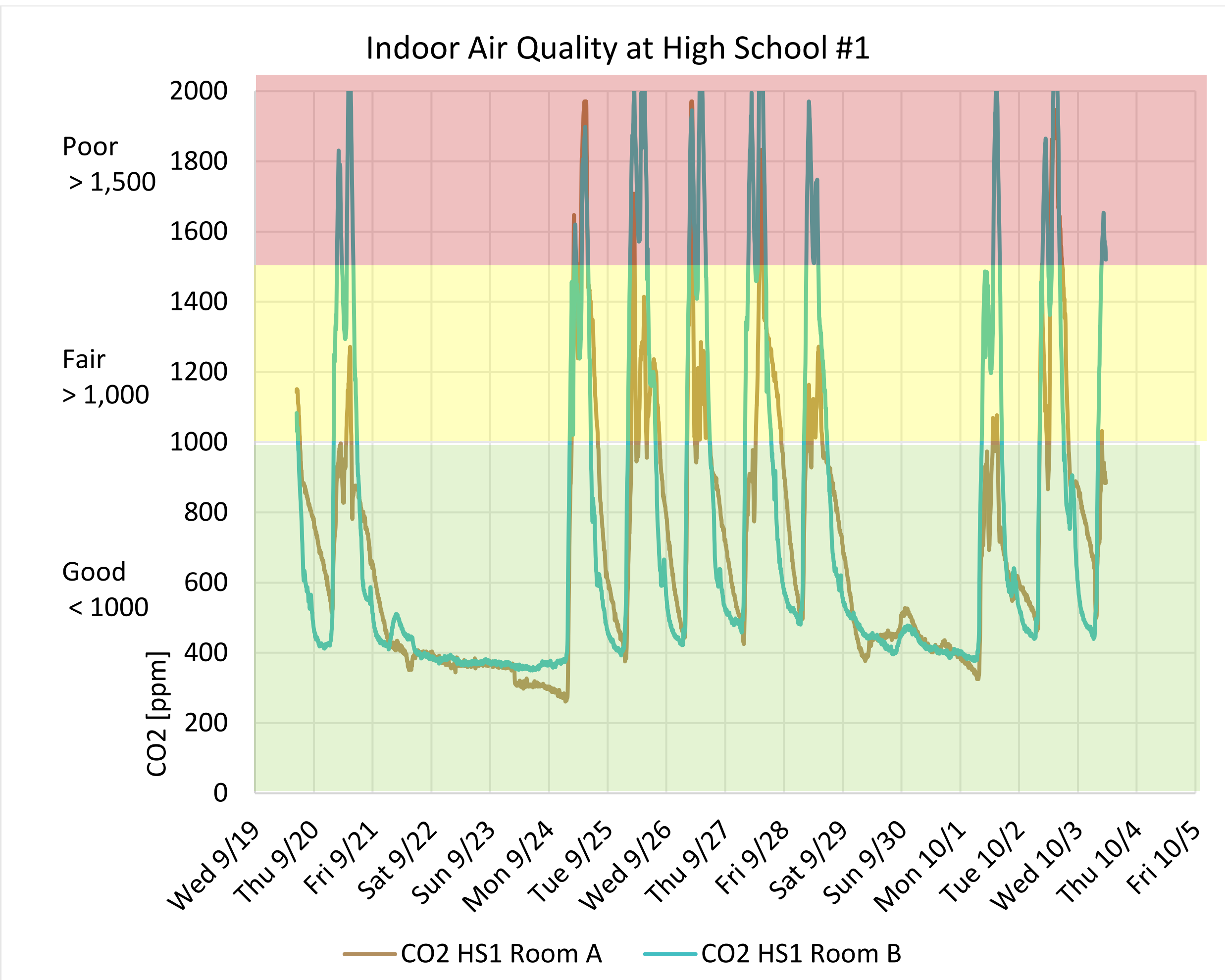
While this study highlights potential savings, Idaho Power could choose to build upon this study in several ways. One way to engage schools would be to work with science teachers to incorporate a project like this into the curriculum so that students may see the relationship between building operations, comfort, and energy bills. A second way IPC could work with schools is to identify facilities that require HVAC improvements if the current equipment cannot properly condition the classrooms or provide adequate fresh air. The IDL team included several air quality monitors within the classrooms to measure whether the HVAC systems were providing adequate ventilation. One provided only fair performance, while the other showed poor performance. Details are shown in Appendix A.

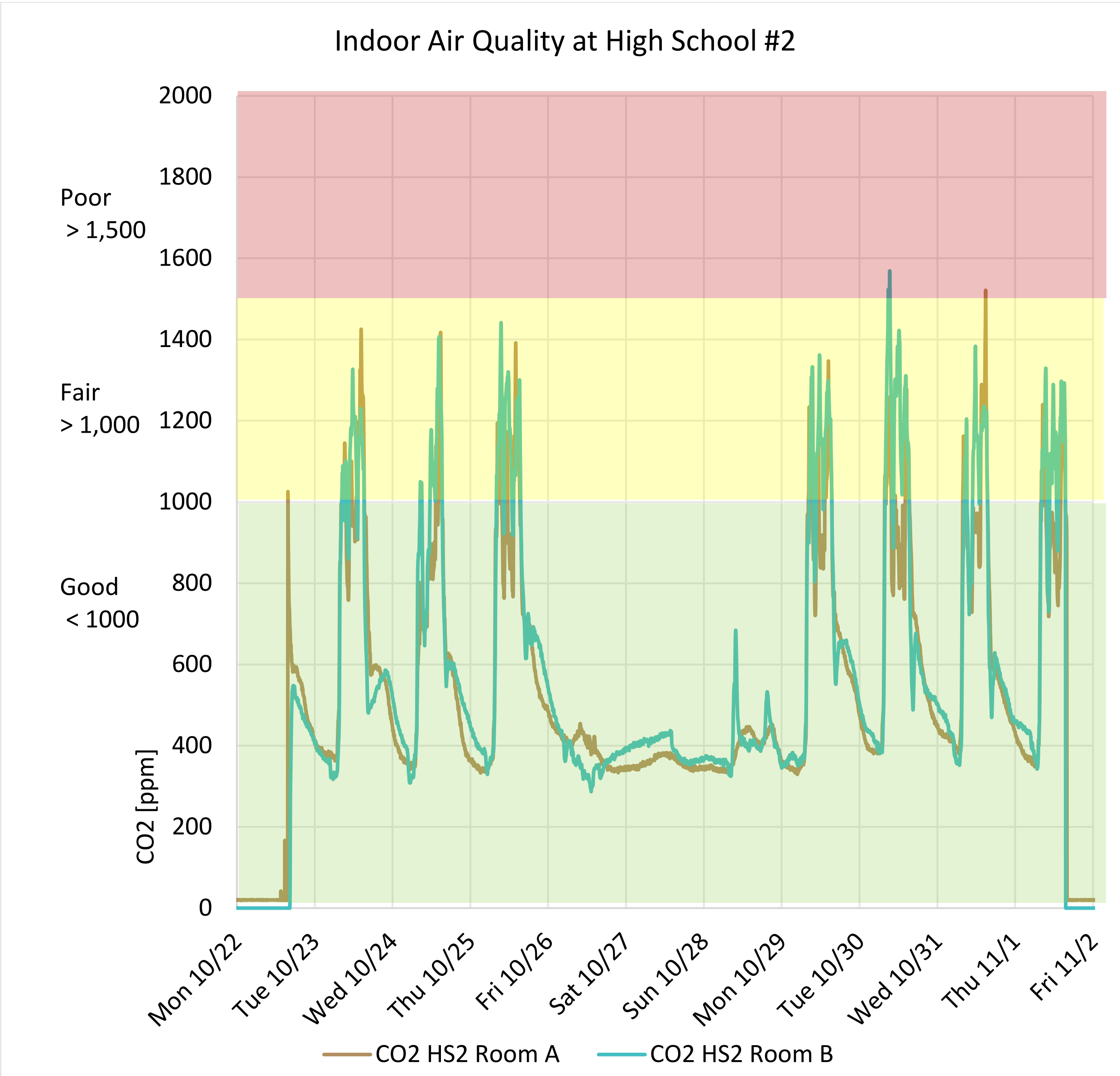
The IDL team achieved the goals of the task by measuring HVAC performance at four classrooms. IDL was able to identify operational changes that can improve energy efficiency while enhancing occupant satisfaction. This study engaged the schools on several levels including: facilities managers, teachers, and students at each of the buildings. Results of the energy simulations showed that there is room for energy savings of over $4 per student in high schools throughout the Idaho Power service territory that have sub-optimal setpoints. These savings could be realized by further outreach and engagement with school facilities personnel.

7. Appendices

Appendix A: Indoor air quality of the classrooms

As part of the assessment for thermal quality, the IDL team also installed CO_2 sensors to monitor the indoor air quality of the classrooms. One of the schools appeared to have adequate fresh air, while the other did not. Schools equipped with Dedicated Outdoor Air Systems (DOAS) can provide much more consistent indoor air quality and be paired with high efficiency heating and cooling systems like Variable Refrigerant Flow (VRF) systems. Neither of these schools had a DOAS or VRF.




Indoor Air Quality at High School #2
Poor
> 1,500
Fair
> 1,000
Good
< 1000
2000
1800
1600
1400
1200
1000
800
600
400
200
0
CO2 [ppm]
Mon 10/22
Tue 10/23
Wed 10/24
Thu 10/25
Fri 10/26
Sat 10/27
Sun 10/28
Mon 10/29
Tue 10/30
Wed 10/31
Thu 11/1
Fri 11/2
CO2 HS2 Room A
CO2 HS2 Room B

RESEARCH/SURVEYS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
2018 Home Energy Audit Program Survey	Residential	Idaho Power	Idaho Power	Survey
2018 Idaho Power Shade Tree Project Survey	Residential	Idaho Power	Idaho Power	Survey
2018 Smart-Saver Pledge Follow-Up Survey	Residential	Idaho Power	Idaho Power	Survey
2018 WAQC Survey Results	Residential	Idaho Power	Idaho Power	Survey
2018 Weatherization Solutions Survey Results	Residential	Idaho Power	Idaho Power	Survey
Multifamily Direct-Install Project Customer Survey	Residential	Idaho Power	Idaho Power	Survey

2018 Home Energy Audit Program Survey

How easy was it for you to apply for the Home Energy Audit program?

Answer Choices	Percent	Responses
Very easy	80.77%	126
Somewhat easy	16.03%	25
Somewhat difficult	3.21%	5
Very difficult	0.00%	0
Answered		156

If the application process was difficult what was it about that process that made it difficult?

Answered 15

Please identify the auditor that you used for your home audit.

Answer Choices	Percent	Responses
Brian Bennett, The Energy Auditor	1.31%	2
Chris Callor, Professional Inspection Services, LLC	18.95%	29
Dallen Ward, H.E.E.T.	4.58%	7
Rod Burk, Home Energy Management	0.00%	0
Tad Duby, On Point, LLC	37.91%	58
I don't know/I don't remember	37.25%	57
Answered		153

Please rate your home auditor on each of the following:

	Excellent	Good	Fair	Poor	Total
Courteousness	84.97%	13.73%	1.31%	0.00%	153
Professionalism	80.92%	15.79%	3.29%	0.00%	152
Explanation of work/measurements to be performed as part of the audit	76.97%	15.79%	5.92%	1.32%	152
Explanation of recommendations resulting from audit	71.71%	18.42%	6.58%	3.29%	152
Overall experience with auditor (from scheduling an appointment to follow up after the audit)	76.16%	17.22%	4.64%	1.99%	151
Answered					153

If you have additional comments you would like to offer about your home auditor, please enter them in the space below.

Answered 36

How much did the audit influence you to reduce the amount of electricity you consume?

Answer Choices	Percent	Responses
Influenced me a lot	38.56%	59
Influenced me some	44.44%	68
Didn't influence me much	11.76%	18
Didn't influence me at all	5.23%	8
Answered		153

As a result of the Home Energy Audit program, please indicate how strongly you agree or disagree with the following statements.

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	N/A	Total
I am more informed about energy usage in my home	56.38%	36.91%	3.36%	3.36%	0.00%	149
Other members of my household are more informed about our household energy usage	36.49%	33.78%	8.11%	5.41%	16.22%	148
I am more informed about energy efficiency programs that are available to me through Idaho Power	35.57%	41.61%	12.75%	8.05%	2.01%	149
I know what no- to low-cost actions I can take	47.97%	36.49%	10.14%	5.41%	0.00%	148
I know what next steps I should take	56.08%	33.11%	6.76%	4.05%	0.00%	148
Answered						149

After receiving your audit through the Home Energy Audit program, please indicate if you have taken any of the following actions:

	Yes	No	Total
Visited the Idaho Power website	54.93%	45.07%	142
Unplugged appliances when not in use	60.42%	39.58%	144
Signed up for My Account	39.86%	60.14%	138
Shared my energy audit experience with relatives and/or friends	76.87%	23.13%	147
Other	55.07%	44.93%	69
If you selected "other", please specify what other actions you have taken:			40
Answered			147

Since receiving your audit through the Home Energy Audit program, please indicate when, or if, you will complete any of the following improvements:

	Already completed	Plan to in next 6 months	Plan to in 6-12 months	Want to but not sure when	Do not plan to at all	Home does not need	Total
Replace additional incandescent light bulbs with more efficient light bulbs (e.g., CFLs and LEDs)	74.50%	13.42%	1.34%	2.01%	0.67%	8.05%	149
Replace additional showerheads with low-flow models	46.26%	6.12%	3.40%	6.12%	21.77%	16.33%	147
Recycle an extra refrigerator or freezer	12.84%	2.70%	2.03%	14.86%	21.62%	45.95%	148
Replace an older, inefficient appliance with a new ENERGY STAR model	21.09%	3.40%	10.20%	21.77%	12.93%	30.61%	147
Service heating equipment	53.06%	17.01%	7.48%	6.12%	3.40%	12.93%	147
Service cooling equipment	48.98%	12.24%	8.16%	6.80%	2.72%	21.09%	147
Increase attic insulation	21.09%	13.61%	10.20%	22.45%	8.84%	23.81%	147
Increase wall insulation	6.94%	2.78%	4.86%	16.67%	29.86%	38.89%	144
Increase underfloor insulation	13.79%	8.97%	5.52%	23.45%	17.93%	30.34%	145
Seal air leaks	38.62%	13.10%	4.83%	17.24%	8.97%	17.24%	145
Seal duct work	30.56%	11.81%	2.78%	19.44%	6.94%	28.47%	144
Other	43.90%	4.88%	2.44%	17.07%	4.88%	26.83%	41
If you selected "other", please specify what other actions you have taken or plan to take:							29
Answered							149

For any improvements you indicated you do not plan to do, please tell us why.

Answered 47

What benefits did you experience from the Home Energy Audit program? (Check all that apply)

Answer Choices	Percent	Responses
Cost savings	52.94%	72
Personal satisfaction	71.32%	97
Raised awareness of energy use	75.00%	102
Benefit to the environment	35.29%	48
Home improvement	57.35%	78
Comfort	39.71%	54
Other	7.35%	10
(please specify)		12
Answered		136

What barriers do you encounter in making energy savings changes in your home? (Check all that apply)

Answer Choices	Percent	Responses
Cost	78.52%	106
Time	40.00%	54
Convenience	20.74%	28
Lack of necessity	14.81%	20
Do not know who to contact	19.26%	26
Other (please specify)	8.89%	12
Answered		135

The most effective method for Idaho Power to provide information about energy efficiency is to: (Check all that apply)

Answer Choices	Percent	Responses
Offer classes in convenient locations	20.44%	28
Communicate information in local newspapers	11.68%	16
Communicate information on the Idaho Power website	40.15%	55
Communicate information on social media	17.52%	24
Offer a minimal cost home audit service	56.93%	78
Send newsletters or information directly to homeowners	42.34%	58
Send email communications to homeowners	34.31%	47
Send information in monthly Idaho Power bill	66.42%	91
Other (please specify)	5.84%	8
Answered		137

How much do you agree with the following statements:

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Total
My Home Energy Audit report contained valuable information	72.73%	20.98%	2.80%	3.50%	143
I would recommend the Home Energy Audit program to a friend or relative	72.03%	18.18%	3.50%	6.29%	143
I am satisfied with my overall experience with the Home Energy Audit program	73.94%	16.90%	4.23%	4.93%	142
Answered					143

If you disagree with any of these statements, please tell us why.

Answered 15

Please identify your age in the ranges below:

Answer Choices	Percent	Responses
Under 25	0.69%	1
26-35	6.90%	10
36-50	19.31%	28
51-65	36.55%	53
Over 65	36.55%	53
Answered		145

What is the highest level of education you completed?

Answer Choices	Percent	Responses
Less than high school	0.00%	0
Some high school	0.00%	0
High school graduate or equivalent	8.33%	12
Some college	18.75%	27
Two year Associate degree or Trade/Technical school	11.11%	16
Four year college degree	28.47%	41
Some graduate courses	10.42%	15
Advanced degree	22.92%	33
Answered		144

2018 Idaho Power Shade Tree Project Survey

How did you hear about Idaho Power's Shade Tree Project? (Check all that apply)

Answer Choices	Percent	Respondents
Letter from Idaho Power	65.66%	457
Friend or relative	20.40%	142
Neighbor	5.17%	36
Idaho Power employee	2.87%	20
Other (please specify)	9.20%	64
Answered		696

What was the primary reason you participated in the program? (Mark one)

Answer Choices	Percent	Respondents
Tree was free	16.52%	115
Home too warm in the summer	12.36%	86
Reduce energy bill	21.26%	148
Improve landscape/property value	17.24%	120
Wanted a tree	20.11%	140
Help the environment	7.61%	53
Other (please specify)	4.89%	34
Answered		696

What kept you from planting a tree prior to the Shade Tree Project? (Mark one)

Answer Choices	Percent	Respondents
Lack of knowledge	17.08%	118
Cost	44.86%	310
Time	11.87%	82
Other (please specify)	26.19%	181
Answered		691

Where would you typically purchase a new tree? (Mark one)

Answer Choices	Percent	Respondents
Garden section of a do-it-yourself/home improvement store	30.47%	209
Nursery/garden store	65.74%	451
Other (please specify)	3.79%	26
Answered		686

How long did you spend on the online enrollment tool? (Mark one)

Answer Choices	Percent	Respondents
10 minutes or less	66.14%	457
11-20 minutes	23.59%	163
21-30 minutes	6.22%	43
31 minutes or more	2.32%	16
Not applicable	1.74%	12
Answered		691

Overall, how easy was it for you to use the online enrollment tool?

Answer Choices	Percent	Respondents
Very easy	74.78%	516
Somewhat easy	21.16%	146
Somewhat difficult	2.32%	16
Very difficult	0.58%	4
Not applicable	1.16%	8
Answered		690

How many trees did you pick up at the Shade Tree event?

Answer Choices	Percent	Respondents
One	33.67%	233
Two	66.33%	459
Answered		692

When did you plant your shade tree?

Answer Choices	Percent	Respondents
Same day as the tree pickup	28.76%	67
1-3 days after the tree pickup	49.79%	116
4-7 days after the tree pickup	13.30%	31
More than 1 week after the tree pickup	5.58%	13
Did not plant the tree	2.58%	6
Answered		233

On which side of your home did you plant your shade tree?

Answer Choices	Percent	Respondents
North	4.04%	9
Northeast	5.83%	13
East	13.00%	29
Southeast	6.28%	14
South	8.52%	19
Southwest	17.49%	39
West	35.87%	80
Northwest	8.97%	20
Answered		223

How far from the home did you plant your shade tree?

Answer Choices	Percent	Respondents
20 feet or less	34.67%	78
21-40 feet	54.22%	122
41-60 feet	8.44%	19
More than 60 feet	2.67%	6
Answered		225

How many shade trees did you plant?

Answer Choices	Percent	Respondents
One tree	2.39%	11
Both trees	95.22%	438
Did not plant trees	2.39%	11
Answered		460

When did you plant your shade tree?

Answer Choices	Percent	Respondents
Same day as the tree pickup	30.00%	3
1-3 days after the tree pickup	30.00%	3
4-7 days after the tree pickup	0.00%	0
More than 1 week after the tree pickup	40.00%	4
Answered		10

On which side of your home did you plant your shade tree?

Answer Choices	Percent	Respondents
North	11.11%	1
Northeast	22.22%	2
East	0.00%	0
Southeast	0.00%	0
South	0.00%	0
Southwest	22.22%	2
West	44.44%	4
Northwest	0.00%	0
Answered		9

How far from the home did you plant your shade tree?

Answer Choices	Percent	Respondents
20 feet or less	10.00%	1
21-40 feet	70.00%	7
41-60 feet	10.00%	1
More than 60 feet	10.00%	1
Answered		10

When did you plant your shade trees?

	Same day as the tree pickup	1-3 days after the tree pickup	4-7 days after the tree pickup	More than 1 week after the tree pickup	Respondents
Tree 1	16.51%	55.28%	18.12%	10.09%	436
Tree 2	15.62%	53.15%	19.90%	11.34%	397
Answered					436

On which side of your home did you plant your shade trees?

	N	NE	E	SE	S	SW	W	NW	Total
Tree 1	9.18%	4.59%	14.49%	6.52%	8.45%	14.25%	35.27%	7.25%	414
Tree 2	6.14%	6.88%	10.81%	11.55%	10.32%	17.20%	31.45%	5.65%	407
Answered									414

How far from the home did you plant your shade trees?

	20 feet or less	21-40 feet	41-60 feet	More than 60 feet	Total
Tree 1	30.97%	50.83%	14.42%	3.78%	423
Tree 2	23.08%	52.11%	18.61%	6.20%	403
Answered					423

How satisfied are you with the information you received on the planting and care of your shade tree?

Answer Choices	Percent	Respondents
Very satisfied	88.04%	596
Somewhat satisfied	9.45%	64
Somewhat dissatisfied	0.59%	4
Very dissatisfied	0.44%	3
Not applicable	1.48%	10
Answered		677

What information did you find most valuable?

Answer Choices	Percent	Respondents
Planting depth	53.69%	364
Circling roots	12.83%	87
Staking	9.44%	64
Watering	9.00%	61
Not applicable	9.14%	62
Other (please specify)	5.90%	40
Answered		678

How much do you agree with the following statements?

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	NA	Total
I am satisfied with the Shade Tree Project pick up event	90.43%	8.39%	1.03%	0.00%	0.15%	679
It was easy to plant my shade tree	85.78%	11.85%	0.59%	0.15%	1.63%	675
I would recommend the Shade Tree Project to a friend or relative	95.72%	3.69%	0.15%	0.30%	0.15%	677
I am satisfied with my overall experience with the Shade Tree Project	92.32%	6.79%	0.89%	0.00%	0.00%	677
Answered						679

If you have additional comments you would like to offer about the Shade Tree Project, please enter them in the space below.

Answered	209

When was this residence originally built? (Select when the building was originally constructed, not when it was remodeled, added to, or converted.)

Answer Choices	Percent	Respondents
Before 1950	4.29%	27
1950–1959	2.38%	15
1960–1969	1.59%	10
1970–1979	6.67%	42
1980–1989	3.81%	24
1990–1999	6.03%	38
2000–2006	18.25%	115
2007–2015	51.27%	323
Don't know	5.71%	36
Answered		630

What one fuel is most often used to heat this residence? (Mark one)

Answer Choices	Percent	Respondents
Electricity	33.03%	220
Natural gas	56.16%	374
Propane	3.15%	21
Fuel Oil	0.00%	0
Wood	4.20%	28
Other (please specify)	3.45%	23
Answered		666

What type of air conditioning system is used at this residence? (Check all that apply)

Answer Choices	Percent	Respondents
None	2.11%	14
Central air conditioner	79.37%	527
Heat pump	16.57%	110
Individual room or window air conditioner	3.92%	26
Evaporative/swamp cooler	0.90%	6
Other (please specify)	0.90%	6
Answered		664

What is your gender?

Answer Choices	Percent	Respondents
Female	59.45%	390
Male	40.55%	266
Answered		656

Which of the following best describes your age?

Answer Choices	Percent	Respondents
Under 18	0.15%	1
18-24	1.06%	7
25-34	21.12%	140
35-44	27.15%	180
45-60	26.70%	177
Over 60	23.83%	158
Answered		663

What is the highest level of education you have completed?

Answer Choices	Percent	Respondents
Less than high school	0.31%	2
High school or equivalent	9.19%	60
Some college/technical school	42.11%	275
4-year college degree	24.66%	161
Some graduate courses	7.81%	51
Graduate degree	15.93%	104
Answered		653

2018 Smart-Saver Pledge Follow-Up Survey

Thank you for taking the Smart-saver Pledge. We'd love to hear how you did in meeting your pledge as well as find out a bit more about you. Which of the following pledges did you commit to? (Select all that apply)

Answer Choices	Percent	Responses
Change the porch light to an LED or add a sensor	45.96%	1,058
Use a programmable pressure cooker once a week instead of the oven or stove	27.32%	629
Hang-dry clothes after washing	28.28%	651
Unplug cell phone charger when not in use	55.73%	1,283
Use kitchen and bath exhaust fans only when needed – don't leave them running	67.25%	1,548
Answered		2,302

Were you able to meet your pledge(s) for the full 21 days?

Answer Choices	Percent	Responses
Yes	94.44%	2,173
No	5.56%	128
Answered		2,301

What kept you from meeting the Smart-saver Pledge? (Select all that apply)

Answer Choices	Percent	Responses
Comfort	7.09%	9
Time	14.96%	19
Low priority	7.87%	10
Other individuals in my household were not aligned	29.13%	37
Other (please specify)	62.99%	80
Answered		127

Will you continue with your energy-saving change(s) now that the pledge has ended?

Answer Choices	Percent	Responses
Yes	99.72%	2,168
No	0.28%	6
Answered		2,174

What is the primary reason you will continue with the energy-saving change(s)?

Answer Choices	Percent	Responses
Save energy	15.88%	344
Save money	38.83%	841
Help the environment	12.83%	278
It's the right thing to do	27.01%	585
Other (please specify)	5.45%	118
Answered		2,166

What is the primary reason why you won't continue with the energy-savings change(s)?

Answer Choices	Percent	Responses
Comfort	0.00%	0
Time	40.00%	2
Low priority	0.00%	0
Other individuals in my household are not aligned	0.00%	0
Other (please specify)	60.00%	3
Answered		5

How did taking the Smart-saver Pledge affect your awareness of your energy habits?

Answer Choices	Percent	Responses
Made me much more aware	32.18%	736
Made me somewhat more aware	49.41%	1,130
Did not affect my awareness	18.41%	421
Answered		2,287

After taking the Smart-saver Pledge, how likely are you to seek out additional ways to save energy?

Answer Choices	Percent	Responses
Very likely	61.10%	1,398
Somewhat likely	36.93%	845
Not very likely	1.79%	41
Not likely at all	0.17%	4
Answered		2,288

What is your level of awareness of other Idaho Power Energy Efficiency programs?

Answer Choices	Percent	Responses
Very aware	14.23%	325
Somewhat aware	58.36%	1,333
Not very aware	23.51%	537
Not aware at all	3.90%	89
Answered		2,284

After taking the Smart-saver Pledge, how likely are you to participate in an Idaho Power Energy Efficiency program?

Answer Choices	Percent	Responses
Very likely	54.21%	889
Somewhat likely	43.29%	710
Not very likely	2.44%	40
Not likely at all	0.06%	1
Answered		1,640

How did you first learn about the Smart-saver Pledge?

Answer Choices	Percent	Responses
Bill insert	41.16%	941
Facebook	3.32%	76
Twitter	0.17%	4
TV	0.52%	12
Idaho Power website	37.75%	863
Idaho Power employee	1.27%	29
Friend, relative or neighbor	2.67%	61
Other (please specify)	13.12%	300
Answered		2,286

What is the primary fuel used to heat your home?

Answer Choices	Percent	Responses
Electricity	29.90%	682
Natural gas	62.25%	1,420
Propane	2.37%	54
Wood	3.86%	88
Other	1.62%	37
Answered		2,281

Do you own or rent your home?

Answer Choices	Percent	Responses
Own	83.61%	1,903
Rent	16.39%	373
Answered		2,276

How many people (including yourself) are in your household?

Answer Choices	Percent	Responses
1	18.68%	426
2	38.46%	877
3	14.61%	333
4	14.65%	334
5	8.51%	194
More than 5	5.09%	116
Answered		2,280

What is your gender?

Answer Choices	Percent	Responses
Male	35.18%	794
Female	64.82%	1,463
Answered		2,257

Which of the following best describes your age?

Answer Choices	Percent	Responses
Under 25	3.67%	83
26-35	22.98%	520
36-50	28.41%	643
51-65	26.82%	607
Over 65	18.12%	410
Answered		2,263

What is the highest level of education you completed?

Answer Choices	Percent	Responses
Less than high school	0.27%	6
Some high school	0.57%	13
High school graduate or equivalent	10.64%	241
Some college	23.63%	535
Two year Associate degree orTrade/Technical school	15.37%	348
Four year college degree	27.78%	629
Some graduate courses	5.74%	130
Advanced degree	15.99%	362
Answered		2,264

2018 WAQC Survey Results

Agency/Contractor Name:

Answer Choices	Percent	Responses
Metro Community Services	14.19%	22
Eastern Idaho Community Action Partnership	0.65%	1
El Ada Community Action Partnership	54.19%	84
South Central Community Action Partnership	16.77%	26
Southeastern Idaho Community Action Agency	12.26%	19
Community Connection of Northeast Oregon	0.00%	0
Community in Action	1.94%	3
Answered		155

How did you learn about the weatherization program(s)?

Answer Choices	Percent	Responses
Agency/Contractor flyer	18.75%	27
Idaho Power employee	7.64%	11
Idaho Power web site	11.81%	17
Friend or relative	35.42%	51
Letter in mail	4.86%	7
Other (please specify)	21.53%	31
Answered		144

What was your primary reason for participating in the weatherization program?

Answer Choices	Percent	Responses
Reduce utility bills	79.33%	119
Improve comfort of home	39.33%	59
Furnace concerns	30.67%	46
Water heater concerns	5.33%	8
Improve insulation	28.67%	43
Other (please specify)	5.33%	8
Answered		150

If you received any energy efficiency equipment upgrade as part of the weatherization, how well was the equipment's operation explained to you?

Answer Choices	Percent	Responses
Completely	86.52%	122
Somewhat	11.35%	16
Not at all	2.13%	3
Answered		141

Which of the following did you learn about from the auditor or crew during the weatherization process? (Check all that apply)

Answer Choices	Percent	Responses
How air leaks affect energy usage	76.92%	110
How insulation affects energy usage	66.43%	95
How to program the new thermostat	46.85%	67
How to reduce the amount of hot water used	32.87%	47
How to use energy wisely	60.84%	87
How to understand what uses the most energy in my home	48.25%	69
Other (please specify)	4.20%	6
Answered		143

Based on the information you received from the agency/contractor about energy use, how likely are you to change your habits to save energy?

Answer Choices	Percent	Responses
Very likely	85.42%	123
Somewhat likely	13.89%	20
Not very likely	0.00%	0
Not likely at all	0.69%	1
Answered		144

How much of the information about energy use have you shared with other members of your household?

Answer Choices	Percent	Responses
All of it	68.49%	100
Some of it	15.07%	22
None of it	1.37%	2
N/A	15.07%	22
Answered		146

If you shared the energy use information with other members of your household, how likely do you think household members will change habits to save energy?

Answer Choices	Percent	Responses
Very likely	53.42%	78
Somewhat likely	23.97%	35
Somewhat unlikely	2.05%	3
Very unlikely	2.74%	4
N/A	17.81%	26
Answered		146

What habits are you and other members of your household most likely to change to save energy? (check all that apply)

Answer Choices	Percent	Responses
Washing full loads of clothes	67.36%	97
Washing full loads of dishes	43.06%	62
Turning off lights when not in use	84.03%	121
Unplugging electrical equipment when not in use	52.08%	75
Turning the thermostat up in the summer	54.17%	78
Turning the thermostat down in the winter	58.33%	84
Other (please specify)		4
Answered		144

How much do you think the weatherization you received will affect the comfort of your home?

Answer Choices	Percent	Responses
Significantly	91.03%	132
Somewhat	6.21%	9
Very little	1.38%	2
Not at all	1.38%	2
Answered		145

Rate the Agency/Contractor based on your interactions with them.

	Excellent	Good	Fair	Poor	Total
Courteousness	95.17%	4.14%	0.69%	0.00%	145
Professionalism	93.01%	6.99%	0.00%	0.00%	143
Explanation of work to be performed on your home	91.67%	7.64%	0.69%	0.00%	144
Overall experience with Agency/Contractor	94.41%	5.59%	0.00%	0.00%	143
Answered					145

Were you aware of Idaho Power's role in the weatherization of your home?

Answer Choices	Percent	Responses
Yes	76.81%	106
No	23.19%	32
Answered		138

Overall how satisfied are you with the weatherization program you participated in?

Answer Choices	Percent	Responses
Very satisfied	97.24%	141
Somewhat satisfied	1.38%	2
Somewhat dissatisfied	0.00%	0
Very dissatisfied	1.38%	2
Answered		145

How has your opinion of Idaho Power changed as a result of its role in the weatherization program?

Answer Choices	Percent	Responses
Improved	85.51%	118
Stayed the same	13.77%	19
Decreased	0.72%	1
Answered		138

How many people beside yourself live in your home year-round?

Answer Choices	Percent	Responses
0	33.10%	47
1	15.49%	22
2	17.61%	25
3	13.38%	19
4	7.75%	11
5	4.23%	6
6 or more	8.45%	12
Answered		142

How long have you been an Idaho Power customer?

Answer Choices	Percent	Responses
Less than 1 year	4.29%	6
1 - 10 years	27.86%	39
11 - 25 years	30.00%	42
26 years or more	37.86%	53
Answered		140

Please select the category below that best describes your age:

Answer Choices	Percent	Responses
Under 25	2.13%	3
25 - 34	14.18%	20
35 - 44	19.86%	28
45 - 54	8.51%	12
55 - 64	19.15%	27
65 - 74	21.99%	31
75 or older	14.18%	20
Answered		141

Select the response below that best describes the highest level of education you have attained:

Answer Choices	Percent	Responses
Less than High School	22.14%	31
High School graduate or GED	30.71%	43
Some College or Technical School	32.14%	45
Associate Degree	7.14%	10
College Degree (including any graduate school or graduate degrees)	7.86%	11
Answered		140

2018 Weatherization Solutions Survey Results

Agency/Contractor Name:

Answer Choices	Percent	Responses
Metro Contractor Services	27.52%	30
Home Energy Management	48.62%	53
Savings Around Power	3.67%	4
Power Savers	20.18%	22
Answered		109

How did you learn about the weatherization program(s)?

Answer Choices	Percent	Responses
Agency/Contractor flyer	17.59%	19
Idaho Power employee	6.48%	7
Idaho Power web site	7.41%	8
Friend or relative	24.07%	26
Letter in mail	37.04%	40
Other (please specify)	7.41%	8
Answered		108

What was your primary reason for participating in the weatherization program?

Answer Choices	Percent	Responses
Reduce utility bills	80.73%	88
Improve comfort of home	29.36%	32
Furnace concerns	14.68%	16
Water heater concerns	0.92%	1
Improve insulation	15.60%	17
Other (please specify)	9.17%	10
Answered		109

If you received any energy efficiency equipment upgrade as part of the weatherization, how well was the equipment's operation explained to you?

Answer Choices	Percent	Responses
Completely	76.77%	76
Somewhat	7.07%	7
Not at all	16.16%	16
Answered		99

Which of the following did you learn about from the auditor or crew during the weatherization process? (Check all that apply)

Answer Choices	Percent	Responses
How air leaks affect energy usage	88.35%	91
How insulation affects energy usage	77.67%	80
How to program the new thermostat	39.81%	41
How to reduce the amount of hot water used	53.40%	55
How to use energy wisely	65.05%	67
How to understand what uses the most energy ir	59.22%	61
Other (please specify)	0.97%	1
Answered		103

Based on the information you received from the agency/contractor about energy use, how likely are you to change your habits to save energy?

Answer Choices	Percent	Responses
Very likely	74.07%	80
Somewhat likely	24.07%	26
Not very likely	0.93%	1
Not likely at all	0.93%	1
Answered		108

How much of the information about energy use have you shared with other members of your household?

Answer Choices	Percent	Responses
All of it	68.52%	74
Some of it	12.04%	13
None of it	1.85%	2
N/A	17.59%	19
Answered		108

If you shared the energy use information with other members of your household, how likely do you think household members will change habits to save energy?

Answer Choices	Percent	Responses
Very likely	50.93%	55
Somewhat likely	21.30%	23
Somewhat unlikely	0.93%	1
Very unlikely	1.85%	2
N/A	25.00%	27
Answered		108

What habits are you and other members of your household most likely to change to save energy? (check all that apply)

Answer Choices	Percent	Responses
Washing full loads of clothes	59.55%	53
Washing full loads of dishes	48.31%	43
Turning off lights when not in use	73.03%	65
Unplugging electrical equipment when not in use	53.93%	48
Turning the thermostat up in the summer	57.30%	51
Turning the thermostat down in the winter	71.91%	64
Other (please specify)		10
Answered		89

How much do you think the weatherization you received will affect the comfort of your home?

Answer Choices	Percent	Responses
Significantly	84.26%	91
Somewhat	13.89%	15
Very little	0.93%	1
Not at all	0.93%	1
Answered		108

Rate the Agency/Contractor based on your interactions with them.

Rated	Excellent	Good	Fair	Poor	Total
Courteousness	95.37%	4.63%	0.00%	0.00%	108
Professionalism	93.52%	6.48%	0.00%	0.00%	108
Explanation of work to be performed on your home…………………………………………	86.11%	12.96%	0.93%	0.00%	108
Overall experience with Agency/Contractor	92.59%	6.48%	0.93%	0.00%	108
Answered					108

Were you aware of Idaho Power's role in the weatherization of your home?

Answer Choices	Percent	Responses
Yes	94.34%	100
No	5.66%	6
Answered		106

Overall how satisfied are you with the weatherization program you participated in?

Answer Choices	Percent	Responses
Very satisfied	94.50%	103
Somewhat satisfied	4.59%	5
Somewhat dissatisfied	0.92%	1
Very dissatisfied	0.00%	0
Answered		109

How has your opinion of Idaho Power changed as a result of its role in the weatherization program?

Answer Choices	Percent	Responses
Improved	86.24%	94
Stayed the same	13.76%	15
Decreased	0.00%	0
Answered		109

How many people beside yourself live in your home year-round?

Answer Choices	Percent	Responses
0	24.77%	27
1	37.61%	41
2	11.93%	13
3	15.60%	17
4	3.67%	4
5	5.50%	6
6 or more	0.92%	1
Answered		109

How long have you been an Idaho Power customer?

Answer Choices	Percent	Responses
Less than 1 year	0.93%	1
1 - 10 years	21.50%	23
11 - 25 years	29.91%	32
26 years or more	47.66%	51
Answered		107

Please select the category below that best describes your age:

Answer Choices	Percent	Responses
Under 25	3.67%	4
25 - 34	9.17%	10
35 - 44	20.18%	22
45 - 54	8.26%	9
55 - 64	16.51%	18
65 - 74	26.61%	29
75 or older	15.60%	17
Answered		109

Select the response below that best describes the highest level of education you have attained:

Answer Choices	Percent	Responses
Less than High School	4.63%	5
High School graduate or GED	28.70%	31
Some College or Technical School	48.15%	52
Associate Degree	11.11%	12
College Degree (including any graduate school c	7.41%	8
Answered		108

Multifamily Direct-Install Project Customer Survey

Please select the project location.

Answer Choices	Percent	Responses
Aspen Grove (Filer)	30.77%	16
Autumn Lane (Wendell)	1.92%	1
Briarwood (Blackfoot)	0.00%	0
Brown Gables (Wendell)	21.15%	11
Camas Street (Blackfoot)	1.92%	1
Colonia Cesar Chavez (Blackfoot)	0.00%	0
Colonia de Colores (Twin Falls)	1.92%	1
Columbia Garden (Caldwell)	1.92%	1
Curtis Meadow (Boise)	0.00%	0
El Rancho Grande (American Falls)	0.00%	0
Fawnbrook (Twin Falls)	0.00%	0
Glenns Landing (Glenns Ferry)	0.00%	0
Green Properties (Pocatello)	0.00%	0
Harrison Hills (Boise)	9.62%	5
North River (Boise)	0.00%	0
Owyhee Place (Boise)	3.85%	2
Park Center (Boise)	1.92%	1
Park Hill (Boise)	0.00%	0
Park Lane (Boise)	0.00%	0
Sister's Villa Eagle Senior Living (Eagle)	19.23%	10
Sundown Square (Ontario)	1.92%	1
5th Ave Apartments (Ontario)	0.00%	0
9th Street Apartments (Ontario)	3.85%	2
19th Street Apartments (Ontario)	0.00%	0
Answered		52

On a scale from 1 (very dissatisfied) to 5 (very satisfied), please rate the following:

Rated	1	2	3	4	5	Total	Weighted Average
LED Bulbs	5.77%	3.85%	3.85%	7.69%	78.85%	52	4.5
High-efficiency showerhead	17.24%	3.45%	6.90%	13.79%	58.62%	29	3.93
Kitchen and bathroom faucet aerators	6.00%	2.00%	10.00%	8.00%	74.00%	50	4.42
Overall satisfaction with the quality of the products	5.77%	1.92%	5.77%	5.77%	80.77%	52	4.54
Overall satisfaction with the Idaho Power energy-saving project	3.92%	0.00%	1.96%	13.73%	80.39%	51	4.67
Answered						52	

How would you describe the brightness of the LED light bulbs?

Answer Choices	Percent	Responses
Too Bright	7.69%	4
Somewhat Bright	21.15%	11
Just Right	63.46%	33
Somewhat Dim	3.85%	2
Too Dim	3.85%	2
Answered		52

EVALUATIONS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
Idaho Power Company Commercial and Industrial Efficiency Program — Custom Projects	Commercial/Industrial	Tetra Tech, MA	Idaho Power	Impact Evaluation
Idaho Power Company Energy Efficient Lighting Program	Residential	Tetra Tech, MA	Idaho Power	Impact Evaluation
Idaho Power Company Multifamily Energy Savings Program	Residential	Tetra Tech, MA	Idaho Power	Impact and Process Evaluation
Shade Tree Project Evaluation	Residential	DNV GL	Idaho Power	Savings Determination Analysis

Idaho Power Company

Idaho Power Company Commercial and Industrial Efficiency Program – Custom Projects

2017 Impact Evaluation Results

TETRA TECH

January 4, 2019

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The Tetra Tech Evaluation Team was made up of the following individuals: Kimberly Bakalars, Mark Bergum, Adam Jablonski, Katie Hanlon, Dallas McCoy, Tom Saxton, and Luke Ramirez.

1.0 EXECUTIVE SUMMARY

Tetra Tech is pleased to provide Idaho Power Company (Idaho Power) with a report for the 2018 impact evaluation of the 2017 Custom Projects component of the Idaho Power Commercial and Industrial Efficiency program. This section of the report consists of an introduction describing the program, evaluation activities, and key findings and recommendations. The detailed impact results can be found in section 3, along with recommendations.

1.1 PROGRAM DESCRIPTION

The Custom Option of the Commercial and Industrial Efficiency program provides monetary incentives and energy auditing services to help identify and evaluate potential energy saving modifications or projects in new and existing facilities. The goal is to encourage commercial and industrial energy savings in Idaho and Oregon service areas. The Custom Option offers an incentive level of up to 70 percent of the project cost or 18 cents per kWh for first year estimated savings, whichever is less.

Interested customers submit applications to Idaho Power for potential modifications. Idaho Power reviews each application and works with the customer and vendors to gather sufficient information to support the energy-savings calculations. Once projects are completed, customers submit a payment application and each project is reviewed by Idaho Power engineering staff, or a third-party consultant, to verify the energy savings methods and calculations. An Idaho Power lighting tool is used to determine all lighting savings and incentives. End-use measure information, project photographs, and project costs are collected through the verification process.

On many projects, especially the larger and more complex projects, Idaho Power or a third-party consultant conducts on-site power monitoring and data collection before and after project implementation to ensure energy savings are obtained and are within program guidelines. If changes in scope take place on a project, Idaho Power recalculates the energy savings and incentive amount based on the actual installed equipment and performance. The measurement and verification reports provided to Idaho Power include a verification of energy savings, costs, estimates of measure life, and any final recommendations.

1.2 METHODOLOGY

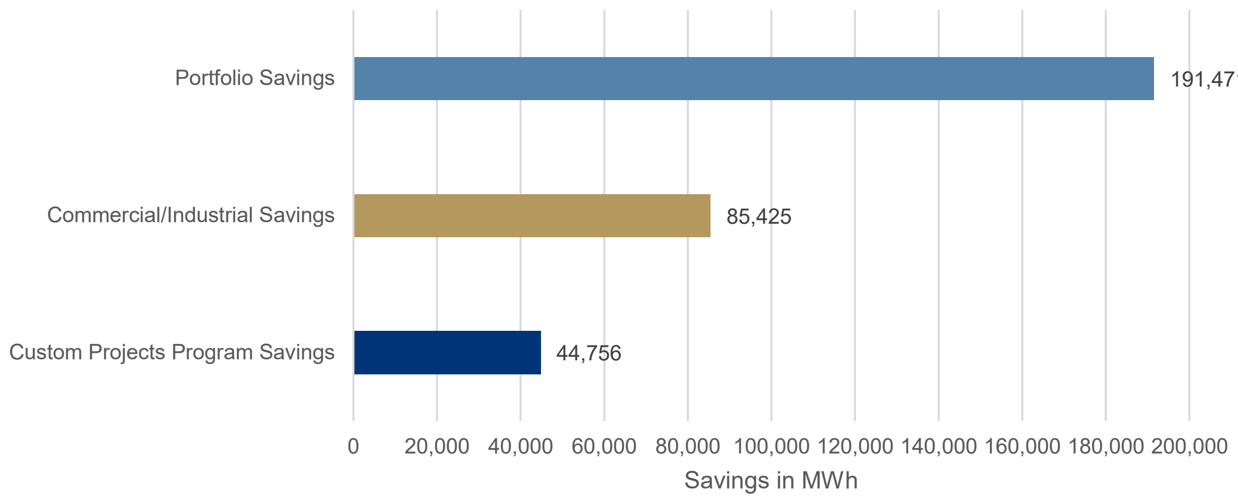
In order to address the evaluation objectives, which included verifying energy impacts attributable to the 2017 program, providing estimates of realization rates, and suggesting enhancements to the savings analysis and reporting, the evaluation team conducted the evaluation activities shown in Figure 1-1.

Figure 1-1. Process for Verifying Program Savings

1.3 FINDINGS AND RECOMMENDATIONS

The impact evaluation for the Custom Projects program revealed a successfully run program. The majority of savings adjustments were made as a result of customer changes to the operation of the equipment after installation. Based on the detailed evaluation activities, Tetra Tech provides some minor areas of improvement for Idaho Power to consider as they continue the program. All findings and recommendations should be considered in the context of the program size and contribution to the Commercial & Industrial sector (52 percent) and overall portfolio savings (23 percent), shown in Figure 1-2.

Figure 1-2. Relative Program Savings



Overall, findings from the impact evaluation show the program savings calculations are reasonable. The evaluation found accurate equipment descriptions, well substantiated and conservative assumptions, and technically correct calculations for most evaluated projects. As Table 1-1 below indicates, Tetra Tech found a 100.4 percent realization rate overall for the Custom C&I program.

Table 1-1. PY2017 Realization Rates[1]

Category	Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Lighting	Lighting	1,321,437	1,311,121	99.2%
Streamlined Cohort	SCE - VFD	1,158,673	1,393,909	120.3%
	SCE - Doors	386,021	309,130	80.1%
	SCE - Comp Air	379,678	369,239	97.3%
	SCE-Refrig Ctrlr	21,007	18,267	87.0%
W/WW Cohort	WWEEC	1,169,362	1,169,362	100.0%
Custom	VFD	11,693,386	11,826,855	101.1%
	Compressed Air	979,090	654,382	66.8%
	Refrigeration	568,627	568,627	100.0%
	HVAC	400,965	389,047	97.0%
	Pump	267,044	414,348	155.2%
	Fan	53,325	53,325	100.0%
	Motors	9,074	8,865	97.7%
	Overall	**18,407,689**	**18,486,478**	**100.4%**

[1] Results reflect a confidence and precision of 90% +/- 3.2%.

The documentation provided for the program showed both Pre-Application submittal and analysis and the post-install final application and analysis. When a change occurred, an explanation of the adjustment was included. The IPC files provided included:

- Pre-Application
- Pre-Application third-party analysis and calculations
- Pre-Approval notice
- Documentation for integration coordination with the IPC grid, when necessary
- Final Application
- Final third-party analysis and calculations
- Incentive check
- Incentive check cover letter for mailing

The IPC files did not originally include the spreadsheet calculation files completed by the third-party engineer. These files were obtained over the course of the evaluation. Obtaining these files when receiving a report from the third party will create a more robust and flexible system.

1.3.1 Impact Recommendations

The following impact recommendations are provided for Idaho Power's consideration:

Collect and file electronic calculators. For the project savings calculated by the third-party contractor, Idaho Power should collect and file the Excel calculators. The calculators were available from the third-party engineer but having them in-house once each project is completed will facilitate any additional quality control or adjustments that Idaho Power would like to make to improve accuracy.

Consider including post-verification customer follow-up for control-based projects. Based on the variation found in savings for projects with controls, and the value Idaho Power places on customer relationships, Tetra Tech recommends that the engineering team identify customers for post-verification visits to discuss control settings and the potential adjustment impacts. This is most useful for projects that have easily adjusted controls such as; variable frequency drives, fast acting doors, and compressed air upgrades. Not only will it help Idaho Power report more accurate savings, it will assist the customer in maximizing savings from their investment in the project.

Review goals for the Streamlined process. The Streamlined process is used to market to customers with a less customized project and provide a more efficient application process. However, the evaluation found that the assumptions for the streamlined projects resulted in more variation from actual conditions than their more "custom" counterpart projects. Idaho Power should continue to monitor the benefits of the process efficiency with the potential variation in savings rigor.

Continue close communications with Wastewater Cohort contacts. The Wastewater cohort has developed a process to claim annual savings from behavioral improvements, but the conditions of the projects and baselines continue to evolve. Changes in project managers at customer facilities and the addition of other capital projects may affect future savings. Idaho Power staff should continue to closely monitor and communicate with their Wastewater project contacts.

Review various energy calculation components for improved accuracy. Idaho Power calculations are currently found to be accurate and well-documented. However, for particular measure categories, the calculation accuracy could be further improved with the following adjustments:

- **Use Regional Technical Forum (RTF) method for New Construction Baseline.** The RTF issues new construction baselines based upon market research. Use the RTF baseline, when available, for project calculations to minimize risk associated with variable baselines per project. This was found specifically in the sample for Compressed Air new construction projects, although it will apply across many different new construction equipment types.
- **Use rated capacity and wattage for equipment.** Lighting and Heating, Ventilation, and Air Conditioning (HVAC) equipment have third party certification agencies which provide rated wattage and capacities of specific equipment models. Utilizing this information will reduce the risk that a manufacturer spec sheet may misrepresent the performance. This was noticed for an HVAC project which did not utilize the rated Air-Conditioning, Heating, and Refrigeration (AHRI) capacity and energy consumption metrics.
- **Consider requiring a pump curve submission for pumping projects.** Pump curves detail the pump efficiency at various operating conditions. Many pumping projects change pump conditions and the pump efficiency will generally have a large impact on the energy savings of the project. To estimate pump performance at multiple condition points, a pump curve is necessary.
- **Monitor specific dairy projects for adjustments to incoming milk temperature.** The RTF states to use 98 degrees based on industry standard practice of milk temperature production unless otherwise measured. Dairies collect milk at approximately 98 degrees in the milking parlor and need to transfer the milk to the chilling system through uninsulated piping. This fluid transfer results in heat dissipation and therefore lower milk temperature at the start of chilling. For at least one of the projects reviewed, the milk traveled a lengthy distance to reach the chilling system which would have resulted in a lower incoming milk temperature assumption of 95 degrees.

2.0 INTRODUCTION

2.1 PROGRAM OVERVIEW

The Custom Option provides monetary incentives and energy auditing services to help identify and evaluate potential energy saving modifications or projects in new and existing facilities. The goal is to encourage commercial and industrial energy savings in Idaho and Oregon service areas. The Custom Option offers an incentive level of up to 70 percent of the project cost or 18 cents per kWh for first year estimated savings, whichever is less.

Interested customers submit applications to Idaho Power for potential modifications that have been identified by the customers, Idaho Power, or by a third-party consultant. Idaho Power reviews each application and works with the customer and vendors to gather sufficient information, through audits if needed, to support the energy-savings calculations. Idaho Power currently has eleven third-party contractors assisting them with audits and savings estimates.

Once projects are completed, customers submit a payment application and each project is reviewed by Idaho Power engineering staff, or a third-party consultant, to verify the energy savings methods and calculations. An Idaho Power lighting tool is used to determine all lighting savings and incentives. End-use measure information, project photographs, and project costs are collected through the verification process.

On many projects, especially the larger and more complex projects, Idaho Power or a third-party consultant conducts on-site power monitoring and data collection before and after project implementation to ensure energy savings are obtained and are within program guidelines. If changes in scope take place on a project, Idaho Power recalculates the energy savings and incentive amount based on the actual installed equipment and performance. The measurement and verification reports provided to Idaho Power include a verification of energy savings, costs, estimates of measure life, and any final recommendations. Table 2-1 shows the 2017 projects and annual energy savings by primary project measure:

Table 2-1. PY2017 Custom Option Summary by Primary Project Measure

Program Summary by Measure	Number of Projects	kWh Saved	Percent of Program Savings
Lighting	84	9,868,688	22.0%
Refrigeration	13	7,454,336	16.7%
HVAC	6	509,777	1.1%
Compressed Air	32	6,650,953	14.9%
Commissioning	6	2,454,702	5.5%
Controls	3	1,832,897	4.1%
Pump	1	850,203	1.9%
VFD	24	14,049,196	31.4%
Other	1	1,094,602	2.4%
Total	**170**	**44,765,354**	**100.0%**

2.1.1 Marketing & Outreach

The Custom program is promoted through Idaho Power's existing account management and program management relationships with customers and trade allies, including engineers and equipment providers. The Custom program is also utilizing a cohort system to focus on outreach and participation for specific customer types to provide more meaningful projects. Program engineers are building training into the program with cohorts to create behavioral savings. The Water/Wastewater Cohort (W/WW) was reviewed for PY2017. Additionally, the Streamlined Process is available to provide customers a more efficient custom process for projects with less uncertainty.

2.1.2 Tracking & Reporting

The Project Pre-Approval and Payment Applications for the Custom program collect information from the program applicant, including the following:

- Account information including business name and account number, installation address and contact information
- Project description
- Estimated project costs and savings
- Project timeline information (dates)
- Payee information if different from the account holder

This information is stored in the program tracking database, CLRIS. In addition to the information above, the CLRIS database includes:

- Project ID
- Customer rate class and SIC code
- Application and approval dates with Idaho Power contacts
- Measure description and category
- Gross kWh savings estimates for application, post-install, and final
- Project cost and incentive amounts

2.2 EVALUATION ACTIVITIES

The evaluation activities conducted for the Custom program are summarized in Table 2-2. Researchable issues and the sampling strategy for desk reviews and on-site visits are also discussed in this section.

Table 2-2. PY2017 Custom Program Evaluation Activities

Activity	Sample Size	Objective
Interviews with program staff	3	Understand program design and delivery. Obtain program staff perspective on program successes and challenges. Identify researchable issues.
Tracking system review	NA	The tracking system was reviewed to determine if all necessary inputs are tracked and if reporting tools contain sufficient information for program review.
Desk reviews	31 projects	Review project documentation and calculations to assess the accuracy of savings claimed for each project. This included review of the custom calculators and the project documentation for agreement with RTF calculators and guidelines for custom projects.
Site visits	29 projects	Visited a sample of sites to verify installation of measures and check assumptions used in savings calculations. The locations were matched to projects that had a completed desk review.

2.2.1 Evaluation Goals

The following impact evaluation goals were addressed through the various evaluation activities:

- Determine and verify the energy impacts attributable to the 2017 program. Ex-ante savings estimates are determined using various sources including the RTF deemed savings, program technical reference manuals, lighting calculator, VFD calculator, and internal/external engineering estimates.
- Provide credible and reliable program energy impact estimates and ex-post realization rates attributed to the program for the 2017 program year.
- Report findings and observations. Provide recommendations that enhance the effectiveness of future ex-ante savings analysis and the accurate and transparent reporting of program savings.

Additional researchable issues were identified during the program staff interviews:

- Are there custom measures that could become prescriptive or streamlined measures?
- What are best practices for Custom programs and how can Idaho Power improve?
- What can be done to increase realization rates of Custom projects?
- How do program staff confidently claim savings on behavioral activity past the first year? How long is reasonable?
- Are Idaho Power baselines set appropriately compared with industry standards?
- How are measure life assumptions affecting cost effectiveness, and is Idaho Power using the correct assumptions?
- Are there any changes that Idaho Power should make to their Measurement and Verification (M&V) process? Does that vary by site or type of project?

3.0 IMPACT EVALUATION

The following sections provide a detailed review of the impact evaluation methodology, evaluation results, and recommendations from the evaluation activities.

3.1 METHODOLOGY

The impact methodology consisted of the five primary evaluation activities shown in Figure 3-1. Each activity is explained in more detail below.

Figure 3-1. Process for Verifying Program Savings

3.1.1 Data Review and Sampling

Idaho Power program staff made the following files in Figure 3-2 available to the Tetra Tech team for review.

Figure 3-2. Custom Project Files

General Materials

- CLRIS database for 2017
- CEP Program Handbook 2017
- CIP Procedures Manual
- Non-lighting Pre-Approval and Payment Application forms

Project Files

- Streamlined efficiency calculators
- Applications
- Submitted project documents
- Savings estimation files/calculators/reports
- M&V reports, Idaho Power internal reviews and reports, QA/QC notes, site inspection notes and photographs

Most review was based upon the documentation folder which was copied and securely delivered to the evaluation team. This folder included the project steps from initial application through pre-install and post-install calculations of savings, description of projects through to the award of incentive, and a copy of the checks delivered. In addition, for most of the projects evaluated, Idaho Power delivered the calculation spreadsheets utilized to create the savings information detailed in the documentation file. Critical components relating to onsite data collection were delivered to onsite staff to minimize customer disruption.

Due to the previous review of lighting projects through the Retrofit program evaluation in 2017, and the prescriptive method for claiming lighting savings, Idaho Power and Tetra Tech agreed to exclude the lighting-only projects from the Custom sampling process, to focus on the custom measures with the most uncertainty. The stratum was selected to isolate lighting projects from the cohorts and other custom projects as summarized in Table 3-1.

Table 3-1. PY2017 Custom Sampling Summary

Sampling Stratum	Addresses (Unique Qty.)	Projects (Total Qty.)	Final Total kWh Savings percentage	Sample Participants
Lighting only	47	84	22.1%	0
Streamlined Process	39	42	9.1%	40
W/WW Cohort	10	11	13.9%	
Custom	29	33	54.9%	
Total	**125***	**170**	**100.00%**	**40**

* There are 117 unique addresses, but some fall into multiple categories.

Sampling was conducted at the service point level[1]. Using tracking data from the 2017 CLRIS database, we drew participants into the sample with a probability proportionate to size, with kWh savings at each site representing its size. Using this approach, every participant had a known probability of selection, but the probability was no longer equal. Rather, a participant with twice the kWh savings as another participant had twice the probability of being selected. The resulting evaluated savings and realization rates are unbiased and represent the population more efficiently, i.e., with a smaller sampling error.

3.1.2 Schedule Site Visits

An oversample of 40 sites was pulled to allow more flexibility in scheduling the 30 site visits needed to achieve 90/10 confidence and precision. The Idaho Power customer representatives were provided with all 40 addresses and were requested to schedule site visits for the sample in three different geographic regions. One to two weeks ahead of each of the weeks designated for site visits, Tetra Tech and Idaho Power staff participated in a conference call to review the logistics and goals for scheduling site visits. Schedules were set up with four time periods per day to choose from and visit duration and drive time were factored into the scheduling process. This process worked well to avoid overlapping appointments and the scheduling overall was very smooth and successful, resulting in 30 sites scheduled over a three-week period, with 29 completed, as shown in Figure 3-3.

Figure 3-3. Site Visit Scheduling Summary

September 24 to September 28	• Eastern Region/East side of Southern Region • 10 site visits scheduled - 10 completed
October 1 to October 5	• Southern Region • 11 site visits scheduled - 11 completed
October 8 to October 12	• Western/Canyon/Capitol Regions • 9 site visits scheduled - 8 completed

3.1.3 Complete Desk Reviews and Site Visits

To provide guidance to onsite staff on what to look for during the site visits, Tetra Tech staff conducted an initial review of the project files. This engineering review of documentation was conducted to

[1] Each service point is a participant facility with a unique address.

describe the project, confirm tracking data, identify key assumptions, and determine critical questions prior to the site visits. Site inspectors then reviewed equipment installation and interviewed customer to identify equipment installed, ask key questions and confirm assumptions, and identify or collect other relevant information.

The data gathered from the site visits was reconciled with the information from the initial desk reviews. There were 29 sites that had a completed desk review and site visit and an additional two sites had only a desk review completed, for a total of 31 projects which were evaluated. For each project, we reviewed all measures for each site, resulting in the review of 57 measures as shown in Table 3-2.

Table 3-2. PY2017 Custom Project Review Summary

Sampling Stratum	Reviewed Addresses	Reviewed Projects (Total Qty.)	Reviewed kWh Savings Percentage	Reviewed kWh
Lighting	31	19	7.2%	1,321,437
Streamlined Process		18	10.6%	1,945,379
W/WW Cohort		2	6.3%	1,169,362
Custom		18	75.9%	13,971,511
Total	31	57		18,407,689

The amount of time spent at each site to review equipment and gather the information required ranged from one hour to four hours. A Tetra Tech engineer conducted each site visit and was frequently accompanied by an Idaho Power customer representative.

3.1.4 Verify kWh Savings

The final step of the impact evaluation combined desk review and site inspection information to provide quality assurance for each reviewed project, describe any revisions to project assumptions and actual conditions, and update calculations to finalize evaluated savings.

3.2 IMPACT REVIEW RESULTS

Overall, the evaluation found that the C&I Custom Energy Efficiency Program had a relative precision of 3.23 percent at the 90 percent confidence interval and an impact realization rate of 100.4 percent as shown in Table 3-3.

Table 3-3. PY2017 Realization Rates

Category	Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Lighting	Lighting	1,321,437	1,311,121	99.2%
Streamlined Cohort	SCE - VFD	1,158,673	1,393,909	120.3%
	SCE - Doors	386,021	309,130	80.1%
	SCE - Comp Air	379,678	369,239	97.3%
	SCE-Refrig Ctrlr	21,007	18,267	87.0%
W/WW Cohort	WWEEC	1,169,362	1,169,362	100.0%
Custom	VFD	11,693,386	11,826,855	101.1%
	Compressed Air	979,090	654,382	66.8%
	Refrigeration	568,627	568,627	100.0%
	HVAC	400,965	389,047	97.0%
	Pump	267,044	414,348	155.2%
	Fan	53,325	53,325	100.0%
	Motors	9,074	8,865	97.7%
	Overall	**18,407,689**	**18,486,478**	**100.4%**

The Custom Energy Efficiency Program has many types of measures installed, and although the overall realization rate was 100 percent, this result does not indicate that each measure category had a realization rate near 100 percent. The following sections will provide more detail on differences within measure categories.

3.2.1 Variable Speed Drives

Variable Speed Drive projects account for 31 percent of the 2017 C&I Custom program. The sample included four projects which accounted for 64 percent of the sampled kWh. Two of the projects claimed 8 million and 3 million kWh per year respectively and themselves accounted for nearly all the VFD claimed efficiency savings. The overall realization rate in Table 3-4 for the savings claimed is 101.1 percent.

Table 3-4. PY2017 Custom VFD Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1869	8,207,124	8,340,593	101.6%
1687	3,109,500	3,109,500	100.0%
1566	312,833	312,833	100.0%
1759	63,929	63,929	100.0%
Overall	**11,693,386**	**11,826,855**	**101.1%**

<u>Project ID 1869:</u>

The site visits confirmed the equipment and control settings were equal to what was identified in the documentation. The site inspection verified that the actual energy consumption at the operating condition was slightly lower than the claimed baseline, therefore the savings increased slightly when that finding was multiplied over the hours of operation.

3.2.2 Lighting

Lighting projects account for 22 percent of the 2017 C&I Custom Energy Program. The sample included 19 projects which accounted for seven percent of the sampled kWh. All projects sampled were at five sites that completed another non-lighting project in 2017. Table 3-5 shows realization rates for each project with the total realization rate for lighting savings claimed at 99.2 percent.

Table 3-5. PY2017 Custom Lighting Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1593*	411,172	411,172	100.0%
1639*	354,997	354,997	100.0%
1673	152,652	152,652	100.0%
1768	103,136	103,136	100.0%
1727*	91,040	89,000	97.8%
1450	64,330	64,330	100.0%
1650	37,802	28,909	76.5%
1737	22,180	25,793	116.3%
1785	13,314	13,314	100.0%
1856	13,314	13,314	100.0%
1554*	13,089	13,089	100.0%
1656	12,382	12,382	100.0%
1603	10,354	8,620	83.3%
1828	8,830	7,568	85.7%
1854	4,457	4,457	100.0%
1750	2,992	2,992	100.0%
1733	2,991	2,991	100.0%
1697	1,496	1,496	100.0%
1753	909	909	100.0%
Overall	**1,321,437**	**1,311,121**	**99.2%**

*The customer for which only a desk review was completed had a significant amount of lighting in the sample under project IDs, 1554, 1593, 1639, and 1727.

<u>Project ID 1727:</u>

The review of the submitted documentation noted that the DesignLights Consortium® (DLC) database contained a rated energy consumption value for high bay fixtures of 102 watts versus the claimed value of 95 watts per fixture. In addition, the explosion proof lighting noted that the DLC database contained a rated energy consumption value for high bay fixtures of 72 watts versus the claimed value of 67 watts per fixture.

<u>Project ID 1650:</u>

The site visit found that 14 fixtures were removed and 15 fixtures were installed. This is less than the claimed amount of 18 fixtures.

Project ID 1737:

The site visit found that occupancy sensors were included on the high bay lighting, increasing the savings for the project over the claimed amount.

Project ID 1603:

The site visit found that the controls for the lighting were not installed.

Project ID 1828:

The site visit found that there were six fixtures replaced, less than the claimed seven fixtures.

3.2.3 Compressed Air

Compressed Air projects account for 10 percent of the 2017 C&I Custom Energy Program. The sample included three projects which accounted for 3.7 percent of the sampled kWh. All three projects were retrofits of existing equipment. The realization rate for the savings claimed is 66.8 percent in Table 3-6.

Table 3-6. PY2017 Custom Compressed Air Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1598	505,344	180,636	35.8%
1422	452,981	452,981	100.0%
1630-1	20,765	20,765	100.0%
Overall	**979,090**	**654,382**	**66.8%**

Project ID 1598:

The site visit found that the intended control structure for the two compressors to work in conjunction using a lead-lag programming was not operating. Both compressors were operating at the same power level. This adjustment in the programming control eliminated a majority of the claimed savings for this project.

3.2.4 Refrigeration

Refrigeration projects account for 16 percent of the 2017 C&I Custom Energy Program. The sample included four projects which accounted for 3.1 percent of the sampled kWh. The four projects were retrofits of existing refrigerated food storage at two locations. Table 3-7 shows the realization rates for the savings claimed is 100 percent for all projects.

Table 3-7. PY2017 Custom Refrigeration Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1222	264,975	264,975	100.0%
1770	201,277	201,277	100.0%
1769	75,539	75,539	100.0%
1893	26,836	26,836	100.0%
Overall	**568,627**	**568,627**	**100.0%**

Food storage refrigeration requires many assumptions based upon the heat load in the food brought into storage. The assumptions claimed in this calculation were made conservatively and the evaluation team agrees with the savings calculations.

3.2.5 HVAC

HVAC projects account for one percent of the 2017 C&I Custom Energy Program. The sample included three projects which accounted for 2.1 percent of the sampled kWh. All three projects were retrofits of existing equipment. Table 3-8 shows the realization rate for the savings claimed is 97.0 percent.

Table 3-8. PY2017 Custom HVAC Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1440	218,937	218,937	100.0%
1706	123,908	114,072	92.1%
1906	58,120	56,038	96.4%
Overall	**400,965**	**389,047**	**97.0%**

Project ID 1706:

The project was intended to provide heat to keep pipes from freezing in an entry area. The claimed savings used the occupancy hours. The evaluation team adjusted the hours of use to match the freezing temperature hours from the weather file.

Project ID 1906:

The claimed savings did not use the AHRI rated capacity of the installed units, the evaluation team adjusted these capacities. In addition, one heat pump was adjusted to claim savings for a <1.5 ton unit from the “1.5 ton – 5 ton” category. This adjustment also required that the unit have a COP of 4.6, which it did not. Therefore, the unit savings were removed from project savings.

3.2.6 Pump

Pump projects account for less than one percent of the 2017 C&I Custom Energy Program. The sample included one project which accounted for 1.3 percent of the sampled kWh. Table 3-9 shows the realization rate for the savings claimed is 155.1 percent.

Table 3-9. PY2017 Custom Pump Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1622	236,885	384,189	162.2%
1630-2	30,159	30,159	100.0%
Overall	**267,044**	**414,348**	**155.1%**

Project ID 1622:

The claimed savings did not appear to account for variable pump efficiencies as the pumping conditions change. The claimed calculation used 80.1% efficiency and the evaluated savings used an average of 76% efficiency to approximate changing conditions. A pump curve was not available and therefore exact values could not be identified. In addition to the reduction of pumping efficiency, the claimed savings assumed that the pump hours would remain constant before and after the improvement. The evaluated savings utilized an assumption that the pumping was volume based and therefore the new pump will operate less hours than the baseline. These combined adjustments increased the energy savings for this project.

3.2.7 Fan

Fan projects account for less than one percent of the 2017 C&I Custom Energy Program. The sample included one project which accounted for 0.3 percent of the sampled kWh. The realization rate for the savings claimed is 100 percent, as shown in Table 3-10. The industrial fan calculator was used to claim savings for this project.

Table 3-10. PY2017 Custom Fan Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1864	53,325	53,325	100.0%

3.2.8 Motors

Motor projects account for less than one percent of the 2017 C&I Custom Energy Program. The sample included one project which accounted for 0.05 percent of the sampled kWh. The realization rate for the savings claimed is 97.7 percent, as shown in Table 3-11.

Table 3-11. PY2017 Custom Motors Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1456	9,074	8,865	97.7%

<u>Project ID 1456:</u>

The evaluated savings adjusted hours of operation from 3,000 to 2,931 to match operations.

3.2.9 Wastewater Energy Efficiency Cohort

The Wastewater Energy Efficiency Cohort (WWEEC) accounted for five percent of the 2017 C&I Custom program savings. The sample included two projects which accounted for 6.3 percent of the sampled kWh. Both projects received 100 percent realization rates, as shown in Table 3-12.

Table 3-12. PY2017 Custom WWEEC Impact Results Summary

Project ID	Claimed kWh	Evaluated kWh	Realization Rate
1121	814,638	814,638	100.0%
1089	354,724	354,724	100.0%
Overall	**1,169,362**	**1,169,362**	**100.0%**

The projects positively identified best practices and relatively quickly were able to support the transition to focus effort on energy efficiency through daily operations at the plant. The M&V process to compare savings utilizes the energy consumed normalized to flow volumes and then subtracting out the raw values of any capital projects was reasonable. The program took a conservative approach to remove the energy savings from capital improvements which received incentives outside the cohort.

In Year 3 & 4 of the program, the energy savings may be more complicated as the staff begins to change at the participating wastewater treatment plants and additional capital improvement projects are constructed at the facilities. As the energy savings occurs from multiple pathways, such as capital improvements, operational efficiency variations of previous process adjustments, and new operational decisions, the claimed savings values from the WWEEC will need to be balanced between multiple interconnected projects claiming savings. The decision to break up the energy savings may not be clear, so it will be important to detail assumptions for sources of energy savings and how they are attributed, with a portion of the total savings values of all these projects attributed to WWEEC.

3.2.10 Streamlined Process

The Streamlined projects account for 10 percent of the overall 2017 C&I Custom Energy Program. The sample included 18 projects which accounted for 10 percent of the sampled kWh. These projects included VFDs, fast acting doors, compressed air upgrades, and dairy pre-cooling. Table 3-13 shows the individual realization rates and an overall realization rate for the savings claimed of 106.2 percent.

Table 3-13. PY2017 Custom Streamlined Impact Results Summary

Project Type	Project ID	Claimed kWh	Evaluated kWh	Realization Rate
VFD	1754	397,844	397,844	100.0%
	1690	364,723	566,409	155.3%
	1685	216,370	241,170	111.5%
	1576	47,720	47,720	100.0%
	1833	38,861	42,708	109.9%
	1698	37,670	37,670	100.0%
	1577	35,790	35,790	100.0%
	1812	19,695	24,598	124.9%
	1754	397,844	397,844	100.0%
Fast Acting Door	1469	185,512	185,512	100.0%
	1699	120,931	44,040	36.4%
	1913	79,578	79,578	100.0%
Compressed Air	1767	85,948	85,948	100.0%
	1746	77,101	71,380	92.6%
	1504	73,851	73,851	100.0%
	1726	73,432	74,205	101.1%
	1795	43,335	37,856	87.4%
	1834	26,011	25,999	100.0%
Dairy Pre-Cooling	1734	21,007	18,267	87.0%
	Overall	**2,343,223**	**2,488,389**	**106.2%**

Overall the streamlined project calculations varied more than the projects which followed the standard Custom program process. This is expected as they are smaller projects and were not calculated with the same amount of rigor. There were several reasons for adjustments, but many focused around the control of equipment post-installation.

Project ID 1690:

The site visit found a different operation profile for both the mixer and the grinder. The mixer increased both the baseline energy consumption and decreased the efficient case energy consumption with increased savings. The grinder baseline and efficient energy consumption both increased, which led to slightly decreased savings.

Project ID 1685:

The site visit found the length of storage to be longer than claimed. The increased hours of operation led to increased savings.

Project ID 1833:

The site visit found a different operation profile for the farm. This is a 24-hour milking operation, although 2-4 hours of this is not milking and therefore the cooling system would not be necessary during that time. The site inspection verified baseline consumption was higher than claimed and the maximum consumption was lower than claimed. Using the hours of operation and the VFD programming, these factors combined to increase savings slightly.

Project ID 1812:

The site visit noted that the thermostat for control of this project was located inside the milking parlor and barn which would be at an elevated temperature compared with the outdoor temperature. Therefore, the hours of operation increased for the project which increased the savings.

Project ID 1699:

The site visit noted several discrepancies for the installation of this project. The doors were smaller than claimed, the controls were site adjusted to allow the door to stay open longer when activated, and the gap between the door and wall was larger than anticipated. It appears that the site staff is working to figure out the best control for the door because the activation sensor is opening the door when employees pass by the door without intending to exit. Combining all these effects, the energy savings for this door is significantly decreased.

Project ID 1746:

The claimed calculation utilized a custom baseline for this new construction project. The calculation was updated to utilize the RTF regional baseline for new construction. In addition, the site visit report noted that the operating profile was most often at 50 percent for the integrated VFD. This adjusted the operating profile slightly which reduced savings.

Project ID 1795:

The claimed calculation included a typo which used 5,880 hours per year instead of the intended 5,088 hours per year. Correcting this resulted in lower savings.

Project ID 1734:

The current savings calculation assumes that there would be no heat loss as the milk was transported to the pre-cooler. Due to the distance of the piping, and the typical associated heat loss, the entering milk temperature was reduced to 95 degrees. This decreased the energy savings.

3.3 IMPACT RECOMMENDATIONS

The following impact recommendations are provided for Idaho Power's consideration:

Collect and file electronic calculators. For the project savings calculated by the third-party contractor, Idaho Power should collect and file the Excel calculators. The calculators were available from the third-party engineer but having them in-house once each project is completed will facilitate any additional quality control or adjustments that Idaho Power would like to make to improve accuracy.

Consider including post-verification customer follow-up for control-based projects. Based on the variation found in savings for projects with controls, and the value Idaho Power places on customer relationships, Tetra Tech recommends that the engineering team identify customers for post-verification visits to discuss control settings and the potential adjustment impacts. This is most useful for projects that have easily adjusted controls such as; variable frequency drives, fast acting doors, and compressed air upgrades. Not only will it help Idaho Power report more accurate savings, it will assist the customer in maximizing savings from their investment in the project.

Review goals for the Streamlined process. The Streamlined process is used to market to customers with a less customized project and provide a more efficient application process. However, the evaluation found that the assumptions for the streamlined projects resulted in more variation from actual conditions than their more "custom" counterpart projects. Idaho Power should continue to monitor the benefits of the process efficiency with the potential variation in savings rigor.

Continue close communications with Wastewater Cohort contacts. The Wastewater cohort has developed a process to claim annual savings from behavioral improvements, but the conditions of the projects and baselines continue to evolve. Changes in project managers at customer facilities and the addition of other capital projects may affect future savings. Idaho Power staff should continue to closely monitor and communicate with their Wastewater project contacts.

Review various energy calculation components for improved accuracy. Idaho Power calculations are currently found to be accurate and well-documented. However, for particular measure categories, the calculation accuracy could be further improved with the following adjustments:

- **Use Regional Technical Forum (RTF) method for New Construction Baseline.** The RTF issues new construction baselines based upon market research. Use the RTF baseline, when available, for project calculations to minimize risk associated with variable baselines per project. This was found specifically in the sample for Compressed Air new construction projects, although it will apply across many different new construction equipment types.
- **Use rated capacity and wattage for equipment.** Lighting and HVAC equipment have third party certification agencies which provide rated wattage and capacities of specific equipment models. Utilizing this information will reduce the risk that a manufacturer spec sheet may misrepresent the performance. This was noticed for an HVAC project which did not utilize the rated Air-Conditioning, Heating, and Refrigeration (AHRI) capacity and energy consumption metrics.
- **Consider requiring a pump curve submission for pumping projects.** Pump curves detail the pump efficiency at various operating conditions. Many pumping projects change pump conditions and the pump efficiency will generally have a large impact on the energy savings of the project. To estimate pump performance at multiple condition points, a pump curve is necessary.
- **Monitor specific dairy projects for adjustments to incoming milk temperature.** The RTF states to use 98 degrees based on industry standard practice of milk temperature production

unless otherwise measured. Dairies collect milk at approximately 98 degrees in the milking parlor and need to transfer the milk to the chilling system through uninsulated piping. This fluid transfer results in heat dissipation and therefore lower milk temperature at the start of chilling. For at least one of the projects reviewed, the milk traveled a lengthy distance to reach the chilling system which would have resulted in a lower incoming milk temperature assumption of 95 degrees.

Idaho Power Company

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Energy Efficient Lighting Program

2017 Impact Evaluation Results

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January 16, 2019

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We would like to acknowledge the many individuals who contributed to the impact evaluation of the Idaho Power Energy Efficient Lighting program savings from 2017. This evaluation effort would not have been possible without their help and support.

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The Tetra Tech Evaluation Team was made up of the following individuals: Kimberly Bakalars, Mark Bergum, and Josh Verbeten.

1.0 EXECUTIVE SUMMARY

Tetra Tech is pleased to provide Idaho Power Company (Idaho Power) with a report for the 2018 impact evaluation of the 2017 Energy Efficient Lighting (EEL) program, a component of the Simple Steps, Smart Savings program. This section of the report consists of an introduction describing the program, evaluation activities, and key findings and recommendations. The detailed impact results can be found in Section 3, along with recommendations.

1.1 PROGRAM DESCRIPTION

Idaho Power and other regional utilities participate in the Simple Steps, Smart Savings™ program. Idaho Power promotes Simple Steps, Smart Savings offerings to customers for both lighting and appliance promotion. Initiated in 2002, the Energy Efficient Lighting program follows a markdown model that provides incentives directly to manufacturers or retailers, with discounted prices passed on to the customer at the point of purchase. The program goal is to help Idaho Power's Idaho and Oregon residential customers afford more efficient lighting technology.

The EEL program is managed by CLEAResult. In addition to managing the program's promotions, which include special product placement, additional discounts, and other retail merchandising tactics designed to increase sales, CLEAResult is responsible for contracting with retailers and manufacturers, providing marketing materials at the point of purchase, and supporting and training retailers.

1.2 METHODOLOGY

To address the evaluation objectives, the impact methodology consisted of the four primary evaluation activities shown in Figure 1-1.

Figure 1-1. Process for Verifying Program Savings

1.3 FINDINGS AND RECOMMENDATIONS

Tetra Tech found no issues with the savings calculations other than a similar rounding issue that was identified through the Multifamily Energy Savings program evaluation. However, there is evidence that Idaho Power applied what was found during the Multifamily evaluation to the EEL program savings and this substantially improved the accuracy of the savings claimed for the EEL program.

The quality control processes already in place for the EEL program result in a realization rate very close to 100 percent. It also appears that Idaho Power has applied many of the previous EEL evaluation recommendations to improve program tracking and savings accuracy. The evaluation team has no recommendations for the program related to claimed savings other than to continue the current processes and rigorous QA/QC.

2.0 INTRODUCTION

2.1 PROGRAM OVERVIEW

Idaho Power and other regional utilities participate in the Simple Steps, Smart Savings™ program. Idaho Power promotes Simple Steps, Smart Savings offerings to customers for both lighting and appliance promotion. Initiated in 2002, the Energy Efficient Lighting (EEL) program follows a markdown model that provides incentives directly to manufacturers or retailers, with discounted prices passed on to the customer at the point of purchase. The benefits of this model are low administration costs, better availability of products to the customer, and the ability to provide an incentive for specific products. The program goal is to help Idaho Power's Idaho and Oregon residential customers afford more efficient lighting technology.

The EEL program is managed by CLEAResult. In addition to managing the program's promotions, which include special product placement, additional discounts, and other retail merchandising tactics designed to increase sales, CLEAResult is responsible for contracting with retailers and manufacturers, providing marketing materials at the point of purchase, and supporting and training retailers. CLEAResult negotiates bulb prices directly with each retail store and contracts can vary by retailer.

Idaho Power pays a flat fee for each kWh of energy savings achieved. A portion of the funding Idaho Power provides is used to buy down the price of the product, and a portion is applied to administration and marketing which varies and can be used for retailer promotions.

Figure 2-1. Payment Process

2.1.1 Marketing & Outreach

In 2017, CLEAResult conducted special product placement and signage promotions for Simple Steps, Smart Savings. CLEAResult staff conducted monthly store visits to check on stock, point-of-purchase signs, and displays, and staffed 13 lighting events at local Home Depot and Costco stores to educate customers about the importance of using LED lightbulbs and the Simple Steps promotion. Additional activities in 2017 involved education and marketing. During events where Idaho Power sponsored a booth and distributed LED lightbulbs, customers were informed about the importance of using energy-efficient lighting, the quality of LED lightbulbs, and the special pricing available for the Simple Steps, Smart Savings products.

The company continued to host an Energy Efficient Lighting program website; to make available a *Change a Light* program brochure designed to help customers select the right lightbulb for their needs; and to discuss energy-efficient lighting with customers at community events. Also, ads for the Fridge and Freezer Recycling Program promoted the free LED lightbulb offer. Several *#TipTuesday* posts on social media throughout the year also focused on energy-efficient lighting. The Idaho Power winter *Energy Efficiency Guide* and the January issue of *Connections* also recommended using ENERGY STAR certified light bulbs.

2.1.2 Tracking & Reporting

In 2017, through the Simple Steps, Smart Savings program, Idaho Power worked with 19 participating retailers, representing 129 individual store locations throughout its service area. Of those participating retailers, 58 percent were smaller grocery, drug, and hardware stores, and the remaining 42 percent were large retailers.

LED lightbulbs comprised 90 percent of lightbulb sales for 2017, an increase from 59 percent in 2016, while LED fixtures remained at approximately five percent of lighting sales. CFL lightbulbs manufactured before January 1, 2017 that had the ENERGY STAR certification did qualify for the Simple Steps markdown price; however, after May 2017 no CFL lightbulbs were included in the Energy Efficient Lighting program.

2.2 EVALUATION ACTIVITIES

The evaluation activities for the Energy Efficient Lighting program are summarized in Table 2-1 below. The impact evaluation of the 2017 Idaho Power EEL program included a database analysis of reported savings with a comparison to Regional Technical Forum (RTF) deemed savings.

Table 2-1. Energy Efficient Lighting Program Evaluation Activities

Activity	Sample Size	Objective
Interviews with Idaho Power staff	3	Understand program design and delivery. Obtain program staff perspective on program successes and challenges. Identify researchable issues.
Database analysis	Census	The tracking system was reviewed to determine if all necessary inputs are tracked and if reporting tools contain sufficient information for program review. A comparison with RTF deemed savings was included.
RTF compliance	Census	Review adoption of new RTF versions.
Retailer invoice checks		Review QA/QC procedures for data entry of retail sales and invoicing information.

3.0 IMPACT EVALUATION RESULTS

This chapter discusses the methodology and results of the impact evaluation of the 2017 EEL program. The impact evaluation was based on discussions with program staff as well as a review of the program tracking database.

3.1 METHODOLOGY

The impact methodology consisted of the four primary evaluation activities shown in Figure 3-1. Each activity is explained in more detail below.

Figure 3-1. Process for Verifying Program Savings

3.1.1 Program Staff Interview

Tetra Tech began the evaluation with a meeting with the Idaho Power evaluation lead to outline goals for the evaluation and identify key issues and Idaho Power personnel for subsequent interviews. Tetra Tech interviewed the program specialist and program analyst to understand data tracking, data availability, and program policies and to develop an ongoing dialogue to discuss questions that may emerge from the initial data review and findings.

3.1.2 Database Review

To review tracking data, Tetra Tech applied a census approach to the review of per-lamp savings tracked in the program's tracking system. The census approach avoids sampling error, resulting in an outcome that exceeds the minimum 90 percent ± 10 percent confidence required of the evaluation findings. Idaho Power program staff made the following files available to the Tetra Tech team for review.

Figure 3-2. Lighting Project Files

Materials Provided
•2017 YTD Lighting •ResLighting_Bulbs_v4_2 •ResLighting_v5.2 •Production_UES_Measures_List (v5.0) (Effective 2016-10-01) •UES_Measures_List_Version 6-1 (Effective 2017-10-01)

3.1.3 RTF Compliance

The RTF periodically updates savings values. Because Bonneville Power Administration maintains the master contract with CLEAResult, Idaho Power follows their timing on when new savings are adopted.

Tetra Tech utilized the program tracking system and RTF workbooks to verify compliance with RTF savings based on this policy.

3.1.4 Verification of kWh Savings

Idaho Power tracks energy savings for the EEL program in a Microsoft Excel® workbook for each program year. Idaho Power provided the 2017 tracking system to Tetra Tech for review as a foundation for verifying program savings. The tracking system contained itemized sales, allocation, incentive payment, and energy savings for each retailer and lamp stock keeping unit (SKU), with 46,884 records. The data spanned retail sales reported to Idaho Power for August 2016 through December 2017. Idaho Power calculated savings using RTF version 4.2 from October 2016 to September 2017 and updated to RTF version 5.2 from October 2017 to September 2018.

The savings verification process compared column AW (Total Savings) in the Idaho Power tracking database with a Verified Total Savings column that Tetra Tech calculated by multiplying Savings per Unit based on the RTF calculator times column AP (Units Counted for Energy Savings).

3.1.5 Retailer Invoice Checks

A portion of the impact review would typically focus on an independent quality control check of retailer sales data and invoices submitted to the program. However, given the description of the quality control and data entry process used by the EEL program staff, this review was determined by the evaluation team and Idaho Power to be an unnecessary burden on busy program staff.

We spoke with the program specialist and program analyst to understand the tracking process for the program as well as any quality control checks that were applied as the sales reports and invoices from CLEAResult were received. The internal quality control procedure is described further in Section 3.2.3.

3.2 IMPACT REVIEW RESULTS

Overall, the evaluation found that the EEL program calculations were accurate with little variation by individual measure type. As shown in Table 3-1, realization rates for each RTF version were very close to 100 percent and became even more accurate when RTF version 5.2 was adopted. Much of this increase in accuracy occurred because Idaho Power discontinued rounding of the unit savings to the nearest whole number after moving to RTF version 5.2.

Table 3-1. Overview of 2017 Program Realization Rate

RTF Applied to Savings	Ex-Ante kWh	Ex-Post kWh	Realization Rate
RTF version 4.2 Applied (10/2016-9/2017)	33,238,503.67	33,506,134.22	1.01
RTF version 5.2 Applied (10/2017-9/2018)	4,526,238.22	4,526,468.65	1.00
Program Year 2017	**37,764,741.89**	**38,032,602.87**	**1.01**

3.2.1 Database Review

The tracking system is comprehensive and allowed Tetra Tech to conduct a census review of all lamp types and aggregate reported energy savings. Tetra Tech found the tracking database to be very clean and consistently complete. In addition to tracking the program participation, the database included a tab with a data legend that explained what each column is used for and identified which column data comes directly from contractors. This is considered a best practice when tracking data and will ensure consistency if someone other than the current user needs to work with the database.

Review of the savings values by RTF version resulted in high realization rates for almost all measures. Table 3-2 below shows the measure level realization rates for savings claimed during the application of RTF version 4.2 and Table 3-3 shows the measure level realization rates for savings claimed during the application of RTF version 5.2.

Table 3-2. RTF v4.2 Savings Comparisons

Bulb Type	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Fixtures LED Decorative Ceiling Flush Mount Retail	724,704.00	724,704.00	1.00
Fixtures LED Downlight Retrofit Kit Retail	1,372,920.00	1,372,920.00	1.00
Fixtures LED Exterior Porch Light Retail	283,498.77	283,498.77	1.00
Fixtures LED Exterior Security Retail	665,336.88	665,336.88	1.00
Fixtures LED Linear Flush Mount Retail	297.00	297.00	1.00
Fixtures LED Linear Shop Light Retail	4,781.70	4,781.70	1.00
Fixtures LED Track Light Retail	1,478.32	1,478.32	1.00
Retail Compact Fluorescent Decorative and Mini-Base1490 to 2600 lumens ANY	28.00	22.93	0.82
Retail Compact Fluorescent Decorative and Mini-Base250 to 1049 lumens ANY	4,290.00	4,347.18	1.01
Retail Compact Fluorescent General Purpose, Dimmable, and Three-Way1050 to 1489 lumens any	82,348.00	82,176.49	1.00
Retail Compact Fluorescent General Purpose, Dimmable, and Three-Way1490 to 2600 lumens any	153,350.00	152,083.81	0.99
Retail Compact Fluorescent General Purpose, Dimmable, and Three-Way250 to 1049 lumens any	505,540.00	509,178.65	1.01
Retail Compact FluorescentGlobe250 to 1049 lumens ANY	576.00	586.29	1.02
Retail Compact Fluorescent Reflectors and Outdoor1050 to 1489 lumens ANY	1,620.00	1,629.06	1.01
Retail Compact Fluorescent Reflectors and Outdoor1490 to 2600 lumens ANY	360.00	377.15	1.05
Retail Compact Fluorescent Reflectors and Outdoor250 to 1049 lumens ANY	108,030.00	108,205.54	1.00
Retail LED Decorative and Mini-Base250 to 1049 lumens ANY	1,523,184.00	1,545,641.85	1.01
Retail LED General Purpose, Dimmable, and Three-Way1050 to 1489 lumens any	187,374.00	188,282.43	1.00
Retail LED General Purpose, Dimmable, and Three-Way1490 to 2600 lumens any	1,591,234.00	1,607,029.90	1.01
Retail LED General Purpose, Dimmable, and Three-Way250 to 1049 lumens any	8,672,820.00	8,767,537.65	1.01
Retail LED Globe250 to 1049 lumens ANY	139,146.00	137,846.48	0.99
Retail LED Reflectors and Outdoor1050 to 1489 lumens ANY	301,872.00	303,412.19	1.01
Retail LED Reflectors and Outdoor1490 to 2600 lumens ANY	24,140.00	23,786.40	0.99
Retail LED Reflectors and Outdoor250 to 1049 lumens ANY	16,889,575.00	17,020,973.56	1.01
Total	**33,238,503.67**	**33,506,134.23**	**1.01**

Unit savings were rounded to the nearest whole number while Version 4.2 of the RTF calculator was being used to calculate savings (from October 2016-September 2017). Rounding to whole numbers stopped after Version 5.2 of the RTF calculator was applied (October 2017 - September 2018). The rounding to two decimal places greatly improves the accuracy of the claimed savings, as highlighted in Table 3-3 below.

Table 3-3. RTF v5.2 Savings Comparisons

Bulb Type	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Retail_Ceiling and Wall Flush Mount _1000 to 1999 lumens	33,716.78	33,716.78	1.00
Retail_Ceiling and Wall Flush Mount _2000 to 3999 lumens	18,914.26	18,914.26	1.00
Retail_Ceiling and Wall Flush Mount _4000 to 7999 lumens	66,808.36	66,808.36	1.00
Retail_Ceiling and Wall Flush Mount _500 to 999 lumens	9,845.33	9,845.33	1.00
Retail_Downlight Fixture_1000 to 1999 lumens	4,267.39	4,267.39	1.00
Retail_Downlight Fixture_250 to 499 lumens	87.38	87.38	1.00
Retail_Downlight Fixture_500 to 999 lumens	237,416.64	237,416.64	1.00
Retail_Exterior Porch_500 to 999 lumens	104.99	104.99	1.00
Retail_Exterior Security_2000 to 3999 lumens	23,443.13	23,443.13	1.00
Retail_Linear Flush Mount_500 to 999 lumens	3.79	3.79	1.00
Retail_Linear Shop_4000 to 7999 lumens	11.19	11.19	1.00
Retail LED Decorative and Mini-Base250 to 1049 lumens ANY	215,968.32	216,049.90	1.00
Retail LED General Purpose, Dimmable, and Three-Way1050 to 1489 lumens any	54,276.16	54,266.44	1.00
Retail LED General Purpose, Dimmable, and Three-Way1490 to 2600 lumens any	275,782.50	275,795.42	1.00
Retail LED General Purpose, Dimmable, and Three-Way250 to 1049 lumens any	1,757,189.16	1,757,641.62	1.00
RetailLEDGlobe250 to 1049 lumens ANY	89,641.76	89,617.52	1.00
Retail LED Reflectors and Outdoor1050 to 1489 lumens ANY	75,243.93	75,253.00	1.00
Retail LED Reflectors and Outdoor1490 to 2600 lumens ANY	20,409.96	20,409.62	1.00
Retail LED Reflectors and Outdoor250 to 1049 lumens ANY	1,643,107.20	1,642,815.90	1.00
Total	**4,526,238.23**	**4,526,468.66**	**1.00**

3.2.2 Regional Technical Forum Compliance

The RTF periodically updates savings values. Because Bonneville Power Administration maintains the master contract with CLEAResult, Idaho Power follows their timing on when new savings are adopted. BPA was using RTF version 4.2 from October 2016-September 2017 and used RTF version 5.2 from October 2017-September 2018. Tetra Tech utilized the program tracking system and RTF workbooks to verify compliance with RTF savings based on this policy.

3.2.3 Retail Sales Report Quality Control

During discussions with the program specialist and program analyst to understand the tracking process for the program, it became clear that there is an extensive process for quality control applied as the sales reports and invoices from CLEAResult are received.

Idaho Power asks for raw sales data from each of the stores on a monthly basis. Their program specialist then verifies that the numbers provided by the contractor match the raw sales data. If there are any discrepancies, the program specialist follows up with the contractor until the discrepancies are resolved.

The program specialist also maintains a SKU lookup tab as part of the tracking database. Lighting SKUs are constantly changing, but the program specialist checks the ENERGY STAR list periodically to make adjustments. In addition, there are lookups in place to verify if a SKU from a store is part of the approved list. If a new SKU appears, the program specialist will do further research to determine if the item qualifies for an incentive.

3.3 IMPACT RECOMMENDATIONS

Tetra Tech found no issues with the savings calculations other than a similar rounding issue that was identified through the Multifamily Energy Savings program evaluation. However, there is evidence that Idaho Power applied what was found during the Multifamily evaluation to the EEL program savings and this substantially improved the accuracy of the savings claimed for the EEL program.

The quality control processes already in place for the EEL program result in a realization rate very close to 100 percent. It also appears that Idaho Power has applied many of the previous EEL evaluation recommendations to improve program tracking and savings accuracy. The evaluation team has no recommendations for the program related to claimed savings other than to continue the current processes and rigorous QA/QC.

Idaho Power Company

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Multifamily Energy Savings Program

2017 Impact and Process Evaluation Results

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ACKNOWLEDGEMENTS

We would like to acknowledge the many individuals who contributed to the 2017 impact and process evaluation of the Idaho Power Multifamily Energy Savings program. This evaluation effort would not have been possible without their help and support.

We would like to specifically thank Gary Grayson and Becky Arte-Howell of Idaho Power, who provided invaluable insight into the program and operations. These individuals participated in ongoing evaluation deliverable reviews and discussions and graciously responded to follow-up questions and data and documentation requests.

The Tetra Tech Evaluation Team was made up of the following individuals: Kimberly Bakalars, Mark Bergum, Josh Verbeten, and Katie Hanlon.

1.0 EXECUTIVE SUMMARY

Tetra Tech is pleased to provide Idaho Power Company (Idaho Power) with this report covering evaluation of current processes and 2017 program impacts for the Multifamily Energy Savings (Multifamily) program. This section of the report consists of an introduction describing the program, evaluation activities, and key findings and recommendations. Both the impact and process evaluations for the program are detailed in separate sections, along with their respective findings and recommendations.

1.1 PROGRAM DESCRIPTION

The Multifamily Energy Savings program began in March 2016 with a pilot project in Pocatello, ID, followed by direct install projects in Boise, ID and Twin Falls, ID in September and December 2016 respectively. There were a total of 196 apartment units served in 2016 and over 700 units were served in 2017, the first full year of the program.

The Multifamily Energy Savings program supports property owners and managers in helping their residents save on monthly energy bills while increasing the comfort of residents. The program allows for the direct installation of energy-saving products in multifamily dwellings consisting of five or more rental units with electric heating and water heating. Direct install products include: ENERGY STAR® LED lightbulbs, thermostatic shut-off valve showerheads, kitchen and bathroom faucet aerators, and water heater pipe insulation. These are installed by insured contractors at no cost to the property owner/property manager or the tenant.

1.2 METHODOLOGY

In order to address the evaluation objectives, which included verifying energy impacts attributable to the 2017 program, providing estimates of realization rates, suggesting enhancements to the savings analysis and reporting, evaluating program design (including implementation, management, outreach, and quality control) and program tracking, the evaluation team conducted several evaluation activities as shown in Figure 1-1.

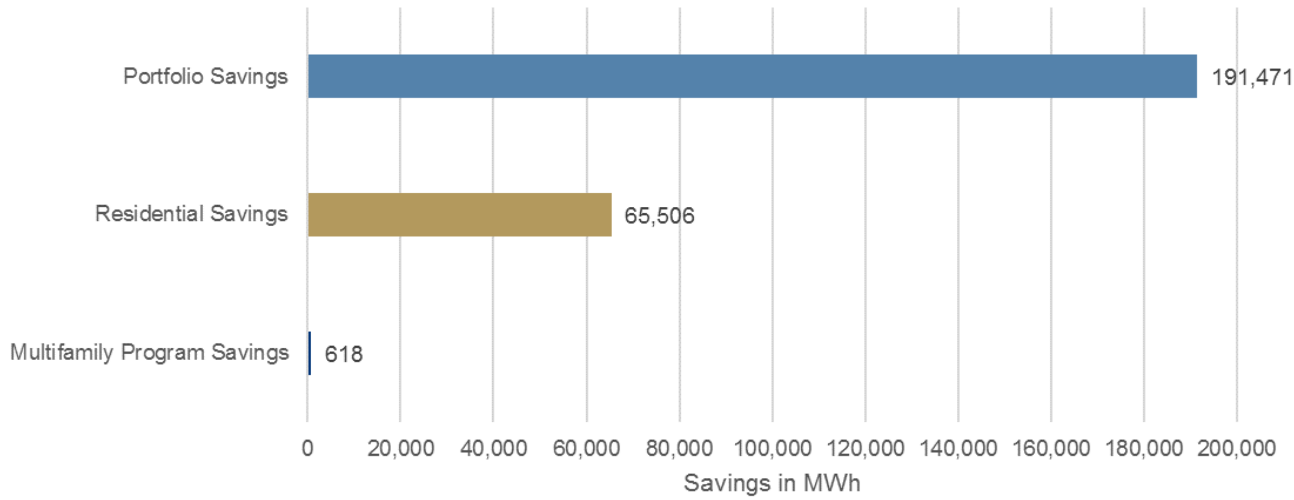
Figure 1-1. Impact and Process Evaluation Activities

Impact	Process
• Documentation and tracking review • Verify savings amounts • Check savings calculations • Review invoices	• Documentation review • Tracking review • Contractor interviews

1.3 FINDINGS AND RECOMMENDATIONS

The impact and process evaluations for the Multifamily Energy Savings program revealed a successful first-year program. There was one error transcribed for prescriptive savings values and no errors were identified in the calculated savings values. Installation contractors could offer no suggested changes to processes or communication. Based on the detailed evaluation activities, Tetra Tech provides some areas of improvement for Idaho Power to consider as they continue, and potentially expand, the program. All findings and recommendations should be considered in the context of the program size and contribution to the Residential sector (1%) and overall portfolio savings (.3%).

Figure 1-2. Relative Program Savings[1]



Overall, findings from the impact evaluation show the program savings calculations are reasonable. The evaluation found just one savings value error in the summary tracking spreadsheet or individual project tracking spreadsheets, resulting in the following realization rates for all measures included in the Multifamily program and an overall realization rate of 84 percent.

Table 1-1. Realization Rates

Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate[2]
9 W Bulb - 800 lumens	90,448	90,448	100%
15 W Bulbs - 1600 lumens	28,920	28,920	100%
6 W Globes - 450 lumens	61,264	61,264	100%
11 W Reflectors - 850 lumens	61,993	61,993	100%
6.5 W Decorative - 325 lumens	5,691	5,691	100%
Kitchen Aerator	71,232	43,116	61%
Bath Aerator	86,814	52,547	61%
Showerhead	105,922	105,922	100%
Thermostatic Combo	6,408	6,408	100%
Water Heater Pipe Wrap	98,850	60,154	61%
Total Savings	**617,542**	**516,463**	**84%**

While not errors, there are a few areas the evaluation team would like to mention where Idaho Power could increase the accuracy of their savings estimates.

[1] From Idaho Power's Demand-Side Management 2017 Annual Report. March 15, 2018

[2] Reductions to the realization rates for kitchen and bath aerators and the pipe wrap were all based on the use of single-family instead of multifamily unit savings values.

- The savings values from the Regional Technical Forum (RTF)[3] are out to two decimal places, but the Idaho Power calculations round savings values to the nearest whole number.
- Designation of primary and secondary showerhead status is not recorded at the time of installation. It is assigned using a formula based on number of bathrooms and showerheads installed. The "Any" category and savings value used in the spreadsheet is an average of Primary and Secondary.
- Lighting quantities are not recorded for each area of the home during installation. The current counts do not match the RTF categories, but are an average of savings values across multiple categories.

1.3.1 Impact Recommendations

The following impact recommendations are provided for Idaho Power's consideration:

Ensure that all 2018 calculations are using the most updated potential study information and clearly referenced. We understand that a few of the 2017 calculations referenced the 2014 potential study, as the 2016 potential study was not final until April 2017. Upgrading at the beginning of the next program year is sufficient for these measures. In addition, the deemed values should be clearly sourced since the program is using a 20-year average for the proper residence type. This includes specifying the date range used for the average.

Update the savings calculator to use the RTF savings values out two decimal places. Rounding the deemed savings numbers to the whole kWh is affecting the accuracy of the measure savings, especially for 9 W and 6 W lighting categories where a high number of lamps are installed. Doing so will ensure that savings calculated by the program are more accurate.

Consider having installation contractors track the type of showerhead needed for savings calculations. The 2017 savings for showerheads was calculated using an underlying formula to assign showerheads as "primary', "secondary", or "any" instead of indicating specifics on the installation log. Adding one more column to the installation log spreadsheet would allow the installation contractor to indicate how many "primary" and how many "secondary" showerheads were installed in each unit. That would alleviate the need for the "any" category, which averages the savings amounts from "primary" and "secondary" and will improve savings accuracy as the number of units increases.

Consider having installation contractors track the area where 9 W lamps are installed. The 2017 savings for the 9 W lamps uses an average of the high use area and moderate use area savings values since contractors are not reporting actual installation location. Adding one more column to the installation log spreadsheet would allow the installation contractor to indicate how many lamps were installed in high use areas and how many were installed in moderate use areas, improving the accuracy of the savings estimates. This is particularly important as the number of units is expected to increase.

Work with the equipment supplier to investigate options for improved tracking of equipment distribution and provide a reduced cost to contractors that order directly. There are two contractors that are currently ordering supplies directly from the same vendor Idaho Power uses. However, contractors reported that the price is slightly higher for them to order directly as they do not get the bulk advantage that Idaho Power receives. In addition, as the program expands, it will be important for the program specialist to have clear counts on the inventory of program materials installed. The cleanest may be the invoices from the suppliers to the contractors for equipment they

[3] https://rtf.nwcouncil.org/measures

order directly for the Multifamily program. This will create a single process and minimize Idaho Power risk associated with the equipment use and storage.

1.3.2 Process Recommendations

The Idaho Power program specialist and installation contractors work well together to deliver the program to multifamily properties. Contractors indicated that the current process with screening and installation visits is working well to streamline the activity and reduce additional visits and burden on property managers and tenants. In general, communication and program processes are working well for contractors. They find the program materials to be professional, informative, and educational. The following process recommendations are provided for Idaho Power's consideration:

Expand the project tracking spreadsheet to contain more complete information. The tracking spreadsheet used for savings calculations is appropriate. However, the tracking for projects and contractors is not collected in a master spreadsheet. This could be problematic if someone other than the program specialist needed to access project information, and this will become more complicated as the program expands. Combining the separate information for evaluation purposes also exposed a few areas of potential errors. For instance, interviews with installation contractors revealed disagreement on who had served two sites. Contractors were not included with the projects but matched by region. The evaluation team has provided an example of a master tracking list of variables in Appendix C as well as an example spreadsheet. The tracking system can be as simple as an Excel spreadsheet, but should include the following information: property information (name, location, property manager contacts), the number of units served, dates of screening visits and installation, installation contractor (name, address, contact information), savings associated with each measure type installed and overall savings for the property, program year, region, and project status. We would not restrict the project status to those projects completed, but also include leads, those determined to be ineligible, projects in the screening phase, sites that declined to participate, and those in the installation phase.

Incorporate questions into customer surveys to gather feedback from Property Managers and tenants regarding the satisfaction with and benefits of the program. Gathering participant feedback was not within the scope of the current process evaluation, as Idaho Power already has multiple outreach methods for obtaining feedback from customers. However, it could provide additional insights into potential program improvements and keep the program on track as it expands.

2.0 INTRODUCTION

2.1 PROGRAM OVERVIEW

The Multifamily Energy Savings program began in March 2016 with a pilot project in Pocatello, ID. This was followed by direct install projects in Boise, ID and Twin Falls, ID in September and December 2016 respectively. There were measures directly installed at 73 units in Pocatello, 43 units in Boise, and 80 units in Twin Falls. Between all three projects, a total of 196 apartment units received the associated measures. 2017 was the first full year of operation for the program.

The Multifamily Energy Savings program supports property owners and managers in helping their residents save on monthly energy bills and increase residents' comfort, while improving the appearance of rental units, and adding value to their multifamily property. The program allows for the direct installation of energy-saving products in multifamily dwellings consisting of five or more rental units. In 2017, eligible buildings were required to have electric heating and water heating. For 2018, the program was adjusted to only require electric water heating.

The products installed are: ENERGY STAR® LED lightbulbs, thermostatic shut-off valve showerheads, kitchen and bathroom faucet aerators, and water heater pipe insulation. These are installed at no cost to the property owner/property manager or the tenant. To ensure energy savings and applicability, each building is pre-approved by the program specialist and contracted energy efficiency measure installation contractor. Items are installed at no cost to the property manager by an insured contractor. A representative from the property must accompany the installation contractor during the visits.

In 2017, 12 projects were completed as program participation increased. Between these projects, a total of 772 apartment units received measures. 2018 participation has been steady and on track to exceed 2017 participation. The table below shows the total number of measures installed in 2017.

Table 2-1. Multifamily Measures Installed in 2017

Activity	2017
Number of Projects	**12**
Number of Tenant Units	**772**
LEDs	12,101
Kitchen Aerators	672
Bath Aerators	819
Showerheads (Including Thermostatic Combo Measure)	685
Pipe Wrap	659

2.1.1 Marketing and Outreach

Idaho Power promotes the Multifamily program component via a number of methods including a web page specifically promoting the program and brochures mailed to landlords and property owners. Materials used on-site to alert tenants of dates and equipment to be installed were revised based on initial pilot participant feedback.

2.1.2 Tracking and Reporting

Idaho Power staff record interest from multifamily property managers and transfers this information to one of four contractors, depending on regional location, to conduct a walkthrough to determine eligibility and gather information on the number of measures needed. Installation log spreadsheets for each site are created by Idaho Power staff for the contractor and are used to record the quantity of each measure installed in each unit. Reasons for not installing measures are also tracked. Idaho Power analysts use these spreadsheets to calculate the energy savings for each location.

2.1.3 Evaluation Goals

The following impact valuation goals were addressed through the various evaluation activities:

- Determine and verify the energy impacts attributable to the 2017 program. Ex-ante savings estimates are determined using various sources including the Regional Technical Forum deemed savings, program technical reference manuals, lighting calculator, and internal/external engineering estimates.
- Provide credible and reliable program energy and non-electric impact estimates and ex-post realization rates attributed to each program for the 2017 program year with a 90/10 confidence and precision.
- Report findings and provide recommendations that enhance the effectiveness of future ex-ante savings analysis and the accurate and transparent reporting of program savings.

Because the program is new, a process evaluation was also conducted for the Multifamily program with the following objectives:

- Evaluate program design including program mission, logic, and use of industry best practices.
- Evaluate program implementation including quality control, operational practice, and outreach.
- Evaluate program administration including program oversight, staffing, management, training, documentation, and reporting.

Additional researchable issues were identified during the program staff interviews:

- Are there ways to streamline the current processes? Any processes that can be discontinued?
- Do contractors have enough bandwidth to handle increased volume if the program expands?
- How does the tracking system accommodate activity entry and tracking for the program?

2.1.4 Evaluation Activities

The process and impact evaluation activities for the Multifamily Energy Savings program are summarized in the table below. Researchable issues and the sampling strategy for desk reviews are also discussed in this section.

Table 2-2. Multifamily Program Evaluation Activities

Activity	Sample Size	Objective
Interviews with implementation staff	1	Understand program design and delivery. Obtain program staff perspective on program successes and challenges. Identify researchable issues.
Review of program materials	NA	Provide feedback on documentation, quality control, project tracking, and use of best practices.
Process interviews with installation contractors	4	Contractor interviews were conducted to understand product ordering, interaction with customers, ability to handle additional projects, and communication. The interview guide can be found in Appendix A.
Tracking system review	2017 tracking database	The tracking system was reviewed to determine if all necessary inputs were tracked, if tabs rolled up to the overview correctly, and if reporting tools contained sufficient information for program review.
Impact review	204 of 772 units Covering all four contractors	Determine the program level energy impacts through an engineering desk review of savings calculators from RTF and confirm the installation log and tracking data for a sample of installation logs and invoices.

3.0 IMPACT EVALUATION RESULTS

The impact evaluation sought to answer the following researchable issues:

- What were the energy impacts attributable to the 2017 program?
- How accurate are the savings and what are the realization rates attributable to the 2017 program?
- How can the reporting of savings improve and become more transparent?

3.1 METHODOLOGY

The impact methodology consisted of the four primary evaluation activities shown in Figure 3-1. Each activity is explained in more detail below.

Figure 3-1. Process for Verifying Program Savings

3.1.1 Program Documentation and Tracking Review

The first step in the evaluation of the Multifamily program for program year 2017 was to review the program documentation and energy savings tracking system provided by Idaho Power. To review tracking data, Tetra Tech applied a census approach to the review of the savings tracked in the program's tracking spreadsheet. The census approach avoids sampling error, resulting in an outcome that exceeds the minimum 90 percent ± 10 percent confidence and precision required of the evaluation findings.

The tracking system was provided to the evaluation team in an excel spreadsheet and included a summary worksheet with counts of measures installed at each individual apartment unit that the program served. An amount of kWh savings was given for each individual measure. The verification of these kWh savings amounts was the first objective of the evaluation team.

3.1.2 Verify kWh Savings Amounts

To verify the savings amounts, the evaluation team retrieved savings calculators from the appropriate online sources. The sources of the calculators that were used by Idaho Power were noted in the column headers for each individual measure in the summary spreadsheet. For instance, the kWh savings number for the 9 W bulb – 800 lumens came from the RTF V4.2 calculator. Additionally, the notes in the column header also describe the installation and usage rate, which directly affect the kWh savings number that was looked up and used from the calculators.

Tetra Tech retrieved the appropriate calculators from the Regional Technical Forum (RTF) website.[4] Calculators for residential lighting, showerheads, and thermostatic shower restriction valves were downloaded for this verification activity. The kWh savings for the remainder of the measures installed through the multifamily program (kitchen and bath aerators and pipe wrapping) were verified through the AEG 2014 potential study.

3.1.3 Check Savings Calculations

Once kWh savings were verified for the measures that were installed through the Multifamily program, the verification of kWh savings calculations was performed.

Tetra Tech selected six out of the twelve projects that were completed through the Multifamily program in 2017. At least one project was selected from each of the four contractors that worked as part of the Multifamily program with the largest project in terms of housing units served, selected for evaluation.

Table 3-1. Units Reviewed for Savings Calculation Accuracy

Apartment Name	Units	Contractor
Site 1 – Twin Falls	36	Home Energy Management
Site 2 - Hailey	42	Home Energy Management
Sire 3 - Pocatello	70	Savings Around Power
Site 4 - Boise	162	Momentum, LLC
Site 5 - Boise	24	Momentum, LLC
Site 6 - Nampa	204	Metro Contractor Services
Total Units	**538**	

These projects were used to confirm the accuracy of the claimed quantities for each unit as well as to confirm energy savings claimed by the program. The analysis was combined with the technical savings analysis for each measure to create a realization rate for each project.

First, the evaluation team verified the kWh savings calculations from the summary sheet for all six sampled projects. This was completed by taking the quantity of measures installed from the summary worksheet in the tracking system and multiplying that number by the savings for each measure that was verified from the calculators in the previous step. The resulting savings numbers were compared to the savings numbers that were calculated by Idaho Power. In addition, the numbers of measures installed at each individual apartment unit for each of the six sampled projects were taken from their individual project sheets within the tracking system. These numbers were multiplied by the savings verified from the savings calculators and were compared to the savings numbers that were calculated by Idaho Power.

3.1.4 Review Materials Invoices

Once the kWh savings were verified for each of the six sampled projects, an invoice review was completed to verify that the actual number of measures installed through the program were purchased and tracked by the Idaho Power Program Specialist and to verify that the correct measure attributes were used when calculating savings through the calculators. This was completed by verifying that the total number of measures installed through the program, as noted in the tracking system, was less than or equal to the total number of each individual measure documented in the program invoices. In

[4] https://rtf.nwcouncil.org/measures

addition to verifying the quantity of measures bought, the invoices were also used to verify that the equipment purchased were identical to what were looked up in the calculators for kWh savings verification purposes.

3.2 IMPACT REVIEW RESULTS

Overall, findings from the impact evaluation show the program savings calculations are reasonable. The evaluation found just one transcription error in the summary tracking spreadsheet or individual project tracking spreadsheets, resulting in the following realization rates for all measures included in the Multifamily program and an overall realization rate of 84 percent.

Table 3-2. Realization Rates

Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate[5]
9 W Bulb - 800 lumens	90,448	90,448	100%
15 W Bulbs - 1600 lumens	28,920	28,920	100%
6 W Globes - 450 lumens	61,264	61,264	100%
11 W Reflectors - 850 lumens	61,993	61,993	100%
6.5 W Decorative - 325 lumens	5,691	5,691	100%
Kitchen Aerator	71,232	43,116	61%
Bath Aerator	86,814	52,547	61%
Showerhead	105,922	105,922	100%
Thermostatic Combo	6,408	6,408	100%
Water Heater Pipe Wrap	98,850	60,154	61%
Total Savings	**617,542**	**516,463**	**84%**

Although they are not errors, there are a few areas the evaluation team would like to mention where Idaho Power can increase the accuracy of their savings estimates.

- While the savings values in the RTF are out to two decimal places, the Idaho Power calculations round savings values to the nearest whole number.
- Designation of primary and secondary showerhead status is not recorded at the time of installation. It is assigned using a formula based on number of bathrooms and showerheads installed. The “Any” category and savings value used in the spreadsheet is an average of primary and secondary savings values.
- Lighting quantities are not recorded for each area of the home during installation. The current counts do not match the RTF categories, but are an average of savings values across multiple categories.

3.2.1 Savings Inputs

The individual measure calculators provided a table of kWh savings for each combination of measure attributes, usage rate, and installation type. The evaluation team noted that this information was

[5] Reductions to the realization rates for kitchen and bath aerators and the pipe wrap were all based on the use of single-family instead of multifamily unit savings values.

provided by Idaho Power in the column headers in the summary page of the tracking system excel spreadsheet. The evaluation team looked up the kWh savings in the calculator savings tables to verify that the correct kWh savings from the RTF was used in the tracking system. The evaluation team found that Idaho Power did indeed look up and use the correct kWh savings for all residential lighting, showerheads, and thermostatic shower restriction valves. The only concern that the evaluation team came across when verifying the kWh savings values was that Idaho Power did seem to round to the nearest kWh. For example, for the 9 W bulb – 800 lumens, the measure description in the tracking system reads – “RTF. V4.2. Direct Install - LED General Purpose. 250 to 1049 lumens. Avg of High & Moderate Use”. From this measure description, the evaluation team needed to retrieve the kWh savings for high and moderate use lamps and average them together. Again, the kWh savings was looked up correctly by Idaho Power with the high use bulb saving 22 kWh and the moderate use saving 10 kWh. When averaging these savings together, the result is 15.9 kWh compared with 16 kWh used in the savings calculations. While this difference only works out to be 0.1 kWh, there were additional examples of rounding that were more substantial. In the case of the 6 W LED Globe lamps, the difference in kWh savings between the calculator (13.67 kWh) and the kWh savings used in the tracking system (14 kWh) is approximately 0.33 kWh per lamp. Additional detail on the rounding differences can be found in Appendix B.

The deemed savings values from the remaining three measures, kitchen aerators, bath aerators, and water heater pipe wrap, were sourced from the 2014 Potential Study. Kitchen and bath aerators used a 20-year average value of 106 kWh – the single-family value – not the multifamily value of 64 kWh. Water heater pipe wrap savings was also calculated using the single-family 20-year average of 150 kWh, not the multifamily value of 91 kWh. The 20-year average range was not specifically noted as well, which would provide more accuracy if recorded in future calculators. These changes resulted in a realization rate of 61 percent for each of the three measures using the 2014 Potential Study as a source.

3.2.2 Savings Accuracy

Once the evaluation team verified that the correct kWh savings were used in the tracking system, the next step was to verify savings calculations for all installed measures through the Multifamily program. The savings calculation was performed for six of the sampled projects both through the summary worksheet in the tracking system and through the individual project tracking sheets within the tracking system excel spreadsheet. The evaluation team found that Idaho Power was consistent in calculating kWh savings for all aerators, thermostatic shower restriction valves, and pipe wrap measures.

The only complication that the evaluation team encountered was that Idaho Power averaged savings across a few RTF categories for 9W bulbs and showerheads installed through the Multifamily program. Details are provided in the Lighting and Showerheads sections below.

Lighting

As previously mentioned, 9 W LED lamps at 800 lumens were installed through the program and the savings associated with these lamps were averaged between a high and moderate use category because installation areas were not recorded. In the RTF calculator that was used to calculate program savings, lamps are classified as high use when they are installed in a family room, kitchen, or living room fixture whereas moderate use lamps are those that are installed into all other rooms, except for closets.

Figure 3-2. Current Lighting Columns – From Installation Log Excerpt

FLOOR PLAN	STANDARD 9w LED bulbs (A19) installed	PATIO/ ENTRY 15w LED bulbs bulbs (A21) installed	GLOBES 6w LED globes installed	CANS 11w LED can lights installed	SCONCES 6.5w LED small base installed
3 Bed - 2 bath Townhome	9	1	20	4	3
2 bed - 1 bath	9	1	12	4	1

While Idaho Power averaged high and moderate use savings correctly, there could be greater accuracy achieved in the savings calculation by having contractors record the number of lamps installed under high and moderate use categories while on site, and then carrying that distinction through when calculating savings in the tracking system. Doing so would also alleviate the problem of not using the exact savings numbers that are found in the lighting calculator.

Figure 3-3. Suggested Lighting Columns – From Installation Log Excerpt

FLOOR PLAN	STANDARD High Kitchen/Family/ Living rm 9w LED bulbs (A19) installed	STANDARD Moderate All other except closets 9w LED bulbs (A19) installed	PATIO/ ENTRY 15w LED bulbs bulbs (A21) installed	GLOBES 6w LED globes installed	CANS 11w LED can lights installed	SCONCES 6.5w LED small base installed
3 Bed - 2 bath Townhome	3	6	1	20	4	3
2 bed - 1 bath	4	5	1	12	4	1

Showerheads

As with the lighting, the way showerheads are recorded on the installation log does not directly match how they are referenced in the RTF for savings values. The tracking system summary sheet shows that there are three possible kWh savings numbers that can be used in the calculation for showerhead savings. The correct value to use is prescribed by which shower the showerhead is installed in (primary, secondary, or any). While the summary worksheet in the tracking system did note this information, the individual worksheets for each project did not. Leaving this information out of the individual worksheets made it difficult to follow and confirm which value was used to calculate the kWh savings. It was determined that the calculation in the spreadsheet compares the number of showerheads installed with the number of bathrooms to assign “primary”, “secondary”, and “any”, which are used to apply savings. However, when noting the distinction in showerheads from the summary spreadsheet, it was confirmed that Idaho Power was using the correct kWh savings in the calculation of showerhead savings.

Figure 3-4. Current Showerhead Column – From Installation Log Excerpt

FLOOR PLAN	kitchen aerator installed (y/n)	# bathroom aerators installed	# shower heads installed	pipe wrap installed
3 Bed - 2 bath Townhome	1	2	2	1
2 bed - 1 bath	1	2	1	1

Similar to the tracking of the 9 W lamps, one additional column could be added to the installation log to capture the number of "primary" and "secondary" showerheads that would eliminate the need for a formula and the averaged "any" category.

Figure 3-5. Suggested Showerhead Columns – From Installation Log Excerpt

FLOOR PLAN	kitchen aerator installed (y/n)	# bathroom aerators installed	# Primary showerheads installed	# Secondary showerheads installed	pipe wrap installed
3 Bed - 2 bath Townhome	1	2	1	1	1
2 bed - 1 bath	1	2	1	0	1

3.2.3 Invoice Review

A review of the invoices for the purchase of measures installed through the Multifamily program was the last step in the evaluation process. The invoices available for review included the Idaho Power purchased materials for the Multifamily program and at least one other program. In addition to these purchases, two contractors did their own purchasing, although those invoices were not available. Because the invoices were not available, the evaluation team attempted to identify purchases of equipment that exceeded the quantity claimed in the program.

Of the measures listed in the invoices provided, four of the five different LED light bulb types and both types of aerators were found to have more units purchased than what the tracking system noted was installed through the program. Conversely, there was no record of any 6.5 W decorative lamps in the invoices provided. For showerheads, thermostatic shower restriction valves, and pipe wrap, the total number recorded in the program's invoices were less than the number that were noted to be installed through the program in the tracking system. Tetra Tech has encountered instances where contractors take advantage of lenient tracking protocols in other programs to redirect equipment or funds. Although we do not believe that is the case at this point, a tighter tracking process will ensure it does not become an issue.

The invoice review also had the evaluation team investigating whether the measures reported in the invoices matched the measure attributes that were noted in the tracking system. When comparing these two pieces of documentation, the evaluation team found that the purchased equipment met measure attributes.

3.3 IMPACT RECOMMENDATIONS

The following impact recommendations are provided for Idaho Power's consideration:

Ensure that all 2018 calculations are using the most updated potential study information and clearly referenced. We understand that a few of the 2017 calculations referenced the 2014 potential study, as the 2016 potential study was not final until April 2017. Upgrading at the beginning of the next program year is sufficient for these measures. In addition, the deemed values should be clearly sourced since the program is using a 20-year average for the proper residence type. This includes specifying the date range used for the average.

Update the savings calculator to use the RTF savings values out two decimal places. Rounding the deemed savings numbers to the whole kWh is affecting the accuracy of the measure savings, especially for 9 W and 6 W lighting categories where a high number of lamps are installed. Doing so will ensure that savings calculated by the program are more accurate.

Consider having installation contractors track the type of showerhead needed for savings calculations. The 2017 savings for showerheads was calculated using an underlying formula to assign showerheads as “primary’, “secondary”, or “any” instead of indicating specifics on the installation log. Adding one more column to the installation log spreadsheet would allow the installation contractor to indicate how many “primary” and how many “secondary” showerheads were installed in each unit. That would alleviate the need for the “any” category, which averages the savings amounts from “primary” and “secondary” and will improve savings accuracy as the number of units increases.

Consider having installation contractors track the area where 9 W lamps are installed. The 2017 savings for the 9 W lamps uses an average of the high use area and moderate use area savings values since contractors are not reporting actual installation location. Adding one more column to the installation log spreadsheet would allow the installation contractor to indicate how many lamps were installed in high use areas and how many were installed in moderate use areas, improving the accuracy of the savings estimates. This is particularly important as the number of units is expected to increase.

Work with the equipment supplier to investigate options for improved tracking of equipment distribution and providing a reduced cost to contractors that order directly. There are two contractors that are currently ordering supplies directly from the same vendor Idaho Power uses. However, contractors reported that the price is slightly higher for them to order directly as they do not get the bulk advantage that Idaho Power receives. In addition, as the program expands, it will be important for the program specialist to have clear counts on the inventory of program materials installed. The cleanest may be the invoices from the suppliers to the contractors for equipment they order directly for the Multifamily program. This will create a single process and minimize Idaho Power risk associated with the equipment use and storage.

4.0 PROCESS EVALUATION RESULTS

Because the program is new, with a pilot in 2016 and the first full year of activity in 2017, a process evaluation was also conducted for the Multifamily Energy Savings program. The process evaluation served as a check on the program design compared with industry best practices, marketing and outreach, the implementation process, contractor engagement and quality control, and program administration and tracking.

The process evaluation sought to answer the following researchable issues:

- Is the program design following industry best practice?
- How successful is the program implementation in terms of staffing, quality control, management, communication, and outreach?
- Are there ways to streamline the current processes?
- How does the tracking system accommodate activity entry and tracking for the program?

4.1 METHODOLOGY

The evaluation team conducted a number of activities in order to address the key process evaluation questions. First, we reviewed the program documentation, including the program description, 2017 reporting, and all materials used at the project sites (door hangers, brochures, and showerhead instruction cards). There is no documented logic model or process flow for the Multifamily program.

Figure 4-1. Process for Reviewing Program Processes

After the documentation review, we collected program tracking information from the program specialist. This included files such as the 2017 and 2018 list of projects completed as well as the contractor contact information.

The last step in the process review was to conduct interviews with the four installation contractors. They were asked to characterize their organization and role in the program as well as provide feedback on how they felt processes were implemented, communication effectiveness, and tracking ease.

4.2 PROCESS REVIEW RESULTS

The process evaluation activities indicate the program is operating smoothly for the first full year following a pilot year, with just a few opportunities for improvement, mostly associated with project tracking.

4.2.1 Program Documentation

The program description is complete and details the program delivery process. Materials provided to property managers have been revised since the program pilot and are professional, educational, and informative.

Tenant notification door hangers are provided to the property managers in advance of the screening and installation visits. The door hangers indicate when the direct installation will occur and what energy saving equipment will be installed.

Upon completion of the direct install visit, contractors leave behind materials provided by Idaho Power. Showerhead usage cards describe how to use the thermostatic showerheads. Leave-behind brochures provide additional detail on what was done, who to call with questions, and additional energy saving tips. A direct install survey postcard is also furnished to encourage tenants to provide feedback on the service provided. At the time of the evaluation, the program specialist reported that not many of the 772 tenants had completed and returned the postcard.

4.2.2 Program Tracking

As part of the process evaluation, we looked at how the projects were tracked and what information was collected. We received three files from the program specialist: a 2017 list of completed projects, a 2018 list of completed projects, and an email with the contractor contact information. Savings data are tracked in a separate file containing a program summary spreadsheet as well as individual spreadsheets containing installation details for each project.

Figure 4-2. Multifamily Energy Savings Program Files Reviewed

"MFDI Completed Jobs" spreadsheet	Participant Information	"2017 Multifamily Savings" spreadsheet	Contractor Information
• Property name • Region • City • Units • Date range	• Property name • Contact name • Address • Phone • Email	• Property name • Measure columns with quantities • Measure columns with savings • Individual log sheets for each complex	• Company name • Contact name • Phone • Address • Region

While the 2017 and 2018 project lists are clean summaries of completed projects for 2017, they do not track as much detail as we are accustomed to seeing in a typical program tracking spreadsheet or database. Separate files also increase the likelihood of tracking errors and missing information. For example, to match up information, key variables were required such as “Complex name” and “Region” shown in Figure 4-2 above. This was sufficient in most cases. However, during interviews with contractors, one contractor reported working at two properties that matched to another contractor based on Region. Entering that information for each property will result in fewer errors than matching separate files on key variable.

The layout of the file also makes it difficult to filter on a region, date range, or other information to understand participation and efficiently report. To understand which contractors provided installation services and what each property received, the evaluation team compiled the individual information into a master tracking spreadsheet. The list below outlines what the evaluation team would anticipate as part of a typical program tracking spreadsheet.

- Program Year
- Status (e.g. Lead, Ineligible, Screening, Declined, Installing, Completed)
- Property Name

- Units Served (may track units at complex as well as units served)
- Property Address
- Property Contact Name
- Property Contact Phone
- Property Contact Email
- Region
- Contractor Name
- Contractor Contact Name
- Contractor Contact Phone
- Contractor Contact Email
- Screening visit date
- Installation visit date
- Installation counts by measure
- Savings by measure
- Total savings

When tracking the project status, we would recommend not restricting the tracking spreadsheet to completed projects only. For a program of this size, it is often useful to track projects that are in process, especially with the eligibility requirements and screening visit. It may also be useful to track properties that were eligible but ultimately declined the service.

Because of the relatively low participation in the program, a rolling tracking spreadsheet could be used by including a program year variable. Reporting by program year could be done using a simple filter and in addition to annual savings might show how contractors have contributed over multiple program years, if some property owners are more active than others, and what is in the pipeline.

4.2.3 Contractor Characteristics

Idaho Power is currently working with four installation contractors, each serving a specific region. Three of the four contractors work closely with weatherization agencies, while the fourth's primary business activity is conducting audits and HERS ratings for residential new construction. Each contractor has completed multiple projects in both 2017 and 2018. Two of the four contractors source their supplies from Idaho Power storage, but the other two order directly from the same supplier as Idaho Power.

Table 4-1. Contractor Summary Characteristics

Contractor	Type	Region	2017 Projects	2018 Projects	Materials
Momentum LLC	NC	Capital	5 (300 units)	8 (301 units)	From Idaho Power storage
Savings Around Power (SEICAA)	Wx	Eastern	3 (150 units)	5 (168 units)	Order directly
Home Energy Management	Wx	Southern	2 (78 units)	4 (122 units)	1st from Idaho Power, now from same provider
Metro Contractor Services	Wx	Canyon/West	2 (244 units)	6 (134 units) some pending	Inventory from Idaho Power

All four contractors have worked with other Idaho Power programs and program specialists. That is how they all learned of the Multifamily program and were asked to provide installation services.

For three of the contractors, the installations through the Multifamily program represent less than 10 percent of their workload. The fourth contractor indicated the Multifamily work represented a much higher proportion of their work during the year. Three of the four contractors indicated they had the capacity to complete more projects if the program expanded and volume increased.

4.2.4 Communication and Support

Contractors have been working with Idaho Power on other programs and have developed good working relationships with Idaho Power. The pilot process helped to work out any issues and communication between the Idaho Power program specialist and the contractors is working well. Contractors had nothing but good things to say about the support from Idaho Power and how they interact with the program specialist. They find it reasonable that Idaho Power takes the lead on getting projects started and is appreciative that Idaho Power includes them as part of the screening visit so they can establish a relationship with the property manager. In addition, one of the contractors mentioned that Idaho Power took their recommendation for different pipe wrap into consideration and eventually upgraded to a better product.

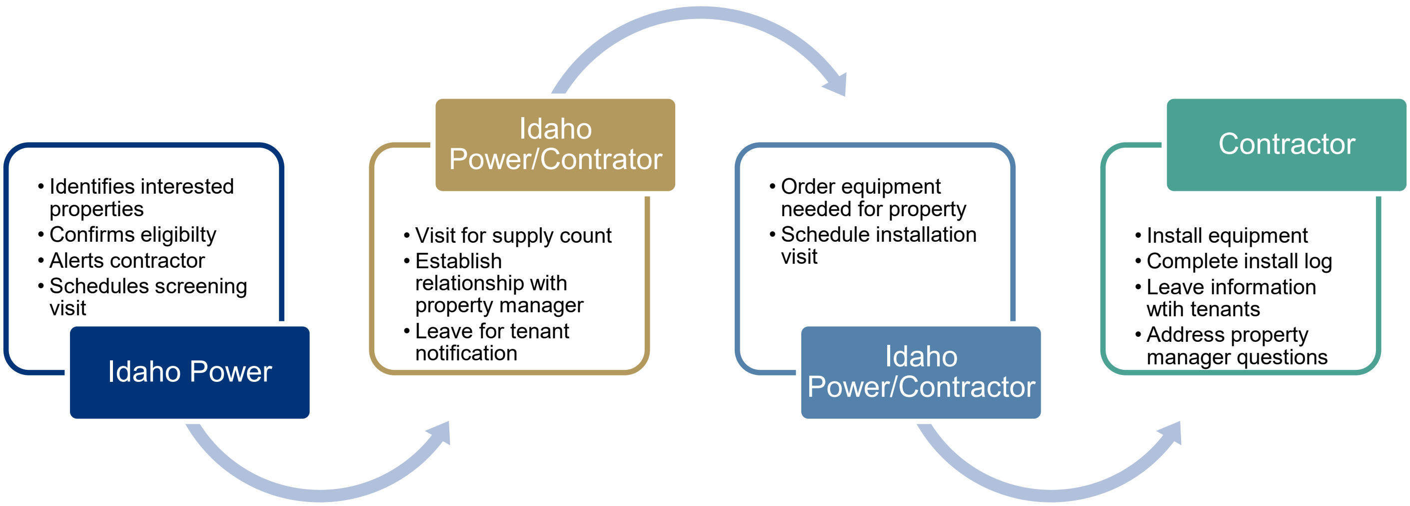
So far, the program specialist reports that most of the activity has been generated through word of mouth between property managers. Idaho Power marketing has set up a “promo pod” with a link to the website with program information and Facebook ads have been used. Contractors associated with community action agencies and weatherization programs are able to provide suggestions to the Idaho Power program specialist regarding potential properties that may benefit from the program.

While the current contractors are now comfortable with how the program works, they did learn a few things from their first few projects. Contractors suggested that new contractors take time to prepare a calendar and timeline for each project so that their presence impacts the property for as short a time as possible. In addition, due to the type of customers served by the program and the multifamily nature, contractors need to be flexible and patient, preparing for property manager changes and schedule changes.

4.2.5 Program Processes

The program does not currently have a logic model or process flow to review. However, the process is outlined in Figure 4-3.

Figure 4-3. Multifamily Energy Savings Program Process Overview



The Idaho Power program specialist identifies interested multifamily properties and checks them against eligibility requirements of the program. Once they are determined to be eligible, the program specialist alerts the contractor in the region and schedules the screening visit at the property. Once there, the Idaho Power program specialist and contractor confirm eligibility, establish a relationship with property manager, and collect material counts. The screening visit also enables contractors to understand potential installation barriers and talk with property managers about working with tenants to resolve them if possible before the installation visit. Materials are left with the property manager to alert tenants of the installation visit.

Next, the contractors will order their equipment directly from Idaho Power's supplier or collect equipment from Idaho Power stock. Materials are either ordered directly from a supplier or taken from Idaho Power inventory. It is slightly more costly for contractors ordering directly from the supplier, as they do not get the "bulk" discounts that Idaho Power gets, but it is more convenient for a couple of them. They then schedule the installation visit with the property manager. Most contractors have evolved their installation visit process to take a team of two to six installers so they can get through the property in one day, reducing the burden on the tenants and the property manager who must accompany them.

Finally, the contractors install the equipment and populate the installation log, leave behind program materials including a showerhead instruction card and feedback postcard, and address any property manager questions. Contractors believe this process, particularly the screening visit, greatly improves the experience for everyone involved and results in fewer visits to properties.

4.3 PROCESS RECOMMENDATIONS

The following recommendations are provided for Idaho Power's consideration:

Expand the project tracking spreadsheet to contain more complete information. The tracking spreadsheet used for savings calculations is appropriate. However, the tracking for projects and contractors is not collected in a master spreadsheet. This could be problematic if someone other than the program specialist needed to access project information, and this will become more complicated as the program expands. Combining the separate information for evaluation purposes also exposed a few areas of potential errors. For instance, interviews with installation contractors revealed disagreement on who had served two sites. Contractors were not included with the projects but matched by region. The evaluation team has provided an example of a master tracking list of variables in Appendix C as well as an example spreadsheet. The tracking system can be as simple as an Excel spreadsheet, but should include the following information: property information (name, location, property manager contacts), the number of units served, dates of screening visits and installation, installation contractor (name, address, contact information), savings associated with each measure type installed and overall savings for the property, program year, region, and project status. We would not restrict the project status to those projects completed, but also include leads, those determined to be ineligible, projects in the screening phase, sites that declined to participate, and those in the installation phase.

Incorporate questions into customer surveys to gather feedback from Property Managers and tenants regarding the satisfaction with and benefits of the program. Gathering participant feedback was not within the scope of the current process evaluation, as Idaho Power already has multiple outreach methods for obtaining feedback from customers. However, a customer survey could provide additional insights into potential program improvements and keep the program on track as it expands.

APPENDIX A: CONTRACTOR INTERVIEW GUIDE

IDAHO POWER MULTIFAMILY ENERGY EFFICIENCY PROGRAM

INSTALLATION CONTRACTOR INTERVIEW GUIDE

In-depth interviews will be conducted by senior Tetra Tech staff via telephone. The interviews will be semi-structured. Therefore, the following interview protocol is only a guide to ensure certain topics are covered, but evaluators will follow the flow of the interview and modify questions as needed to fit the interviewee's circumstance and flow of conversation.

This guide will be used to understand the perspectives of installation contractors involved with the Idaho Power Multifamily Energy Efficiency Program during 2017-2018. We expect the interviews to take approximately 30 minutes. We will attempt to schedule interviews with respondents in advance to accommodate each contractor's schedule.

A. Background

The program began in March 2016 with a pilot project in Pocatello, ID. This was followed by direct install projects in Boise, ID and Twin Falls, ID in September and December 2016 respectively. There were measures directly installed at 73 units in Pocatello, 43 units in Boise, and 80 units in Twin Falls. Between all three projects, a total of 196 apartment units received the associated measures.

The Multifamily Energy Savings program provides for the direct installation of energy-saving products in multi-family dwellings consisting of five or more rental units. In 2017, eligible buildings were required to have electric heating and water heating. For 2018, the program was adjusted to only require electric water heating.

The products installed are: ENERGY STAR® LED lightbulbs, high-efficiency showerheads, kitchen and bathroom faucet aerators, and water heater pipe insulation. These are installed at no cost to the property owner/property manager or the tenant. To ensure energy savings and applicability, each building is pre-approved by the contracted energy efficiency measure installation contractor. A representative from the property must accompany the installation contractor during the visits.

NOTE TO INTERVIEWER: Check the sample information and website for each contractor prior to calling.

B. Introduction

Hello, may I speak to [______]? My name is ______, and I'm calling from Tetra Tech on behalf of Idaho Power. We are conducting interviews with firms that install equipment and provide services through the Multifamily Energy Efficiency Program to get their feedback on the program, including what worked well and what improvements you might recommend.

Are you the best person at [COMPANY] to talk to about experience with Idaho Power's Multifamily program?

1 Yes -> [Continue]
2 No -> Can you tell me who I should speak with?

The interview should last less than 30 minutes. The information you provide will be treated as confidential and will help Idaho Power improve their program in the future.

Is this a convenient time for you to talk, or would you prefer to schedule another time?

[If needed: Offer the contact name from below as the person to contact with any questions about the validity of this research.]

Name	Phone #
Becky Arte-Howell	208-388-2785

With your permission, I would like to record the interview. Do I have your permission to do so? [IF NEEDED: We will use the recording to help us compile the results, in order to make sure we accurately represent your responses. No one but Tetra Tech staff will listen to the recording.]

C. Business Scope

I understand from viewing your website that your company… (Overview what was found through website search. Then start as needed with questions below.)

1) I have a few additional questions about your business. Could you tell me…

- How long have you been in business?
- How many employees (full-time equivalents) does your company employ?
- What market does your firm typically serve? For example: residential, commercial, industrial, multifamily, etc.

2) What proportion (or percent) of your total projects in 2017 did the projects completed through Idaho Power's Multifamily program represent?

3) For 2018, do you expect this percentage to be higher, lower, or about the same?

1 Higher -> Why is that? How many more projects are you staffed to handle?
2 Lower -> Why is that?
3 About the same

D. Program Awareness, Marketing, and Recruitment

1) When did you first get involved with the Idaho Power Multifamily program?
- How did you first hear about it?
- Who do you get most of your program information from?

2) Do you feel adequately informed of program requirements and/or changes?

1 Yes -> What communication method is working best for you?
2 No -> How would you like to be better informed of program requirements and/or changes?

3) Are you aware of other Idaho Power (or other utility) energy efficiency programs?

1 No
2 Yes -> Which ones?
Do you have any involvement with these programs? Why or why not?

E. Participation Process and Support

For Interviewer: Number of projects per year and geographic location

# of 2017 projects:	
# of 2018 projects:	
Area:	

1) We understand this program consists of a screening visit where you determine eligibility and collect counts for items as well as a separate installation visit. Phone screening is not allowed. Is that correct?
   - If NOT: What is the current process you follow?
   - Who schedules the screening visit?
   - Who schedules the installation visit?

2) Please describe the typical screening visit process…
   - What do you look for during the screening visit?
     How many sites do not pass the screening visit?
   - What is the benefit of the onsite screening visit?
   - What are the pros and cons of screening over the phone?

3) Please describe the typical installation visit process…
   - What are common barriers to installing items?
   - What processes work well during the installation visits?
   - Do you think the updated site materials (door hangers and shower cards) helped with tenant cooperation?

4) What type of reporting is required once you complete the installation visit?

5) Next I'm going to ask you a few scale questions. First, using a scale of 1 to 5 where 1 is "not at all satisfied" and 5 is "very satisfied," how satisfied are you with the program's technical support?

   - [IF RATING IS A 1 OR 2, ASK] What could be done to improve the program's technical support?

6) On a scale of 1 to 5 where 1 is "not at all difficult" and 5 is "very difficult," how would you rate the program's administrative requirements (e.g., paperwork) for you?

   - [IF RATING IS A 4 OR 5, ASK] What could be done to improve these requirements and/or process?

7) Thinking of a typical Idaho Power Multifamily project…
   - What is the easiest part of the process?

- What is the most challenging?

8) Are there any energy saving opportunities that you identify during the visit that are not covered through the Multifamily program? Which are most common?

9) Is there anything in the current market or coming soon that would affect program participation, either positively or negatively? What are they? [PROBE: example issues (e.g., changes to building codes and standards, market for MF housing, low income requirements, etc.)].

G. Overall Program

Now I'd like to wrap up with a few final questions.

1) Using a five-point scale where 1 means "not at all satisfied," and 5 means "very satisfied," overall, how satisfied are you with Idaho Power's Multifamily Energy Efficiency program?

2) If you were to recommend anything to Idaho Power regarding the program design or operations, what would it be?

3) Is there anything else you'd like to share with us about Idaho Power's Multifamily Energy Efficiency program?

4) In case we would like to clarify anything we discussed, would it be alright if I contacted you again? If YES, get best phone number and email address

Those are all the questions I have today. If you think of anything you would like to add, please feel free to contact us. Thank you very much for your time.

APPENDIX B: DETAILED IMPACT TABLE

Measure In Tracking System	Measure in Calculator	Calculator Savings (kWh/yr)	Final Calculator Savings (kWh/yr)	Tracking System Savings (kWh/yr)	Quantity Installed
9W 800 lumens - Direct Install - LED General Purpose. 250 to 1049 lumens. Avg of High & Moderate Use.	Direct install - High Use_LED_General Purpose, Dimmable, and Three-Way_250 to 1049 lumens	21.55	15.90	16	5,653
	Direct install - Moderate Use_LED_General Purpose, Dimmable, and Three-Way_250 to 1049 lumens	10.25			
15W 1600 lumens - Direct Install - LED General Purpose. 1490 to 2600 lumens. Exterior.	Direct install - Exterior_LED_General Purpose, Dimmable, and Three-Way_1490 to 2600 lumens	60.10	60.10	60	482
6W Globes 450 lumens - Direct Install - LED Globe. 250 to 1049 lumens. Moderate Use.	Direct install - Moderate Use_LED_Globe_250 to 1049 lumens	13.67	13.67	14	4,376
11W Reflectors 850 lumens - Direct Install - LED Reflectors and Outdoor. 250 to 1049 lumens. High Use.	Direct install - High Use_LED_Reflectors and Outdoor_250 to 1049 lumens	46.88	46.88	47	1,319
6.5W Decorative 325 lumens - Direct Install - LED Decorative and Mini-base. 250 to 1049 lumens. Moderate Use.	Direct install - Moderate Use_LED_Decorative and Mini-Base_250 to 1049 lumens	21.48	21.48	21	271
Thermostats					
Thermostatic Combo - Measure_Table tab. Residential. Electric Resistance. Direct Install. 1.75 gpm.	Residential_Direct install_Valve and 1.75 gpm showerhead_Electric resistance DHW - Water Heating	256.48	266.64	267	24
	Residential_Direct install_Valve and 1.75 gpm showerhead_Electric resistance DHW - Water Treatment	10.15			
Showerhead Savings - Residential Showerhead Replacement. Electric Water heat. Direct Install. 2.0 gpm. Combined Water heating and water treatment savings. Primary	Residential Showerhead Replacement_2_00gpm_Primary Shower_ Electric Water Heating_Direct Install	182.29	182.29	182	465

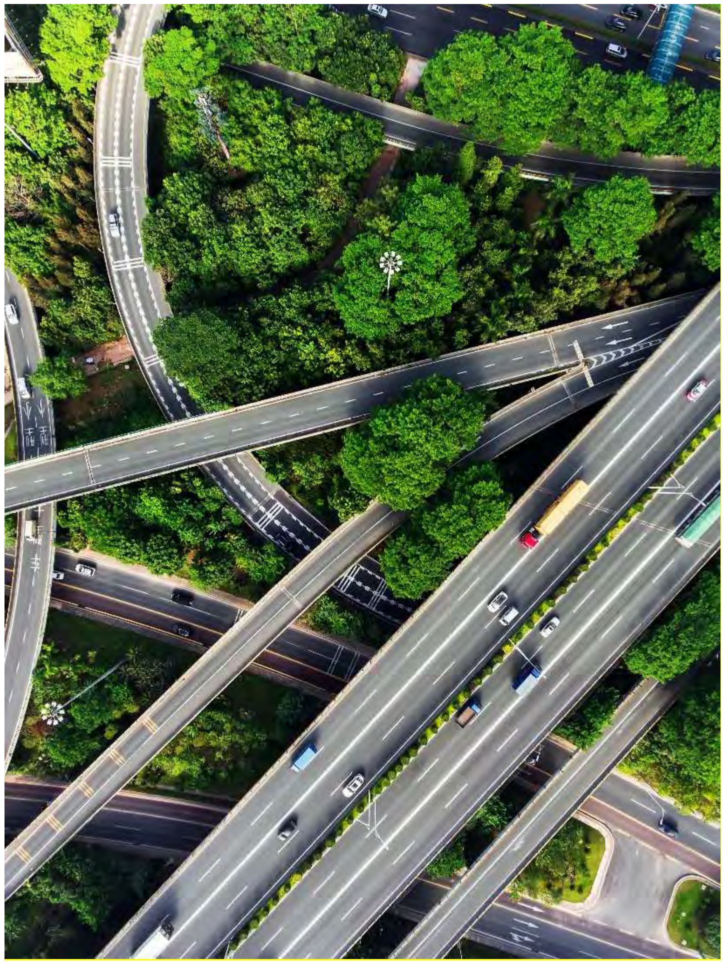
Showerhead Savings - Residential Showerhead Replacement. Electric Water heat. Direct Install. 2.0 gpm. Combined Water heating and water treatment savings. Any	Residential Showerhead Replacement_2_00gpm_Any Shower_ Electric Water Heating_Direct Install	145.08	145.08	145	64
Showerhead Savings - Residential Showerhead Replacement. Electric Water heat. Direct Install. 2.0 gpm. Combined Water heating and water treatment savings. Secondary	Residential Showerhead Replacement_2_00gpm_Secondary Shower_ Electric Water Heating_Direct Install	91.14	91.14	91	132

APPENDIX C: PROJECT TRACKING FILE EXAMPLE

As an example of what could be tracked in terms of program participation, we have included the table below as suggested tracking variables and values. During the evaluation, Tetra Tech also compiled the current information available into a Master Tracking Spreadsheet and will provide that to the Idaho Power Multifamily Energy Savings program specialist.

Table C-1. Suggested Tracking Variables and Description of Values

Tracking Variables	Values
Program Year	2016, 2017, or 2018
Status	Lead, Ineligible, Screening, Declined, Installing, Completed
Property Name	
Units at Property	#
Units Served	#
Property Address	
Property Contact Name	
Property Contact Phone	
Property Contact Email	
Region	Capital, Eastern, Southern, Canyon/West
Contractor Name	
Contractor Contact Name	
Contractor Contact Phone	
Contractor Contact Email	
Screening visit date	
Installation visit date	
Installation counts by measure	Pull from Multifamily Savings spreadsheet
Savings by measure	Pull from Multifamily Savings spreadsheet
Total savings	Pull from Multifamily Savings spreadsheet



Shade Tree Project Evaluation

Prepared for Idaho Power

December 21, 2018

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1 EXECUTIVE SUMMARY

According to the U.S. Department of Energy, a well-placed shade tree can reduce energy used for summer cooling by 15 percent or more. Idaho Power implements the Shade Tree Project in partnership with the Arbor Day Foundation's Energy-Saving Trees program. Arbor Day Foundation provides a software tool that estimates energy savings at enrollment based on the tree species, orientation, and distance from home.

The Shade Tree Project has been active since beginning as a pilot in 2013. Idaho Power records contained usable data for 9,830 enrolled trees. Idaho Power conducted two rounds of onsite audits to verify survivorship and tree placement relative to the home. Idaho Power provided usable records for 1,748 trees selected for audits and 1,196 trees that received an audit.

1.1 Evaluation activities

DNV GL reviewed benefits calculations based on enrollment data provided by Idaho Power for program years 2013-2018. We reconciled the enrollment data with data obtained during audits of a random selection of 2013-2016 program year trees conducted by Idaho Power in 2015 and 2017. The audits recorded actual orientation and distance from home and recalculated savings based on those actual values. The audits also provided mortality data.

The i-Trees software estimates kWh savings (and other benefits) for years 5, 10, 15, and 20 after the tree planting year. DNV GL calculated average realization rates for each of these four quinquennial benefits, for each planting year, by audited tree species. We then assigned these average realization rates to the unaudited trees and calculated evaluated savings by multiplying the enrollment savings by the realization rates. We then averaged all values per planting year to calculate the average per-tree benefits. Next, we used linear interpolation to calculate annual per-tree average benefits for the inter-quinquennial years. Finally, we calculated total benefits by multiplying the per-tree average benefits by the number of trees planted each year (based on original enrollment data counts) and an estimated survival rate for that year.

1.2 Key findings

Claimable savings: DNV GL recommends Idaho Power claim the following energy savings. Additional calendar year savings recommendations are provided in the accompanying Excel workbook.

Table 1. Recommended kWh savings summary

Planting Years	Saving Year	kWh Savings
2013	2017	3,724
2013, 2014	2018	39,095
2013, 2014, 2015	2019	80,212

Mortality: The audits resulted in a mortality rate of 36% at 3-5 years since planting.

Enrollment savings calculations: Davey, the primary developer of i-Trees, periodically updates their algorithms to keep pace with Forestry science. They made a substantial update in late 2015 that cut calculated benefits approximately in half. The realization rates in this study account for this change. However, Idaho Power should stay alert for other significant software updates in the future.

Additional non-electric impacts calculations: The i-Trees software provides estimated impacts for therms, air pollutants, carbon, and stormwater runoff in addition to kWh. If Idaho Power chooses to claim additional non-electric impacts from the sponsored trees, DNV GL recommends the following numbers. Note that the Therms and Carbon impacts are negative, while the Air pollution and Stormwater imapcts are positive. Additional calendar year impact recommendations are provided in the accompanying Excel workbook.

Table 2. Recommended non-electric impacts summary

Planting Years	Saving Year	Therms	Air Pollutant $	Carbon $	Stormwater Runoff $
2013	2017	(195)	$9	($12)	$71
2013, 2014	2018	(2,049)	$99	($127)	$743
2013, 2014, 2015	2019	(4,364)	$203	($257)	$1,537

2 INTRODUCTION

2.1 Program background

The Shade Tree Project began as a pilot in 2013. According to the U.S. Department of Energy (DOE), a well-placed shade tree can reduce energy used for summer cooling by 15 percent or more. Utility programs throughout the country report high customer satisfaction with shade tree programs and an enhanced public image for the utility related to sustainability and environmental stewardship. Other utilities report energy savings between 40 kWh per year (coastal climate San Diego) and over 200 kWh per year (Phoenix) per tree planted.

To be successful, trees should be planted to maximize energy savings and ensure survivability. Two technological developments in urban forestry—the state-sponsored Treasure Valley Urban Tree Canopy Assessment and the Arbor Day Foundation's Energy-Saving Trees tool—provided Idaho Power with the information to facilitate a shade tree project. Arbor Day's tool is based on the i-Trees software package, developed by Davey and the U.S. Forestry Service (USFS).

The Shade Tree Project operates in a small geographic area each spring and fall, offering free shade trees to Idaho Power's residential customers. Participants enroll using the online Energy-Saving Trees tool and pick up their tree at specific events. Unclaimed trees are donated to cities and schools.

Using the online enrollment tool, participants locate their home on a map, indicate the basic outline of their exterior walls, select from a list of available trees, and evaluate the potential energy savings associated with planting in different locations. During enrollment, participants learn how trees planted to the west and east save more energy over time than trees planted to the south and north.

Ensuring the tree is planted properly helps it grow to provide maximum energy savings. At the tree pickup events, participants receive additional education on where to plant trees for maximum energy savings and other tree care guidance from experts. Local specialists include city arborists from participating municipalities; Idaho Power utility arborists; county master gardeners; and College of Western Idaho horticulture students.

Idaho Power records contained usable data for 9,830 enrolled trees. Idaho Power conducted two rounds of onsite audits to verify survivorship and tree placement relative to the home. Idaho Power provided usable records for 1,748 trees selected for audits and 1,196 trees that received an audit.

2.2 Evaluation overview

The primary goals of the evaluation were to:

- Review the available data for participants for all available program years,
- Confirm the energy savings and non-energy benefits recorded are correctly calculated using the Arbor Day Foundation's Energy Saving Trees Tool, which is based on the Davey/USFS i-Tree design tool,

- Review the audit information collected by Idaho Power on random samples of participants in 2015 and 2017,
- Derive adjustments to the claimed savings to reflect differences between the original i-Tree data in the tracking system and what was eventually done at customer homes, and to adjust for mortality, and
- Apply those adjustments to calculate recommended savings across all program years.

To achieve these goals, DNV GL received and combined the following data from Idaho Power:

- Enrollment data, which includes the inputs to the savings tool, and the estimated savings in 5-year increments for 20 years
- Audit data, from audits conducted in 2015 and 2017, with the updated tree and placement information and the resulting updated savings estimates

After combining these data, DNV GL performed the following analyses:

- Reviewed the enrollment data and calculations for accuracy, appropriate use of the tool, and consistency of data
- Assessed the similarity of the sample audited to the total participant population to ensure that the audit sample is representative of that total population
- For the participants audited, compared the audit results with the enrollment data, and developed appropriate adjustment factors based on the differences between the two datasets
- Developed adjustments for mortality based on the audit data results and the survey data
- Applied all adjustments to the i-Trees output to provide evaluated benefits metrics.

Additionally, DNV GL searched for and reviewed publicly available evaluations and peer-reviewed papers on the energy savings from similar shade tree programs to provide a secondary check on the savings estimates.

3 FINDINGS

3.1 Enrollment and audit data analysis

3.1.1 Enrollment population versus audited sample

DNV GL split the trees into three groups and compared enrollment data for tree orientation and species for the trees. The three groups were: trees that were not selected for an audit, trees selected for an audit but that did not receive one (usually because the customer reported that the tree died), and trees that were selected for an audit and received one.

The distribution of enrollment orientation was similar across the three groups with one exception. Trees that were selected for an audit but did not receive one (10%) were slightly more likely to be enrolled with a “North” orientation than those not audited (6%) or those selected and audited (7%).

For species, the trees selected for audit differed somewhat from those not selected (Table 3). These differences appear to be within reasonable thresholds for random selection.

Table 3. Enrollment species by audit selection and completion

Species	Not selected	Selected, no Audit	Audited
Birch	13%	20%	19%
Elm	14%	8%	10%
Ginkgo	3%	2%	2%
Hackberry	7%	3%	4%
Linden	5%	4%	3%
Oak	28%	22%	24%
Other	4%	8%	7%
Planetree	4%	1%	2%
Sweetgum	11%	18%	13%
Tuliptree	11%	12%	15%
Unknown	1%	2%	1%

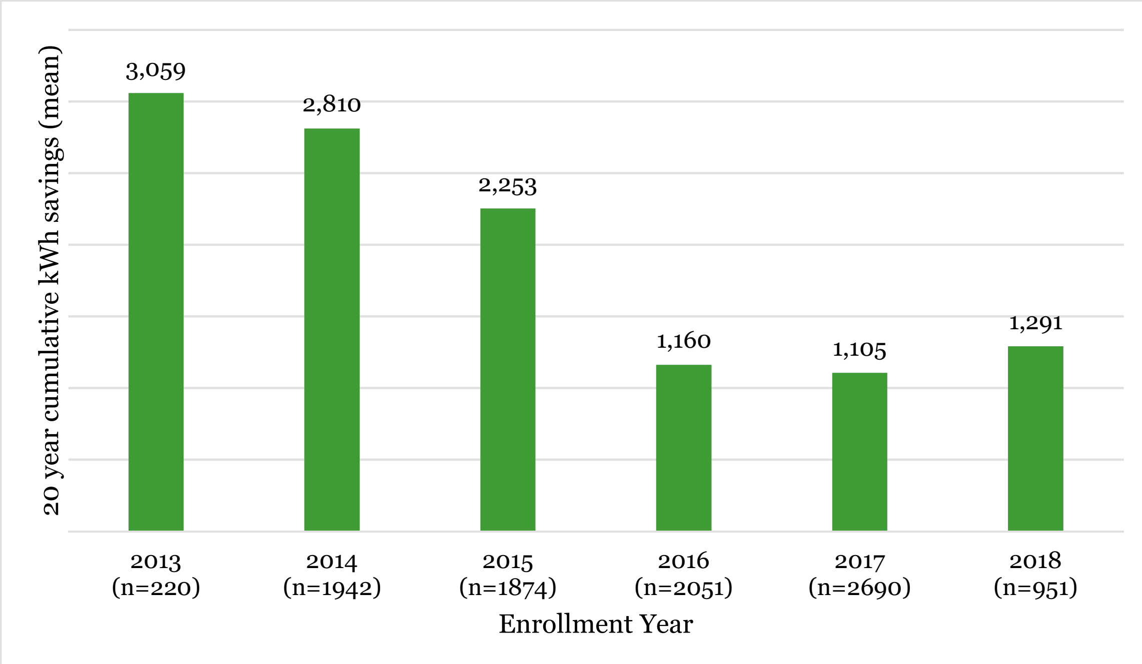
3.1.2 Mortality rates

Approximately 36% (589 trees) were confirmed as dead by the audit process. Based on conversation with Davey (the company that develops the i-Trees software) and review of the i-Trees program manual, the algorithms i-Trees uses to calculate benefits do not factor in an estimated mortality rate.

3.1.3 Enrollment benefits calculations changes

Davey reported that they made significant changes to their benefits calculation algorithms in late 2015. Davey reported that they periodically update the algorithm to keep pace with the state-of-the-art in Forestry science, so the new benefits calculations should be more accurate than the older ones. The result of this change is a substantial decrease in calculated benefits for trees entered into i-Trees after 2015. Figure 1 shows this effect using the 20 year cumulative kWh savings calculated during enrollment. The effect occurs across all benefits and all species in Idaho Power's program.

Figure 1. Savings per tree by year



The data re-entry and savings calculations for all audited trees occurred after the 2015 change to the tool. This means that all re-entry calculations were based on the updated (changed) i-Trees algorithm. This has two effects on our calculation of the audit realization rate:

1. Trees ordered before 2016 have low realization rates because they are and should be affected by the change to the benefits calculations.
2. Trees ordered after 2016 have a separate realization rate, which is greater than the realization rate for the pre-2016 trees because both the enrollment and audit savings calculations used the same, updated algorithm.

3.2 Evaluated savings calculations

The i-Trees software calculates annual kWh and cumulative kWh savings at 5, 10, 15, and 20 year increments based on tree species, orientation to home, and distance from home. DNV GL's review of these calculations revealed the following:

- Annual savings estimates follow a nearly linear trend, increasing approximately 30 kWh each five-year period.
- Reported cumulative savings in years 10, 15, and 20 match very closely to the values obtained by summing the annual savings over the same periods.
- Reported cumulative savings in year 5 did not match the sum of individual annual savings for years 1 through 5 based on any interpolation method that DNV GL tried for estimating annual savings in years 1 to 5.

Based on these findings, DNV GL decided to base evaluated savings estimates on i-Tree's reported annual savings values using the following method:

1. Calculate an audit realization rate by tree species for each planting year based on the audit results. Planting years 2013 – 2016 received realization rates. Audits were not conducted for trees planted in 2017 or 2018, so those years received realization rates of 1 for all species.
2. Audited trees received individual realization rates based on actual audit results. Unaudited trees received the average realization rate of the other trees of the same species, planted in the same year, that were audited.[1] Thus all enrolled trees received a realization rate.
3. Calculate adjusted savings by multiplying savings calculated during enrollment by the realization rate.
4. We repeat steps 1-3 for each of the five-year periods for which i-Trees reported annual savings. Thus, each enrolled tree gets an adjusted annual savings for years 5, 10, 15, and 20.
5. Calculate the per-tree average adjusted annual savings for years 5, 10, 15, and 20 across all enrolled trees.
6. Use linear interpolation to calculate the per-tree average adjusted annual savings for all intermediate years. We assumed zero savings per year for years 1-3.
7. Estimate tree survival rate starting at 66% for year 4, based on the audit results, and subtract 1% per year up to year 20. This approach results in a 50% survival rate for year 20.[2]

This process resulted in a per-tree average annual savings for each year for years 4 through 20. We calculated total program year savings claimable by Idaho Power by multiplying the number of trees planted (based on the original data set) in a particular year by per-tree average annual savings for the tree age represented by any particular calendar year relative to the planting year (e.g. 2018 is year 5 for trees planted in 2013 and year 4 for trees planted in 2014). We then multiplied this number by survival rate for that year of life.

We calculated total kWh savings claimable by Idaho Power for each calendar year by summing all planting year savings applicable to that calendar year (Table 4). An accompanying workbook provides calculations up to calendar year 2033.

Table 4. Claimable kWh savings by calendar year

Number of Trees	Year Planted	Calendar Year		
		2017	2018	2019
220	2013	3,724	4,584	5,367
2,039	2014	-	34,511	42,485
1,912	2015	-	-	32,361
2,061	2016	-	-	-
2,711	2017	-	-	-
952	2018	-	-	-
	Annual Claimable kWh	3,724	39,095	80,212
	Total Cumulative Claimable kWh	3,724	42,818	123,030

[1] There were three exceptions:

- Trees with species grouping of "Unknown" received the average ratio across all audited trees in their year.
- Linden trees planted in 2016 received a ratio of 1 because none were audited after 2016 and giving them the same ratios as 2013-2015 Lindens would unfairly penalize them for the benefits calculation change.
- Trees planted in 2017 and 2018 all received realization rates of 1 because none were audited.

[2] A 50% survival rate is close to but slightly more conservative than the 22-year 52% savings rate adjustment based on survivability found by Ko, et al (2015) based on their review of the SMUD trees planted in 1997 on which the i-Trees algorithms were originally based.

Note: The number of trees in this table represent the total enrolled, which is slightly higher than the total used to compute the average savings per tree. See Appendix A for detail on why the numbers differ.

3.2.1 Non-electric impacts

DNV GL used the same method to calculate the non-electric impacts for four additional metrics provided by the i-Trees software: Therms, air pollution dollars, carbon dollars, and stormwater runoff dollars. Table 5 summarizes DNV GL's recommendations for annual claimable impacts for these metrics. Impacts for additional years are included in the accompanying workbook.

Table 5. Recommended non-electric impacts summary

Planting Years	Saving Year	Therms	Air Pollutant $	Carbon $	Stormwater Runoff $
2013	2017	(195)	$9	($12)	$71
2013, 2014	2018	(2,049)	$99	($127)	$743
2013, 2014, 2015	2019	(4,364)	$203	($257)	$1,537

3.3 Industry shade tree program review

DNV GL attempted to review evaluations of similar shade tree programs across the country. The purpose of this activity was to provide a check on the reasonableness of the impact results. DNV GL searched the following sources for relevant information:

- Our own internal report libraries
- Calmac.org
- ACEEE and IEPEC proceedings online databases
- Elsevier press
- Google

Our search turned up 13 relevant studies and peer-reviewed papers (see Appendix B for bibliography). These studies produce a consensus annual electricity savings of approximately 140 kWh per tree. However, DNV GL observed several limitations that lead us to recommend against using this consensus value as a check on Idaho Power electricity savings:

- The consistency occurs because all the programs use the same basis to estimate savings. All of the savings estimates appear to be based on the i-Trees software package, which is itself based on Simpson and McPherson (1997) that used shadow pattern simulations to estimate the home-cooling effects of shade produced by trees in Sacramento.
- We found no evidence of independent verification of the accuracy of these estimates using alternative methods such as billing analysis or experimental designs.
- Davey updates the algorithm in the i-Trees software on a regular basis to keep pace with new Forestry science findings.

Several studies found that factors such as tree size, orientation to home, distance from home, and mortality affected the savings. These findings support the practice of using audits to confirm characteristics of the trees after they have been planted and adjust savings according to the audit findings.

- DNV GL (2011) found that approximately 14% of trees were planted at a site other than the home of the person participating in the program.
- Zebedee & Associates (2009) study of San Diego Gas & Electric's program:
  - found a first year mortality rate of 8.1%
  - eliminated 31% of trees from impact calculations because of orientation and distance from home, tree size, and climate zone
- Donovan & Butry (2009) study of the Sacramento Municipal Utility District's (SMUD's) program found significantly less savings for trees planted on the north side of home (~55 kWh annually) compared to those planted on the west or south sides (~185 kWh annually).
- Ko, et al. (2015) revisited the 1997 Sacramento study sites and found that annual cooling savings were about half (52% or 80 kWh per tree) their original estimates, mostly due to mortality.

While DNV GL recommends against a strong interpretation of the fact there is consensus in savings estimates, we also did not find any evidence to invalidate the commonly used i-Trees software. The group maintaining the i-Trees software clearly makes periodic updates to the software and savings algorithms, and through the years has added factors such as tree orientation and distance from home to the savings estimates.

Two additional findings bear mention, although at this point in time, DNV GL does not recommend any adjustments to program savings estimates based upon them:

- Sawka and colleagues (2013) adjusted the Sacramento results to Toronto and estimated per tree savings of 167 kWh annually. A notable finding from this study was that approximately half of the savings came from shading of *neighboring* homes.
- At this point in time, the Arbor Day Energy-Saving Trees program is a dominant player in the implementation of tree programs. According to Arbor Day Foundation records, approximately 60 utilities in 36 states are partnered with the program.

Appendix A ADDITIONAL METHOD DETAIL

A.1.1 Data preparation

The first step in data preparation was to match enrollment records with audit records. These matches were done based on a numeric identifier that Idaho Power assigned to both data sets and tree species. In cases where the same id had two trees of the same species, we chose the pairing that resulted in the shortest combined distance between the latitude and longitude coordinates in the enrollment and audit data.

Idaho Power provided enrollment records for 9,895 trees that it sponsored between 2013 and Spring 2018 and audit records for 1,856 trees. After merging the enrollment and audit data and removing records with data and matching issues, there were usable records for 9,830 enrolled trees, 1,748 trees selected for audits, and 1,196 trees that received audits. The final data contained records for 102 trees without enrollment benefits data because they were an additional tree taken at pickup or workshop trees (and therefore never went through the i-Trees tool at enrollment). Table 6 provides a summary of the number of original and analysis records by program year.

Table 6. Original and analysis data records by year

Year	Original Data			Analysis Data		
	Total records	Selected for Audit	Received Audit	Total records	Selected for Audit	Received Audit
2013	220	134	79	220	134	79
2014	2,039	945	586	2,005	877	554
2015	1,912	487	370	1,887	458	347
2016	2,061	290	227	2,055	279	216
2017	2,711	0	0	2,711	0	0
2018	952	0	0	952	0	0
Total	9,895	1,856	1,262	9,830	1,748	1,196

We then grouped the trees into species groups based on the tree ordered (as recorded in the data) as shown in Table 7. As can be seen in the table, some of the differences in the data entered are clearly data entry inconsistencies such as "Bur Oak" and "Burr Oak". We used the species group for the trees' species throughout the rest of the methods.

Table 7. Tree species categories

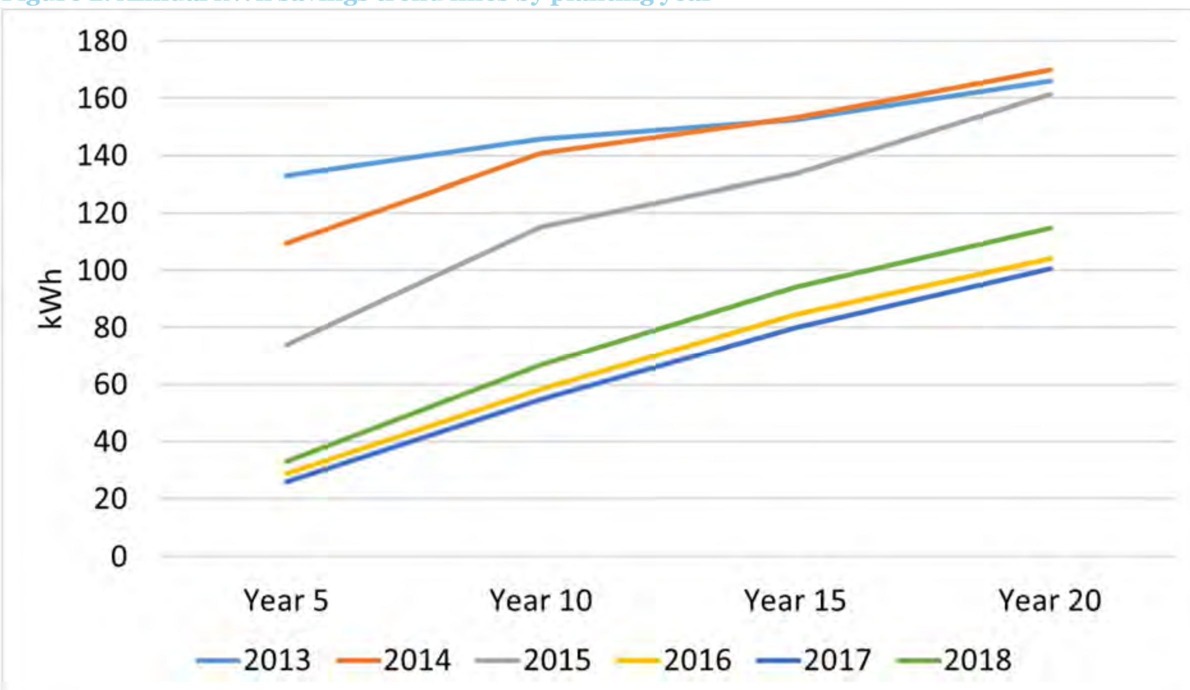
Species Group	Tree Ordered	Frequency
Birch	Heritage River Birch	197
	River Birch (clump form)	281
	River Birch Clump	846
Elm	Frontier Elm	495
	New Harmony Elm	394
	Princeton Elm	201
	Valley Forge Elm	248
Ginkgo	Ginkgo	169
Hackberry	Common Hackberry	543
	Hackberry	218
Linden	Greenspire Linden	524
	Greenspire Littleleaf Linden	139
	Redmond Linden	53
Oak	Bur Oak	826
	Burr Oak	188
	Northern Red Oak	861
	Swamp White Oak	940
Other	Kentucky Coffeetree	39
	Kentucky coffeetree	87
	Red Maple Armstrong	34
	Sourwood	87
	Suncole" Sunburst Honeylocust"	46
Planetree	Exclamation London Planetree	59
	London Planetree Bloodgood""	114
	London planetree	13
Sweetgum	Happidaze Sweetgum	105
	Moraine Sweetgum	143
	Worplesdon Sweetgum	731
Tuliptree	Tulip Tree	852
	Tuliptree	280
Unknown[1]		5
	NA	20
	None	92
Total		9,830

[1] Trees with an unknown species were predominately workshop trees. A few were also extras taken at pickup.

A.1.2 Review of annual and cumulative kWh

The i-Trees software calculates annual kWh and cumulative kWh savings at 5, 10, 15, and 20 year increments based on tree species, orientation to home, and distance from home. DNV GL's review of these calculations revealed that annual savings estimates follow a nearly linear trend. Annual savings increase by approximately 30 kWh each five-year period (Figure 2). The gap in the upper and lower groups of lines in this figure also demonstrates the savings discontinuity caused by the algorithm update in late 2015.

Figure 2. Annual kWh savings trend lines by planting year



Appendix B SHADE TREE PROGRAM STUDY BIBILOGRAPHY

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OTHER REPORTS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
2018 Flex Peak Program End-of-Season Annual Report	Commercial/Industrial	Idaho Power	Idaho Power	Other
2018 Irrigation Peak Results	Irrigation	Idaho Power	Idaho Power	Other
A/C Cool Credit: 2018 Demand Response Analysis	Residential	Idaho Power	Idaho Power	Other
Energy-Saving Kit Program Summary Report, 2018	Residential	Resource Action Programs	Idaho Power	Summary
Historical DSM Expense and Performance, 2002–2018	Residential, Commercial/Industrial, and Irrigation	Idaho Power	Idaho Power	Other
Home Energy Report Program Summary Report (Year One)	Residential	Aclara	Idaho Power	Summary
Idaho Power Energy Wise Program Summary Report, 2017–2018	Residential	Resource Action Programs	Idaho Power	Summary
Technical Reference Manual 2.2	Commercial/Industrial	ADM Associates	Idaho Power	Other

Report titles appearing in blue are links to the online versions of the reports. A PDF of this supplement can be found at idahopower.com/ways-to-save/energy-efficiency-program-reports/.

2018 Flex Peak Program
End-of-Season Annual Report

November 2, 2018

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Executive Summary

The Flex Peak Program ("Program") has been operated by Idaho Power Company ("Idaho Power" or "Company") since 2015. The Program is a voluntary demand response ("DR") program available to large commercial and industrial customers that can reduce their electrical energy loads for short periods during summer peak days. By reducing demand on extreme system load days, the Program reduces the amount of generation and transmission resources required to serve customers. This Program, along with Idaho Power's other DR programs, Irrigation Peak Rewards and the Residential Air Conditioner Cycling Program, have helped delay the need to build supply-side resources.

The results presented in this report are from the 2018 Program season, the Company's fourth year of operating the Program. In its fourth year, the Program maintained similar load reduction and realization rates as the prior year (2017). There were five new sites added and overall participation resulted in the highest hourly load reduction for the season of 33 megawatts ("MW"). The average realization rate for the three load reduction events that occurred in the 2018 Program season was 89 percent. Enrollment in the Program virtually stayed the same for the 2018 Program season and 96 percent of previously participating sites re-enrolled in the Program. The total Program costs through October 1, 2018, were $417,819. The cost of having this resource available was $12.66 per kilowatt ("kW") based on the maximum demand reduction of 33 MW achieved on July 31, 2018.

Background

In 2015, the Company requested approval to implement the Flex Peak Program as an Idaho Power operated program. The Idaho Public Utilities Commission ("IPUC") approved the Company's request in Order No. 33292,[1] and the Public Utility Commission of Oregon ("OPUC") accepted the proposal from Advice No. 15-03.[2] Prior to 2015, a similar DR program for commercial and industrial customers was operated by a third-party vendor.

As part of Advice No. 15-03, the OPUC adopted Staff's recommendation that the Company file an annual end-of-season report with information regarding the Program. The Company was also directed by the IPUC in Order No. 33292 to file an annual end-of-season report detailing the results of the Program. In compliance with the reporting requirements, the annual end-of-season report includes the following:

- Number of participating customers
- Number of participating sites

[1] *In the Matter of Idaho Power's Company's Application for Approval of New Tariff Schedule 82, A Commercial and Industrial Demand-Response Program (Flex Peak Program)*, Case No. IPC-E-15-03, Order No. 33292 (May 7, 2015).

[2] Schedule 76, Flex Peak Program, Docket No. ADV 7/Advice No. 15-03 (approved April 28, 2015).

- MW of demand response under contract
- MW of demand response realized and incented per dispatch
- Percent of nominated MW achieved in each dispatch event by participant
- Cost analysis of the Program
- Number of events called
- Total load dropped for each event
- Event duration
- Total capacity payments made
- Total energy payments made
- Number of customers who failed to meet their load
- Number of Program applications denied due to Program subscription limit
- Benefits identified with each dispatch of the resource
- Assessment of whether the trigger or dispatch price is properly set to utilize the asset most often
- Participant attrition
- Issues the utility has identified meeting requests to participate in the Program
- Changes in baseline methodology taken or anticipated
- Improvements Idaho Power and the Program might benefit from

Program Details

The Program pays participants a financial incentive for reducing load within their facility and is active June 15 to August 15, between the hours of 2 p.m. and 8 p.m. on non-holiday weekdays.

Customers with the ability to nominate or provide load reduction of at least 20 kW are eligible to enroll in the Program. The 20 kW threshold allows a broad range of customers the ability to participate in the Program. Participants receive notification of a load reduction event ("event") two hours prior to the start of the event, and events last between two to four hours.

The parameters of the optional Program are set forth in Schedule 76[3] in Oregon and Schedule 82[4] in Idaho, and include the following:

- A minimum of three load reduction events will occur each Program season.

- Events can occur any weekday, excluding July 4, between the hours of 2 p.m. and 8 p.m.

- Events can occur up to four hours per day and up to 15 hours per week, but no more than 60 hours per program season.

[3] Idaho Power Company, P.U.C. ORE. No. E-27, Schedule 76.

[4] Idaho Power Company, I.P.U.C. No. 29, Tariff No. 101, Schedule 82.

- Idaho Power will provide notification to participants two hours prior to the initiation of an event.
- If prior notice of a load reduction event has been sent, Idaho Power can choose to cancel the event and notify participants of cancellation 30 minutes prior to the start of the event.

Program Incentives

The Program includes both a fixed and variable incentive payment. The fixed incentive is calculated by multiplying the actual kW reduction by $3.25 for weeks when an event is called or the weekly nominated kW amount by $3.25 for weeks when an event is not called. The variable energy incentive is calculated by multiplying the kW reduction by the event duration hours to achieve the total kilowatt-hour (“kWh”) reduction during an event. The variable incentive payment is $0.16 per kWh and is implemented for events that occur after the first three events.

The Program also includes an incentive adjustment of $2.00 when participants do not achieve their nominated amount during load reduction events. This adjustment amount is used for the first three events. After the third event, the adjustment is reduced to $0.25 per kW. Incentives are calculated using Idaho Power’s interval metering billing data and participants received the incentive checks within 30 days of the end of the Program season. Participants were mailed their incentive checks or had their Idaho Power account credited by September 15 in 2018. The incentive structure offered for the 2018 season is listed in Table 1.

Table 1.

Fixed-Capacity Payment Rate*	**Variable Energy Payment Rate****
$3.25 per Weekly Effective kW Reduction	$0.16 per kWh (Actual kW x Hours of Event)
Adjustment for first three events	**Adjustment after first three events**
$2.00 per kW not achieved up to nomination	$0.25 per kW not achieved up to nomination
*To be prorated for partial weeks	**Does not apply to first three Program events

Program Results

The results presented throughout this report are at the generation level and system losses have been considered. Idaho Power called three load reduction events in 2018. The first event occurred on July 16, the second on July 25, and the third on July 31. The maximum realization rate during the season was 108 percent and the average for all three events combined was 89 percent. The realization rate is the percentage of load reduction achieved versus the amount of load reduction committed for an event. The highest hourly load reduction achieved was during the July 31 event at 33 MW.

Participants had a committed load reduction of 29.4 MW in the first week of the Program. This weekly commitment, or "nomination", was comprised of customers participating in the Program totaling 140 sites. Out of the total number of sites, 135 sites participated in the 2017 season, and five sites were newly added in 2018. The committed load reduction at the end of the season was 29.6 MW and was the peak committed load reduction for the season.

The first event was called on Monday, July 16. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 29.4 MW. The average load reduction was 26 MW. The highest hourly load reduction was 27 MW during hour two. The realization rate for this event was 88 percent.

The second event was called on Wednesday, July 25. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 29.3 MW. The average load reduction was 21 MW. The highest hourly load reduction was 22 MW during hour one. The realization rate for this event was 72 percent. The lower realization rate for this event was primarily due to some larger sites that underperformed or had reduced participation due to operational needs of the sites.

The third event was called on Tuesday, July 31. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 29.5 MW. The average load reduction was 32 MW. The highest hourly load reduction was 33 MW during hour one. The realization rate for this event was 108 percent.

Enrollment specific to the Oregon service territory included six participants totaling nine sites enrolled. These nine sites had a nominated capacity of 5.6 MW and achieved a maximum reduction during the season of 6.3 MW during hour four on the July 16 event.

Participation

The number of sites enrolled in the Program for 2018 was 140 sites from 65 participants, with five new sites enrolling for the Program season. The average number of sites enrolled per participating customer was 2.1. The Program did not experience significant attrition and re-enrollment in the Program was high as 135 of the 141 sites participating from the prior season re-enrolled. Four sites did not re-enroll from the 2017 season because the vendor supporting the site's demand response control platform no longer offered that service. The remaining two sites did not enroll as one business closed and the other site reduced its operating hours significantly such that it no longer was a good program candidate.

This past season Idaho Power continued the auto-enrollment option with good success. Existing participants were re-enrolled in the Program automatically and mailed a confirmation packet early in March based on the prior year's enrollment information. Participants notified the Company in writing if they no longer wanted to participate as well as to change their nomination amount or update/change contact information regarding personnel for event notification. The auto-enrollment implementation was successful and the Company will continue to utilize this process in the future.

While Idaho Power did not actively market the Program, the Company has worked to maintain the number and size diversity (in terms of nominated load reduction) of sites enrolled. The breakout of nomination groups among the sites has stayed very consistent from the 2017 season with the largest quantity of sites falling within the 0-50 kW segment followed by 51-200 kW.

Pursuant to the Settlement Agreement approved in IPUC Case No. IPC-E-13-14[5] and OPUC Docket No. UM 1653[6] ("Settlement"), Idaho Power did not actively market the Program prior to the 2018 season as enrolled capacity was maintained at approximately 35 MW, which was the amount agreed upon in the 2013 Settlement. However, the Program did have reduced capacity for the 2018 season as one single large customer reduced its nomination significantly a week prior to the season starting. The Company did not deny any Program applications in 2018.

Figure 1 represents Idaho Power's service area divided into three regional areas with two sub areas: Canyon (Canyon West), Capital, and Southern (South East).

Figure 1.

[5] *In the Matter of the Continuation of Idaho Power Company's A/C Cool Credit, Irrigation Peak Rewards, and FlexPeak Demand Response Programs for 2014 and Beyond*, Case No. IPC-E-13-14, Order No. 32923 (Nov. 12, 2013).

[6] *In the Matter of Idaho Power Company, Staff Evaluation of the Demand Response Programs*, UM 1653, Order No. 13-482 (Dec. 19, 2013).

Figure 2 represents the enrolled capacity (total nominations) that were enrolled in 2018 and the distribution by Idaho Power's regional service areas.

Figure 2.

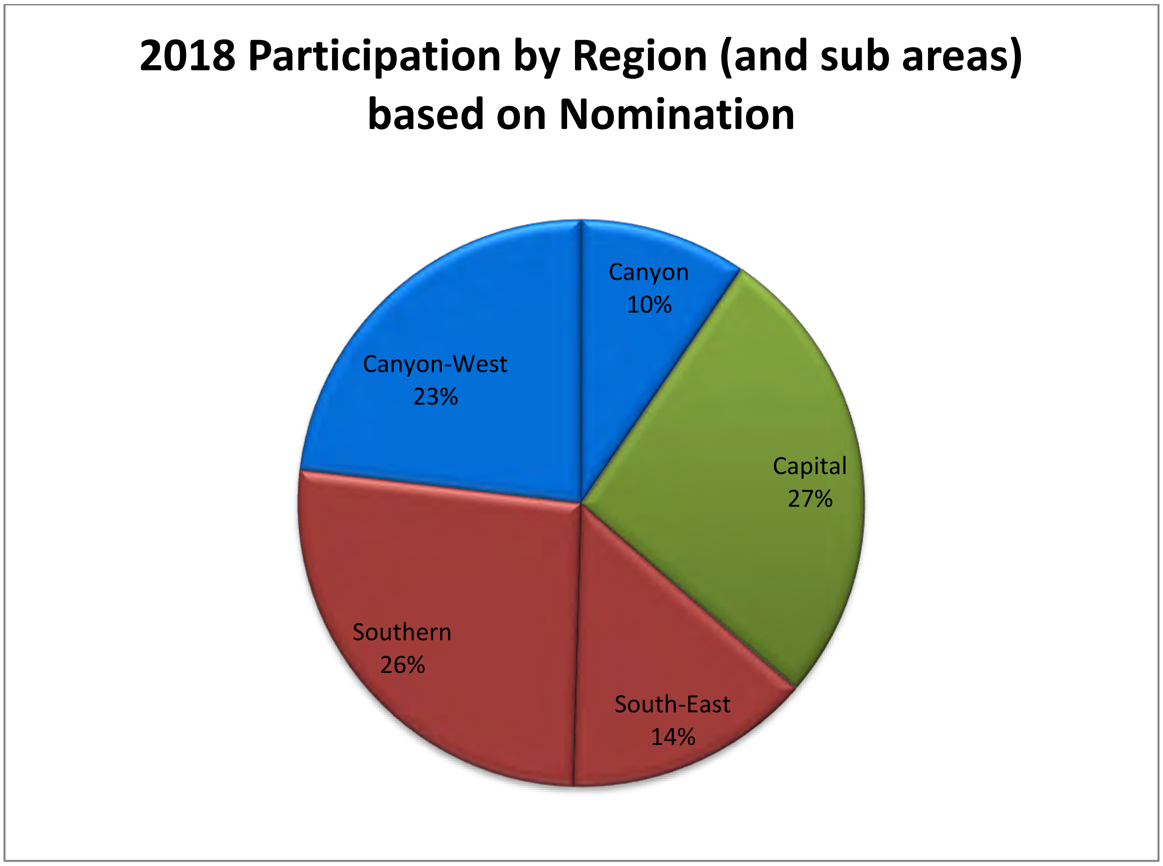
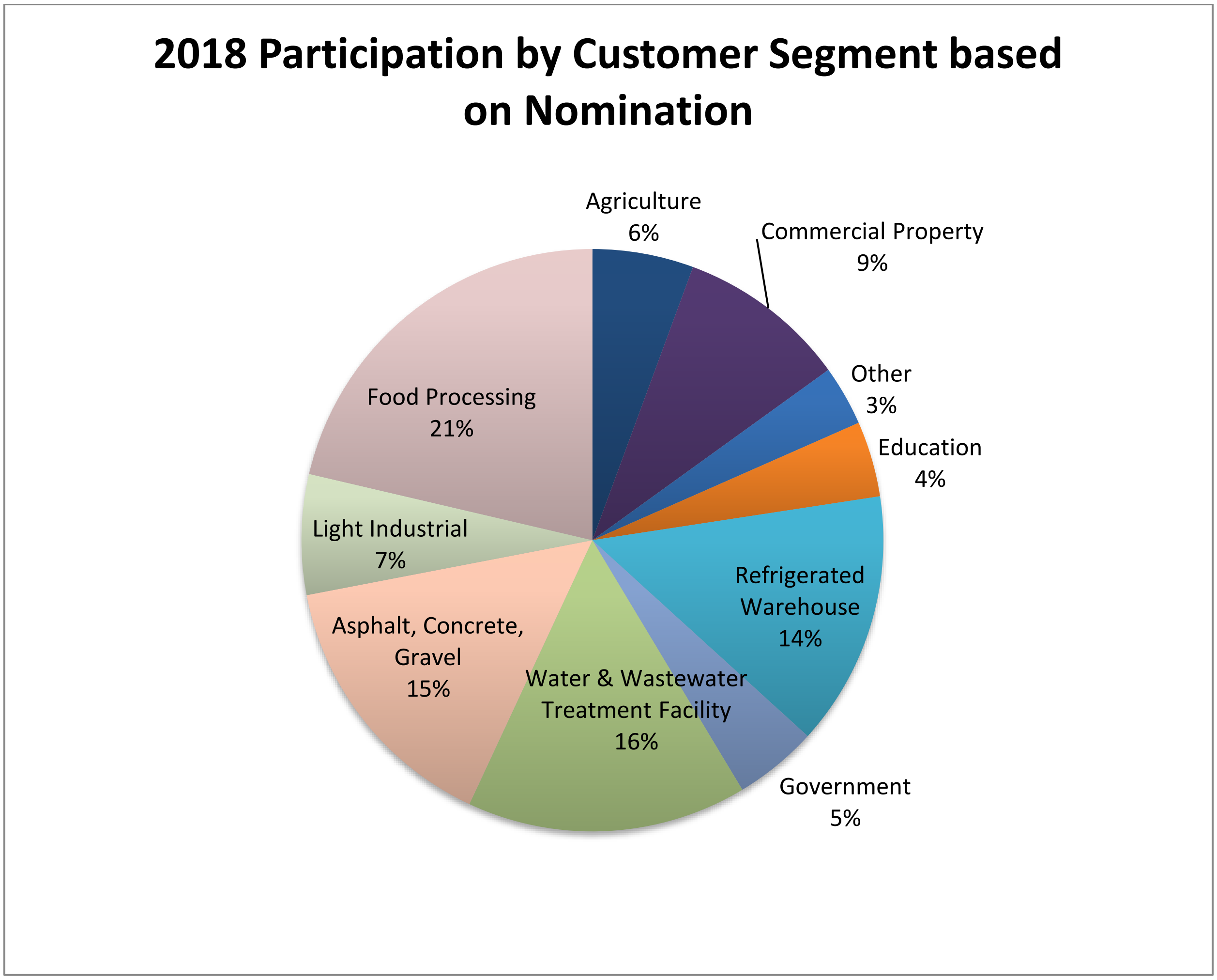


Figure 3 represents the enrolled capacity in 2018 and the diversity based on business type.

Figure 3.



Operations

Interval metering data provides Idaho Power the ability to view all participants' load after events, and calculate the reduction achieved per site during load reduction events. Using this data, Idaho Power provided participants post-event usage reports that showed hourly baseline, actual usage, and reduction during an event. The data assists participants in refining their nomination for future events. This data also provides information useful in determining which participating sites may have opportunity to provide more reduction or change their reduction strategy if nomination amounts were not achieved.

Load Reduction Analysis

An evaluation of the potential load reduction impacts in 2018 was conducted internally by Idaho Power. The goal of the review performed by Idaho Power was to calculate the load reduction in MW for the Program. The analysis also verified load reduction per site and per event.

The baseline methodology used in 2018 is the same methodology utilized in prior seasons. The baseline that load reductions are measured against during load reduction events is calculated using a 10-day period. The baseline is the average kW of the highest energy usage days during the event availability time (2-8 p.m.) from the highest three days out of the last 10 non-event weekdays. Individual baselines are calculated for each facility site. Once the original baseline is calculated, there is an adjustment included in the methodology called the Day-of-Adjustment ("DOA") that is used to arrive at the adjusted baseline.

Adjustments address situations where load is lower or higher than it has historically been and the baseline does not accurately reflect the load behavior immediately prior to the event. The DOA is applied to each site's original baseline by accounting for the difference between the average baseline kW and the average curtailment day kW during hours 2-3 prior to the start of the event. The DOA is calculated as a flat kW and is applied to all baseline hours and capped at +/- 20 percent of the original baseline kW. The DOA is symmetrical, having either an upward or downward adjustment to the baseline, and is applied to the original baseline kW for each facility site for each hour during the Program event.

As Figure 4 below depicts, the most commonly nominated load reduction was in the 0-50 kW range, accounting for approximately 39 percent of the sites.

Figure 4.

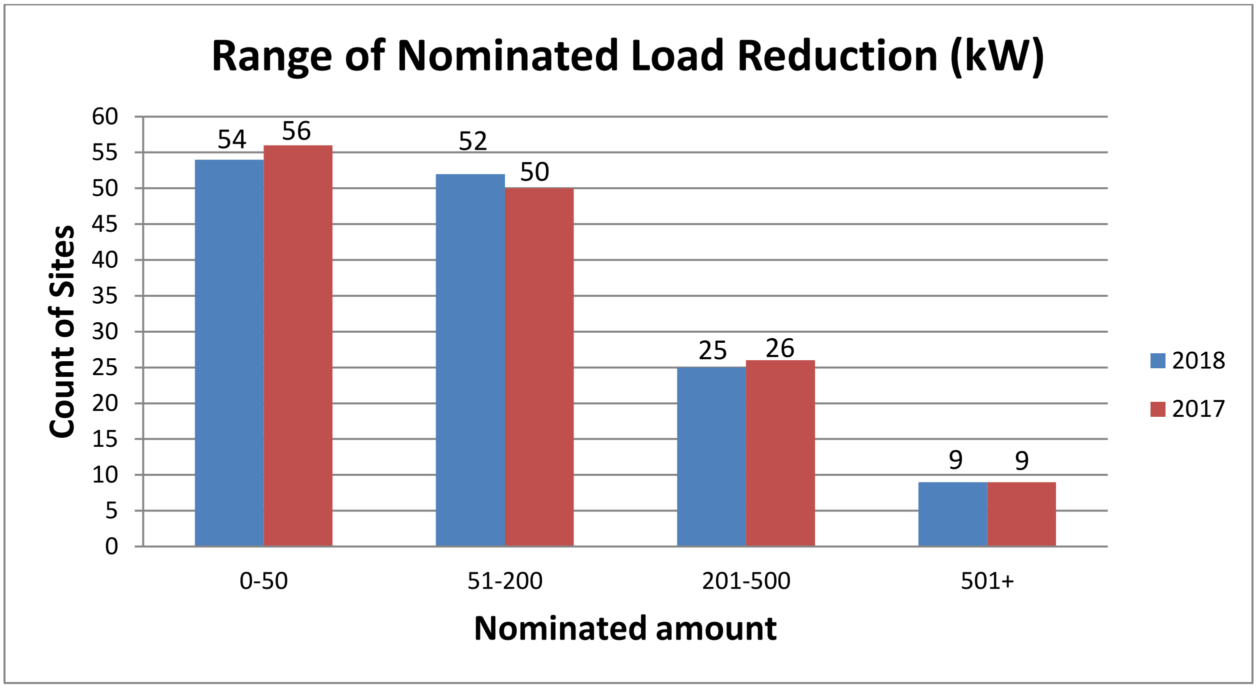


Table 2 shows the Program realization rates for 2018 based on average load reduction per event.

Table 2.

Curtailment Event	Event Timeframe	Nominated Demand Reduction	Average Demand Reduction (MW)	Max Demand Reduction (MW)	Realization Rate*
July 16	4-8 pm	29.4	26	27	88%
July 25	4-8 pm	29.3	21	22	72%
July 31	4-8 pm	29.5	32	33	108%
Average		29.4	26.3	27.3	89%

** Based on average reduction*

Figure 5 below shows both the average and peak demand reduction achieved during each of the three curtailment events. The maximum demand reduction achieved ranged from a low of 22 MW for the July 25 event to a high of 33 MW for the July 31 event. The July 25 event's 22 MW reduction achieved a realization rate of 72 percent, while the July 31 event's 33 MW reduction achieved a realization rate of 108 percent. Combined, the three events had an average realization rate of 89 percent.

The realization rate analysis shows that maximum load reduction was achieved in the middle to late portion of the Program season during the third event.

Figure 5.

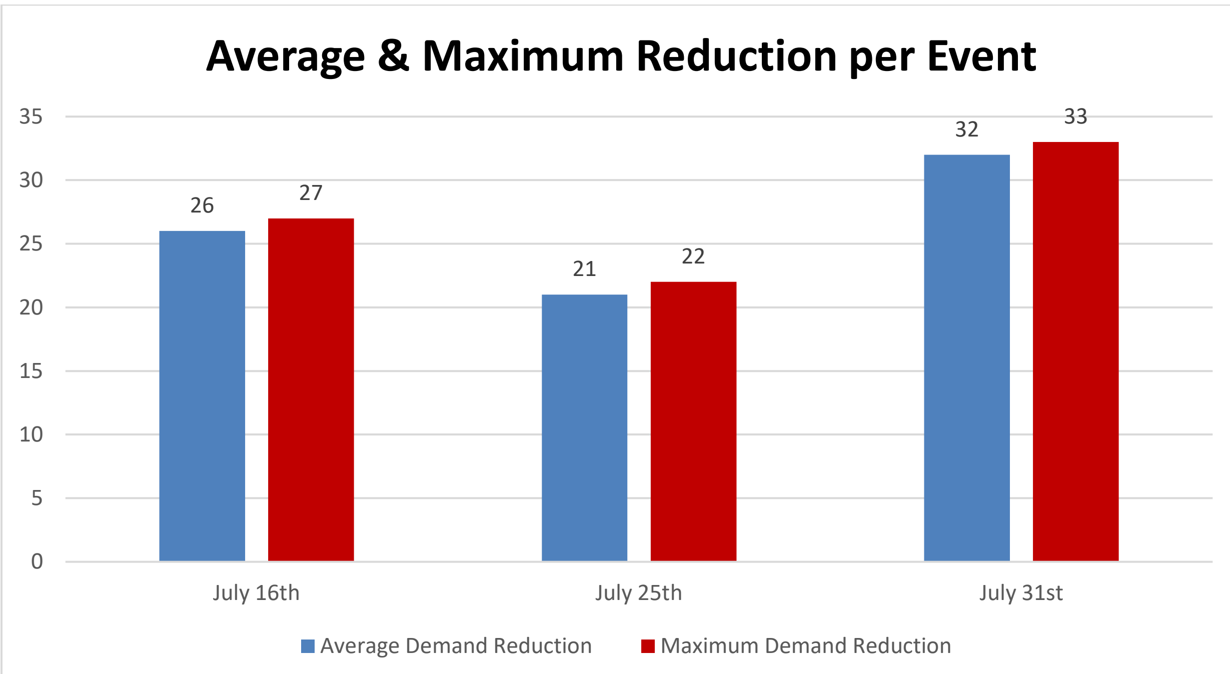


Table 3 shows the realization rate for each participant in the Program for 2018.

Table 3.

Participant Number	July 16 Event Realization	July 23 Event Realization	July 31 Event Realization	2018 Season Realization
1	140%	77%	172%	130%
2	17%	70%	9%	32%
3	74%	74%	98%	82%
4	25%	0%	44%	23%
5	13%	0%	11%	8%
6	101%	52%	87%	80%
7	557%	150%	5%	237%
8	132%	150%	146%	142%
9	106%	120%	114%	113%
10	196%	168%	140%	168%
11	0%	0%	0%	0%
12	45%	40%	44%	43%
13	113%	130%	121%	121%
14	139%	126%	69%	111%
15	102%	103%	97%	101%
16	28%	0%	0%	9%
17	54%	41%	30%	42%
18	30%	216%	293%	180%
19	104%	139%	141%	128%
20	127%	204%	182%	171%
21	137%	88%	107%	111%
22	65%	76%	64%	68%
23	97%	100%	112%	103%
24	0%	45%	11%	19%
25	59%	38%	75%	57%
26	101%	83%	42%	76%
27	74%	90%	97%	87%
28	15%	38%	8%	20%
29	18%	0%	86%	35%
30	455%	132%	123%	237%
31	8%	180%	180%	122%
32	114%	140%	109%	121%
33	0%	55%	16%	24%
34	124%	45%	129%	100%
35	932%	639%	1832%	1134%
36	14%	20%	76%	37%

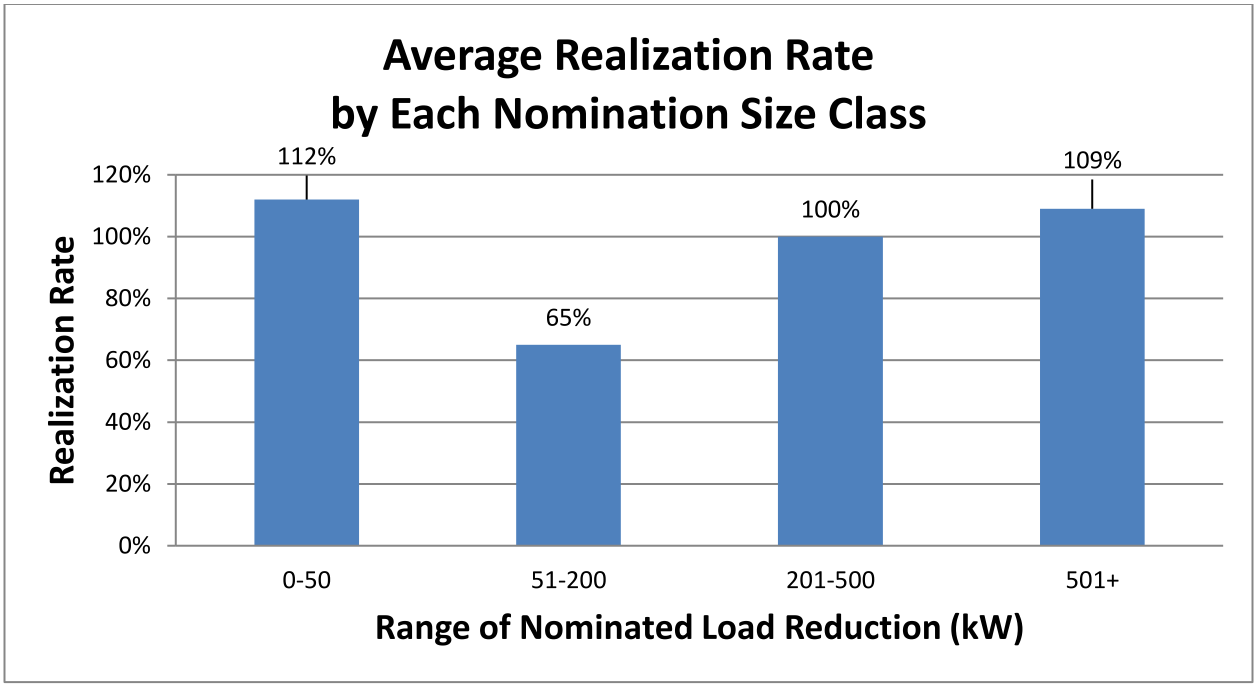
37	74%	47%	78%	66%
38	80%	180%	9%	89%
39	209%	171%	864%	415%
40	18%	0%	0%	6%
41	31%	77%	0%	36%
42	119%	44%	57%	74%
43	153%	42%	73%	89%
44	124%	130%	15%	90%
45	25%	40%	44%	36%
46	2%	55%	14%	23%
47	119%	23%	326%	156%
48	50%	67%	97%	71%
49	0%	0%	0%	0%
50	4%	19%	0%	8%
51	8%	22%	38%	23%
52	102%	112%	111%	108%
53	36%	3%	35%	25%
54	61%	70%	64%	65%
55	64%	0%	58%	41%
56	206%	43%	0%	83%
57	59%	74%	57%	63%
58	17%	3%	0%	7%
59	119%	89%	96%	101%
60	63%	123%	124%	104%
61	144%	96%	149%	130%
62	11%	0%	67%	26%
63	2%	0%	12%	4%
64	94%	103%	117%	105%
65	74%	97%	91%	87%

Broken out across four size classes, the sites with the smallest nominated load reduction, 0–50 kW, achieved the highest average realization rate across the three events at 112 percent. The 0-50 kW group had the largest portion of sites enrolled in the Program, totaling 54 sites that accounted for 39 percent of total enrolled sites. The second smallest size class, 51–200 kW, had 52 sites enrolled and achieved the lowest average realization rate at 65 percent. The 201-500 kW group had 25 sites enrolled and achieved a realization rate of 100 percent. The largest size class, 501+ kW, had nine sites enrolled and achieved a realization rate of 109 percent.

Idaho Power will continue to work with all customer segments to help refine nominations to align closer with realistic reduction opportunities which will increase the overall program realization rate.

Figure 6 below represents the realization rate achieved by each nomination group, averaged across all three events. To calculate the results, each site's average load reduction (across three events) was divided by its average nomination across the three events and then grouped by size.

Figure 6.



Program Costs

Program costs totaled $417,819 through October 1, 2018. Incentive payments were the largest expenditure comprising approximately 89 percent of total costs.

The incentive payments were fixed-capacity payments resulting from the three events called during the 2018 Program season. The fixed capacity payments total was $371,496 and the variable energy payment total was $0. Variable energy payments were not made during the season because the variable energy payment is implemented starting with the fourth event.

Preliminarily,[7] the total Program costs for 2018 are estimated to be $12.66 per kW based on the maximum demand reduction of 33 MW, or $15.89 per kW, based on average load reduction for the season of 26.3 MW.

[7] Final Program costs for 2018 will be available after the close of the Company's 2018 financial reporting year, December 31, 2018.

Table 4 below displays the 2018 year-to-date ("YTD") Program costs by expense category.

Table 4.

Expense Category	2018 YTD Program Costs
Materials & Equipment	$1,001
Marketing & Administration	$45,322
Incentive payments	$371,496
Total	**$417,819**

Benefit-Cost Analysis

Idaho Power believes the purpose of demand response is to minimize or delay the need to build new supply-side peaking generation resources and to reduce load during extreme system peaks. The benefits of having the Program available, and with each load reduction event, provide Idaho Power a supply side resource to mitigate any system peak deficits. DR helps fulfill the current system capacity need and prolongs the need to build new generation resources.

The Benefit-Cost analysis for the Program is based on a 20-year model that uses financial and demand-side management alternate cost assumptions from the most recently acknowledged Integrated Resource Plan ("IRP") available during budgeting for the upcoming Program year, the *2015 Integrated Resource Plan*. The Settlement, as approved in IPUC Order No. 32923 and OPUC Order No.13-482, established a new method for valuing DR and defined the annual cost of operating Idaho Power's three DR programs for the maximum allowable 60 hours as no more than $16.7 million.

The annual value calculation is updated with each IRP based on changes that include, but are not limited to, need, capital cost, or financial assumptions. This amount was re-evaluated in the 2015 IRP to be $18.5 million. Under the 2017 IRP, this value is $19.8 million.

In 2018, the preliminary cost estimate of operating all three of Idaho Power's DR programs was $7.9 million through October 1, 2018. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $11.1 million, which is below the total annual costs agreed upon in the Settlement as revised in both the 2015 and 2017 IRP.

The Company believes by calling at least three events per season the Program will be more effective in providing consistent and reliable reduction. Having a minimum of three events allows the Company to test processes and software and helps customers fine tune their curtailment plan. The Company did not call more than three load reduction events during the 2018 Program season because Idaho Power's generation resources were sufficient to satisfy system load. However, in all three events the Program provided a resource to assist Load Serving Operators balancing the forecast when it did not align with actual peak load, as well as potentially avoid additional market purchases. Based on market prices for each of the days in 2018 the Program was dispatched, Idaho Power estimates the Program saved a total of $20,000 worth of energy purchases.

The variable energy price for utilizing the Program after the third event is $0.16/kWh and could be considered the dispatch price for calling load reduction events beginning with the fourth event. The price of $0.16/kWh is typically higher than the energy market price. The Company believes the variable energy price is appropriate because having a dispatch price below $0.16/kWh could cause the Company to call events more frequently resulting in reduced participant performance and event fatigue. The Company also believes that a lower dispatch price to trigger more load reduction events could send the wrong signal regarding the purpose of the Program and DR.

Idaho Power's cost-effectiveness evaluation for DR programs is updated annually. A more comprehensive cost-benefit analysis will be included in the Company's Demand-Side Management 2018 Annual Report when all the final 2018 financial data will be available.

Customer Satisfaction Results

Idaho Power did not conduct a post-season survey this year as there were not significant changes made to the Program from the last three seasons. The prior two surveys conducted in 2015 and 2016 were favorable and the Company believes conducting a survey every 2-3 years will reduce survey fatigue considering this customer segment also participates in the quarterly *Customer Satisfaction Research Survey* conducted by Burke, Inc. The Company plans to conduct a post season survey after the 2019 season to re-evaluate customer satisfaction with the Program offering.

Program Activities for 2019

The primary improvement Idaho Power and the Program could benefit from is a larger enrolled nominated capacity and more consistent load reduction when events are called. The Company will continue to communicate the value proposition with enrolled participants and the importance of active participation when events are called. Recruitment efforts for the 2019 season will begin the fourth quarter of 2018 to encourage participation. Idaho Power will meet with existing participants during the off-season to discuss past-season performance and upcoming season details. The Program Specialist has already started meeting with new potential candidates for the 2019 season.

The Program will be jointly marketed along with Idaho Power's applicable energy efficiency programs as needed. The Company will utilize its field representatives to retain the currently enrolled sites and encourage new sites to participate.

Both the nomination and achieved reduction amounts decreased in 2018 due to one large customer that reduced its nominated amount in the Program by 65 percent due to market conditions. This specific customer reduced its enrolled nomination amount on June 5, 2018, after the auto-enrollment had been sent out in early March. This allowed the Company only 10 days to seek out new candidates to make up the 5 MW reduction.

For the upcoming season, Idaho Power plans to focus on retaining currently enrolled participants and will actively market the Program. The Company is not seeking to expand the capacity of the FlexPeak Program, but recognizes there is attrition over time and many participants may reduce their nomination based on operational and business needs so it is important to consistently have at least 37-40 MW of nominated capacity available. This level of nominated capacity will allow events to achieve 35 MW of load reduction considering the typical realization rate of nominated capacity ranging from 85-95 percent.

Conclusion

The Program currently contributes approximately 10 percent of the Company's overall DR portfolio and can be relied on to provide dispatchable load reduction to the electrical grid. When analyzing the Program at the generation level, industrial and commercial customers have made noteworthy contributions to Idaho Power's DR programs. The cost of having this resource available was $15.89 per kW based on average reduction (26.3 MW) for the season.

2018 Irrigation Peak Rewards Program Report

January 2019

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INTRODUCTION

The Irrigation Peak Rewards Program (IPR) is a voluntary demand response program available to Idaho Power Company's (IPC) agricultural irrigation customers since 2004. IPR pays irrigation customers a financial incentive for the ability to turn off participating irrigation pumps at potentially high system load periods (summer peak). IPC estimates future capacity needs through the Integrated Resource Plan and then plans resources to mitigate these shortfalls. IPR is a result of this planning process and the success of the program is measured by the amount of demand reduction available to IPC during potential system peak periods.

Details

Interruption Options

IPR is available to Idaho Power irrigation customers receiving service under Schedules 24 and 84 in Idaho and Oregon respectively. Eligibility is based on prior program participation at the pump location. The pump location may have a device installed on the panel to automatically dispatch or remotely turn off the pump when a demand response event is called, or the participant may shut down manually at the event start time.

Automatic Dispatch Option

Pumps enrolled in the automatic dispatch option have one of two devices installed at the pump location to allow IPC the ability to send a signal that controls the associated irrigation pump(s). This option requires all pumps at a site be controlled. Communication is sent to the device during a load control event to turn off the pump. Nearly 90% of the devices use IPC's Automated Metering Infrastructure (AMI) to send the signal to the demand response unit (DRU). If the meter at the service location is an AMI meter, then the pump panel will have a DRU installed. If AMI technology is not available, a cellular network device (cell device) is installed on the pump panel. Approximately 12% of the automatic dispatch option pumps have a cell device installed. The device has the same load control feature as the AMI DRU but a cellular network signal is used to communicate with the device.

Manual Dispatch Option

Pumps with at least 1,000 cumulative horse power (HP) or that IPC has determined to have limited communication availability, are eligible for the manual dispatch option (manual). Participants under this classification choose to manually control which pumps are turned off during a load control event. Manual participants are required to select a nominated load reduction of kilowatts (kW) they plan to turn off during load control season.

Parameters

- Season dates June 15th – August 15th
- Minimum of three load control events
- Load control events may occur any weekday or Saturday, excluding July 4th holiday between the hours of 1:00 pm and 9:00 pm
- Load control events may occur up to four hours per day and up to 15 hours per week, but no more than 60 hours per program season
- Two ways to participate; Automatic or Manual
- IPC provides notification via phone, email and/or text messaging to Automatic participants four hours prior to the start of the event whenever possible
- IPC provides notification via phone, email and/or text to Manual participants four hours prior to the start of the event
- IPC could choose to cancel the load control event and notify participants of cancellation up to 30 minutes prior to the event start time
- Parameters for IPR do not apply to system emergencies

Incentives

Automatic dispatch participants receive incentives in the form of a billing credit. The billing credit is made up of a demand credit and an energy credit applied to the monthly bill June 15th through August 15th. The demand and energy credits for the Manual dispatch participants are paid with a physical check.

Demand credits are calculated by multiplying the monthly billing kW by the demand-related incentive amount. The energy credits are calculated by multiplying the monthly billing kilowatt-hour (kWh) usage by the energy-related incentive amount. Credits are prorated for periods when meter reading/billing cycles do not align with the IPR season dates.

The incentive structure includes ‘Fixed’ and ‘Variable’ incentives. Variable incentives apply if more than three events occur in the season. Participants who allow the later dispatch time until 9:00 pm are paid a larger variable credit incentive if more than three events are called in the same season. No ‘Variable’ incentive payments were made in 2018. Incentives are calculated for Manual and Automatic dispatch participants using IPC metered billing data.

Monthly billing credits are calculated and applied using IPC’s billing software. Manual credits are calculated using interval metering data and nominated kW and issued via mail in the form of a check. The incentive rates for 2018 are listed in Table 1.

Table 1. Monthly incentive rates for manual and automatic options

Fixed Demand Credit ($/billing kW)	Fixed Energy Credit ($/billing kWh)	Variable Energy Credit ($/billing kWh)	Extended Variable Energy Credit* ($/billing kWh)
$5.00	$0.0076	$0.148	$0.198

*(5-9 pm group)

Opt-Outs

Under the rules of the automatic dispatch option, participants have the option to opt-out of a load control event up to five times per pump per season. Opt-out fees are equal to $5.00 multiplied by the billed kW for that billing cycle. An explicit opt-out occurs when the participant asks IPC to remove the pump for that specific load control event.

PARTICIPATION

IPR enrollment packets were mailed to all past participants in February 2018. Contents of the packet included an IPR brochure, program application, incentive structure details, eligible pump locations and an estimated incentive for each pump location.

IPC presented IPR details at irrigation workshops across the service area. IPC also had the opportunity to communicate program details while staffing the IPC booth at four agricultural shows across the service territory. IPC continues to make a concerted effort to encourage past participants to re-enroll.

2018 total billing demand enrollment was 416.8 MW with 2,335 pumps. The pump count and nominated kW increased over 2017 numbers. A total of 85.2% of the eligible pumps enrolled, an increase over last year of 1.7%.

Figure 1 shows IPC's service area divided into three regional areas; Canyon-West, Capital and South-East. Five areas within the three regions will be referenced throughout this report; Western, Canyon, Capital, Southern and Eastern.

Figure 1. Idaho Power service area

Figure 2. Distribution of participants by service area

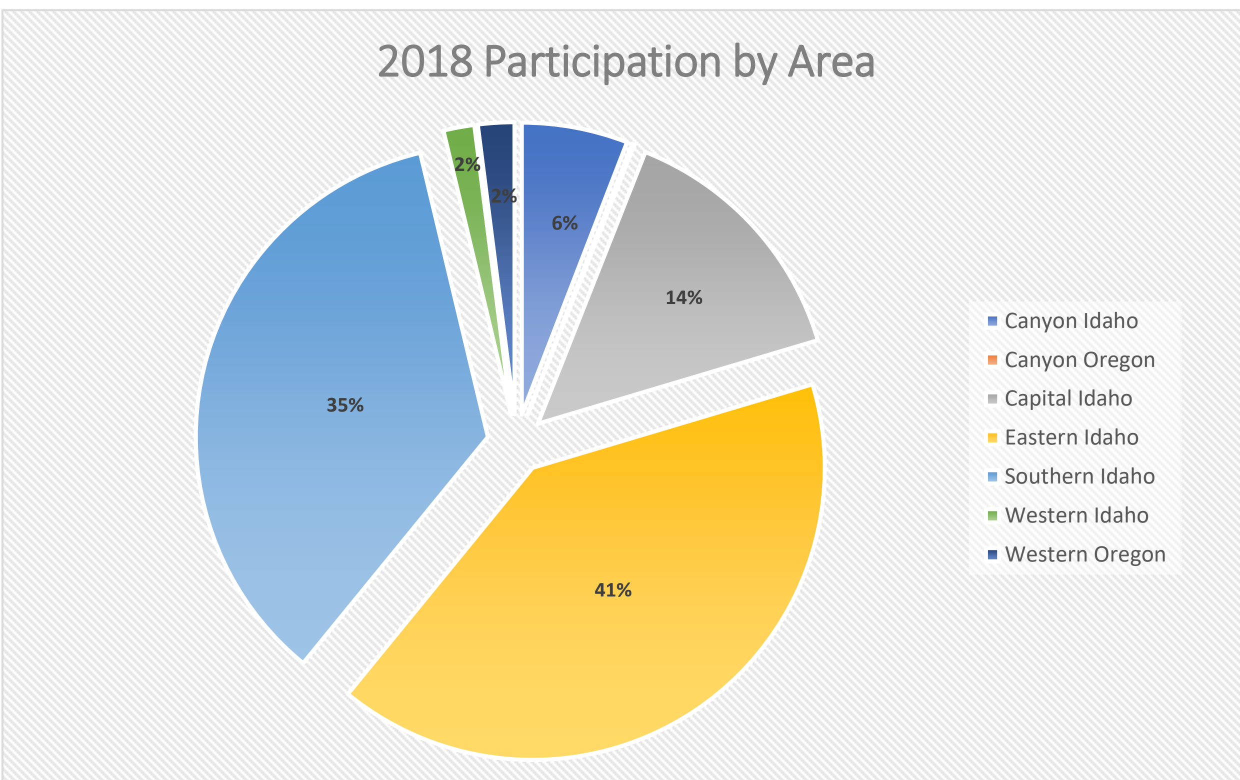


Table 2. Eligible pump locations, nominated MW and participation levels by area

IPC Regional Area	Eligible Service Locations	Manual Dispatch Option	Automatic Dispatch Option	Total Enrolled by Area	Eligible Enrolled	Nominated MW
Canyon Idaho	154	11	126	137	89.0%	38.1
Canyon Oregon	4	0	3	3	75.0%	0.2
Capital Idaho	374	30	306	336	89.8%	91.1
Eastern Idaho	1,118	0	946	946	84.6%	133.7
Southern Idaho	971	5	821	826	85.1%	138.9
Western Idaho	60	0	40	40	66.7%	3.3
Western Oregon	59	3	44	47	79.7%	11.5
Totals	2,740	49	2,286	2,335	85.2%	416.8

OPERATIONS

Equipment

IPC has expanded the use of AMI technology with the use of DRUs installed at pump locations. AMI technology provides the ability to turn off pumps during an IPR event by sending communication through the power line to the DRU.

AMI technology allows IPC to monitor the status of many participating pumps during load control events through an hourly usage report. These reports provide data to help determine which DRU's functioned properly and which pumps were off during the event. During the 2018 season 2438 DRU's were active and installed at 1998 pump locations.

In addition to using AMI technology, IPC developed its own load control device. These devices utilize a cellular network signal to communicate with and shut off the pump during a load control event. The data available from the cellular device systems allows IPC to view status information for each location and successful cellular communication. Hourly usage data is not available at these sites. During the 2018 season 319 cellular devices were active and installed at 275 pump locations.

In order to spread load reduction out over a period long enough to utilize full program capacity, IPC has four dispatch groups. Each group is a four-hour block of time. The 5:00 – 9:00 pm option may have an additional variable payment should four or more events be dispatched during the season. The four options for dispatch groups are as follows:

- 2:00 – 6:00 pm
- 3:00 – 7:00 pm
- 4:00 – 8:00 pm
- 5:00 – 9:00 pm

Monitoring

Identification and correction of device failure is an ongoing effort before the season begins and throughout the season. The AMI hourly data and the AMI communication reports provide information as to which DRU's are malfunctioning and need repair and/or replacement.

A variety of issues with the DRU's and Cellular devices were identified including:

- Inoperable
- Damaged or missing fuse in the DRU
- DRU serial number had been recorded inaccurately and the system could not find the correct communication path
- New panel install at the pump site
- Water damage to the DRU
- DRU missing - no longer at the pump location

ANALYSIS

The load reduction analysis or program performance for the season is calculated utilizing six primary sources:

1. Program participant list
2. AMI hourly usage data
3. Interval metering data
4. Cellular device data
5. Cellular device event communication data
6. Total system load data for event days and surrogate days

The IPR participant data for each load reduction event day includes the following:

- Pump number
- Meter number
- 2018 dispatch option
- 2018 dispatch group
- Nominated kW
- Cellular device or DRU number

IPC system load monitoring was used as a comparison for impact of the load reduction during the event. The total system load monitoring provides megawatt hour (MW) readings in five-minute increments on event days as well as comparative nonevent days.

Data Gathering and Processing

Troubleshooting, customer payments and program performance are informed by data analysis. The first steps of the data analysis are gathering and processing the data. This included AMI Data, cellular device data, MV-90 hourly data and logged data from manually read meters. The data was then separated into three data sets:

1. Pumps with AMI technology and hourly usage data
2. Pumps with cellular device data
3. Pumps running on the manual dispatch option with interval data

Individual Pump Location Load Reduction Results

Calculating the performance of the program requires a comparison between usage prior to the event and usage during the event.

- Average of the hourly interval readings in the second, third and fourth hours of each dispatch group. The first hour is not considered in the baseline data due to the potential for a delay in AMI communications and the message may take up to 10 minutes to register at any specific pump location to shut down for the event therefore showing usage data in the first hour.
- Each pump's usage during the baseline hours is summed to arrive at a combined baseline for each dispatch group (reference Appendix for the demand reduction calculation method and definition of terms).

Table 3 displays the load reduction results for each event day. Each event day includes the four dispatch groups. The load reductions at generation level include a 9.7 percent line loss.

Table 3. Hourly demand reduction results (MW) for each event including line losses.

Event Date	2 - 3 PM	3 - 4 PM	4 - 5 PM	5 - 6 PM	6 - 7 PM	7 - 8 PM	8 - 9 PM
7/13/2018	75.9	149.3	231.8	296.7	218.0	139.3	58.3
7/17/2018	71.3	125.9	206.8	256.6	180.9	121.5	43.6
8/1/2018	54.3	117.3	206.8	263.8	208.5	142.7	54.6

Baseline Calculations and Event Reduction Calculations

July 13th

For the first event, some pumps that should have been active were still listed as inactive due to 2017 information that had not been written over. This occurred due to a modification file not being uploaded for the 2018 enrollments listing active and inactive participants. The modification file is tied to IPC customer information system (CR&B). CR&B holds the record throughout the program season. Without the update some of the pumps were not sent the communication for the DRU to turn the pump off. The mislabeled DRU's were 1.08% of the 2018 program's nominated kW. The modification file was uploaded after the first event and a process put in place to ensure timely uploading in the future.

July 17th

The second event communication to the DRU's for multiple pumps failed due to a vendor provided software issue. This issue impacted the 4:00 pm dispatch group the most, of the DRU's enrolled in the program 6.12% did not receive the communication due to this issue. IPC substations contain equipment to transmit the communication to the service points/ DRU's served in that area. After the issue was identified through the metering department, the technical expert reinstated the communications in time for the 5:00 pm dispatch group to work successfully. In addition to the communication failure on the July 17th event, there were also three substations with no communication to the DRU's. Two substations provided no communication due to power outages in the area and one substation provided no communication because the AMI communication equipment was not operating.

August 1st

The third event of the season went smoothly. The notifications to participants went out as designed and the communication to the DRU's occurred without delays. Overall, the event had lower load reduction due to being scheduled later in the season when many of the participants were done watering their crops for the year.

Potential Realization Rate Analysis

Realization rate is used to determine the IPR potential performance for any day during the season. It is defined as the likelihood that an irrigation pump is on and available for shut off during the demand response event. Potential realization rate is reduced by device failures, opt-outs and small loads left on during an event. These reductions averaged 3.59% for the 2018 season. Table 4 shows results for each event and identifies and categorizes the load left on at participating service locations.

Table 4. Results for all options by percentage

Percentage of MW on during each event by reason				
Event Date	Small Load	Opt Out	Device Failure	Total
7/13/2018	0.39%	0.67%	3.80%	4.86%
7/17/2018	0.24%	0.47%	1.70%	2.41%
8/1/2018	0.28%	1.29%	1.92%	3.49%
Season Average	0.30%	0.81%	2.47%	3.59%

The potential realization rate is the percentage of enrolled demand expected to result in an actual load reduction on the system during a given interruption period in a typical summer.

This rate is highest at the end of June and the beginning of July when a larger percentage of irrigation pumps are operating nearly 24 hours per day seven days per week. The potential realization rate is lower later in the season when many pumps are not operating due to crop maturity and reduced watering demands, primarily for grain crops. Figure 3 shows eligible days in the season and the pumping load of participating pumps. The percentage of load running is reduced by the average percentage of load left on during the three load control event days. The graph shows a maximum potential realization rate of 68.5% which results in a maximum potential load reduction for IPR of 313.5 MW.

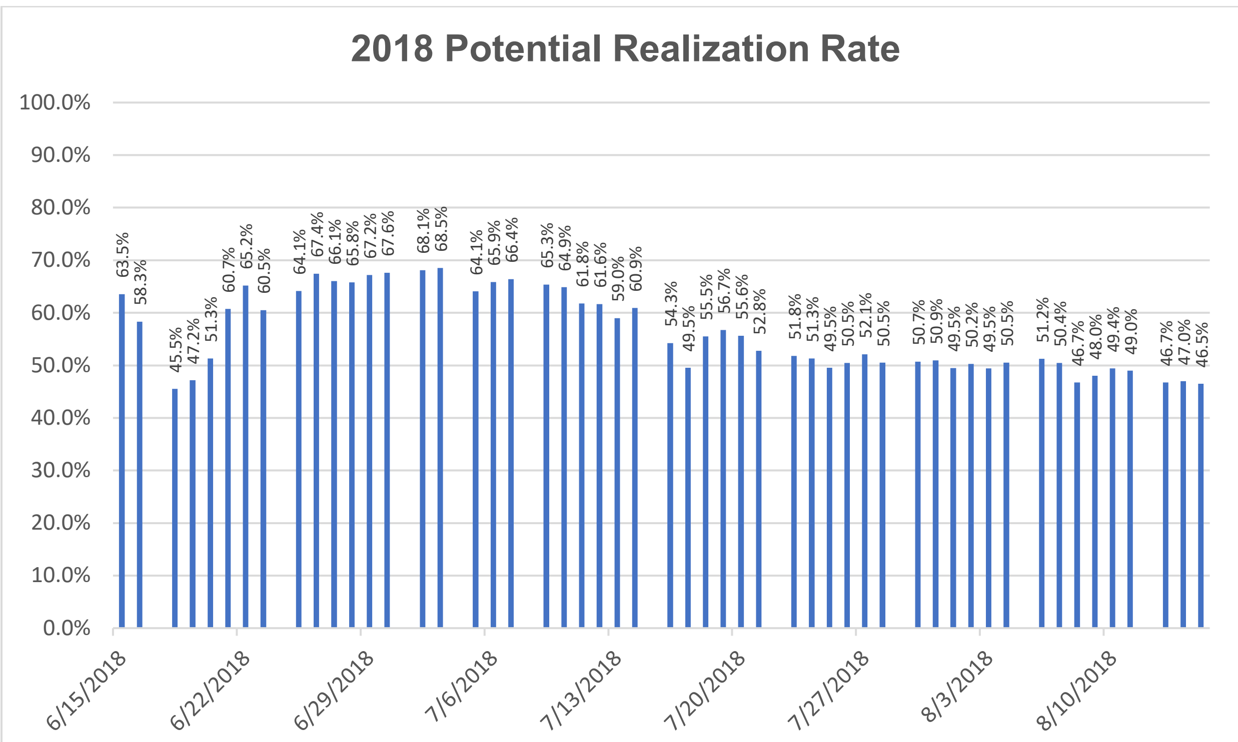


Figure 3. Potential realization rate per day excluding Sunday's and July 4th

Load Reduction Results – Total System Load Data

Idaho Power measures system load data in five-minute intervals. These data were also used to estimate load reduction for IPR. Each event day is considered to evaluate the results of the program operation. The reduction is considered an estimate due to the magnitude of what would have happened absent an event. Figure 4 shows an approximate reduction of 300 MW at 6:00 pm which correlates well with the interval metering data analysis.

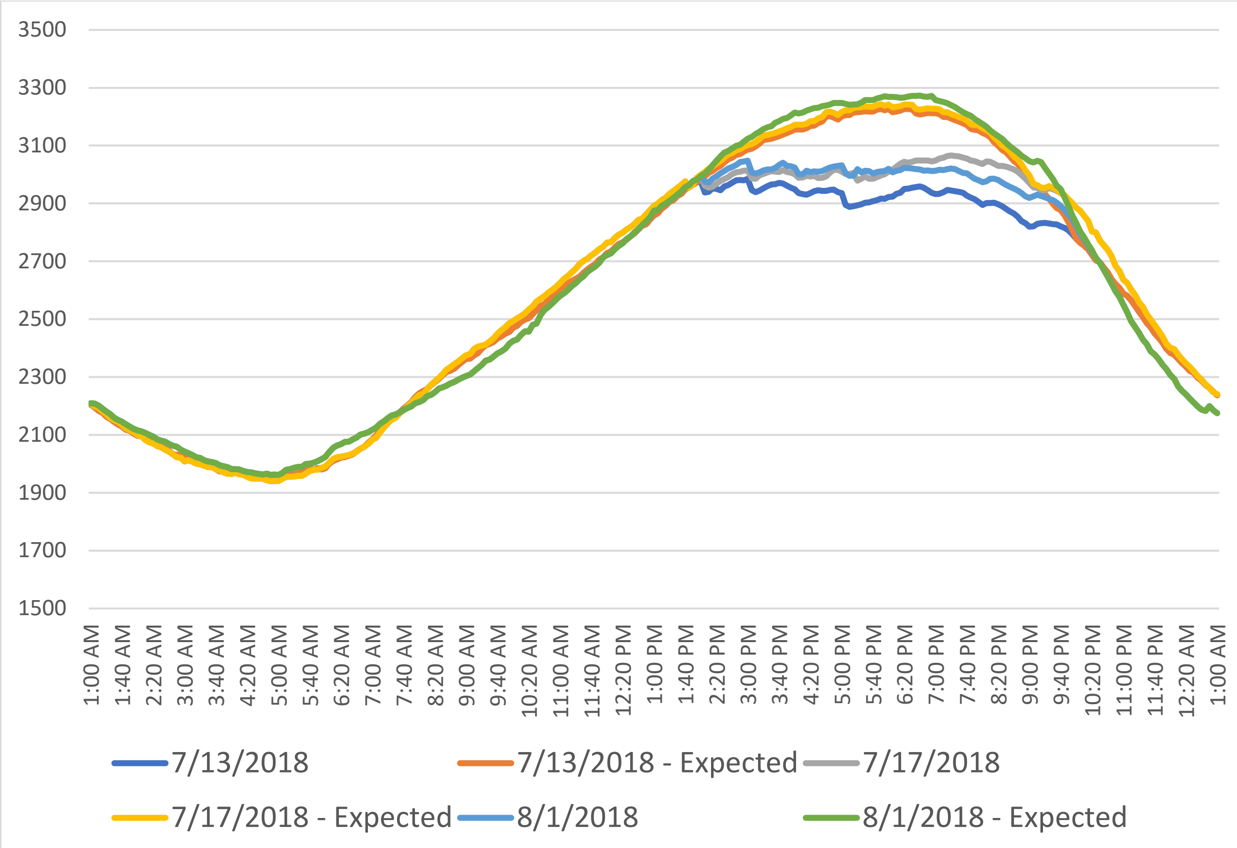


Figure 4. Load reduction results – total system load data

COSTS

IPR spent a total of $6,891,737.00 with the incentive credit being the largest portion at 96.2% of total program costs. Incentives paid for the 2018 season totaled $6,636,510.

Table 5. Annual program costs by category

Expense Item	2018 Total Cost
Materials & Equipment	$ 67,887.00
Purchased Services	$ 77,028.00
Other Expense	$ 2,476.00
Incentives	$ 6,636,510.00
Labor/Administrative Expense	$ 107,836.00
Total	$ 6,891,737.00

CONCLUSIONS

2018 Irrigation Peak Rewards had a demand reduction potential reduction of 313.5 MW and an actual reduction of 296.7 including line losses. Idaho Power Company runs three demand response programs; Irrigation Peak Rewards - Irrigation, Flex Peak - Commercial/Industrial and A/C Cool Credit - Residential. The total load reduction for all three demand response programs was 384.5. Irrigation Peak Rewards presents approximately 81.5% of the total load reduction for the company. Highlights listed below:

- 2,335 pumps enrolled
- 2,438 active AMI DRU's
- 319 active IPC cellular devices
- 85.2% of eligible pump locations participated
- Event 1 – July 13th - max reduction 296.7 MW
- Event 2 – July 17th - max reduction 256.6 MW
- Event 3 – August 1st - max reduction 263.8 MW
- The cost of having this resource available was $21.98 per kW
- The cost of running the program for three events this season was $6.9 million
- The estimated additional cost of running the program at the full 60 hours per season or an additional 48 hours is approximately $2.9 million

APPENDIX

This appendix is a detailed account of the demand reduction calculation method.

Abbreviations

ADO—Automatic Dispatch Option

AEL—Average Event Load

AMI—Automated Metering Infrastructure

BL—Baseline Load

DR—Demand Reduction

MDO—Manual Dispatch Option

MV-90—Specific Meter Package with Interval Data

Σ—Sum

Automatic Dispatch Option

Load reduction for each event was calculated using hourly data for each pump using the last three hours of each curtailment event as follows:

$$DR_{pump} = BL_{pump} – AEL_{pump}$$

The load reduction for all pumps within a dispatch group is the total hourly reduction for each group as calculated below:

$$DR_{group} = \Sigma\ DR_{pump\ (groups\ 1\text{-}4)}$$

Load reduction for the automatic dispatch option was calculated as follows:

$$DR_{ado} = \Sigma\ DR_{group}$$

Manual Dispatch Option

Data utilized for manual dispatch option participants is AMI hourly usage or MV-90 interval data.

Load reduction for manual dispatch option was calculated as follows:

$DR_{group} = \Sigma\, DR_{pump\ AMI} + \Sigma\, DR_{pump\ MV\text{-}90}$

The total demand reduction for the Manual Dispatch Option was calculated as follows:

$DR_{MDO} = \Sigma\, DR_{group}$

The total IPR load reduction was calculated by summing the Automatic Dispatch Option sites and the Manual Dispatch Option sites calculated reduction:

$\text{Total Program DR} = DR_{MDO} + DR_{Group}$

A/C Cool Credit

2018 Demand Response Analysis

Prepared by: Idaho Power

December 2018

Executive Summary

Four three-hour AC Cool Credit events were run July 16, 25, 31, and August 6. Peak program demand reduction occurred July 16th (1.05 kW/participant, 26.5 MW). Accounting for system average energy losses at peak of 9.7% between generation facilities and customers, the max 2018 peak reduction in reduction was 29.1 MW.

The average hourly meter level demand reduction between the four events ranged from 0.33 kW per participant on August 6th to 0.98 on July 16th. The August 6th event was called despite lower temperatures to help regional reliability following a major power line outside of Idaho Power service area went out of service.

Analysis Methodology

AC Cool Credit participants' hourly consumption data was used to estimate demand reduction for all events. The hourly consumption data approach was validated in the 2012 impact evaluation, which analyzed both AMI and logger data, and demonstrated that both sources produced similar estimations of energy reduction per curtailment event. The analytical approach was established through 3rd party evaluations from 2014-2016.

Data Cleaning

Participants were merged with hourly consumption data for each event day and the 10 previous non-weekend days. Error codes were pulled in for all hours and any hour that had an error code, outage flag or was marked as an estimated read during the 4-7 pm event hours or 3 pm prior to the event was removed from the analysis. 96% of all customer sites were preserved after data cleaning.

The sub-sections below describe the project's methodology related to the sampling plan, demand reduction analysis, and updating of the predictive model.

Table 1. 2018 Summary of events and participation

Curtailment Event	Event Hours	AC units enrolled	Sites Analyzed for Reduction*
July 16	4pm – 7pm	26,180	25,175
July 25	4pm – 7pm	26,059	25,063
July 31	4pm – 7pm	25,975	24,981
Aug 6	4pm – 7pm	25,975	24,981

Notes: Customer sites may have more than one AC unit enrolled in program.

Baseline Data

The load reduction achieved during curtailment events was calculated by comparing the average load from each curtailment day against the average load developed from non-curtailment days selected for the baseline. The "previous days" approach was used, which utilizes the average load data from the previous ten non-weekend, non-curtailment days. Baseline kW was calculated as the average of the three days with the greatest demand from these previous ten non-curtailment days, as ranked by the highest hourly demand occurring during the curtailment timeframe. Curtailment days normally occur on hot, high demand days, thus selecting high demand days for the baseline ensures a similar load profile is used for the baseline days as the curtailment days.

Offset Factor

To effectively compare baseline and curtailment day loads, the baseline load was adjusted using an offset factor, calculated as the difference in kW between the baseline and curtailment event day load during the hour prior to the start of the curtailment. The offset factor was applied to the baseline day to "normalize" the baseline kW to the curtailment day kW. The offset factor mitigates underlying differences in load due to slight differences in outdoor temperature or other external factors.

Results

A total of four curtailment events were completed as part of the 2018 A/C Cool Credit program. Table 2 below details the characteristics of these events, including daily high temperature, event time period, and cycling percent.

Table 2. 2018 Summary Results of Curtailment Events

Event Date and High Temp	Cycling %	Region	Avg. kW Reduction per Participant	Max kW Reduction per Participant	Avg. Total kW Reduction	Max Total kW Reduction
July 16 Boise: 97° Poc/TF: 91°	55%	All	.98	1.05	24,578	26,468
		Boise	1.05	1.14	22,458	24,393
		Poc/TF	0.55	0.57	-2,064	-2,108
July 25 Boise: 100° Poc/TF: 94°	55%	All	0.94	0.99	24,436	24,893
		Boise	1.00	0.95	20,193	21,419
		Poc/TF	0.89	0.96	3,396	3,632
July 31 Boise: 97° Poc/TF: 93°	55%	All	0.55	0.59	13,884	14,661
		Boise	0.57	0.61	12,218	12,939
		Poc/TF	0.49	0.45	1,686	1,710
August 6 Boise: 93° Poc/TF: 87°	55%	All	0.33	0.38	8,148	9,520
		Boise	.37	.39	7,759	8,693
		Poc/TF	0.13	0.22	475	846

Figure 1. July 16th 2018

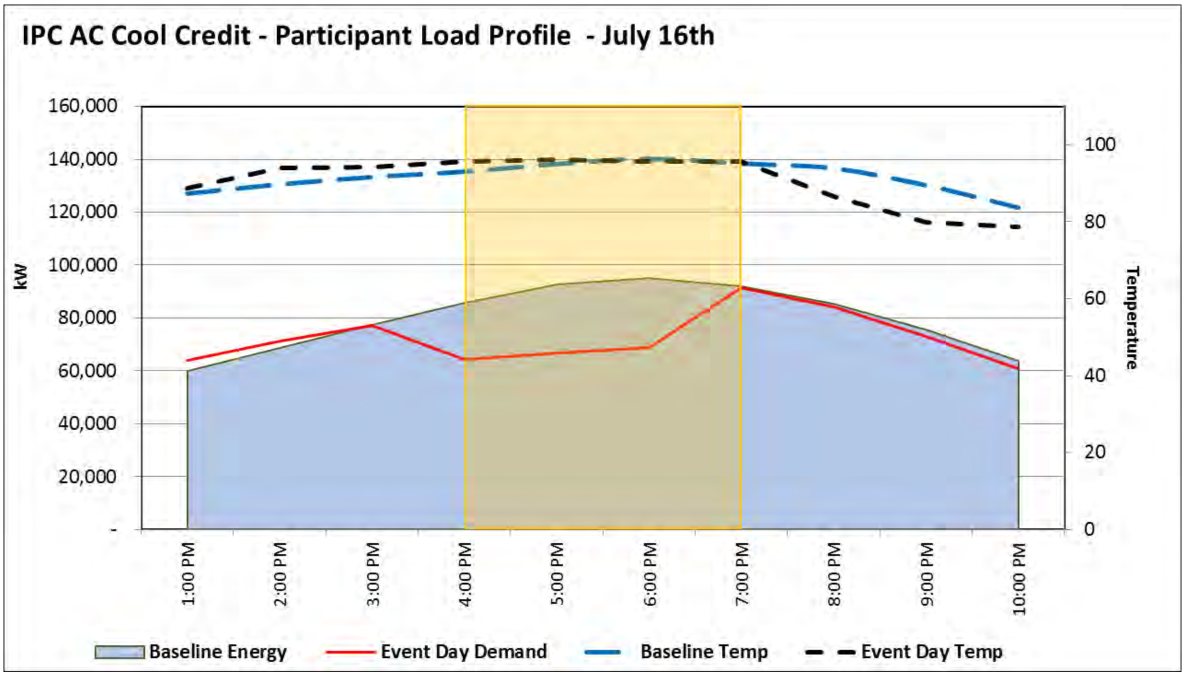


Figure 2. July 25th 2018

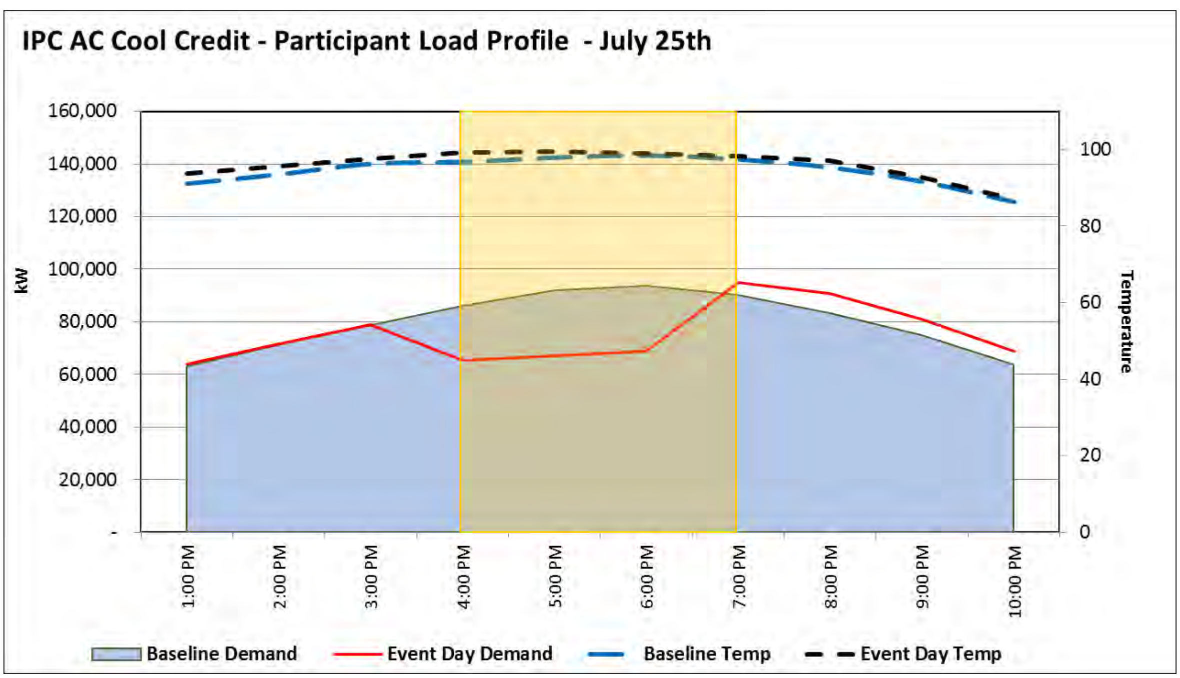


Figure 3 July 31st 2018

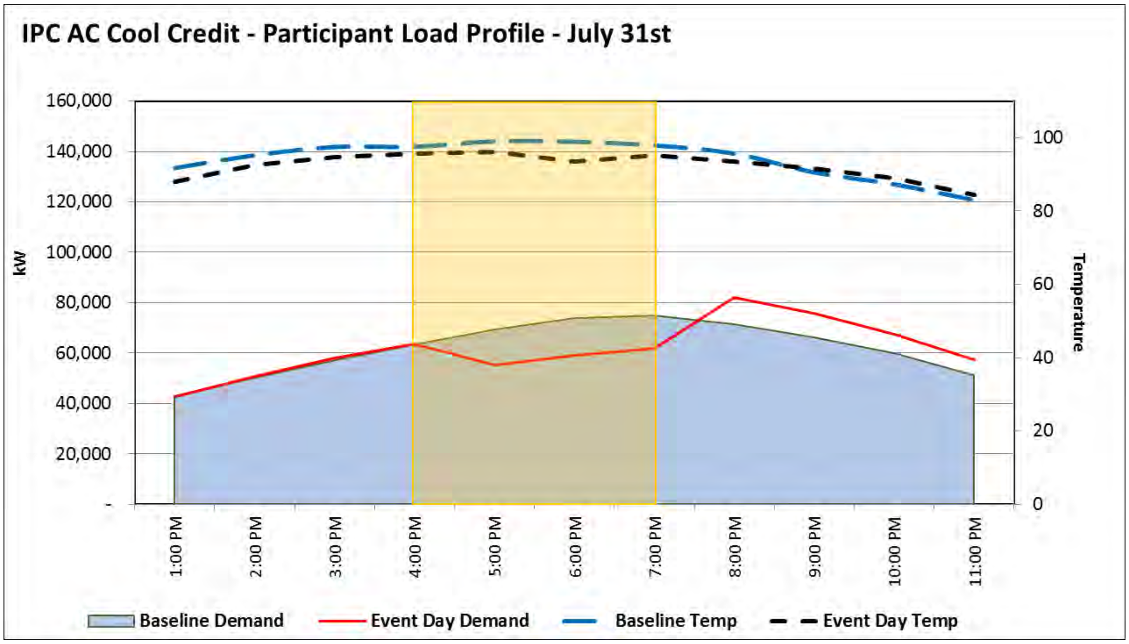
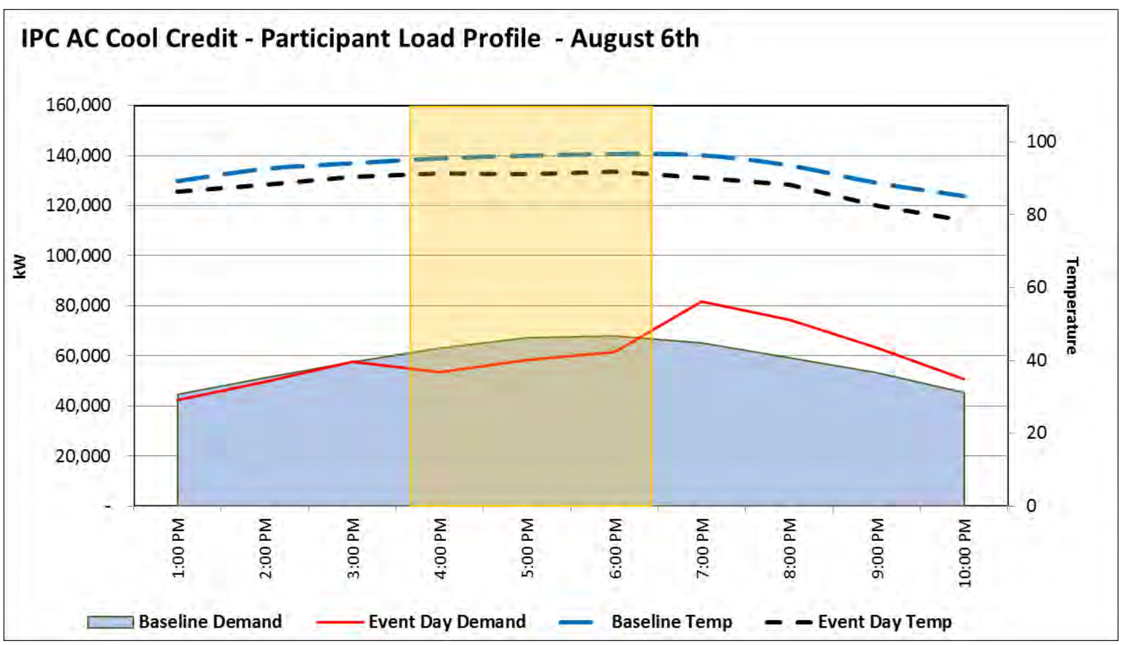


Figure 4 August 6th 2018



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ENERGY-SAVING KIT PROGRAM SUMMARY REPORT
2018

SUBMITTED BY:
RESOURCE ACTION PROGRAMS®

Idaho Power Energy-Saving Kit Program Summary Report 2018

Sponsored by:

IDAHO POWER®

An IDACORP Company

Submitted by:

RESOURCE ACTION PROGRAMS

January 2019

“Shower timer: 3 people — 40 gallon water heater — you do the math. :)”

– Idaho Power Energy-Saving Kit Program Participant

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“Really love all the bulbs! Thank you for helping us out!”

– Idaho Power Energy-Saving Kit Program Participant

Executive Summary

The Idaho Power Energy-Saving Kit Program was designed and implemented to provide Idaho Power's residential households with energy-efficiency education, measures to reduce their energy costs, and help them develop energy-efficient behaviors consistent with Idaho Power. This report summarizes the 2018 Energy-Saving Kit program, which was implemented by forty-three thousand, eight-hundred forty nine (43,849) Idaho households and eight-hundred forty two (842) Oregon households. Funding was provided by Idaho Power.

The program achieved or exceeded expectations and the results are listed below.

PROGRAM ACHIEVEMENTS

1. Provided residential energy-saving measures and energy-efficiency education to 43,849 Idaho and 842 Oregon households.

- Affected all five regions of the Idaho Power service territory
- Affected 107 cities & towns in Idaho
- Affected 19 cities & towns in Oregon

REGIONS	HOUSEHOLDS	ELECTRIC KIT	NON-ELECTRIC KIT
Canyon	7,182	3,334	3,848
Capital	27,341	8,317	19,024
Eastern	3,049	1,805	1,244
Southern	3,878	2,426	1,416
Western	3,241	2,465	776
TOTALS	44,691	18,383	26,308

2. Generated residential energy and water savings. Projected annual savings:

- 214,488,146 gallons of water saved
- 16,823,689 kWh of electricity saved
- 103,394 therms of gas saved

(continued on next page)

(continued)

3. Idaho Power supported their customers through utilization of the following diverse marketing methods.

- Direct Mail
- Email from Idaho Power
- Idaho Power employee
- Idaho Power website
- Info in bill
- Facebook/Twitter
- Friend or Family
- Other:
  - ✔ Fair/Expo/Tradeshow
  - ✔ Fit One
  - ✔ Home and Garden Show
  - ✔ Home Energy Report
  - ✔ Energy Savings Booklet
  - ✔ Flyer
  - ✔ New customer Welcome Kit
  - ✔ Nextdoor
  - ✔ Reddit
  - ✔ School
  - ✔ Senior Center
  - ✔ Smart Women Smart Money Conf.
  - ✔ TV
  - ✔ WICAP Head Start
  - ✔ Miscellaneous
  - ✔ Other
  - ✔ Blank

4. Designed and provided complementary educational materials and incentives to maximize installation of targeted efficiency measures (Installation rates ranged from 44 – 96 percent).
5. Maintained data collection and management services to collect and process audit ready data from participating households.
6. Maintained tracking and reporting to summarize the Program participation.

OPTING-IN METHODS	HOUSEHOLDS	%
Website	**16,256**	**36.4%**
Phone	**1,638**	**3.7%**
Postcards	**26,797**	**60.0%**

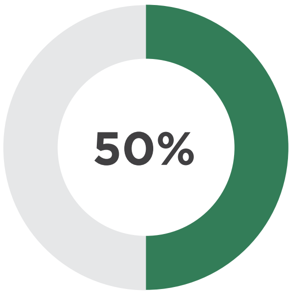
The program was launched in January. Direct mailings were distributed in January (49,288), April (47,537) and September (92,500) and resulted in immediate positive response from Idaho Power customers.

Program content on the Idaho Power website, mention on the Idaho Power Infomercial combined with community events generated a steady demand for the energy-saving kit. The program served a total of 44,691 households in both Idaho and Oregon.

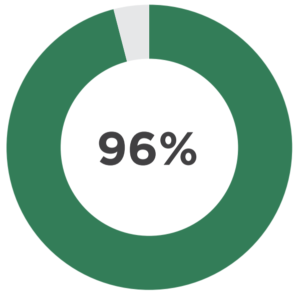
The Program provided customized Direct-to-Customer Program modules, which included educational materials and energy-saving products. A participant survey was included with the program materials (in-kit). The purpose of the survey was to increase educational retention and impact while serving as a data collection tool.

New to 2018, a second follow-up survey was distributed two months after participants' kit receipt. The objective being to determine if those initially responding they had not yet installed but will followed through. The installation responses in the follow-up surveys confirmed they did as overall installation percentages improved.

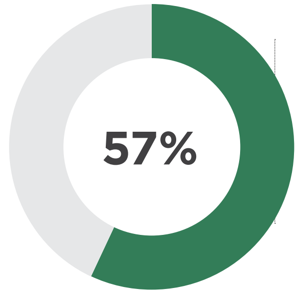
Survey responses indicated high participant satisfaction and participation in product retrofits and adoption of new energy saving behaviors. Total 16,078 households returned completed surveys and the responses were overwhelmingly positive. Highlights include:



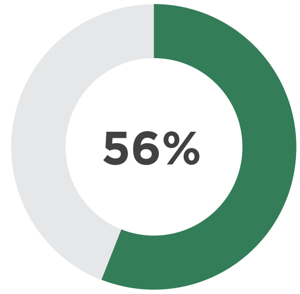
Reported households with ALL 9 LED Light Bulbs installed.



Reported households with the LED Night Light installed.



Reported households with the Evolve TSV & Showerhead installed.



Reported households who used the Shower Timer.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Projected energy savings from this program are significant. Based on the reported actions, annual and lifetime resource savings are as follows:

PROJECTED ANNUAL SAVINGS	
214,488,146	gallons of water saved
16,823,689	kWh of electricity saved
103,394	therms of gas saved

PROJECTED LIFETIME SAVINGS	
1,845,124,456	gallons of water saved
156,010,094	kWh of electricity saved
206,787	therms of gas saved

PROJECTED ANNUAL SAVINGS PER HOME	
11,668	gallons of water saved
376	kWh of electricity saved
2	therms of gas saved

PROJECTED LIFETIME SAVINGS PER HOME	
100,371	gallons of water saved
3,491	kWh of electricity saved
5	therms of gas saved

"Love the showerhead."

– Idaho Power Energy-Saving Kit Program Participant

RAP Direct-to-Customer Programs

For more than 25 years, Resource Action Programs® (RAP) has designed and implemented resource efficiency and education programs, changing household energy and water use while delivering significant, measurable resource savings for program sponsors. All RAP programs feature a proven blend of innovative education and comprehensive implementation services.

RAP Programs serve more than 650,000 households each year through school and adult delivered Measure Based Education Programs. Our forty-person staff manages the implementation process and program oversight for nearly 300 individual programs annually. Recognized nationally as a leader in energy and water efficiency education and program design, RAP has a strong reputation for providing the highest level of service to program sponsors as part of a wide range of conservation and resource efficiency solutions for municipalities, utilities, states, community agencies, and corporations.

All aspects of program design and implementation are completed at the Program Center in Sparks, Nevada. These include: graphic and web design, print production, procurement, warehousing, logistics, module production, marketing, program tracking, data tabulation and reporting.

The Direct-to-Customer Program represents the leading edge of community energy efficiency education program design and implementation. The Program uses a client-directed Measure Based Education model to generate lasting residential energy savings from both retrofits and new behaviors. Initially, participants choose their personal savings target. Then they select retrofits using provided measures and energy-saving behaviors to reach their goal. The Direct-to-Customer Program is tremendously versatile, and can easily be introduced and distributed via a wide range of delivery channels, including Opt-in Direct Mail, CBO/CAA distribution, workshops, community events, affinity groups (volunteers, CAAs, CBOs, churches) or public events.

Cost-effective energy savings from the measure installations will justify program investments on their own, but the Program delivers several other important benefits as well. The educational component is designed to include each household member in order to manage household energy use. Measures, immediate savings actions and additional savings ideas for all areas of residential energy use are grouped by areas of the home and provided to participants as options to help them reach their personal savings targets. Additional rebates and program opportunities can be introduced through the Program or offered as incentives for program performance.

Participation in the Direct-to-Customer Program provides a strong, personalized pathway for participants to realize both initial and ongoing savings from new products and behavior choices in their homes.

Idaho Power Energy-Saving Kit Program Overview

The overarching goal of this measure based program was to assist Idaho Power in providing their residential households with energy-efficiency education and reduced energy costs as well as developing energy efficiency behaviors consistent with Idaho Power's energy efficiency objectives. The energy-savings Kits empowered the Idaho and Oregon households to save energy and money.

The program created and distributed a custom educational savings module consisting of efficiency measures, educational materials, and household surveys. Educational materials included a Quick Start Guide, Survey, Installation Instructions, Mini-Home Assessment (Idaho Power provided) and other tools such as stickers and magnets as reminders for new energy-efficient conservation behaviors. All elements were customized to meet Idaho Power priorities, regional conditions and regulatory requirements.

The program was offered to eligible Idaho Power residential households as defined by Idaho Power. Those in participating households cited the categories shown in the table (at right) when asked how they heard of the program.

HEARD ABOUT PROGRAM	HOUSEHOLDS	%
Direct Mail	31,937	71.46%
Email from Idaho Power	1,112	2.49%
Idaho Power employee	1,371	3.07%
Idaho Power Website	1,372	3.07%
Info in Bill	1,330	2.98%
Facebook/Twitter	323	0.72%
Friend or Family	3,509	7.85%
Other - Fair/Expo/Tradeshow	70	0.16%
Other - Fit One	46	0.10%
Other - Home and Garden Show	75	0.17%
Other - Home Energy Report	15	0.03%
Other - Energy Savings Booklet	12	0.03%
Other - Flyer	22	0.05%
Other - New Customer Welcome Kit	10	0.02%
Other - Nextdoor	33	0.07%
Other - Reddit	11	0.02%
Other - School	20	0.04%
Other - Senior Center	15	0.03%
Other - Smart Women Smart Money Conference	10	0.02%
Other - TV	157	0.35%
Other - WICAP Head Start	17	0.04%
Other - Miscellaneous	446	1.00%
Other	196	0.44%
Blank	2,582	5.78%
TOTALS	44,691	100%

Those in eligible households opting-in to receive the energy-saving kit utilized one of three primary methods:

1. RAP developed and maintained a program website to process energy-saving kit orders as well as to provide program information, including product installation videos and instructions.
2. RAP maintained a toll-free phone number to process the called-in kit orders and address any inquiries and issues.
3. Custom-designed direct mailers were sent to households with program information and instructions on ordering a kit.

Kit installation surveys were received from 16,078 participating households, representing an average response rate of 36% of the 44,691 energy-saving kits distributed. A monthly drawing for a $100 gift card provided the incentive for returning the household installation surveys.

OPTING-IN METHODS	HOUSEHOLDS	%
Website	16,256	36.4%
Phone	1,638	3.7%
Postcards	26,797	60.0%


QUICK START GUIDE
Español en el otro lado
IDAHO POWER
An IDACORP Company
START SAVING NOW!
1 Install the energy-efficient products in your kit.
2 Follow the energy-saving tips provided in this Quick Start Guide.
3 For additional ways to save, visit idahopower.com/save2day.
117419
Shower Timer
LED Lighting
Water Flow-Rate Test Bag
Refrigerator/Freezer
Want to Save More?
Water Heater
Evolve Showerhead Plus TSV
Installation Questions?
Don't forget!

Idaho Power Energy-Saving Kit Program Materials

Each participating household received an energy-saving kit containing efficiency measures for their homes and a Quick Start Guide with energy efficiency information and behavioral tips. The materials were customized for Idaho Power. Households with electric water heating received an electric kit (including water-saving measures). Households with other water heating options received a non-electric kit (excluding water-saving measures).

Included Educational Materials

Quick Start Guide

Survey

Survey Envelope (postage prepaid)

Sticker and Magnet Reminder

Mini-Home Assessment (Idaho Power provided)

Installation Instructions

Included Efficiency Measures

Six 9-Watt LEDs (800 Lumens)

Three 6-Watt LEDs (480 Lumens)

IPC branded LED Night Light

Evolve TSV & Showerhead*

Kitchen and Bathroom Faucet Aerators*

Shower Timer

Digital Thermometer

* An Electric Kit


117429
INSTALLATION SURVEY
(Español en el otro lado)
Complete this survey for a chance to win a
$100* Gift Card
All you have to do is...
1. Install the energy-efficient products in your kit.
2. Follow the energy-saving tips
quick start guide.
3. Return this survey for a cha
gift card!
(Postage-paid envelope included
Fill in each bubble comp
Use a black pen to fill in
next to the correct answ
*For contest details visit Idahopower.com/sa
15039 A0092 Idaho Power DTC
0000000
1. What type of home do you live in?
Single family home - Detached
Apartment, Condo, Townhouse, or Multi-family with 2-3 units
Apartment, Condo, Townhouse, or Multi-family with 4 or more units
Mobile/Manufactured home
2. How many people live in your home?
5 or more
4
3
2
1
3. How many of the LEDs did you install?
All of them
7-8
5-6
3-4
1-2
None
4. If you did not install all of the LEDs, what did you do with the remainder?
Plan to install, just haven't yet
Stored for later use
Gave them to someone else
Other
Have you used the
5. LED Night Light?
6. Shower Timer?
7. Flow-Rate Test Bag to test the flow rate of your shower or faucets?
Yes
Not yet, but will
No, won't use
8. If you used the Digital Thermometer to check the temperature of your water, what was the temperature?
> 140° F
131° F to 140° F
120° F to 130° F
< 120° F
Did not check water temperature
Did you adjust the temperature of your
9. Electric water heater?
10. Refrigerator?
11. Freezer?
Yes I lowered it
Yes I raised it
No I did not adjust
12. How satisfied were you with the kit ordering process?
Very satisfied
Somewhat satisfied
Somewhat dissatisfied
Very dissatisfied
13. Did you receive your kit within 3 weeks?
Yes
No
14. How likely would you be to tell a friend or family member to order a kit?
Very likely
Somewhat likely
Somewhat unlikely
Very unlikely
15. Prior to hearing about the Energy-Saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?
Yes
No
16. Have you ever gone to Idaho Power's website to look for information about energy efficiency programs or to find ways to save?
Yes
No
17. How likely are you to participate in another energy efficiency program?
Very likely
Somewhat likely
Somewhat unlikely
Very unlikely
18. If you did not install some of the kit items, please tell us why.
Return this survey in the postage-paid envelope included in your kit.
You will be entered into our monthly drawing for a chance to win a $100 gift card.

Idaho Power Energy-Saving Kit Program Implementation

An introductory marketing direct mailer, supported by the information on the Idaho Power website, merited positive results. Many shared their positive program experience with their family and friends though social media, word of mouth, and emails. Additional exposure through bill inserts and community events resulted in a steady demand for the program.

Participation was processed and tracked at the RAP Program Center, which has the capacity to handle in excess of 100,000 requests per month. The program website, a toll-free phone number, and the business reply postcards provided convenient methods for interested households to order a kit and participate in the program.

Orders were tracked and managed daily from all outreach and enrollment sources. Program materials and products were packaged and addressed for individual home delivery. All Program modules received a unique ID number to improve the accuracy of data tracking and reduce the amount of information required from respondents.

All enrollments, shipping, and survey data were managed by RAP's proprietary Program Database. In addition, all returned surveys were tabulated and included in the program database. This procedure allows for reporting, which is an important element for tracking the measurements and goals of this program.

“Installed all and happy with all.”

– Idaho Power Energy-Saving Kit Program Participant

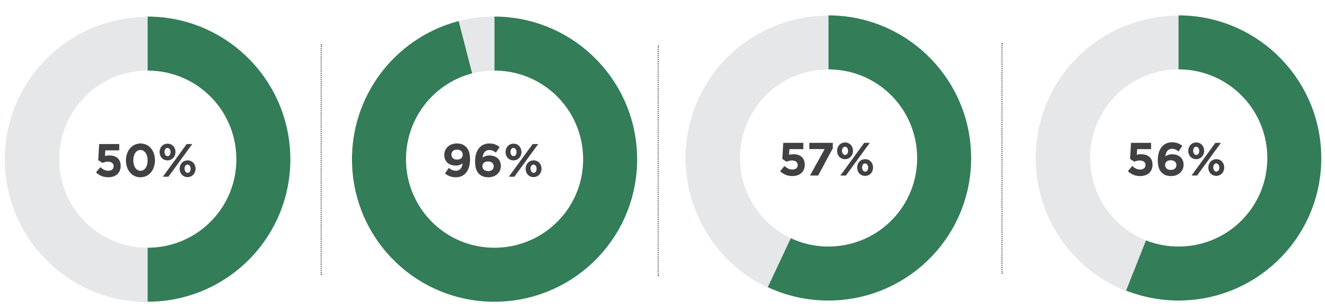
Idaho Power Energy-Saving Kit Program Impact

The program impacted 107 cities and towns throughout Idaho and 19 cities and towns in Oregon. As illustrated below, the program successfully educated those in participating households about energy and water efficiency while generating resource savings through the installation of efficiency measures in their homes. Home survey and installation information was collected to track savings and gather household consumption and demographic data. The three program elements, described on the next few pages, were used to collect this data.

A. Home Survey and Retrofit Data

Upon completion of the program, participating households were asked to complete a home survey to assess their resource use, verify product installation, provide demographic information, and measure participation rates. Sample questions appear below and a complete summary of all responses is included in Appendix B.

Did you install ALL 9 LED Light Bulbs?	**Yes - 50%**
Did you install the LED Night Light?	**Yes - 96%**
Did you install the Evolve TSV & Showerhead?	**Yes - 57%**
Did you use the Shower Timer?	**Yes - 56%**



Reported households with ALL 9 LED Light Bulbs installed.

Reported households with the LED Night Light installed.

Reported households with the Evolve TSV & Showerhead installed.

Reported households who used the Shower Timer.

B. Water and Energy Savings Summary

As part of the program, participants installed retrofit efficiency measures in their homes. Using the family habits collected from the home surveys as the basis for this calculation, 44,691 households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Total Number of Participants:	**44,691**		
Number of Electric Only Participants:	**18,383**		
Number of Non-Electric Participants:	**26,308**		
	Annual	**Lifetime**	
Projected reduction from Showerhead retrofit:	**102,246,454**	**1,022,464,540**	gallons
Measure Life: **10 years**	**4,411,920**	**44,119,200**	kWh
Projected reduction from Shower Timer installation:	**37,469,625**	**74,939,250**	gallons
Product Life: **2 years**	**2,806,400**	**5,612,800**	kWh
	103,394	**206,787**	therms
Projected reduction from Kitchen Faucet Aerator retrofit:	**43,472,132**	**434,721,318**	gallons
Measure Life: **10 years**	**2,463,322**	**24,633,220**	kWh
Projected reduction from Bathroom Faucet Aerator retrofit:	**31,299,935**	**312,999,349**	gallons
Measure Life: **10 years**	**2,757,450**	**27,574,500**	kWh
Projected reduction from **9**-watt LED Light Bulbs:	**2,198,797**	**28,804,243**	kWh
Measure Life: **13.1 years**			
Projected reduction from **6**-watt LED Light Bulbs:	**1,099,399**	**14,402,122**	kWh
Measure Life: **13.1 years**			
Projected reduction from LED Night Light:	**1,086,401**	**10,864,009**	kWh
Measure Life: **10 years**			
TOTAL PROJECTED PROGRAM SAVINGS:	**214,488,146**	**1,845,124,456**	gallons
	16,823,689	**156,010,094**	kWh
	103,394	**206,787**	therms
TOTAL PROJECTED PROGRAM SAVINGS PER HOUSEHOLD:	**11,667.74**	**100,371.24**	gallons
	376	**3,491**	kWh
	2	**5**	therms

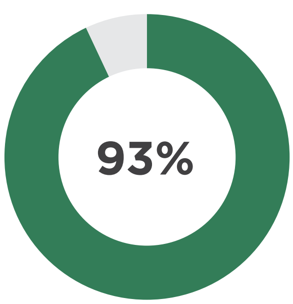
C. Participant Response

Participant response to Idaho Power's various outreach methods combined with social media and interpersonal communication resulted in an overwhelming demand for the program. Idaho Power increased the budget and the kit availability for this program in order to fulfill all residential customer orders. The participants utilized the Quick Start Guide to choose which measures and actions to take. Installation videos and text instructions made retrofit projects easy to complete. The installation rate data and the participant satisfaction data presented in this report were provided by kit surveys.

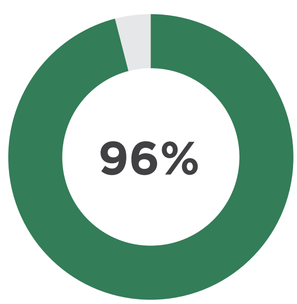
SURVEY TYPE	KITS SHIPPED	IN-KIT SURVEYS RECEIVED	IN-KIT SURVEY RESPONSE %	FOLLOW-UP SURVEYS RECEIVED*	FOLLOW-UP SURVEY RESPONSE%*
Electric	18,383	2,051	11.2%	6,220	33.8%
Non-Electric	26,308	4,084	15.5%	9,858	37.5%
TOTAL	44,691	6,135	13.7%	16,078	36.0%

**Includes Q3 2017 served, excludes November & December 2018 served due to every other month distribution.*

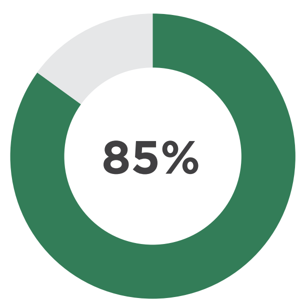
How satisfied were you with the kit ordering process?	**Very Satisfied - 93%**
Did you receive your kit within 3 weeks?	**Yes - 96%**
How likely would you be to tell a friend or family member to order a kit?	**Very Likely - 85%**
How likely are you to participate in another energy efficiency program?	**Very Likely - 78%**



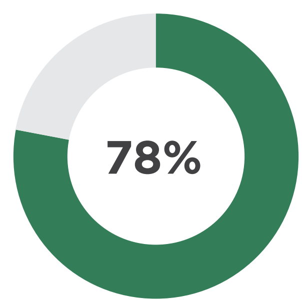
Reported households that were very satisfied with the ordering process.



Reported households that received their kits within 3 weeks.



Reported households that were very likely to tell a friend or family member to order a kit.



Reported households that were very likely to participate in another energy efficiency program.

Participant Responses

Really love all the LED bulbs! Thank you for helping us out! :)

Thank you so much for sending all these helpful items. I'm sure they will be a big change for the better. Again — thank you.

We installed them in all of our lights :) Thank you!

I liked it and went and got more light bulbs to complete the house. Thank you.

I was very satisfied with all the products you supplied. Idaho Power has done an excellent job of informing consumers of cost-energy savings — thanx.

I put them in and I love them all. Thank you. My kids told me about it. And I am so glad.

Will use as needed, just replaced kitchen and bath aerator. Showerhead goes in today. Checking freezer temp but turned down hot water heater and freezer after talking to Idaho Power representative, prior to receiving kit, which we are so pleased with. Thank you.

Installed all items, thank you very much for this program. I hope more ID Power Company customers will take advantage of the program.

So excited about these items — we are always looking for ways to reduce our footprint and save money!

Thank you! I will use or share everything.

I am very energy conscious. I installed what I could. Would like solar power incentives. All lights had been changed!

I installed all of them and I think this is one of the finest programs available to the public.

We are very delighted with the kit. The light is so much brighter and the kids are having a blast trying to keep their showers to 5 minutes, so we appreciate our gift very much.

Great kit! Thank you.

We've been in our home since 1974. Thank you for such a great service. We're in our 80s, so it really helps us.

I installed everything but the LED light bulbs, but will when the old ones need replacing.

I'm 100% LED now. I really looked forward to having you pick up my old refrigerator. I just replaced — why did you end that program!?

Participant Responses *(continued)*

Plan on installing all of it. Already had some installed. Thanks so much for the kit.

I now have them all installed.

Kitchen faucet aerator already installed.

We have CFL bulbs in some of our lights. As soon as they burn out we will replace them with the LEDs.

I installed everything. Thank you for the great energy-saving kit.

Thank you for making me more aware of energy saving items and ideas.

I use all of the kit items… I love it because it did save me energy.

We plan to use all. Thank you.

Going to install everything. :)

We've already implemented many of these features — the biggest help was the webpage and its "hour usage" function. Wow — we cut our power in half!

Everything is installed. Thank you for the kit.

Used all of the LED bulbs, plus went out and bought more. All lights in our house are now LED. The other items we did not need and gave to less fortunate family member to use.

Thank you so much! Awesome kit!

We used and loved everything.

The thermometer is/was excellent. We have adjusted many things because of it. Thanks! Great program!

Kids love shower timer!

Thank you! Please keep this kind of program going!

We are very grateful for our energy kit and have used everything we can. We will try our best to continue saving energy with your help!

Each household needs one of these kits!! :)

* An Electric Kit

Appendices

Appendix A

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Projected Savings from 9-watt LED Retrofit

9-watt LED Light Bulb retrofit inputs and assumptions:

Lamps per participant:	**6**	
Number of participants:	**44,691**	
Deemed savings per lamp (kWh):	**8.20**	kWh[1]
Measure life:	**13.1**	years[1]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**2,198,797**	kWh[2]
The LED retrofit projects a **lifetime** reduction of:	**28,804,243**	kWh[3]

1 *Based on Regional Technical Forum. By request. General purpose and Three-Way. 250 to 1049 lumens.*

2 *LED kWh savings formula (Deemed savings per lamp x Number of participants x Lamps per participant).*

3 *LED kWh lifetime savings formula (Annual savings x Measure Life).*

Projected Savings from 6-watt LED Retrofit

6-watt LED Light Bulb retrofit inputs and assumptions:

Lamps per participant:	**3**	
Number of participants:	**44,691**	
Deemed savings per lamp (kWh):	**8.20**	kWh[1]
Measure life:	**13.1**	years[1]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**1,099,399**	kWh[2]
The LED retrofit projects a **lifetime** reduction of:	**14,402,122**	kWh[3]

1. *Based on Regional Technical Forum. By request. General purpose and Three-Way. 250 to 1049 lumens.*
2. *LED kWh savings formula (Deemed savings per lamp x Number of participants x Lamps per participant).*
3. *LED kWh lifetime savings formula (Annual savings x Measure Life).*

Projected Savings from Evolve TSV Combo Showerhead Retrofit

Evolve TSV Combo showerhead retrofit inputs and assumptions:

Showerheads per electric DHW kit:	**1**	
Number of electric DHW participants:	**18,383**	
Domestic electric hot water reported:	**100%**	1
Number of people per household:	**2.59**	1
Deemed Savings:	**240.00**	2
Length of average shower:	**7.84**	minutes[3]
Showerhead (baseline):	**2.50**	gpm[3]
TSV Combo showerhead new (retrofit):	**1.75**	gpm
Measure life:	**10.00**	years[2]

Projected Electricity Savings:

TSV Combo showerhead retrofit projects an **annual** reduction of:	**4,411,920**	kWh[5]
TSV Combo showerhead retrofit projects a **lifetime** reduction of:	**44,119,200**	kWh[5]

Potential Water Savings with 100 Percent Installation:

TSV Combo showerhead retrofit projects an **annual** reduction of:	**102,246,454**	gallons[4]
TSV Combo showerhead retrofit projects a **lifetime** reduction of:	**1,022,464,540**	gallons[4]

1. *Data Reported by Program Participants.*
2. *Based on Regional Technical Forum. ThermostaticShowerRestrictionValve_1_3.xlsm.*
3. *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*
4. *Showerhead Gallons Formula (Number of participants x (Showerhead baseline - Showerhead new) x Length of average shower x Days per year x People per household).*
5. *Showerhead kWh formula (Number of Participants x Deemed Savings).*

Appendix A

Projected Savings from Kitchen Faucet Aerator Retrofit

Kitchen Faucet Aerator retrofit inputs and assumptions:

Kitchen Faucet Aerator per electric DHW kit:	**1**	
Number of electric DHW participants:	**18,383**	
Domestic electric hot water reported:	**100%**	[1]
Number of people per household:	**2.59**	[1]
Savings:	**134**	kWh[2]
Average daily use:	**2.50**	minutes [3]
Kitchen Faucet Aerator (baseline):	**2.50**	gpm[3]
Kitchen Faucet Aerator (retrofit):	**1.50**	gpm
Measure life:	**10.00**	years[3]

Projected Electricity Savings:

Kitchen Faucet Aerator retrofit projects an **annual** reduction of:	**2,463,322**	kWh[4]
Kitchen Faucet Aerator retrofit projects a **lifetime** reduction of:	**24,633,220**	kWh[5]

Potential Water Savings with 100 Percent Installation:

Kitchen Faucet Aerator retrofit projects an **annual** reduction of:	**43,472,132**	gallons[6]
Kitchen Faucet Aerator retrofit projects a **lifetime** reduction of:	**434,721,318**	gallons[6]

1. *Data Reported by Program Participants.*
2. *Provided by Idaho Power. From Measure Approval Document for Energy Saver Kits. January 1, 2018-December 31, 2018. Energy Trust of Oregon.*
3. *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*
4. *Kitchen Aerators kWh formula (Number of Participants x Savings).*
5. *Kitchen Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*
6. *Kitchen Aerators gallons formula (Number of Participants x (Kitchen aerator baseline - Kitchen aerator retrofit) x Average Daily Use x Days per year x People per household).*

Projected Savings from Bathroom Faucet Aerator Retrofit

Bathroom Faucet Aerator retrofit inputs and assumptions:		
Bathroom Faucet Aerator per electric DHW kit:	**2**	
Number of electric DHW participants:	**18,383**	
Domestic electric hot water reported:	**100%**	[1]
Number of people per household:	**2.59**	[1]
Savings:	**75**	kWh[2]
Average daily use:	**1.50**	minutes [3]
Bathroom Faucet Aerator (baseline):	**2.20**	gpm[3]
Bathroom Faucet Aerator (retrofit):	**1.00**	gpm
Measure life:	**10.00**	years[3]
Projected Electricity Savings:		
Bathroom Faucet Aerator retrofit projects an **annual** reduction of:	**2,757,450**	kWh[4]
Bathroom Faucet Aerator retrofit projects a **lifetime** reduction of:	**27,574,500**	kWh[5]
Potential Water Savings with 100 Percent Installation:		
Bathroom Faucet Aerator retrofit projects an **annual** reduction of:	**31,299,935**	gallons[6]
Bathroom Faucet Aerator retrofit projects a **lifetime** reduction of:	**312,999,349**	gallons[6]

1. *Data Reported by Program Participants.*
2. *Provided by Idaho Power. From Measure Approval Document for Energy Saver Kits. January 1, 2018-December 31, 2018. Energy Trust of Oregon.*
3. *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*
4. *Bathroom Faucet Aerator kWh formula (Number of participants x savings x Bathroom Faucet Aerators per electric DHW kit).*

5 *Bathroom Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*

6. *Bathroom Faucet Aerator gallons formula ((People per Household x Average daily use) x (Bathroom faucet baseline - Bathroom faucet retrofit) x Days per year x Number of Participants).*

Projected Savings from LED Night Light Installation

Energy Efficient Night Light Retrofit Inputs and Assumptions:

Average length of use:	**4,380**	hours per year[1]
Average night light uses:	**7**	watts
Retrofit night light uses:	**0.5**	watts
Measure life:	**10**	years[2]
Energy saved per year:	**28**	kWh per year
Energy saved over life expectancy:	**285**	kWh
Installation / participation rate of:	**85.39%**	[3]
Number of participants:	**44,691**	[3]

Projected Electricity Savings:

The Energy Efficient Night Light retrofit projects an **annual** reduction of:	**1,086,401**	kWh[4]
The Energy Efficient Night Light retrofit projects a **lifetime** reduction of:	**10,864,009**	kWh[5]

1. *Assumption (12 hours per day)*
2. *Product life provided by manufacturer*
3. *Data reported by program participants*
4. *Energy Efficient Night Light kWh savings formula (Energy saved per year x Number of participants x Installation rate)*
5. *Energy Efficient Night Light kWh lifetime savings formula (Energy saved over life expectancy x Number of participants x Installation rate)*

Projected Savings from Shower Timer Installation

Shower TImer inputs and assumptions:		
% of water heated by gas:	**42.00%**	[1]
% of water heated by electricity:	**57.00%**	[1]
Installation / participation rate of Shower Timer:	**50.42%**	[1]
Average showerhead has a flow rate of:	**2.50**	gallons per minute[1]
Retrofit showerhead has flow rate of:	**1.75**	gallons per minute[1]
Number of participants:	**44,691**	[1]
Average of baseline and retrofit showerhead flow rate:	**2.13**	gallons per minute[2]
Shower duration:	**8.20**	minutes per day[3]
Shower Timer duration:	**5.00**	minutes per day[4]
Showers per capita per day (SPCD):	**0.67**	showers per day[3]
Percent of water that is hot water:	**73%**	[5]
Days per year:	**365.00**	days
Product life:	**2.00**	years[5]
Projected Water Savings:		
Shower Timer installation projects an **annual** reduction of:	**37,469,625**	gallons[6]
Shower Timer installation projects a **lifetime** reduction of:	**74,939,250**	gallons[7]
Projected Electricity Savings:		
Shower Timer installation projects an **annual** reduction of:	**2,806,400**	kWh[8]
Shower Timer installation projects a **lifetime** reduction of:	**5,612,800**	kWh[9]
Projected Natural Gas Savings:		
Shower Timer installation projects an **annual** reduction of:	**103,394**	therms[10]
Shower Timer installation projects a **lifetime** reduction of:	**206,787**	therms[11]

1. *Data Reported by Program Participants.*
2. *Average of the baseline GPM and the retrofit GPM*
3. *(March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf*
4. *Provided by manufacturer.*
5. *Navigant EM&V Report for Super Savers Program in Illinois PY7*
6. *Annual water savings = Water Flow (Average of baseline and retrofit flow) × (Baseline Shower duration - Shower Timer duration) × Participants × Days per year × SPCD × Installation Rate of Shower Timer*
7. *Projected Annual Water Savings x Product Life*
8. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Participants*
9. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life x Participants*
10. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Participants*
11. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life x Participants*

Enrollment Survey Response Summary

1 How is the water heated in your home?	
Electricity	41%
Gas	58%
Other	1%
2 Do you own or rent your home?	
Own	88%
Rent	12%
3 What is the primary method of heating your home?	
Gas forced air	68%
Heat pump	6%
Electric forced air	17%
Baseboard or ceiling cable	4%
Other	5%
4 What is the primary method of cooling your home?	
Central A/C	77%
Window A/C	11%
Heat pump	6%
Other	2%
None	4%
5 What, if any, energy-saving improvements are you planning to make in the next two years?	
Windows	27%
Furnace or A/C	16%
Insulation	11%
Appliances	19%
Smart thermostat	16%
Other	11%
6 How did you hear about this kit offering?	
Direct mail	77%
Idaho Power employee	3%
Idaho Power website	3%
Info in bill	3%
Facebook/Twitter	1%
Friend or Family	9%
Other	3%
Blank	1%

Due to rounding of numbers, percentages may not add up to 100%

Kit Survey Response Summary

1 What type of home do you live in?	
Single family home - detached	86%
Apartment, Condo, Townhouses, or Multi-family with 2-3 units	5%
Apartment, Condo, Townhouses, or Multi-family with 4 or more units	2%
Mobile/Manufactured home	7%
2 How many people live in your home?	
5 or more	8%
4	11%
3	13%
2	48%
1	20%
3 How many of the LEDs did you install?	
All of them	48%
7-8	5%
5-6	16%
3-4	17%
1-2	8%
None	6%
4 If you did not install all of the LEDs, what did you do with the remainer?	
Plan to install, just haven't yet	29%
Stored for later use	65%
Gave them to someone else	2%
Other _________	5%
5 Have you installed the Evolve Showerhead?	
Yes	46%
Not yet, but will	40%
No, won't use	14%
6 Have you installed the Kitchen Faucet Aerator?	
Yes	47%
Not yet, but will	29%
No, won't use	23%
7 Have you installed the Bathroom Faucet Aerator #1?	
Yes	55%
Not yet, but will	33%
No, won't use	12%
8 Have you installed the Bathroom Faucet Aerator #2?	
Yes	38%
Not yet, but will	37%
No, won't use	25%

Due to rounding of numbers, percentages may not add up to 100%

Kit Survey Response Summary *(continued)*

9 Have you used the LED Night Light?	
Yes	87%
Not yet, but will	11%
No, won't use	2%
10 Have you used the Shower Timer?	
Yes	50%
Not yet, but will	32%
No, won't use	18%
11 Have you used the Flow-Rate Test Bag to test the flow rate of your shower or faucets?	
Yes	22%
Not yet, but will	56%
No, won't use	22%
12 If you used the Digital Thermometer to check the temperature of your water, what was the temperature?	
> 140 F	2%
131 F to 140 F	8%
121 F - 130 F	24%
< 121 F	26%
Did not check water temperature	39%
13 Did you adjust the temperature of your electric water heater?	
Yes, I lowered it	20%
Yes, I raised it	2%
No, I did not adjust	79%
14 Did you adjust the temperature of your refrigerator?	
Yes, I lowered it	24%
Yes, I raised it	12%
No, I did not adjust	64%
15 Did you adjust the temperature of your freezer?	
Yes, I lowered it	19%
Yes, I raised it	10%
No, I did not adjust	71%
16 How satisfied were you with the kit ordering process?	
Very satisfied	93%
Somewhat satisfied	5%
Somewhat dissatisfied	0%
Very dissatisfied	1%
17 Did you receive your kit within 3 weeks?	
Yes	96%
No	4%

Due to rounding of numbers, percentages may not add up to 100%

Kit Survey Response Summary *(continued)*

18 How likely would you be to tell a friend or family member to order a kit?

Very likely	85%
Somewhat likely	13%
Somewhat unlikely	1%
Very unlikely	1%

19 Prior to hearing about the Energy-Saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?

Yes	53%
No	47%

20 Have you ever gone to Idaho Power's website to look for information about energy efficiency programs and incentives?

Yes	31%
No	69%

21 How likely are you to participate in another energy efficiency program?

Very likely	78%
Somewhat likely	19%
Somewhat unlikely	2%
Very unlikely	1%

22 If you did not install some of the kit items, please tell us why.

Due to rounding of numbers, percentages may not add up to 100%

Idaho Cities & Towns Served

IDAHO CITIES & TOWNS SERVED		
ABERDEEN	GLENNS FERRY	NEW MEADOWS
AMERICAN FALLS	GOODING	NEW PLYMOUTH
ARBON	GRANDVIEW	NORTH FORK
BANKS	GREENLEAF	NOTUS
BELLEVUE	HAGERMAN	OAKLEY
BLACKFOOT	HAILEY	OLA
BLISS	HAMMETT	OREANA
BOISE	HANSEN	PARMA
BRUNEAU	HAZELTON	PAUL
BUHL	HOMEDALE	PAYETTE
BURLEY	HORSESHOE BEND	PICABO
CALDWELL	IDAHO CITY	PINE
CAMBRIDGE	INDIAN VALLEY	PINGREE
CAREY	INKOM	PLACERVILLE
CARMEN	JEROME	POCATELLO
CASCADE	KETCHUM	POLLOCK
CASTLEFORD	KIMBERLY	RICHFIELD
CENTERVILLE	KING HILL	RIGGINS
CHUBBUCK	KUNA	ROCKLAND
CORRAL	LAKE FORK	ROGERSON
COUNCIL	LEADORE	RUPERT
DIETRICH	LEMHI	SALMON
DONNELLY	LETHA	SHOSHONE
EAGLE	LOWMAN	SPRINGFIELD
EAST MAGIC	MARSING	STAR
EDEN	MCCALL	STERLING
EMMETT	MELBA	SUN VALLEY
FAIRFIELD	MERIDIAN	SWEET
FEATHERVILLE	MESA	TENDOY
FILER	MIDDLETON	TWIN FALLS
FORT HALL	MIDVALE	WEISER
FRUITLAND	MONTOUR	WENDELL
FRUITVALE	MOUNTAIN HOME	WEST MAGIC
GARDEN CITY	MURPHY	WILDER
GARDEN VALLEY	MURTAUGH	YELLOW PINE
GIBBONSVILLE	NAMPA	
TOTAL NUMBER OF CITIES & TOWNS SERVED: 107		
TOTAL NUMBER OF HOUSEHOLDS SERVED: 43,849		

Oregon Cities & Towns Served

OREGON CITIES & TOWNS SERVED		
ADRIAN	HEREFORD	ONTARIO
AROCK	HUNTINGTON	OXBOW
BROGAN	IRONSIDE	RICHLAND
DREWSEY	JAMIESON	UNITY
DURKEE	JORDAN VALLEY	VALE
HALFWAY	JUNTURA	
HARPER	NYSSA	
TOTAL NUMBER OF CITIES & TOWNS SERVED: 19		
TOTAL NUMBER OF HOUSEHOLDS SERVED: 842		

Idaho Power Regions Served

REGIONS (IDAHO)	ELECTRIC	NON-ELECTRIC
CANYON	3,315	3,848
CAPITAL	8,317	19,024
EASTERN	1,805	1,244
SOUTHERN	2,462	1,416
WESTERN	1,789	629
NUMBER OF HOUSEHOLDS IMPACTED:	17,688	26,161
TOTAL NUMBER OF HOUSEHOLDS IMPACTED:	43,849	

REGIONS (OREGON)	ELECTRIC	NON-ELECTRIC
CANYON	19	0
WESTERN	676	147
NUMBER OF HOUSEHOLDS IMPACTED:	695	147
TOTAL NUMBER OF HOUSEHOLDS IMPACTED:	842	

REGIONS (IDAHO POWER)	ELECTRIC	NON-ELECTRIC
NUMBER OF HOUSEHOLDS IMPACTED:	18,383	26,308
TOTAL NUMBER OF HOUSEHOLDS IMPACTED:	44,691	

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N30000

Historical DSM Expense and Performance

2002–2018

Historical DSM Expense and Performance, 2002–2018

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	**Participants**	**Utility Cost [b]**	**Resource Cost [c]**	**Annual Energy (kWh)**	**Peak Demand [d] (MW)**	**Measure Life (Years)**	**Total Utility ($/kWh)**	**Total Resource ($/kWh)**
Demand Response								
A/C Cool Credit								
2003	204	$ 275,645	$ 275,645		0.0			
2004	420	287,253	287,253		0.5			
2005	2,369	754,062	754,062		3			
2006	5,369	1,235,476	1,235,476		6			
2007	13,692	2,426,154	2,426,154		12			
2008	20,195	2,969,377	2,969,377		26			
2009	30,391	3,451,988	3,451,988		39			
2010	30,803	2,002,546	2,002,546		39			
2011	37,728	2,896,542	2,896,542		24			
2012	36,454	5,727,994	5,727,994		45			
2013	n/a	663,858	663,858		n/a			
2014	29,642	1,465,646	1,465,646		44			
2015	29,000	1,148,935	1,148,935		36			
2016	28,315	1,103,295	1,103,295		34			
2017	28,214	936,272	936,272		29			
2018	25,845	844,369	844,369		29			
Total		**$ 28,189,412**	**$ $28,189,411**					
Flex Peak Program								
2009	33	528,681	528,681		19			
2010	60	1,902,680	1,902,680		48			
2011	111	2,057,730	2,057,730		59			
2012	102	3,009,822	3,009,822		53			
2013	100	2,743,615	2,743,615		48			
2014	93	1,563,211	1,563,211		40			
2015	72	592,872	592,872		26			
2016	137	767,997	767,997		42			
2017	141	658,156	658,156		36			
2018	140	433,313	433,313		33			
Total		**$ $14,258,076**	**$ $14,258,076**					

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Irrigation Peak Rewards								
2004	58	344,714	344,714		6			
2005	894	1,468,282	1,468,282		40			
2006	906	1,324,418	1,324,418		32			
2007	947	1,615,881	1,615,881		37			
2008	897	1,431,840	1,431,840		35			
2009	1,512	9,655,283	9,655,283		160			
2010	2,038	13,330,826	13,330,826		250			
2011....................	2,342	12,086,222	12,086,222		320			
2012	2,433	12,423,364	12,423,364		340			
2013	n/a	2,072,107	2,072,107		n/a			
2014	2,225	7,597,213	7,597,213		295			
2015	2,259	7,258,831	7,258,831		305			
2016	2,286	7,600,076	7,600,076		303			
2017	2,307	7,223,101	7,223,101		318			
2018	2,335	6,891,737	6,891,737		297			
Total		**$ 92,323,895**	**$ 92,323,895**					
Residential Efficiency								
Ductless Heat Pump Pilot								
2009	96	202,005	451,605	409,180		18	0.031	0.086
2010	104	189,231	439,559	364,000		20	0.044	0.103
2011....................	131	191,183	550,033	458,500		20	0.028	0.081
2012	127	159,867	617,833	444,500		20	0.024	0.094
2013	215	237,575	992,440	589,142		15	0.032	0.132
2014	179	251,446	884,211	462,747		15	0.042	0.148
Total	**852**	**$ 1,231,307**	**$ 3,935,681**	**2,728,069**		15	**$ 0.044**	**$ 0.138**
Easy Savings : Low-Income Energy Efficiency Education								
2015	2,068	127,477	127,477	624,536		10	0.021	0.021
2016	2,001	127,587	127,587	402,961		9	0.035	0.035
2017	2,470	149,813	149,813	280,049		8	0.064	0.064
2018	282	147,936	147,936	29,610		3	1.37	1.37
Total	**6,821**	**$ 552,812**	**$ 552,812**	**1,337,156**		**3**	**$ 0.138**	**$ 0.138**

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Educational Distributions								
2015	28,197	432,185	432,185	1,669,495		10	0.026	0.026
2016	67,065	2,392,884	2,392,884	15,149,605		10	0.016	0.016
2017	84,399	3,466,027	3,466,027	21,187,261		11	0.016	0.016
2018	94,717	3,180,380	3,180,380	16,051,888		11	0.019	0.019
Total	**274,378**	**$ 9,471,476**	**$ 9,471,476**	**54,058,249**		**11**	**$ 0.020**	**$ 0.020**
Energy Efficiency Packets								
2002	2,925	755	755	155,757		7	0.001	0.001
Total	**2,925**	**$ 755**	**$ 755**	**155,757**		**7**	**$ 0.001**	**$ 0.001**
Energy Efficient Lighting								
2002	11,618	243,033	310,643	3,299,654		7	0.012	0.015
2003	12,662	314,641	464,059	3,596,150		7	0.014	0.021
2004								
2005	43,760	73,152	107,810	1,734,646		7	0.007	0.010
2006	178,514	298,754	539,877	6,302,794		7	0.008	0.014
2007	219,739	557,646	433,626	7,207,439		7	0.012	0.017
2008	436,234	1,018,292	793,265	14,309,444		7	0.011	0.013
2009	549,846	1,207,366	1,456,796	13,410,748		5	0.020	0.024
2010	1,190,139	2,501,278	3,976,476	28,082,738		5	0.020	0.031
2011....................	1,039,755	1,719,133	2,764,623	19,694,381		5	0.015	0.024
2012	925,460	1,126,836	2,407,355	16,708,659		5	0.012	0.025
2013	1,085,225	1,356,926	4,889,501	9,995,753		8	0.016	0.058
2014	1,161,553	1,909,823	7,148,427	12,882,151		8	0.018	0.066
2015	1,343,255	2,063,383	4,428,676	15,876,117		10	0.013	0.028
2016	1,442,561	3,080,708	10,770,703	21,093,813		11	0.014	0.049
2017	1,766,758	4,872,888	11,078,990	37,765,190		12	0.012	0.026
2018	1,340,842	2,435,130	3,277,039	18,856,933		14	0.011	0.014
Total	**12,747,921**	**$ 24,778,988**	**$ 54,847,866**	**230,816,609**		**12**	**$ 0.012**	**$ 0.026**
Energy House Calls								
2002	17	26,053	26,053	25,989		20	0.082	0.082
2003	420	167,076	167,076	602,723		20	0.023	0.023
2004	1,708	725,981	725,981	2,349,783		20	0.025	0.025
2005	891	375,610	375,610	1,775,770		20	0.017	0.017

		Total Costs		Savings and Demand Reductions			Levelized Costs[a]	
Program/Year	Participants	Utility Cost[b]	Resource Cost[c]	Annual Energy (kWh)	Peak Demand[d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2006	819	336,701	336,701	777,244		20	0.035	0.035
2007	700	336,372	336,372	699,899		20	0.039	0.039
2008	1,099	484,379	484,379	883,038		20	0.045	0.045
2009	1,266	569,594	569,594	928,875		20	0.052	0.052
2010	1,602	762,330	762,330	1,198,655		20	0.054	0.054
2011..................	881	483,375	483,375	1,214,004		20	0.027	0.027
2012	668	275,884	275,884	1,192,039		18	0.016	0.016
2013	411	199,995	199,995	837,261		18	0.016	0.016
2014	297	197,987	197,987	579,126		18	0.029	0.029
2015	362	214,103	214,103	754,646		18	0.020	0.020
2016	375	206,437	206,437	509,859		18	0.029	0.029
2017	335	183,035	183,035	428,819		16	0.032	0.032
2018	280	160,777	160,777	374,484		16	0.032	0.032
Total	**12,131**	**$ 5,705,689**	**$ 5,705,689**	**15,132,214**		**16**	**$ 0.035**	**$ 0.035**
ENERGY STAR® Homes Northwest (gas heated)								
2014	282			195,372		22		
2015	69			46,872		22		
Total	**351**	**$ 0**	**$ 0**	**242,244**		**22**		
Fridge and Freezer Recycling Program								
2009	1,661	305,401	305,401	1,132,802		22	0.041	0.041
2010	3,152	565,079	565,079	1,567,736		8	0.054	0.054
2011..................	3,449	654,393	654,393	1,712,423		8	0.046	0.046
2012	3,176	613,146	613,146	1,576,426		8	0.046	0.046
2013	3,307	589,054	589,054	1,442,344		8	0.061	0.061
2014	3,194	576,051	576,051	1,390,760		6	0.062	0.062
2015	1,630	227,179	227,179	720,208		6	0.048	0.048
2016	1,539	257,916	257,916	632,186		6	0.062	0.062
2017	2,031	265,942	265,942	498,513		6	0.080	0.080
2018	304	33,907	33,907	73,602		7	0.061	0.061
Total	**23,443**	**$ 4,088,068**	**$ 4,088,068**	**10,747,000**		**7**	**$ 0.062**	**$ 0.062**
Heating & Cooling Efficiency Program								
2006		17,444	17,444					
2007	4	488,211	494,989	1,595		18	27.344	27.710

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2008	359	473,551	599,771	561,440		18	0.073	0.092
2009	349	478,373	764,671	1,274,829		18	0.034	0.054
2010	217	327,669	1,073,604	1,104,497		20	0.025	0.083
2011..................	130	195,770	614,523	733,405		20	0.018	0.056
2012	141	182,281	676,530	688,855		20	0.018	0.066
2013	210	329,674	741,586	1,003,730		20	0.022	0.050
2014	230	362,014	1,247,560	1,099,464		20	0.022	0.075
2015	427	626,369	2,064,055	1,502,172		20	0.028	0.092
2016	483	594,913	1,404,625	1,113,574		20	0.040	0.040
2017	654	597,198	1,433,357	1,138,744		15	0.041	0.099
2018	712	585,211	1,686,618	1,556,065		15	0.029	0.085
Total	**3,916**	**$ 5,258,678**	**$ 12,819,332**	**11,778,370**		**15**	**$ 0.043**	**$ 0.104**
Home Energy Audits								
2013		88,740	88,740					
2014	354	170,648	170,648	141,077		10		
2015	251	201,957	226,806	136,002		10		
2016	539	289,812	289,812	207,249		11	0.13	0.13
2017	524	282,809	353,385	175,010		12	0.146	0.182
2018	466	264,394	321,978	211,003		12	0.113	0.137
Total	**2,134**	**$ 1,298,360**	**$ 1,451,369**	**870,341**		**12**	**$ 0.164**	**$ 0.183**
Home Energy Reports Pilot Program								
2018	23,914	194,812	194,812	3,281,780		1	0.046	0.046
Total	**23,914**	**$ 194,812**	**$ 194,812**	**3,281,780**		**1**	**$ 0.046**	**$ 0.046**
Home Improvement Program								
2008	282	123,454	157,866	317,814		25	0.029	0.037
2009	1,188	321,140	550,148	1,338,876		25	0.019	0.032
2010	3,537	944,716	2,112,737	3,986,199		45	0.016	0.035
2011..................	2,275	666,041	2,704,816	917,519		45	0.038	0.155
2012	840	385,091	812,827	457,353		45	0.044	0.093
2013	365	299,497	1,061,314	616,044		45	0.025	0.090
2014	555	324,717	896,246	838,929		45	0.020	0.055
2015	408	272,509	893,731	303,580		45	0.046	0.152

Program/Year	Participants	Total Costs: Utility Cost [b]	Total Costs: Resource Cost [c]	Savings and Demand Reductions: Annual Energy (kWh)	Savings and Demand Reductions: Peak Demand [d] (MW)	Measure Life (Years)	Levelized Costs [a]: Total Utility ($/kWh)	Levelized Costs [a]: Total Resource ($/kWh)
2016	482	324,024	1,685,301	500,280		45	0.034	0.177
2017	355	166,830	1,345,002	415,824		45	0.021	0.167
2018		2,926	2,926					
Total	**10,287**	**$ 3,830,946**	**$ 12,222,915**	**9,692,418**		**45**	**$ 0.025**	**$ 0.079**
Multifamily Energy Savings Program								
2016	3	59,046	59,046	149,760		10	0.040	0.040
2017	12	168,216	168,216	617,542		11	0.026	0.026
2018	25	205,131	205,131	655,953		11	0.030	0.030
Total	**40**	**$ 432,394**	**$ 432,394**	**1,423,255**		**11**	**$ 0.035**	**$ 0.035**
Oregon Residential Weatherization								
2002	24	-662	23,971	4,580		25	0.010	0.389
2003		-943						
2004	4	1,057	1,057					
2005	4	612	3,608	7,927		25	0.006	0.034
2006		4,126	4,126					
2007	1	3,781	5,589	9,971		25	0.028	0.042
2008	3	7,417	28,752	22,196		25	0.025	0.096
2009	1	7,645	8,410	2,907		25	0.203	0.223
2010	1	6,050	6,275	320		30	0.011	0.062
2011	8	7,926	10,208	21,908		30	0.021	0.027
2012	5	4,516	11,657	11,985		30	0.022	0.056
2013	14	9,017	14,369	14,907		30	0.035	0.055
2014	13	5,462	9,723	11,032		30	0.028	0.050
2015	4	5,808	10,388	11,910		30	0.028	0.050
2016	7	3,930	5,900	2,847		30	0.079	0.118
2017	7	2,384	3,755	2,154		30	0.063	0.099
2018	5	5,507	5,507					
Total	**101**	**$ 73,633**	**$ 153,295**	**124,644**		**30**	**$ 0.041**	**$ 0.085**
Rebate Advantage								
2003	73	27,372	79,399	227,434		45	0.008	0.022
2004	105	52,187	178,712	332,587		45	0.010	0.034

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2005	98	46,173	158,462	312,311		45	0.009	0.032
2006	102	52,673	140,289	333,494		45	0.010	0.027
2007	123	89,269	182,152	554,018		45	0.010	0.021
2008	107	90,888	179,868	463,401		45	0.012	0.025
2009	57	49,525	93,073	247,348		25	0.015	0.029
2010	35	39,402	66,142	164,894		25	0.018	0.031
2011..................	25	63,469	85,044	159,325		25	0.024	0.033
2012	35	37,241	71,911	187,108		25	0.012	0.024
2013	42	60,770	92,690	269,891		25	0.014	0.021
2014	44	63,231	89,699	269,643		25	0.014	0.020
2015	58	85,438	117,322	358,683		25	0.014	0.020
2016	67	111,050	148,142	411,272		25	0.016	0.022
2017	66	104,996	229,104	214,479		45	0.025	0.055
2018	107	147,483	355,115	284,559		45	0.027	0.064
Total	**1,143**	**$ 1,121,168**	**$ 2,267,124**	**4,790,447**		**45**	**$ 0.015**	**$ 0.030**
Residential New Construction Pilot Program (ENERGY STAR® Homes Northwest)								
2003		13,597	13,597	0				
2004	44	140,165	335,437	101,200		25	0.103	0.246
2005	200	253,105	315,311	415,600		25	0.045	0.056
2006	439	469,609	602,651	912,242		25	0.038	0.049
2007	303	475,044	400,637	629,634		25	0.056	0.047
2008	254	302,061	375,007	468,958		25	0.048	0.059
2009	474	355,623	498,622	705,784		25	0.039	0.055
2010	630	375,605	579,495	883,260		25	0.033	0.051
2011..................	308	259,762	651,249	728,030		32	0.020	0.051
2012	410	453,186	871,310	537,447		35	0.046	0.089
2013	267	352,882	697,682	365,370		36	0.053	0.104
2014	243	343,277	689,021	332,682		36	0.057	0.114
2015	598	653,674	1,412,126	773,812		36	0.046	0.099
2016	110	142,158	297,518	150,282		36	0.051	0.107
2017	277	323,520	603,420	608,292		45	0.029	0.054
2018	307	400,912	926,958	777,369		36	0.027	0.061
Total	**4,864**	**$ 5,314,179**	**$ 9,270,041**	**8,389,962**		**36**	**$ 0.042**	**$ 0.073**

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Simple Steps, Smart Savings								
2007		9,275	9,275	0				
2008	3,034	250,860	468,056	541,615		15	0.044	0.082
2009	9,499	511,313	844,811	1,638,038		15	0.031	0.051
2010	16,322	832,161	1,025,151	1,443,580		15	0.057	0.070
2011	15,896	638,323	1,520,977	1,485,326		15	0.034	0.080
2012	16,675	659,032	817,924	887,222		14	0.061	0.075
2013	13,792	405,515	702,536	885,980		12	0.041	0.071
2014	10,061	227,176	302,289	652,129		12	0.031	0.041
2015	9,343	139,096	397,898	770,822		10	0.018	0.053
2016	7,880	153,784	379,752	577,320		11	0.025	0.063
2017	12,556	191,621	484,380	900,171		11	0.020	0.051
2018	7,377	90,484	133,101	241,215		12	0.034	0.050
Total	**122,435**	**$ 4,108,640**	**$ 7,086,150**	**10,023,419**		**11**	**$ 0.045**	**$ 0.078**
Weatherization Solutions for Eligible Customers								
2008	16	52,807	52,807	71,680		25	0.057	0.057
2009	41	162,995	162,995	211,719		25	0.059	0.059
2010	47	228,425	228,425	313,309		25	0.056	0.056
2011	117	788,148	788,148	1,141,194		25	0.042	0.042
2012	141	1,070,556	1,070,556	257,466		25	0.254	0.254
2013	166	1,267,791	1,267,791	303,116		25	0.240	0.240
2014	118	791,344	791,344	290,926		25	0.163	0.163
2015	171	1,243,269	1,243,269	432,958		25	0.175	0.175
2016	147	1,323,793	1,323,793	621,653		25	0.130	0.130
2017	164	1,108,862	1,121,071	604,733		23	0.115	0.117
2018	141	1,022,471	1,022,471	571,741		25	0.112	0.112
Total	**1,269**	**$ 9,060,460**	**$ 9,072,669**	**4,820,495**		**25**	**$ 0.139**	**$ 0.139**
Window AC Trade Up Pilot								
2003	99	6,687	10,492	14,454		12	0.051	0.079
Total	**99**	**$ 6,687**	**$ 10,492**	**14,454**		**12**	**$ 0.051**	**$ 0.079**

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Residential—Weatherization Assistance for Qualified Customers (WAQC)								
WAQC—Idaho								
2002	197	235,048	492,139					
2003	208	228,134	483,369					
2004	269	498,474	859,482	1,271,677		25	0.029	0.050
2005	570	1,402,487	1,927,424	3,179,311		25	0.033	0.045
2006	540	1,455,373	2,231,086	2,958,024		25	0.037	0.056
2007	397	1,292,930	1,757,105	3,296,019		25	0.029	0.040
2008	439	1,375,632	1,755,749	4,064,301		25	0.025	0.032
2009	427	1,260,922	1,937,578	4,563,832		25	0.021	0.033
2010	373	1,205,446	2,782,597	3,452,025		25	0.026	0.060
2011..................	273	1,278,112	1,861,836	2,648,676		25	0.036	0.052
2012	228	1,321,927	1,743,863	621,464		25	0.157	0.208
2013	245	1,336,742	1,984,173	657,580		25	0.150	0.223
2014	244	1,267,212	1,902,615	509,620		25	0.184	0.276
2015	233	1,278,159	2,072,901	529,426		25	0.179	0.290
2016	234	1,254,338	1,870,481	722,430		25	0.129	0.192
2017	196	1,269,507	1,721,632	654,464		30	0.134	0.182
2018	190	1,254,630	1,795,301	641,619		30	0.136	0.194
Total	**5,263**	**$ 19,215,073**	**$ 29,179,331**	**29,770,469**		**30**	**$ 0.045**	**$ 0.068**
WAQC—Oregon								
2002	31	24,773	47,221	68,323		25	0.027	0.051
2003	29	22,255	42,335	102,643		25	0.016	0.031
2004	17	13,469	25,452	28,436		25	0.035	0.067
2005	28	44,348	59,443	94,279		25	0.035	0.047
2006						25		
2007	11	30,694	41,700	42,108		25	0.054	0.074
2008	14	43,843	74,048	73,841		25	0.040	0.068
2009	10	33,940	46,513	114,982		25	0.023	0.031
2010	27	115,686	147,712	289,627		25	0.030	0.038
2011..................	14	46,303	63,981	134,972		25	0.025	0.035
2012	10	48,214	76,083	26,840		25	0.133	0.210
2013	9	54,935	67,847	24,156		25	0.168	0.208

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2014	11	52,900	94,493	24,180		25	0.162	0.289
2015	10	36,873	46,900	20,595		25	0.133	0.169
2016	12	35,471	63,934	23,732		25	0.111	0.199
2017	7	37,978	61,052	15,074		30	0.175	0.281
2018	3	18,344	24,191	7,886		30	0.161	0.213
Total	**243**	**$ 660,025**	**$ 982,905**	**1,091,674**		**30**	**$ 0.042**	**$ 0.062**
WAQC—BPA Supplemental								
2002	75	55,966	118,255	311,347		25	0.013	0.028
2003	57	49,895	106,915	223,591		25	0.017	0.036
2004	40	69,409	105,021	125,919		25	0.041	0.062
Total	**172**	**$ 175,270**	**$ 330,191**	**660,857**		**25**	**$ 0.020**	**$ 0.037**
WAQC Total		**$ 20,050,368**	**$ 30,492,426**	**31,523,000**		**25**	**$ 0.047**	**$ 0.072**
Commercial								
Air Care Plus Pilot								
2003	4	5,764	9,061	33,976		10	0.021	0.033
2004		344	344					
Total	**4**	**$ 6,108**	**$ 9,405**	**33,976**		**10**	**$ 0.022**	**$ 0.034**
New Construction								
2004		28,821	28,821					
2005	12	194,066	233,149	494,239		12	0.043	0.052
2006	40	374,008	463,770	704,541		12	0.058	0.072
2007	22	669,032	802,839	2,817,248		12	0.015	0.040
2008	60	1,055,009	1,671,375	6,598,123		12	0.017	0.028
2009	72	1,327,127	2,356,434	6,146,139		12	0.024	0.043
2010	70	1,509,682	3,312,963	10,819,598		12	0.016	0.035
2011	63	1,291,425	3,320,015	11,514,641		12	0.010	0.026
2012	84	1,592,572	8,204,883	20,450,037		12	0.007	0.036
2013	59	1,507,035	3,942,880	10,988,934		12	0.012	0.032
2014	69	1,258,273	3,972,822	9,458,059		12	0.012	0.037
2015	81	2,162,001	6,293,071	23,232,017		12	0.008	0.024
2016	116	1,931,222	4,560,826	12,393,249		12	0.014	0.033

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2017	121	2,433,596	4,265,056	17,353,820		12	0.013	0.022
2018	104	2,069,645	5,054,215	13,378,315		12	0.014	0.034
Total	**973**	**$ 19,403,515**	**$ 48,483,120**	**146,348,960**		**12**	**$ 0.015**	**$ 0.036**
Retrofits								
2006		31,819	31,819					
2007	104	711,494	1,882,035	5,183,640	0.8	12	0.015	0.040
2008	666	2,992,261	10,096,627	25,928,391	4.5	12	0.013	0.043
2009	1,224	3,325,505	10,076,237	35,171,627	6.1	12	0.011	0.032
2010	1,535	3,974,410	7,655,397	35,824,463	7.8	12	0.013	0.024
2011..................	1,732	4,719,466	9,519,364	38,723,073		12	0.011	0.022
2012	1,838	5,349,753	9,245,297	41,568,672		12	0.012	0.020
2013	1,392	3,359,790	6,738,645	21,061,946		12	0.014	0.029
2014	1,095	3,150,942	5,453,380	19,118,494		12	0.015	0.025
2015	1,222	4,350,865	7,604,200	23,594,701		12	0.017	0.029
2016	1,577	5,040,190	8,038,791	28,124,779		12	0.016	0.026
2017	1,137	4,343,835	12,500,303	23,161,877		12	0.017	0.049
2018	1,358	5,990,179	16,253,716	34,910,707		12	0.015	0.042
Total	**14,880**	**$ 47,340,509**	**$ 105,095,811**	**332,372,370**		**12**	**$ 0.016**	**$ 0.035**
Holiday Lighting								
2008	14	28,782	73,108	259,092		10	0.014	0.035
2009	32	33,930	72,874	142,109		10	0.031	0.066
2010	25	46,132	65,308	248,865		10	0.024	0.034
2011..................	6	2,568	2,990	66,189		10	0.004	0.005
Total	**77**	**$ 111,412**	**$ 214,280**	**716,255**		**10**	**$ 0.019**	**$ 0.037**
Oregon Commercial Audit								
2002	24	5,200	5,200					
2003	21	4,000	4,000					
2004	7	0	0					
2005	7	5,450	5,450					
2006	6							
2007		1,981	1,981					
2008		58	58					

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2009	41	20,732	20,732					
2010	22	5,049	5,049					
2011	12	13,597	13,597					
2012	14	12,470	12,470					
2013	18	5,090	5,090					
2014	16	9,464	9,464					
2015	17	4,251	4,251					
2016	7	7,717	7,717					
2017	13	8,102	8,102					
2018	0	1,473	1,473					
Total	**225**	**$ 104,634**	**$ 104,634**					
Oregon School Efficiency								
2005		86	86					
2006	6	24,379	89,771	223,368		12	0.012	0.044
Total	**6**	**$ 24,465**	**$ 89,857**	**223,368**		**12**	**$ 0.012**	**$ 0.044**
Industrial								
Custom Projects								
2003		1,303	1,303					
2004	1	112,311	133,441	211,295		12	0.058	0.069
2005	24	1,128,076	3,653,152	12,016,678		12	0.010	0.033
2006	40	1,625,216	4,273,885	19,211,605		12	0.009	0.024
2007	49	3,161,866	7,012,686	29,789,304	3.6	12	0.012	0.026
2008	101	4,045,671	16,312,379	41,058,639	4.8	12	0.011	0.044
2009	132	6,061,467	10,848,123	51,835,612	6.7	12	0.013	0.024
2010	223	8,778,125	17,172,176	71,580,075	9.5	12	0.014	0.027
2011	166	8,783,811	19,830,834	67,979,157	7.8	12	0.012	0.026
2012	126	7,092,581	12,975,629	54,253,106	7.6	12	0.012	0.021
2013	73	2,466,225	5,771,640	21,370,350	2.4	12	0.010	0.024
2014	131	7,173,054	13,409,922	50,363,052	5.6	12	0.013	0.024
2015	160	9,012,628	20,533,742	55,247,192	6.3	11	0.016	0.035
2016	196	7,982,624	16,123,619	47,518,871		16	0.013	0.026

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2017	170	8,679,919	17,279,117	44,765,354		16	0.015	0.029
2018	248	8,808,512	16,112,540	46,963,690		16	0.014	0.026
Total	**1,840**	**$ 84,913,388**	**$ 181,444,188**	**614,163,980**		**12**	**$ 0.015**	**$ 0.032**
Irrigation								
Irrigation Efficiency Rewards								
2003	2	41,089	54,609	36,792	0.0	15	0.106	0.141
2004	33	120,808	402,978	802,812	0.4	15	0.014	0.048
2005	38	150,577	657,460	1,012,883	0.4	15	0.014	0.062
2006	559	2,779,620	8,514,231	16,986,008	5.1	8	0.024	0.073
2007	816	2,001,961	8,694,772	12,304,073	3.4	8	0.024	0.103
2008	961	2,103,702	5,850,778	11,746,395	3.5	8	0.026	0.073
2009	887	2,293,896	6,732,268	13,157,619	3.4	8	0.026	0.077
2010	753	2,200,814	6,968,598	10,968,430	3.3	8	0.030	0.096
2011..................	880	2,360,304	13,281,492	13,979,833	3.8	8	0.020	0.113
2012	908	2,373,201	11,598,185	12,617,164	3.1	8	0.022	0.110
2013	995	2,441,386	15,223,928	18,511,221	3.0	8	0.016	0.098
2014	1,128	2,446,507	18,459,781	18,463,611	4.6	8	0.016	0.119
2015	902	1,835,711	9,939,842	14,027,411	1.6	8	0.016	0.085
2016	851	2,372,352	8,162,206	15,673,513		8	0.018	0.063
2017	801	2,475,677	8,382,962	16,824,266		8	0.018	0.060
2018	1,022	2,953,706	11,948,469	18,933,831		8	0.019	0.076
Total	**11,536**	**$ 30,951,311**	**$ 134,872,559**	**196,045,862**		**8**	**$ 0.023**	**$ 0.101**
Other Programs								
Building Operator Training								
2003	71	48,853	48,853	1,825,000		5	0.006	0.006
2004	26	43,969	43,969	650,000		5	0.014	0.014
2005	7	1,750	4,480	434,167		5	0.001	0.002
Total	**104**	**94,572**	**97,302**	**2,909,167**		**5**	**0.007**	**0.007**
Commercial Education Initiative								
2005		3,497	3,497					
2006		4,663	4,663					
2007		26,823	26,823					
2008		72,738	72,738					

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2009		120,584	120,584					
2010		68,765	68,765					
2011		89,856	89,856					
2012		73,788	73,788					
2013		66,790	66,790					
2014		76,606	76,606					
2015		65,250	65,250					
2016								
2017								
2018		146,174	146,174	442,170				
Total		**$ 815,533**	**$ 815,533**	**442,170**				
Comprehensive Lighting								
2011		2,404	2,404					
2012		64,094	64,094					
Total		**$ 66,498**	**$ 66,498**					
Distribution Efficiency Initiative								
2005		21,552	43,969					
2006		24,306	24,306					
2007		8,987	8,987					
2008		-1,913	-1,913					
Total		**$ 52,932**	**$ 75,349**					
DSM Direct Program Overhead								
2007		56,909	56,909					
2008		169,911	169,911					
2009		164,957	164,957					
2010		117,874	117,874					
2011		210,477	210,477					
2012		285,951	285,951					
2013		380,957	380,957					
2014		478,658	478,658					
2015		272,858	272,858					
2016		293,039	293,039					

		Total Costs		Savings and Demand Reductions			Levelized Costs[a]	
Program/Year	Participants	Utility Cost[b]	Resource Cost[c]	Annual Energy (kWh)	Peak Demand[d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2017		1,759,352	1,759,352					
2018		1,801,955	1,801,955					
Total		**$ 5,992,899**	**$ 5,992,899**					
Green Motors Rewind—Industrial								
2016				123,700		7		
2017				143,976		7		
2018				64,167		7		
Total				**331,843**		**7**		
Green Motors Rewind—Irrigation								
2016				73,617		19		
2017				63,783		19		
2018				67,676		19		
Total				**205,076**		**19**		
Local Energy Efficiency Fund								
2003	56	5,100	5,100					
2004		23,449	23,449					
2005	2	14,896	26,756	78,000		10	0.024	0.042
2006	480	3,459	3,459	19,027		7	0.009	0.009
2007	1	7,520	7,520	9,000		7	0.135	0.135
2008	2	22,714	60,100	115,931	0.0	15	0.019	0.049
2009	1	5,870	4,274	10,340	0.0	12	0.064	0.047
2010	1	251	251		0.0			
2011....................	1	1,026	2,052	2,028		30	0.035	0.070
2012								
2013								
2014	1	9,100	9,100	95,834		18		
Total	**545**	**$ 93,385**	**$ 142,061**	**330,160**		**14**	**$ 0.028**	**$ 0.043**
Other C&RD and CRC BPA								
2002		55,722	55,722					
2003		67,012	67,012					
2004		108,191	108,191					
2005		101,177	101,177					
2006		124,956	124,956					

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2007		31,645	31,645					
2008		6,950	6,950					
Total		**$ 495,654**	**$ 495,654**					
Residential Economizer Pilot								
2011		101,713	101,713					
2012		93,491	93,491					
2013		74,901	74,901					
Total		**$ 270,105**	**$ 270,105**					
Residential Education Initiative								
2005		7,498	7,498					
2006		56,727	56,727					
2007								
2008		150,917	150,917					
2009		193,653	193,653					
2010		222,092	222,092					
2011		159,645	159,645					
2012		174,738	174,738					
2013		416,166	416,166					
2014	6,312	423,091	423,091	1,491,225		11		
2015		149,903	149,903					
2016		290,179	290,179					
2017		223,880	223,880					
2018		172,215	172,215					
Total		**$ 2,640,704**	**$ 2,640,704**	**1,491,225**				
Shade Tree Project								
2014	2,041	147,290	147,290					
2015	1,925	105,392	105,392					
2016	2,070	76,642	76,642					
2017	2,711	195,817	195,817					
2018	2,093	162,995	162,995	35,571				
Total	**3,966**	**$ 688,136**	**$ 688,136**	**35,571**				

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Solar 4R Schools								
2009		45,522	45,522					
Total		**$ 45,522**	**$ 45,522**					
Market Transformation								
Consumer Electronic Initiative								
2009		160,762	160,762					
Total		**$ 160,762**	**$ 160,762**					
NEEA								
2002		1,286,632	1,286,632	12,925,450				
2003		1,292,748	1,292,748	11,991,580				
2004		1,256,611	1,256,611	13,329,071				
2005		476,891	476,891	16,422,224				
2006		930,455	930,455	18,597,955				
2007		893,340	893,340	28,601,410				
2008		942,014	942,014	21,024,279				
2009		968,263	968,263	10,702,998				
2010		2,391,217	2,391,217	21,300,366				
2011...................		3,108,393	3,108,393	20,161,728				
2012		3,379,756	3,379,756	19,567,984				
2013		3,313,058	3,313,058	20,567,965				
2014		3,305,917	3,305,917	26,805,600				
2015		2,582,919	2,582,919	21,900,000				
2016		2,676,387	2,676,387	24,615,600				
2017		2,698,756	2,698,756	23,652,000				
2018		2,500,165	2,500,165	24,966,000				
Total		**$ 34,003,521**	**$ 34,003,521**	**337,920,611**				
Annual Totals								
2002		1,932,520	2,366,591	16,791,100	0.0			
2003		2,566,228	3,125,572	18,654,343	0.0			
2004		3,827,213	4,860,912	19,202,780	6.5			
2005		6,523,348	10,383,577	37,978,035	43.9			
2006		11,174,181	20,950,110	67,026,303	43.6			

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2007		14,896,816	27,123,018	91,145,357	57.9			
2008		20,213,216	44,775,829	128,508,579	74.3			
2009		33,821,062	53,090,852	143,146,365	235.5			
2010		44,643,541	68,981,324	193,592,637	357.7			
2011		44,877,117	79,436,532	183,476,312	415.2			
2012		47,991,350	77,336,341	172,054,327	448.8			
2013		26,100,091	54,803,353	109,505,690	54.5			
2014		35,648,260	71,372,414	145,475,713	389.7			
2015		37,149,893	70,467,082	162,533,155	374.5			
2016		40,499,570	70,984,604	170,792,152	379.0			
2017		44,828,089	78,799,054	191,471,395	383.0			
2018		42,926,872	75,797,483	183,377,834	358.7			
Total Direct Program		**$ 459,623,368**	**$ 814,654,650**	**2,035,663,138**				
Indirect Program Expenses								
DSM Overhead and Other Indirect								
2002		128,855						
2003		-41,543						
2004		142,337						
2005		177,624						
2006		309,832						
2007		765,561						
2008		980,305						
2009		1,025,704						
2010		1,189,310						
2011		1,389,135						
2012		1,335,509						
2013		$741,287						
2014		1,065,072						
2015		1,891,042						
2016		2,263,893						
2017		2,929,407						
2018		1,335,208						
Total		**$ 17,628,538**						

Program/Year	Participants	Total Costs: Utility Cost [b]	Resource Cost [c]	Savings and Demand Reductions: Annual Energy (kWh)	Peak Demand [d] (MW)	Measure Life (Years)	Levelized Costs [a]: Total Utility ($/kWh)	Total Resource ($/kWh)
Total Expenses								
2002		2,061,375						
2003		2,528,685						
2004		3,969,550						
2005		6,700,972						
2006		11,484,013						
2007		15,662,377						
2008		21,193,521						
2009		34,846,766						
2010		45,832,851						
2011...................		46,266,252						
2012		49,326,859						
2013		26,841,378						
2014		36,713,333						
2015		39,040,935						
2016		42,763,463						
2017		47,757,496						
2018		44,262,080						
Total 2002–2018		**$ 477,251,906**						

[a] Levelized Costs are based on financial inputs from Idaho Power's *2015 Integrated Resource Plan* and calculations include line loss adjusted energy savings.
[b] The Total Utility Cost is all cost incurred by Idaho Power to implement and manage a DSM program.
[c] The Total Resource Cost is the total expenditures for a DSM program from the point of view of Idaho Power and its customers as a whole.
[d] Peak Demand is reported for programs that directly reduce load or measure demand reductions during summer peak season. Peak demand reduction for demand response programs is reported at the generation level assuming 13 percent peak line losses.

ACLARA ACE™

Adaptive Consumer Engagement

Idaho Power Corporation
Home Energy Report Year 1
Public Program Summary

Version 1.3
Updated: 3/1/2019

Aclara

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REVISION HISTORY

Date	Version	Description	Author/Editor
8/29/18	1.0	Initial Report Created	Trudeau
11/4/18	1.1	Revised from Requirement Meeting	O'Keefe
02/20/21	1.2	Revised based on IPC edits	Cornish
02/20/28	1.3	Additional revisions requested by IPC	Cornish

DOCUMENT APPROVAL

The purpose of this section is to acknowledge approval of the information presented within. Please use the track changes features to indicate any changes necessary before approval of the plan can be made. When ready to approve, please indicate the version number being approved, and complete the fields below.

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Client Name: ______________________

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Date: ______________________

1. EXECUTIVE SUMMARY

Aclara delivered a Home Energy Report program for Idaho Power Corporation from July 2017 to July 2018. Aclara's Home Energy Reports (HER) program is a turnkey behavioral program designed to combine feedback on energy use with contextual information that helps to educate and motivate customers to reduce their energy use and increase customer satisfaction and engagement. The visual design of the report includes varying analytical modules, like smart meter disaggregation, along with targeted messaging that provides insights into customer energy use and encourages customers to take action and become more energy efficient and save.

The program was optimized to drive measurable results across all of Idaho Power's program objectives following the Appendix A - NREL Residential Behavior standard attached hereto.

In line with these goals, 27,000 customers were initially selected to receive paper Home Energy Reports. These households were split into four treatment groups:

Table 1 - Treatment Group Summary

	Cohort	Definition	Number in initial treatment group	Number of customers receiving 1st Report	Number of customers receiving Last Report
T1	Winter Heating Group	High electric heating	7,900	7,092	6,849
T3	Year-Round Group	High User - Use > Average kWh/yr.	8,500	8,295	7,330
T4	Year-Round Group	Medium User - Use Average kWh/yr.	4,100	3,985	3,488
T5	Year-Round Group	Low User - Use < Average kWh/yr.	6,500	6,305	5,411
		TOTAL	27,000	25,677	23,078

The Winter Heating Group were sent four reports: one in November 2017 (along with a welcome letter), one in December 2017, one in January 2018 and one in February 2018. The Year-Round Group received a welcome letter and report in July 2017, and bi-monthly reports starting in August 2017 and ending in June 2018.

Figure 1 - Report Delivery Schedule

Each report included varying modules and messages to provide clear value propositions and calls to action. The paper reports contained a combination of the following elements:

- Customer information – including name, address and account number.

- Smart Meter Disaggregation – Providing targeted groups of residential customers with personalized appliance level usage insights.
- Targeted Message(s) – Calls to action with customized messages for each customer segment based on past program participation. These messages were used throughout the report to drive customers to the My Account portal and to relevant program pages at the direction of IPC relative to sales and marketing initiatives.
- Peer Comparison – normative messaging designed to motivate people to save by comparing the customer's energy use to both typical homes and those homes that are highly efficient. The customer's peer group is derived by taking into account important characteristics of the home.
- Personalized savings measures –The collection of tips to be used for any given individual in the campaign is created based on home profile attributes (obtained or assumed) and customer segmentation.

The attrition rate for the Year-Round Group was 12%. The attrition rate for the Winter Heating Group was 3.5% from first report to last. 94% of the attrition for the Year-Round Group was caused by move-outs and National Change of Address nondeliverables. After the first report, 86% of the attrition was caused by move-outs and National Change of Address nondeliverables in the Winter Heating Group.

1.1 PROGRAM ACHIEVEMENTS

Program achievements include:

- 149,546 total reports sent from July 2017 to June 2018 date affecting 25,677 total customers within the Counties of Ada, Bannock, Bingham, Canyon, Cassia, Gem, Gooding, Jerome, Lemhi, Payette, Twin Falls, Valley, and Washington.
- 172 customers opted out—representing a low opt out rate of 0.64 percent when compared with an average 1 percent in typical Home Energy Report programs.
- Year 1 of the of the program achieved statistically significant energy savings with a 95% confidence interval in 3 out of the 4 treatment groups. The percent saved ranged from 0.5% to 1.7%, and the average energy savings per customer ranged from 28 kWh to 207 kWh.

Customer Satisfaction was measured through a customer survey and calls into the CSRs. Call volume was low overall with 411 total calls to the call center during the report period. The full Customer Satisfaction Survey report is included as Appendix C of this report. Highlights of the customer survey include:

- 90% of survey respondents indicated they want to continue receiving the report.
- 83% of survey respondents felt their utility helps them understand their usage.
- 74% of survey respondents indicated they were motivated to save energy.

2. PROGRAM OVERVIEW

The Winter Heating Group was selected based on their high electric heating usage in the winter. They received four reports from November 2017 – February 2018 that focused on their electric heating usage and tips to save on electric heating.

Table 2 – Winter Heating Group (T1) Report Schedule for Year 1

Report	Date Mailed	Reporting Period
1	November 17, 2017	2016/11/1 – 2017/3/31
2	December 6, 2017	2016/11/1 – 2017/3/31
3	January 23, 2018	2017/11/1 – 2017/12/31
4	February 22, 2018	2017/11/1 – 2018/1/31

The Year Round received four reports from July 2017 to July 2018 that focused on their electric usage related to appliances and lights, always on and air conditioning and associated tips to save.

Table 3 – Year Round Groups (T3, T4 and T5) Report Schedule for Year 1

Report	Date Mailed	Reporting Period
1	July 24, 2017	2016/6/1 – 2017/5/31
		2016/6/1 – 2016/8/31
2	August 22, 2017	2017/6/1 – 2017/7/31
3	October 27, 2017	2017/8/1 – 2017/9/30
4	December 27, 2017	2017/10/1 – 2017/11/30
5	February 27, 2018	2017/12/1 – 2018/1/31
6	April 24, 2018	2018/2/1 – 2018/3/31
7	July 2, 2018	2018/4/1 – 2018/5/31

2.1 OBJECTIVES

Idaho Power identified the following primary objectives for the HER program pilot:

- Provide average annual savings of 1-3% across the participant group.
- Maintain or enhance the current customer satisfaction levels.
- Encourage customer engagement with electric usage, including utilization of online tools and lift for other EE programs.
- Meet cost-effectiveness guidelines from a Total Resource Cost (TRC) perspective.

Further objectives of the pilot included:

- Following industry best practices/protocols for all segments to ensure lessons learned from the pilot appropriately inform program decisions going forward.
- Ensuring program design will stand up to the rigors of a 3rd party evaluation on the back end, i.e., sample sizes adequate to detect and claim expected savings, control and treatment group assignments clean and accurate, etc.
- Obtaining information to provide insights for the future of the program:
    - Scalability
    - Anticipated savings for various customer segments
    - Best target audiences (energy use, geography, etc.)
    - Audiences to exclude, etc.
    - Ability to measure savings

2.2 INTEGRATION AND IMPLEMENTATION

Aclara utilizes a phased implementation methodology to include:

- Phase 1: Project Initiation & Kickoff
- Phase 2: Program Design & Requirements Gathering
- Phase 3: Data Acquisition & Analytics
- Phase 4: Implementation & Configuration
- Phase 5: Report Testing & Approval
- Phase 6: Report Preparation & Fulfillment
- Phase 7: Program Monitoring
- Phase 8: Savings Quantification and Program Summary Report

The Aclara methodology has been developed to help reach the following goals:

- Overall client satisfaction
- Ensure first time implementation success
- Clearly set expectations
- Ensure buy-in at all levels of the client organization
- Enable client's change request process
- Provide avenues for feedback and refinement of the product and process

Fundamentals used to develop methodology and meet implementation goals:

- Include client feedback throughout the process
- Ensure client involvement at all levels (executive to end user)
- Ensure timely delivery of the application

Aclara worked with Idaho Power to acquire the data needed to support the program and analyzed the data to ensure that there were no quality issues. Aclara leveraged existing and/or purchased third party demographic and property data for Idaho Power electric customer records. The household-level data sources will allow for the creation of more robust control and peer groups for driving behavior change and evaluating program performance. Where gaps occurred in third-party property data, Aclara leveraged its consumption analytics model (ACE) leveraging monthly consumption data to determine the property's likely fuel use for heating, cooling and water heating to better validate peer group assignment and segmentation.

Table 4- Program Data Integration

Integration Point	Description	Integration Format	Frequency	Responsible Party Initiator	Responsible Party - Receiver
Electric Customer Billing Data	Idaho Power will provide electric customer billing data to Aclara incrementally each month as each bill cycle is completed for treatment group customers, selected control customers, and random sample for benchmarking.	CSV	Batch – one-time Historical & Reoccurring Weekly	Idaho Power	Aclara
Electric Customer AMI Data	Idaho Power to provide recurring daily AMI updates of electric AMI data for treatment group customers, selected control customers, and random sample for benchmarking.	CSV	Batch– one-time Historical & Reoccurring Weekly	Idaho Power	Aclara
Public Record Data	Aclara calls Melissa Data for latest property records for treatment group customers, selected control customers, and random sample for benchmarking.	CSV	Batch– one-time Historical	Aclara	Aclara
Action and Profile Data	Aclara extracts customer action and profile data from My Account tools (EnergyPrism) for treatment group customers, selected control customers, and random sample for benchmarking.	CSV	Batch – one-time Historical & Reoccurring Weekly	Aclara	Aclara
Opt-Outs	Idaho Power delivery a weekly opt out report to Aclara for removal of customer prior to next program report.	CSV	Reoccurring Weekly	Idaho Power	Aclara

Aclara conducted an eligibility screening of potential participants prior to allocating participants to either a treatment group or a corresponding control group. Criteria for removing customers from eligibility included (but were not limited to):

Table 5 - Criteria and Rationale for Elibility Screening

Criteria	Rationale
Multi-family	Removed multi-family accounts due to difficulty of providing appropriate benchmarking comparisons due to lack of available housing details.
Tenant billing mismatch	Removing accounts where the landlords might be receiving reports relating to tenants.
<1 year of AMI data available	More than 1 year of energy data is needed to provide a baseline for EM&V purposes.
Oregon Accounts	For the pilot period, participation was limited to Idaho customers.
Net Metering Accounts	Households on a net metering rate would receive an HER that does not accurately reflect their household energy use, so they were not eligible for the HER program.
County	Regions that did not have sufficient eligible accounts to create robust benchmarks were removed from eligibility to ensure that all customers were compared to robust benchmarks.

Once customer segmentation had been identified, Aclara worked with Idaho Power to define the campaign strategy to customize key messaging in the report. Customer segmentation was leveraged to refine savings tips selections and promotions based on targeting offers that would be both the most relevant and have the highest likelihood of adoption.

Aclara, in collaboration with Idaho Power, implemented an iterative report configuration that enables Idaho Power to update the content of the report to ensure the design meets Idaho Power's program objectives.

2.3 TEAM STRUCTURE

Aclara and Ecotagious have been partnering since 2016 to deliver greater value to our customers. We have been successfully integrating our two technologies and have already delivered results exceeding expectations to all our clients. Ecotagious' ability to segment residential customers on their appliance use plays a key role in Aclara's behavioral efficiency programs to drive energy savings for gas and electric utilities.

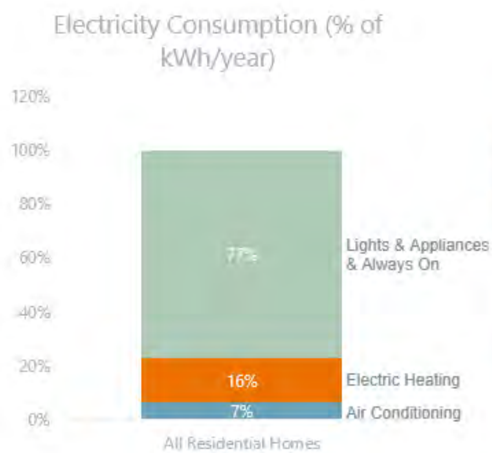
Ecotagious and Aclara were pleased partner with Idaho Power Corporation to deliver this Home Energy Report Program.

3. METHODOLOGY

In this pilot, the energy savings from different customer segments were tested. Treatment groups of High-users (T3: > Average kWh/year), Medium-users (T4: ~Average kWh/year)) and Low-users (T5: < Average kWh/year) were created to measure the difference in energy savings between them. The savings results are provided in section 5. A Winter Heating Group was also created that included customers with high electricity use for heating in the winter. This group received 4 reports during the heating season.

Idaho Power has strong summer and winter periods of high electricity use for A/C & Heating, representing 23% of average residential electricity use. Analyzing the electricity consumption per home per year allowed for identifying Year Round program candidates as well as winter heating and summer AC candidates.

Figure 2 - Average kWh electricity use - Jan1, 2016 - Dec 31, 2016



Average Home's Electricity Use by Major Appliance (kWh/yr)	kWh/yr	% of Total
Lights & Appliances & Always On	8,511	77%
Electric Heating	1,791	16%
Air Conditioning	752	7%
Total	11,055	100%

Figure 3 - Electricity Consumption (% of kWh/year)

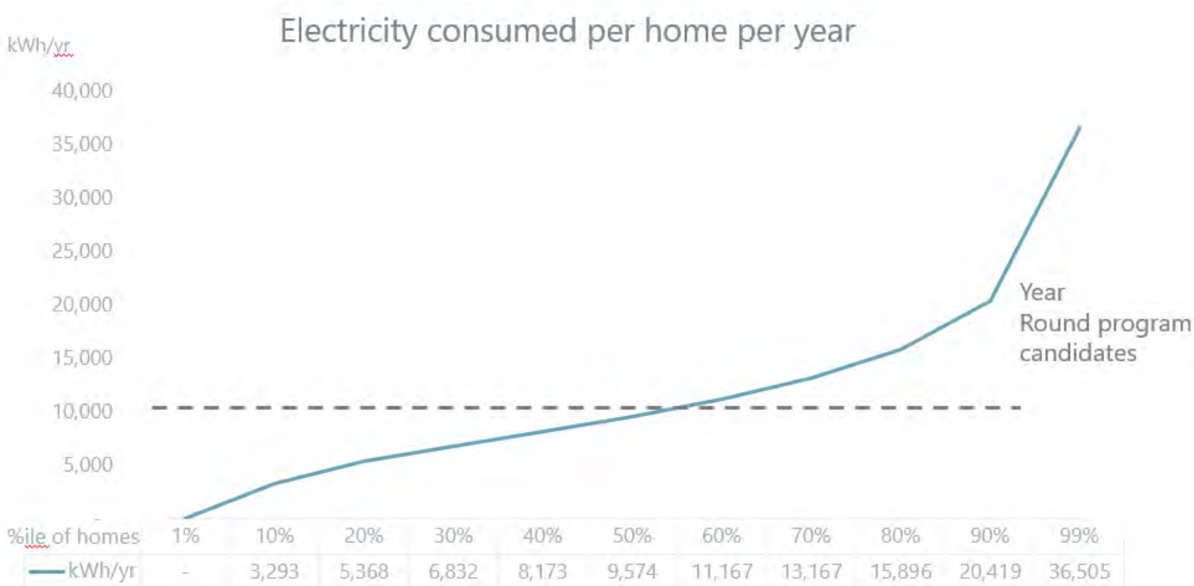


Figure 4 - Electrcicity consumed per home per year

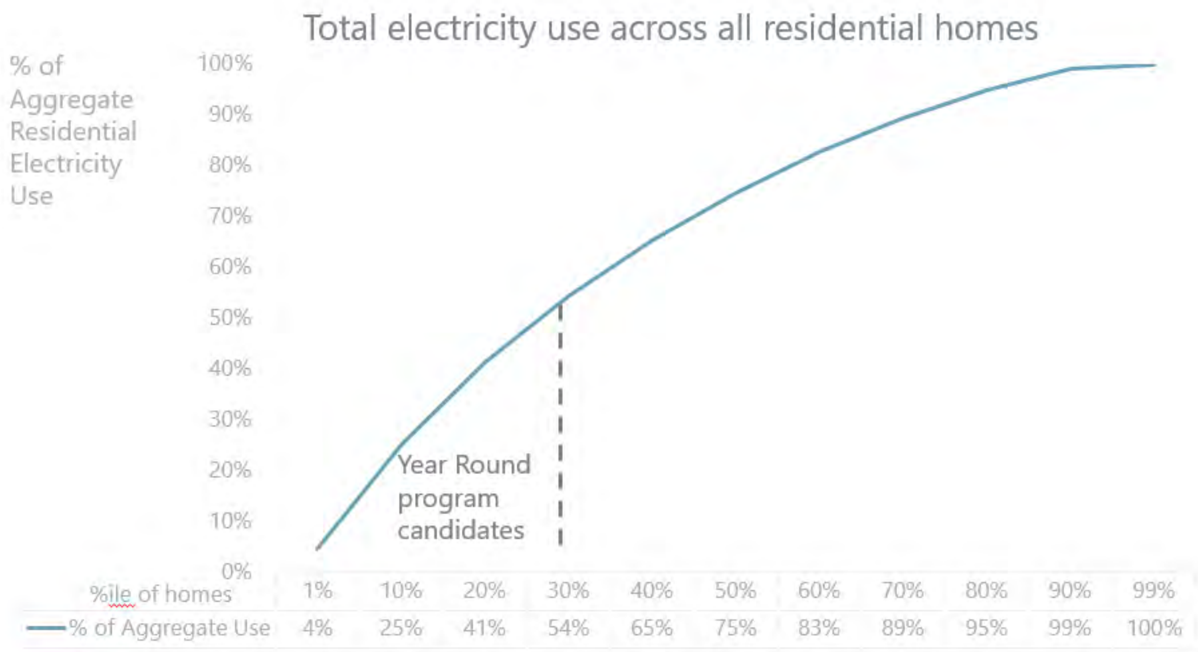


Figure 5 - Total electricity load across all residential homes

3.1 PROGRAM DESIGN

The energy savings from these groups were evaluated following standard industry-accepted evaluation practices. The program was set up as a Randomized Control Trial (RCT) where a third party created the treatment and control groups. 27,000 customers were identified as initial program participants.

After taking into consideration exclusionary factors such as move-ins and move-outs, as well as removing a number of the T-1 potential participants due to the lack of adequate county benchmarks, the sample sizes at the time first reports were delivered were:

Table 6 – Treatment and Control Group Size at First Report

	Treatment	Control
Winter Heating – T1	7,092	14,995
Year-Round – T3	8,295	44,232
Year-Round – T4	3,985	40,830
Year-Round – T5	6,305	66,783
TOTAL	25,677	166,840

The evaluation employed a ‘difference-in-differences’ approach to allow for accurate evaluation of program driven energy savings. Appropriate-sized treatment and control groups were created for each cohort, accounting for an attrition rate of 10 percent and allowing for statistically significant detection of energy savings in excess of 1.2% in the treatment groups. To achieve this objective, all eligible customers were placed in either the treatment group or the control group.

Households that moved-out during the evaluation period were taken out of both the treatment and control groups. Customers who opted out or were removed due to being marked nondeliverable by the National Change of Address database were left in both the treatment and control groups.

4. CUSTOMER SATISFACTION

4.1 CUSTOMER SATISFACTION SURVEY

The primary goal of the customer satisfaction survey was to measure customer satisfaction. Oraclepoll Research Limited was commissioned to conduct survey research with Idaho Power customers to assess impact of the Home Energy Reports. A total of 400 customers were interviewed, broken down as follows:

- N=200 completed interviews for the control group
- N=200 completed interviews for the treatment sample, with:
    - N=100 interviews among the winter heating group (T1)
    - N=100 interviews among the year-round group (T3, T4 & T5)

The survey was conducted by telephone using live person researchers at the Oraclepoll call center. The survey questions are included in Appendix C.

The survey was completed between April 15th – April 24th, 2018. The margin of error for the total N=400 sample is ± 4.8%, 19/20 times. The error rates for each of the two N=200 sub-samples are ± 6.9%, 19/20 times.

Based on the survey respondents' answers to the questions posed:

a) The Home Energy Reports have not had a negative effect on customer satisfaction.
b) Households who received Home Energy Reports perceived that Idaho Power was trying to help them manage their energy use.
c) Households who received Home Energy Reports remembered receiving them and said they read "all or most" of them.
d) Households who received Home Energy Reports said they acted to save money and electricity.
e) Households who received Home Energy Reports would like to continue receiving them.

Details of the customer satisfaction survey results are provided in Appendix C.

Interestingly, the results of the customer survey suggest that the T5 group is the most interested in continuing to receive reports. 87% of customers in group T5 answered yes to the question "If the program remains in place, would you like to continue receiving Home Energy Reports at no charge?"

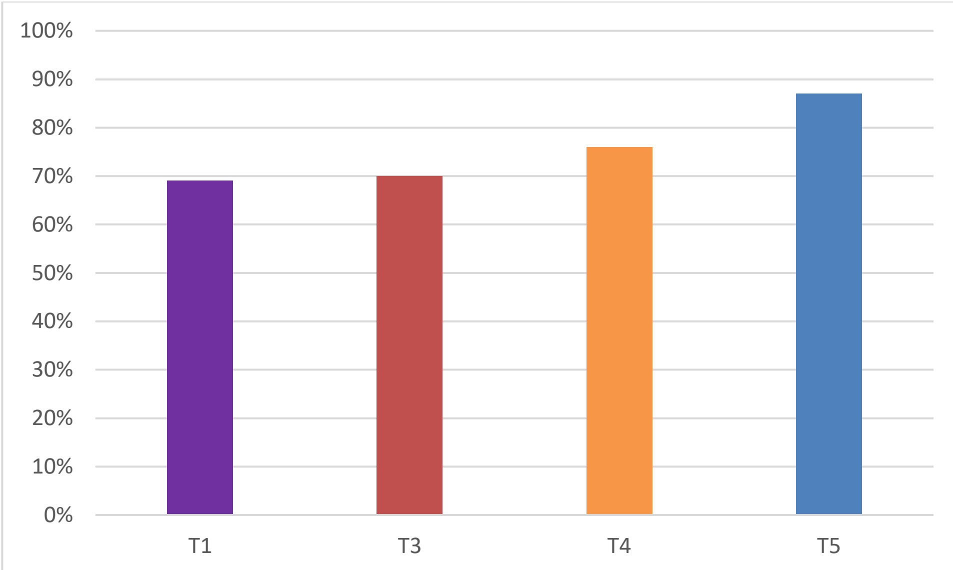


Figure 6 - Percentage of each treatment group who answered "yes" to "If the program remains in place, would you like to continue receiving Home Energy Reports at no charge?"

A further breakout of the survey results is provided in Appendix D.

4.2 CSA RESULTS & OPT-OUTS

IPC Customer Service Agents received a total of 411 calls, which is 1.5% percent of treated customers. This is a low call-in rate.

The opt-rate for the program was 0.64%, below the industry average of 1%.

CSAs reported excellent feedback on the program, summarized here:

- Reports driving customers to update their profiles online
- Reports driving customers to have conversations about IPC energy saving programs
- Customers calling to say they like the program

Few customers were reporting negative feedback.

- Customers calling to say they don't like the report

Table 7 - CSA Results & Opt-Outs

Call Reason	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
General	30	3	1	13	18	10	8	17	3	3	1	4	110
Profile Update	34	9	1	4	13	20	4	2	2	2	0	3	94
Opt-Out	101	11	0	7	23	9	0	2	1	12	0	6	172
Escalation	1	0	0	0	0	0	0	0	0	0	0	0	1
Non-Prog Related	9	0	1	1	2	2	1	6	1	1	0	0	24
Other	10	1	0	3	9	1	2	4	1	1	0	3	35

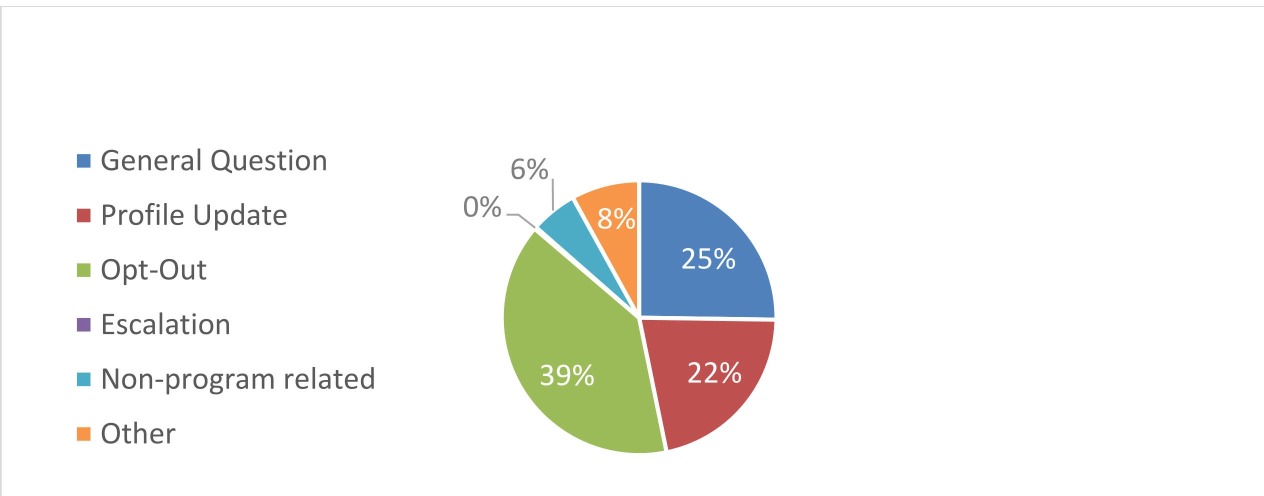


Figure 7 - CSA Dispositions

4.3 MICROSITE ENGAGEMENT

Table 8 - Microsite Activity by Month

Microsite Activity	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total Program to Date
Unique Clicks	24	10	11	11	7	9	3	6	2	1	0	31	115
Total Clicks	25	10	12	14	7	10	3	9	2	1	0	32	125

The microsite usage is low, as expected. In programs where there is no ability to opt-out or update home profile on the microsite, we expect the usage to be low. The intent of the microsite in this pilot is to help reduce call volumes by providing answers to frequently asked questions.

5. PROGRAM SAVINGS

The Winter Heating Group has the highest cumulative aggregate savings due to the intensity of electric heating, even though they only received four reports. Energy savings for the treatment period were statistically significant during this treatment period for T1, T3 and T4, but not T5.

Table 9 - Cumulative Savings by Cohort

Cohort	Avg Energy Savings in kWh per Customer in the Treatment Period	95% Confidence Margin of Error	One-Sided Null Hypothesis	~Cumulative Aggregate Savings (kWh)	Treatment Period
Winter Heating – T1	207	101	3.13E-05	1462, 412	Dec 01, 2017 to July 31, 2018
Year-Round - T3	151	54	2.86E-08	1125, 930	Aug 01, 2017 to July 31, 2018
Year-Round - T4	149	51	7.59E-09	534, 536	Aug 01, 2017 to July 31, 2018
Year-Round - T5	28	35	0.0563	158, 902	Aug 01, 2017 to July 31, 2018

5.1 WINTER HEATING GROUP M&V RESULTS

Table 10 - Winter Heating Group Percentage Annualized Savings

Winter Heating – T1	1.5%

*excludes initial 3 month ramp-up period from Dec 2017-Feb 2018

The chart below shows the monthly reduction in energy use for the Winter Heating Group (negative values are energy savings).

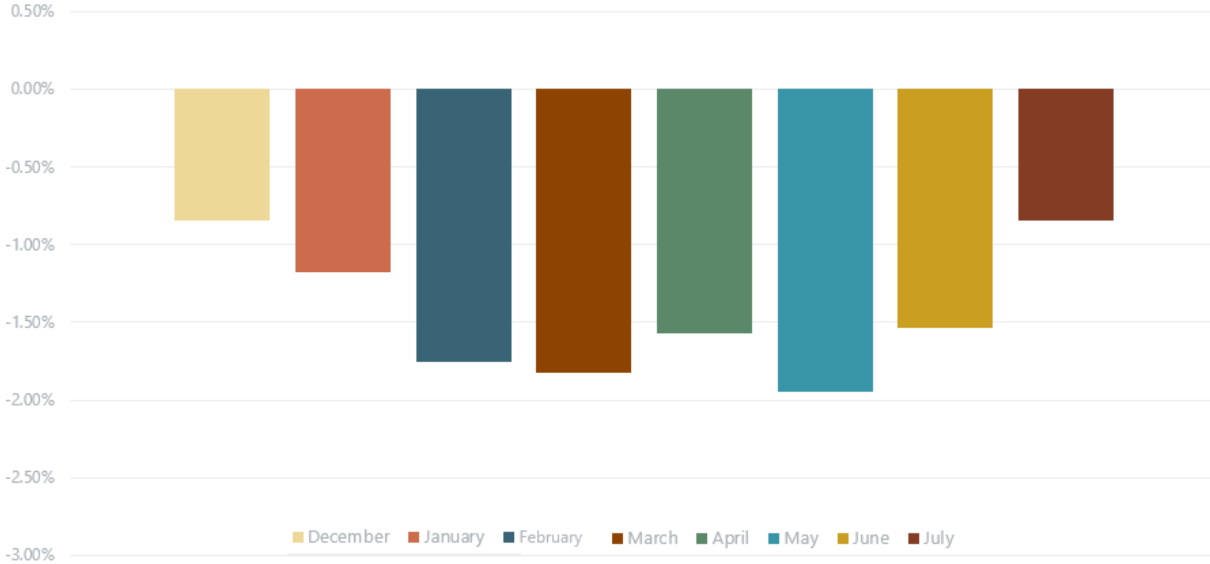


Figure 8 - Winter Heating Monthly Energy Use Reduction in %

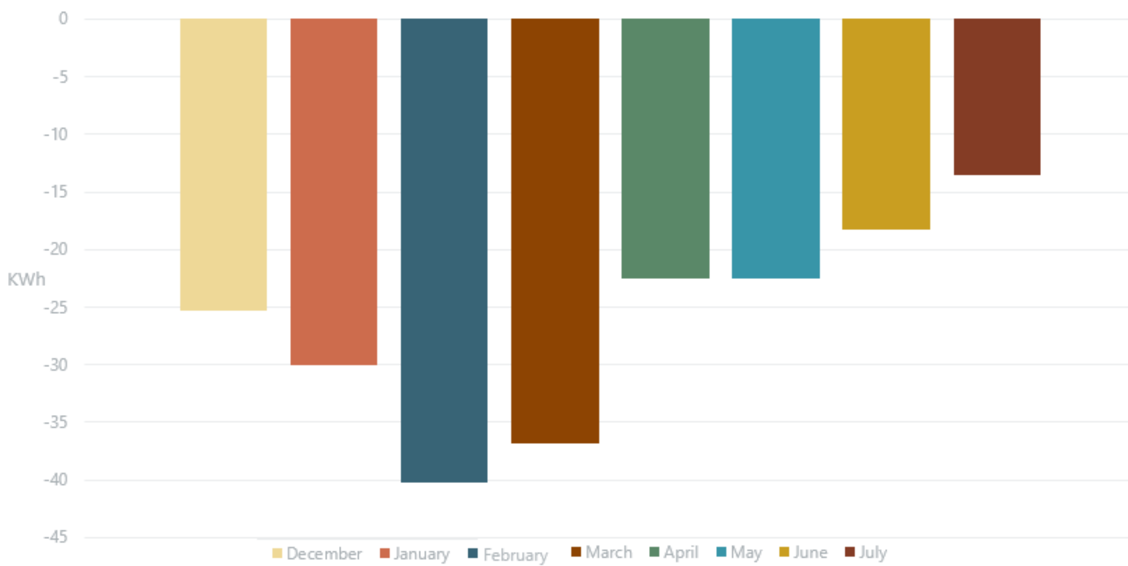


Figure 9 - Winter Heating Group Monthly Average Reduction in Energy Use by kWh per Household

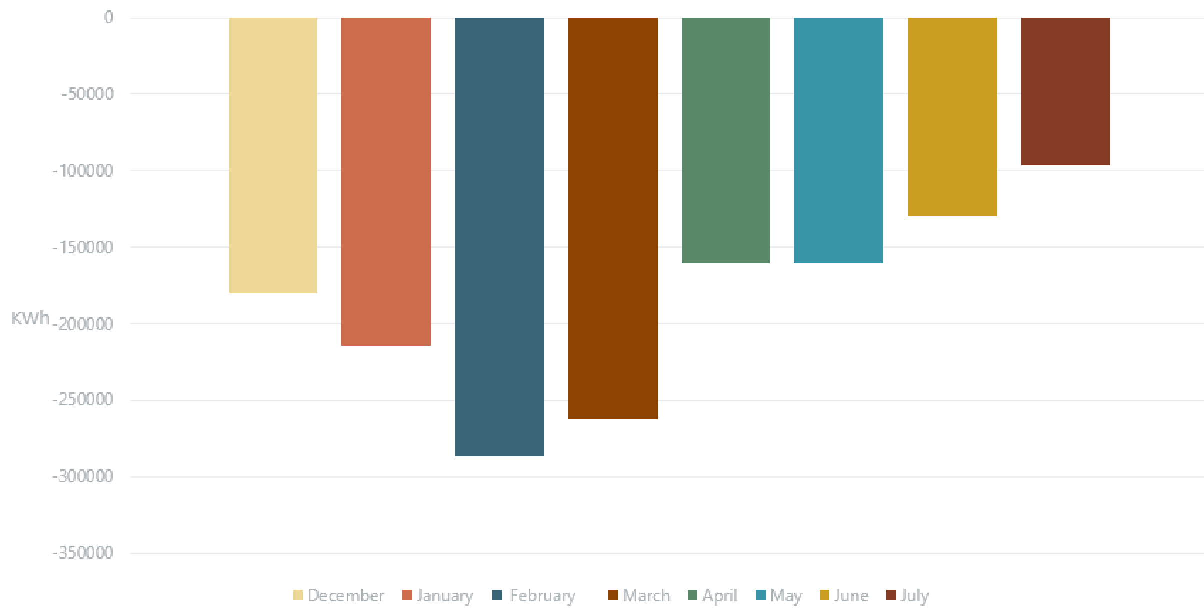


Figure 10 - Winter Heating Group Approximate Aggregate Energy Use Reduction by Month, kWh

Figure 11 - Winter Heating Energy Use Reduction by Month with 95% Confidence Bounds

5.2 YEAR-ROUND GROUP M&V RESULTS

Table 11 – Year-Round Group Percentage Annualized Savings

Year-Round - T3	1.3%
Year-Round - T4	1.7%
Year-Round - T5	0.5%

*excludes 3 month ramp-up period from Aug-Oct 2017

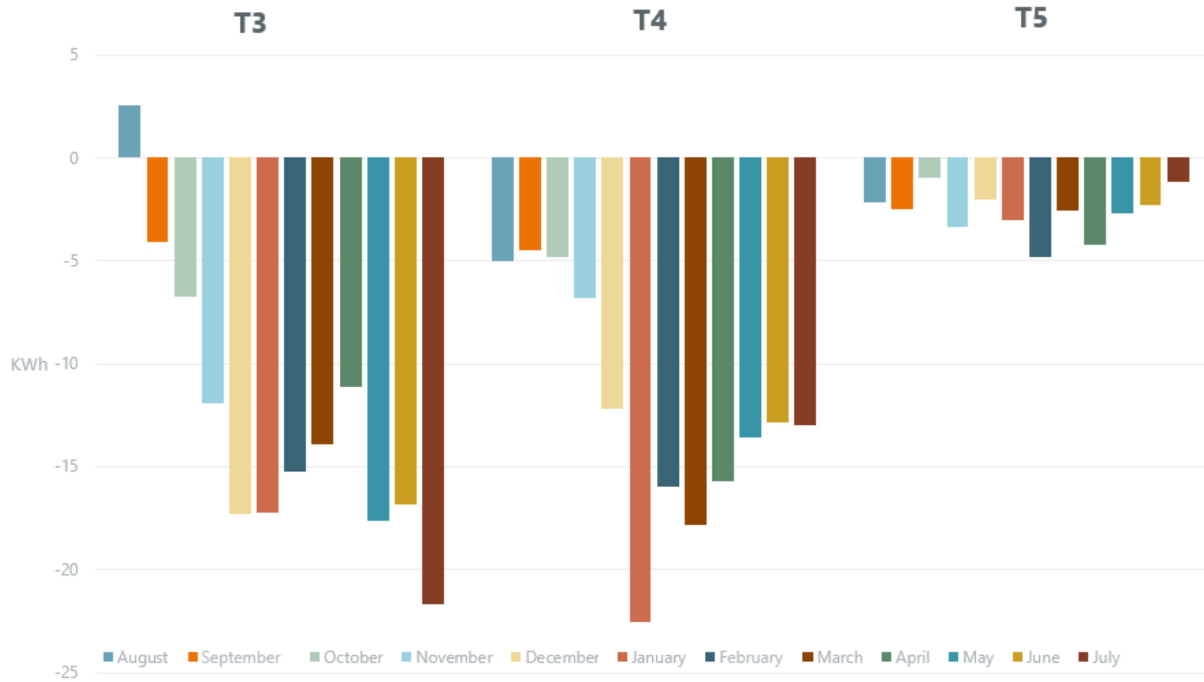


Figure 12 - Year-Round Group Monthly Energy Use Reduction in %

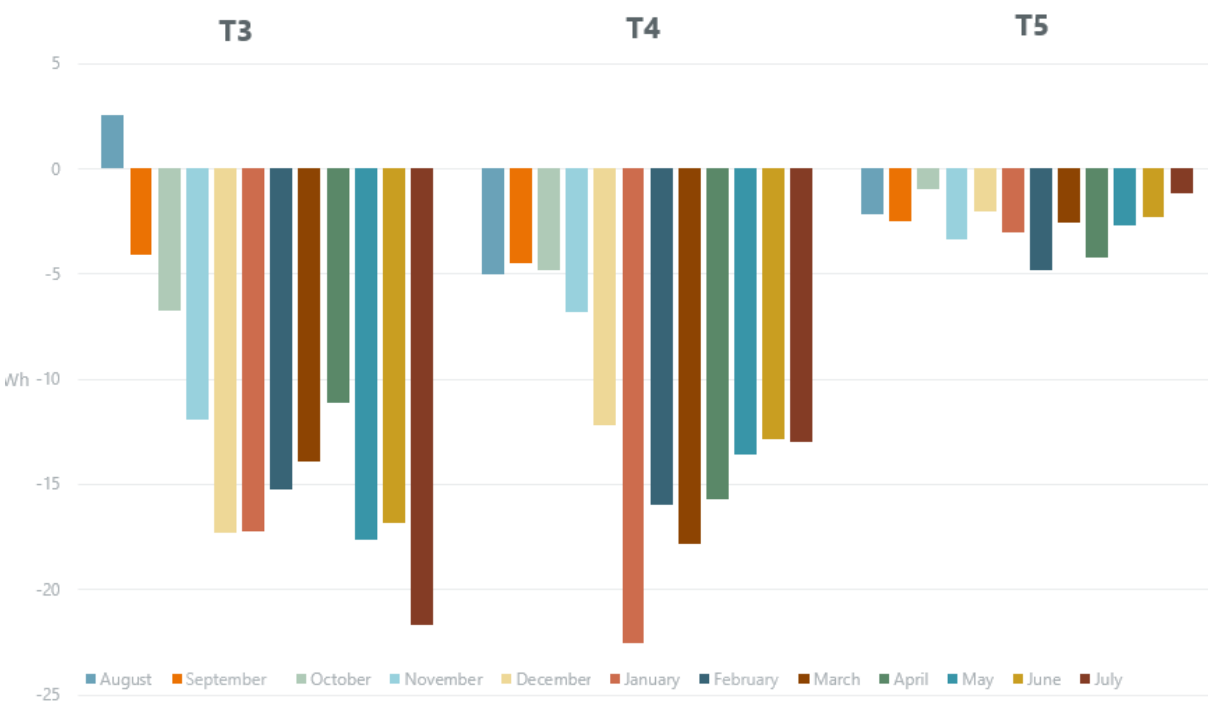


Figure 83 - Year-Round Group Monthly Average Reduction in Energy Use by kWh per Household

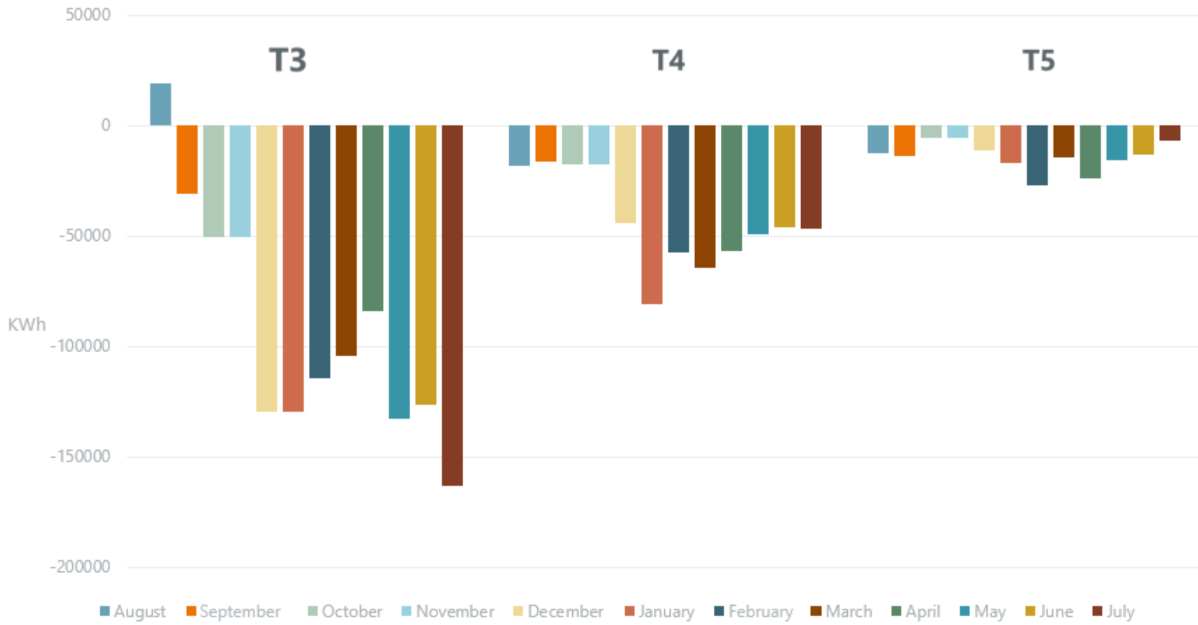


Figure 14 - Year-Round Group Approximate Aggregate Energy Use Reduction by Month, kWh

Figure 15 - T3 Energy Use Reduction by Month with 95% Confidence Bounds

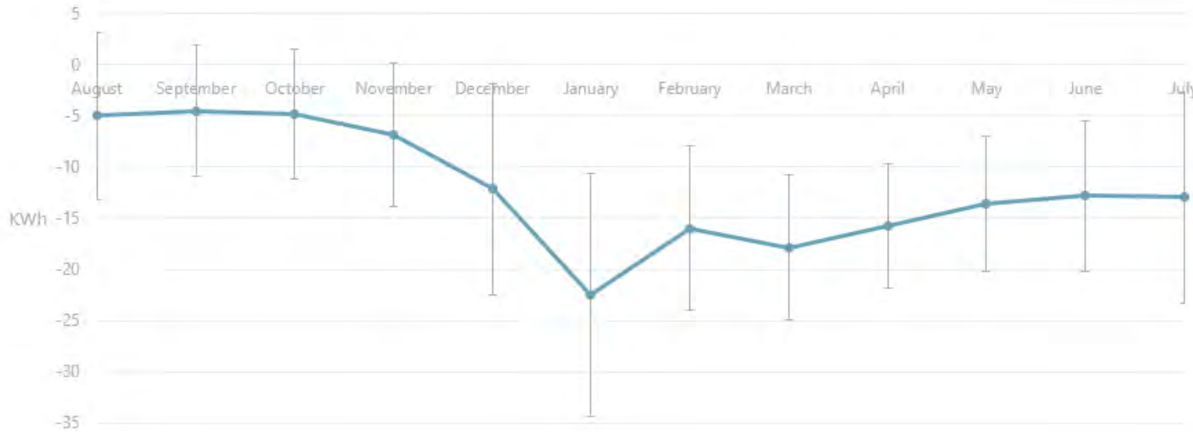


Figure 16 - T4 Energy Use Reduction by Month with 95% Confidence Bounds

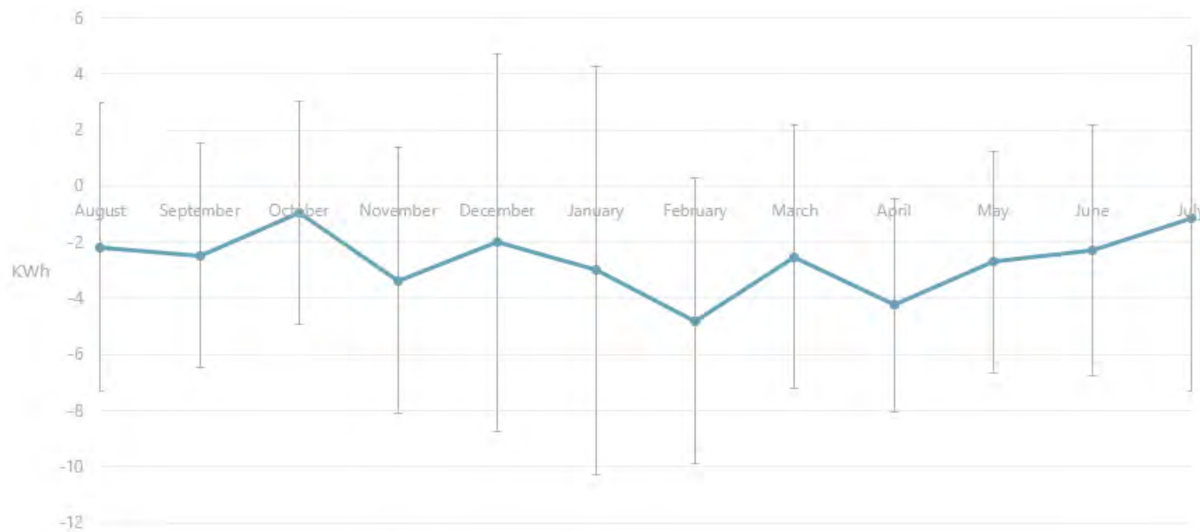


Figure 97 - T5 Energy Use Reduction by Month with 95% Confidence Bounds

6. LESSONS LEARNED

During Year One of the pilot there were a number of lesson learned and process improvements, detailed below.

6.1.1 OBJECTIVES

There were a number of learnings related to the objectives of the pilot (detailed in 2.1). This included:

- Electric heating households (the Winter Heating group) delivered the highest kWh savings by a significant margin, due to the kWh intensity of electric heating.
- The low user group (T5) had the lowest kWh savings and did not achieve statistically significant savings.
- The program did not have a negative impact on customer satisfaction levels.
- In the Customer Satisfaction Survey, despite not having high savings results, the lower user group (T5) did indicate they enjoyed receiving the reports.

- Data analysis found that approximately 13% of accounts in T3, T4, and T5 were under-performing in terms of saving energy.
- Evidence from the CSA results suggests that the results do prompt customers to inquire about the Idaho Power energy efficiency programs promoted in the reports.
- Based on feedback from the Customer Solutions Advisors, the reports appeared to have encouraged customer engagement with electric usage, including utilization of online tools and lift for other EE programs.

6.1.1.1 HER PROGRAM ELIGIBILITY

The ability to include customers identified as high electric heating and potential candidates for the Winter Heating Group was impacted by a lack of the necessary publicly available building data. This is a requirement for accurate benchmarking for inclusion in the Winter Heating program. The Winter Heating program was therefore smaller than it otherwise could have been.

In addition, an issue with location data caused 355 accounts to be removed from the Winter Heating Group after eligibility was complete and before the first report went out. Location data is required to benchmark accounts against other households in the same region for an effective benchmark.

6.1.1.2 REPORT TERMINOLOGY

There were a number of learnings during Year 1 that lead to improvements in the terminology used in the HER. These include:

- Feedback from the CSA results suggested that the inclusion of the word “Space” in Electric Space Heating was confusing. This was updated to “Electric Heating.”
- Feedback was received from an account where the household had done a large lighting retrofit and did not notice a large difference in their Lights & Appliance usage. The suggestion was to rename the end-use breakdown to Appliances & Lights to make the relative intensity of the two end uses clearer.
- Feedback from the CSA results suggested that the HER could be clearer about what energy use period the HER report referred to.

6.1.1.3 TIMING AND CONTENT OF BIMONTHLY REPORTS

A couple issues came up during Year 1 related to sending bimonthly reports where the report period for energy usage was the previous 2 months.

- Low users (T5) had very low usage data in some of the 2 month periods. Idaho Power called these customers before they received their reports to explain why their reports did not have a motivational narrative.

6.1.1.4 ATTRITION RATE

The program had an overall attrition rate of 12 percent. This is slightly higher than the 10 percent accounted for in the initial program design, but within the range expected for similar programs. In a full program roll-out, the treatment and control groups should be sized to accommodate a minimum attrition of 12 percent and a maximum attrition of 14%.

6.1.1.5 REPORT DELIVERY TIMELINE

In an investigation into how to make the reports received by customers arrive more closely after the end of the report period revealed the major limitation was the weekly AMI files. The weekly AMI files received every Sunday only have data up to Tuesday night, so in some months, depending on how the dates fall in the week, all the data needed to begin report generation is not received until the 2nd Monday of the month.

7. PROGRAM RECOMMENDATIONS AND DECISIONS FOR YEAR 2

Based on the findings from year 1 of the pilot, to enhance the program for Year 2 and beyond, Aclara has the following recommendations:

1. Expand to new customers
    - To maximize 2019 savings and create a good customer experience, launch an expanded winter-heating group in time for winter – sending two reports at end of 2018. An expanded winter heating group could be made by sourcing additional building data through primary survey techniques.
2. Further enhance cost-effectiveness
    - Cull existing customers from T3, T4 and T5 to remove sub-optimal customers.
    - Continue sending reports to T1, and optimized T3, T4 & T5 customers.
3. Continue to include the promotion of Idaho Power energy efficiency programs in the HER to drive uptake in these programs.
4. Improve the clarity of the HER reports by:
    - Renaming Lights & Appliances to Appliances & Lights and updating the detailed description of this end-use to a descending order of the most energy-intensive appliances: water heaters, dryers, stoves, washers, TV's, and dishwashers
    - Increasing the prominence of the period of energy use that the report covers and including it in more places on the report.
5. Consider alternative report content strategies for the spring and fall for focusing on A/C and heating energy use.
6. Align delivery schedules
    - Place all customers on a year-round bimonthly schedule
    - Turn the Winter Heating Group into a year-round group to align program delivery schedule
        - High winter heating users should receive an extra seasonal report in the winter (i.e. T1 and T2)
        - High summer AC users should receive an extra seasonal report in the summer (all T groups)
    - Evaluate option of reducing to quarterly reports + 1 seasonal after first year
7. Ensure customer satisfaction continues
    - Try opt-in approach to allow customers to toggle channel from paper to email

APPENDIX A – NREL RESIDENTIAL BEHAVIORAL STANDARD

UMPChapter17-residential-behavior.pdf

APPENDIX B – REPORT & MICROSITE SAMPLES

Year Round Group – Report 1 Welcome Letter (Delivered July 2017)

IDAHO POWER.
An IDACORP Company

**************************SNGLP 1-1 ## 000003 2671 11
Jim Brown
123 Cherry Street
Boise, ID 83702-1234

Dear <Customer Name>,

Idaho Power is committed to offering programs to help you use energy wisely. As part of this commitment, we are introducing a new Home Energy Report. We created these reports because many of our customers told us a personalized report, separate from their power bill, would be useful and informative in helping them manage their electricity use.

For the next 12 months, we will test these reports with a limited number of customers to determine the value of the information provided. Each report will include:

- A comparison of your household's electricity use to homes in your community of similar type, size and heating source
- A breakdown of your home's electricity use by major appliance to highlight areas where you can save
- Personalized tips and recommendations for ways to help you save energy

Your first report is enclosed with this letter and provides insights on your electricity use from the previous year. Beginning next month, you will receive bimonthly reports containing information about the most recent two-month period.

At the end of the year, you will be asked to participate in a follow-up survey to provide feedback about your experience. If you do not wish to receive reports, you may opt out by calling 1 800 632 6605.

Even though Idaho Power has some of the lowest rates in the nation, we continue to look for ways to help our customers save on their electric bills. We hope you find your personalized Home Energy Report valuable and welcome your feedback.

Sincerely,

Denise C Humphreys

Denise C. Humphreys
Program Specialist
208-388-5986
dhumphreys@idahopower.com

1221 W. Idaho St. (83702)
P.O. Box 70
Boise, ID 83707

Frequently Asked Questions

What is a Home Energy Report?

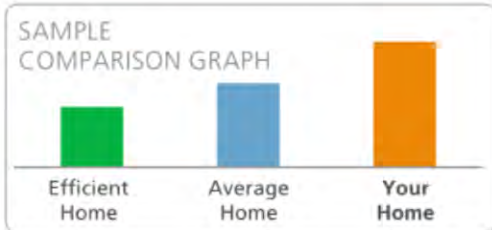
A Home Energy Report is a personalized report showing your home's monthly energy performance and ways to save.

How was I selected to receive Home Energy Reports?

Participants were selected based on historical energy use and energy-savings potential.

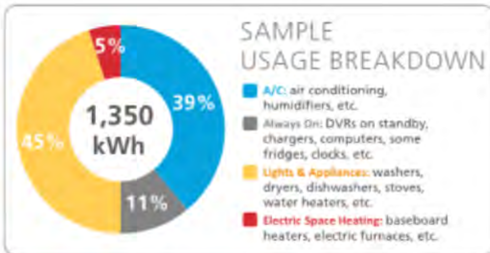
Who am I being compared to?

Your energy use is compared to more than 100 other homes in your county that have similar characteristics. These include home type (e.g., manufactured home, single family dwelling), primary heat source and home size, if available. Your home's usage will be shown in orange.



How accurate is the usage breakdown?

The breakdown of your electricity use is based on an algorithm that takes into account a number of factors, including the changes in your home's electricity consumption as the outside temperature changes. The estimates are typically within 10 percent of the actual use.



What if the home profile information in the report appears to be incorrect?

To get more accurate reports, update information about your home (e.g., home type, primary heat source, home size) by visiting myAccount at **idahopower.com** or by calling **1-800-632-6605**.

How can the report help me save energy?

Saving energy and money begins with an increased awareness of how and when you use energy at home. Your personalized Home Energy Report gives you a benchmark so you can get a sense of your savings potential. Then if you decide you want to make a change, your electricity use breakdown highlights where to focus — and the customized tips on the back suggest what actions to take first.

How do I stop receiving reports? Call **1-800-632-6605**.

What if I have other questions?

For more information about your Home Energy Report, visit **idahopower.com/HomeEnergyReport**, or call **1-800-632-6605**, Mon – Fri, 7:30 a.m. to 6:30 p.m. MT.

Year Round Group – Report 1a (Delivered July 2017)

Last Year (Jun 2016 – May 2017)

Home Energy Report

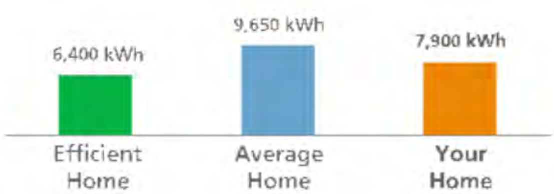
For: 124 Cherry Street
Account Number: 2203206137

IDAHO POWER
An IDACORP Company

We're here to help.
Call 1-800-632-6605, Mon – Fri., 7:30 a.m. to 6:30 p.m. MT, or visit idahopower.com/HomeEnergyReport

Jim Brown
124 CHERRY STREET Unit 222
Ada, Idaho 12345

Here's how your home compares:



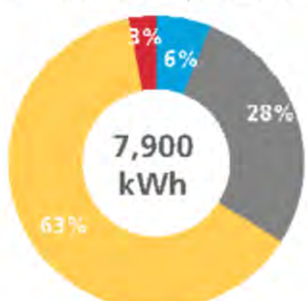
Average Homes: Average of 1,000 – 2,000 sq. ft. single family homes in Ada County whose primary heat source is electricity.
Efficient Homes: Top 25 percent of those homes.
1 kWh = a typical refrigerator running 10 hours

23% MORE ELECTRICITY

Your home used about 23% more electricity than efficient 1,000 – 2,000 sq. ft. single family homes in your community.

This costs you an extra $160 per year.

Your electricity use breakdown:



- **A/C:** air conditioning, humidifiers, etc.
- **Always On:** DVRs on standby, chargers, computers, some fridges, clocks, etc.
- **Lights & Appliances:** washers, dryers, dishwashers, stoves, water heaters, etc.
- **Electric Space Heating:** baseboard heaters, electric furnaces, etc.

Calculated estimates based on an analysis of your electricity consumption data.

Last year:

63% of your electricity use was for

Lights & Appliances

This costs you approximately **$520** per year.

Want to save?

Lights and Appliances Tips To Help You Save

Use a clothesline.

SAVE UP TO **$80** PER YEAR

Reduce your electricity costs by hanging your clothes and letting them air dry. In addition to saving money and energy, your clothes will last longer.

Indoor clothes racks allow for air drying year-round, even on rainy days!

Dry full loads in your clothes dryer.

SAVE UP TO **$35** PER YEAR

A clothes dryer is typically the second most energy-hungry appliance in your home. To reduce the energy your dryer uses:

- Run your clothes through an extra spin cycle to remove more water.
- Clean your dryer's lint filter regularly to reduce drying time.
- Line dry laundry whenever possible (it's better for your clothing too!)
- Use your dryer's sensor to prevent over-drying.

Get an incentive when you upgrade to more efficient heating and cooling equipment.

SAVE UP TO **$170** PER YEAR

Did you know that up to 50 percent of your home's energy costs may be going to heating and cooling? Energy efficient heating and cooling equipment can keep your home more comfortable and may save you money.

Idaho Power offers cash incentives on ducted air and water-source heat pumps, ductless heat pumps, evaporative coolers, duct sealing, whole-house fans, electronically commutated motors and smart thermostats.

Visit **idahopower.com/heatingcooling** for details.

This report is based on estimates and projections and is provided for informational purposes only with no warranty. Actual results will vary.

Year Round Group – Report 6 (Delivered April 2018)

Report Period:
Feb 1 - Mar 31, 2018

Home Energy Report

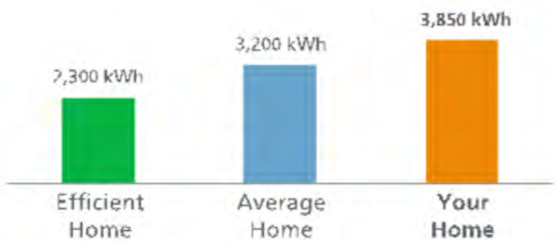
For: 12 MAIN ST
Account Number: 1111111111

IDAHO POWER
An IDACORP Company

We're here to help.
Call **1-800-632-6605**, Mon. - Fri., 7:30 a.m. to 6:30 p.m. MT, or visit **idahopower.com/HomeEnergyReport**

****************AUTO**5-DIGIT 12345 008510 1782019 33
ALBERT SMITH
12 MAIN ST
BOISE, ID 12345-1234

Here's how your home compares:



Average Homes: Average of 2,000 – 3,000 sq. ft. single family homes in Canyon County.

Efficient Homes: Top 25 percent of those homes.

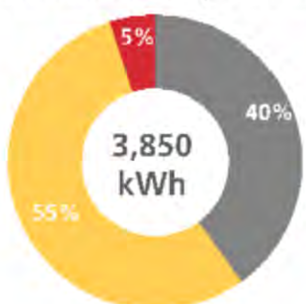
1 kWh = a typical refrigerator running 10 hours

20% MORE ELECTRICITY

Your home used about 20 percent more electricity than average 2,000 – 3,000 sq. ft. single family homes in your community.

This costs you an extra $350 per year.

Your electricity use breakdown:



- **A/C:** air conditioning, humidifiers, etc.
- **Always On:** DVRs on standby, chargers, computers, some fridges, clocks, etc.
- **Lights & Appliances:** washers, dryers, dishwashers, stoves, water heaters, etc.
- **Electric Heating:** baseboard heaters, electric furnaces, etc.

Over the last two months:

40% of your electricity use was for

Always On

This costs you approximately **$830** per year.

Calculated estimates based on an analysis of your electricity consumption data.

Want to save?

Clean up your energy use this spring and save all year.

Let a smart power strip do the work for you.

SAVE UP TO **$100** PER YEAR

Up to 10 percent of a typical home's energy use goes to powering electronics and appliances while in standby mode. A smart power strip can help combat these phantom loads.

A smart power strip senses when the primary device is turned off or goes into standby mode (think TV or PC). When this happens, it automatically shuts off the power to all of the other devices plugged into the strip. Use it with your TV to turn off your DVD player, speakers, etc. Also use it with your computer to turn off your monitor and printer when your desktop goes into sleep mode - push a button to turn on your computer and it all turns back on again!

Unplug that unused extra fridge.

SAVE UP TO **$50** PER YEAR

Refrigerators, which run 24 hours a day, are some of the most energy-hungry appliances. Did you know a 10-year-old fridge can use up to twice as much energy as a newer, more efficient model?

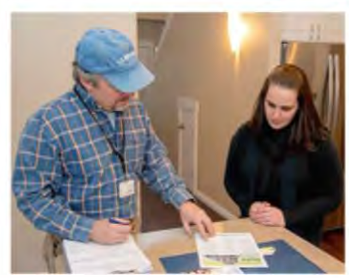
If you have an extra fridge or freezer you aren't using, unplug it, and enjoy the energy savings.

See where your energy is going with a discounted Home Energy Audit.

SAVE UP TO **$346** ON AUDIT

An energy-efficient home is a comfortable home, and Idaho Power's Home Energy Audit program can help you with both. A certified Home Performance Specialist can evaluate your home and provide suggestions to make it more comfortable and use less energy.

The audit is valued at $445 and costs only $99 for all-electric homes and $149 for gas, propane or other fuel sources. Visit idahopower.com/HomeEnergyAudit for program terms and conditions.



This report is based on estimates and projections and is provided for informational purposes only with no warranty. Actual results will vary.

APPENDIX C – CUSTOMER SATISFACTION SURVEY REPORT

ECOTAGIOUS
Energy conservation. Worth spreading.

Idaho Power
Survey Report 2018

oraclepoll
RESEARCH

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Methodology & Logistics

Background

- Oraclepoll Research Limited was commissioned by Ecotagious to conduct survey research among Idaho Power customers. The purpose of the research was to assess receipt and the impact of Home Energy Reports sent to Idaho Power customers.
- Within this context, we interviewed a treatment sample of respondents from a "winter heating" that started receiving reports in December 2017 and a "year-round" cohort that first got theirs in July 2017. In addition, a control sample of those that did not receive the report were interviewed – this to look for any variances of option between the groups.

Study Sample

- Idaho Power made a database of its customers available for interviewing.
- Quotas were set and for each client category, with the completed sample breakdown being as follows.

- N=200 completed interviews for the control group (C1, C3, C4 & C5)
- N=200 completed interviews for the treatment sample, with:
    - *N=100 interviews among the winter heating group (T1)*
    - *N=100 interviews among the year-round group (T3, T4 & T5)*

Survey Method

- The survey was conducted using computer-assisted techniques of telephone interviewing (CATI) using live person to person researchers at the Oraclepoll call centre.
- An initial call was made to contact respondents, or if requested to set up a suitable call back time to complete the interview.
- Respondents were screened to ensure they were 18 years of age or older and responsible for making energy related decisions in their home.

Logistics

- Surveys were completed between the days of April 15th and April 24th, 2018.

Confidence

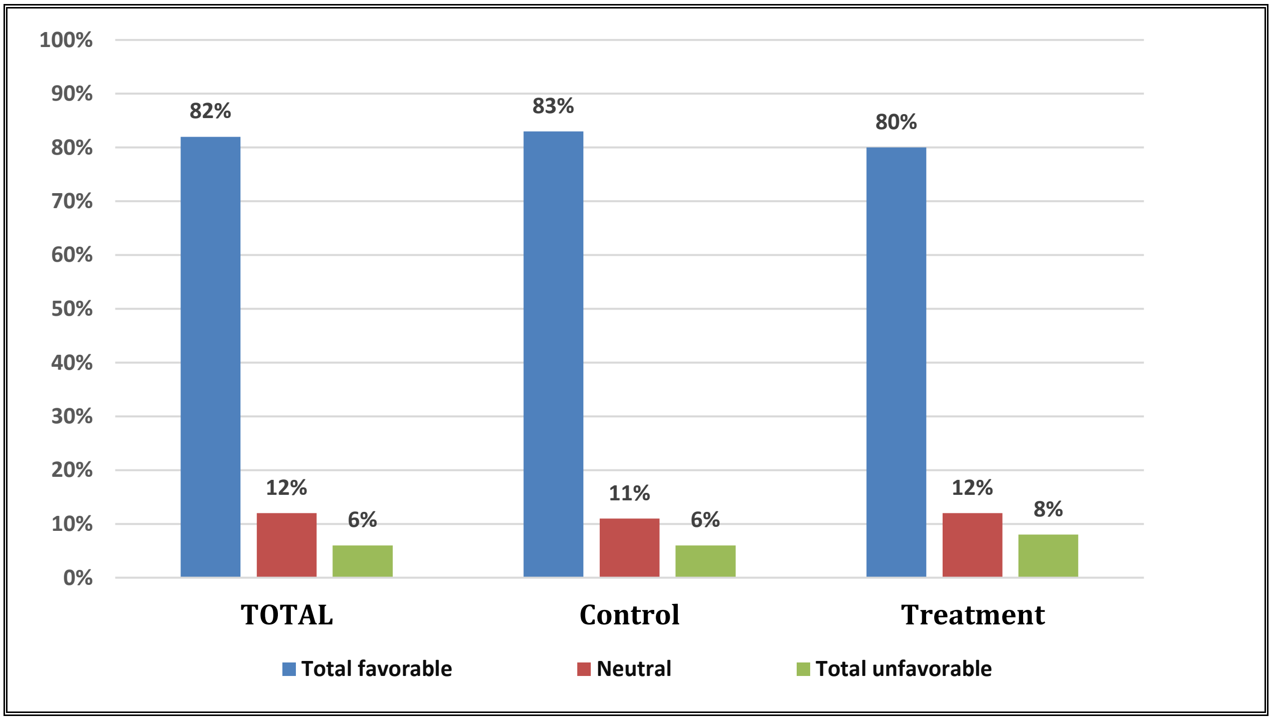
- The margin of error for the total N=400 sample is ± 4.8%, 19/20 times. The error rates for each of the two N=200 sub-samples are ± 6.9%, 19/20 times.

Executive RESULTS – ALL RESPONDENTS

Favorability

All N=400 respondents were first asked to rate their opinion of Idaho Power using a five-point favorability scale. The graph below combines the total favorable (5-very favorable & 4-favorable) as well a total unfavorable (1-very unfavorable & 2-unfavorable) results.

Q1." Using a scale from one to five where one is very unfavorable and five is very favorable, how would you rate your overall opinion of Idaho Power?"



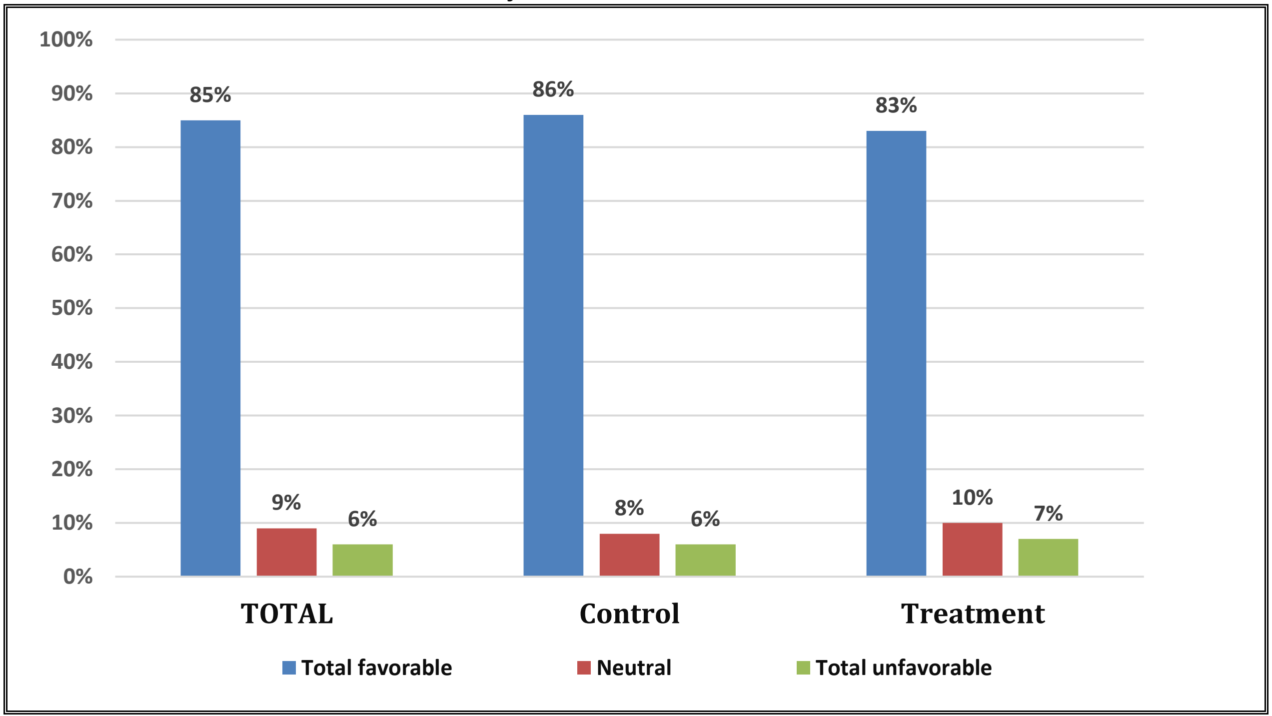
Idaho Power rates high in terms of favorability among eight in ten customers or 82% of all customers (59% very favorable & 24% favorable), compared to only 6% that accorded an unfavorable score (3% very unfavorable & 3% unfavorable), while 12% provided a mid-point "3" neutral rating of neither poor nor good.

Results were consistent across the control (83%) and treatment groups (80%).

Satisfaction

Next, all respondents rated their level of **satisfaction with Idaho Power** using a five-point scale. The graph below combines the total satisfied (5-very satisfied & 4-satisfied) as well a total dissatisfied (1-very dissatisfied & 2-dissatisfied) results.

Q2. "Using a scale from one to five where one is very dissatisfied and five is very satisfied, what is your overall satisfaction with Idaho Power?"

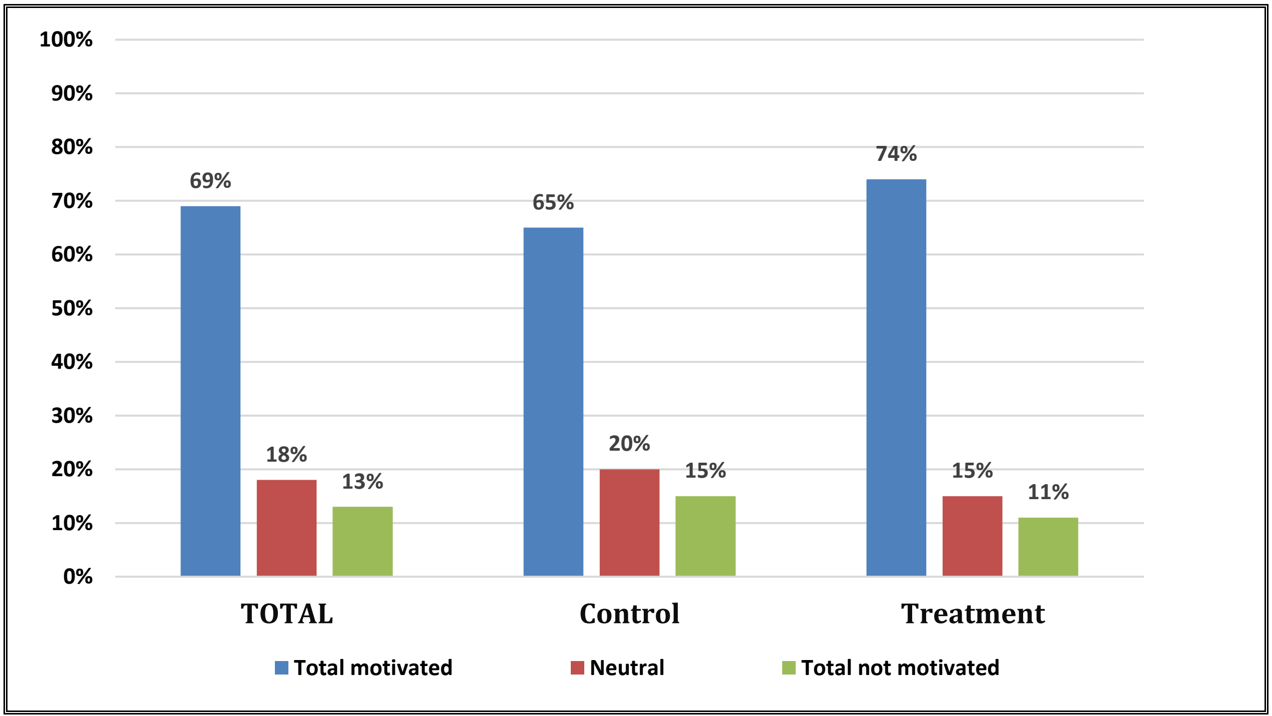


There is a strong sense of satisfaction among customers at 85% (60% very satisfied & 25% satisfied) including a similar 86% from the control group (56% very satisfied & 30% satisfied) and 83% from the treatment cohort (63% very satisfied & 20% satisfied).

Motivation to Reduce Consumption

Customers (N=400) were questioned about **how motivated they are to reduce the amount of electricity consumed at their residence**. Results from total motivated (5-very motivated & 4-motivated) and total not motivated (1-not at all motivated & 2-not motivated) scores are combined below.

Q3. "How motivated are you to reduce the amount of electricity you use in your home? Please respond using a scale from one to five where one is not at all motivated and five is very motivated."



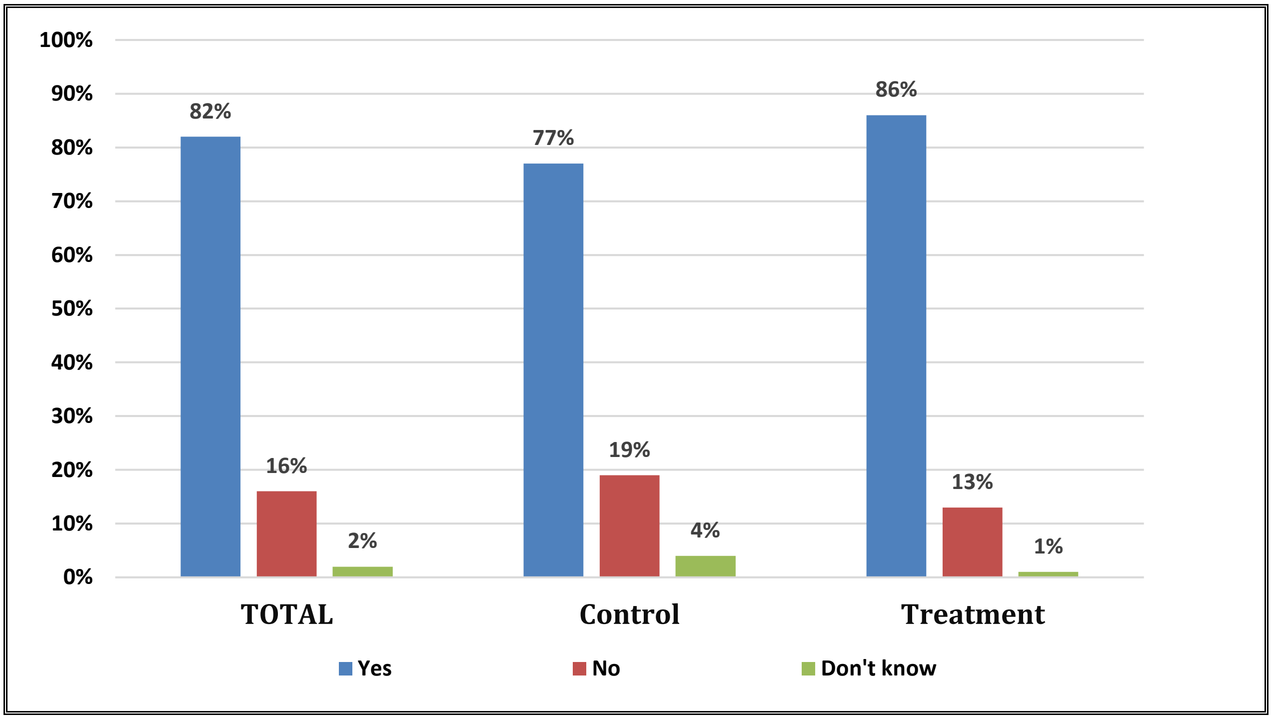
While almost seven in ten (69%) of all customers said they are motivated (27%) or very motivated (42%), there was a significant variance in the findings between the control and treatment groups. Almost three-quarters of the treatment sample or 74% said they were motivated (51% very motivated & 23% motivated) compared to the control group where 65% were motivated (31%) or very motivated (34%).

Among those in the treatment group (N=200), 81% of the year-round sample were motivated (25%) or very motivated (56%), in relation to the winter component where 66% were motivated (21%) or very motivated (45%).

Efforts to Reduce Use

All N=400 respondents were then specifically asked **if they make efforts to reduce the electricity that they use**.

Q4." Do you make any efforts to reduce your electricity use?"



Eighty-two percent (N=326) of all customers claimed that they make efforts to reduce their use of electricity. There was a significant difference among the two cohorts, with 77% of the control group and a +9% higher 86% of the treatment sample saying that they conserve in this area.

More of the year-round component of the treatment group (89%) reduce their usage than those from the winter sample (83%).

Reasons for Reducing

The N=326 of respondents that said in Q4 that they make efforts to reduce their electricity consumption, were then asked if a series of five areas are **contributing factors as to why they conserve**.

Q5. "Please tell me if each of the following are reasons why you make efforts to reduce your electricity use."

REASONS TO REDUCE	TOTAL SAMPLE "YES"	CONTROL SAMPLE "YES"	TREATMENT SAMPLE "YES"
a. Save money	98%	97%	98%
b. Reduce waste	86%	83%	88%
c. Make your home more comfortable	73%	64%	81%
d. Help preserve the environment	76%	69%	83%
e. Reduce your dependence on fossil fuels	67%	60%	73%

Saving money was named by almost all or 98% and reducing waste by 86%. The next most named areas were helping to preserve the environment by 76% and making their home more comfortable by 73%, while lower mentioned was reducing dependence on fossil fuels (67%). Across all five indicators treatment sample results were higher than those from the control group.

Agreement Statements

All N=400 respondents were read and asked to **rate their level of agreement with each of nine statements** using a five-point rating scale. Figures in the following table include the total agree answers (5-strongly agree & 4-agree) for each indicator.

Q6. "I am now going to ask you to rate your level of agreement with a series of statements related to Idaho Power. For each one, please respond using a scale from one to five where one means you strongly disagree and five means you strongly agree."

AGREEMENT STATEMENTS – TOTAL AGREE RESULTS	TOTAL SAMPLE	CONTROL SAMPLE	TREATMENT SAMPLE
a. Idaho Power provides excellent customer service	84%	84%	83%
b. Idaho Power provides service at a reasonable cost	74%	75%	74%
c. Idaho Power cares about its customers	69%	70%	68%
d. Idaho Power helps me understand how I'm using energy	71%	59%	83%
e. Idaho Power provides helpful tools to help me save money	68%	61%	75%
f. Idaho Power is a trusted resource for information on how to save energy	65%	60%	70%
g. Idaho Power helps me manage my energy usage	58%	45%	71%
h. Idaho Power helps me save electricity by providing useful energy-saving recommendations and programs	62%	53%	72%
I. I feel like my smart meter is providing valuable information	45%	39%	52%

Idaho Power rated highest in terms of agreement for providing excellent service at 84% and then for providing service at a reasonable cost (74%), with consistent results from both the control and treatment samples.

While 68% agreed Idaho Power provides tools to help them save money, +24% more in the treatment sample agreed with this statement than those in the control sample. Caring for customers rated next at 69% (no variance among the sub-samples), followed by proving tools to help save money (68%) with 75% in the treatment group agreeing compared to 61% in the control cohort.

In the three areas that next followed, the treatment sample results were significantly higher in relation to the control group. This included, being a trusted resource to save money (65%-total, 70%-treatment & 60%-control), providing useful energy-saving recommendations and programs (62%-total, 72% treatment & 53% control) and helping to manage energy use (58%-total, 71% treatment & 45% control).

Only 45% agreed that with the smart meter statement related to providing them valuable information, but findings were higher among the treatment sample at 52% (39% control).

Actions to Save

Next, all N=400 respondents were asked if they have **completed a series of nine conservation actions**.

Q7. "Please indicate if you have completed or done any of the following actions at your residence within the last 6 months to save energy."

ACTIONS TAKEN TO SAVE ENERGY	TOTAL SAMPLE "YES"	CONTROL SAMPLE "YES"	TREATMENT SAMPLE "YES"
a. Set your thermostat to a lower or higher temperature	74%	75%	72%
b. Avoided heating unused rooms	84%	81%	88%
c. Installed a high efficiency showerhead	41%	37%	44%
d. Added insulation to your home	21%	13%	29%
e. Used a clothesline to dry clothing	25%	20%	31%
f. Only used dryer when it's full	85%	83%	87%
g. Washed clothes in cold water	71%	67%	76%
h. Checked air ducts for leaks	37%	38%	37%
i. Purchased LEDs to install in your home	83%	82%	83%

Customers were most likely to have used their dryer when full (85%), avoided heating unused rooms (84%) and purchased LEDs (83%) and washing clothes in cold water (71%). Fewer said they took the remaining actions, but results were higher for installing an efficient showerhead (41%) and checking air ducts for leaks (37%). They were lowest for using a clothesline (25%) and adding insulation (21%).

The 83% or N=330 of those that said they purchased LEDs were asked a follow-up question about how many they acquired. Sixteen percent said 1-3 LEDs, 21% 4-6, 13% 7-9 and most or 50% named 10 or more.

The final question asked to all N=400 customers probed about any other actions they have done at their residence to help save electricity.

"Q8. Did you do anything else to save electricity at your residence within the last 6 months?"

No	*N=257*	*64.3*
Turned off lights	*N=83*	*20.8*
Unplugged items	*N=20*	*5.0*
Reduced shower time	*N=15*	*3.8*
Upgraded furnace / air	*N=7*	*1.8*
Changed appliances	*N=6*	*1.5*
Changed windows / doors	*N=6*	*1.5*
Solar panels	*N=3*	*.8*
Burn wood / pellets	*N=3*	*.8*

While a majority said no other actions were taken, the most named by those providing a mention was turning off lights, next followed by unplugging items and reducing shower time.

Executive RESULTS – TREATMENT GROUP

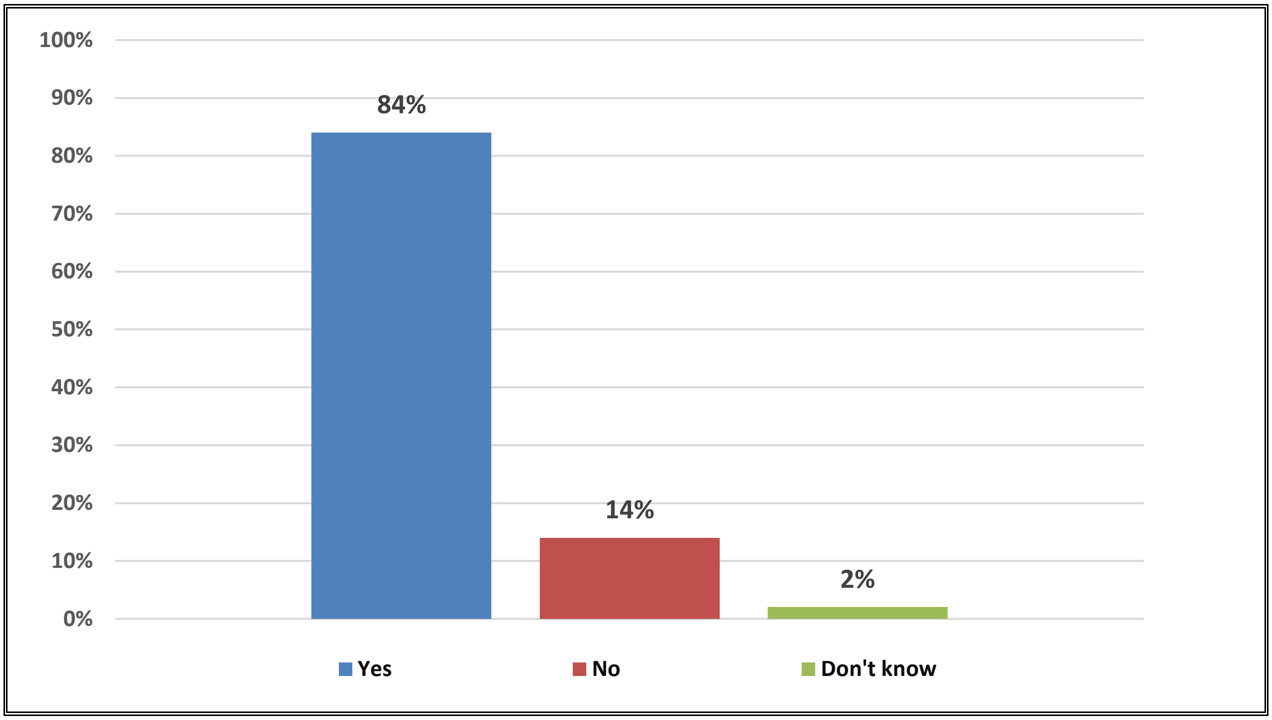
The N=200 treatment group was then asked a series of question relating specifically to the Home Energy Reports. They were first read the following short introductory statement.

"Next, we have some questions about the Home Energy Reports you receive from Idaho Power. Over the last couple months, Idaho Power sent Home Energy Reports to select customers in the mail. These reports provide a breakdown of your electricity use by major appliance, a comparison of your electricity use in relation to other homes similar to yours and recommendations on how you can save electricity."

Receipt of Report

They were then asked if they **recalled receiving a Home Energy Report**.

T1. "Do you recall receiving a Home Energy report?"



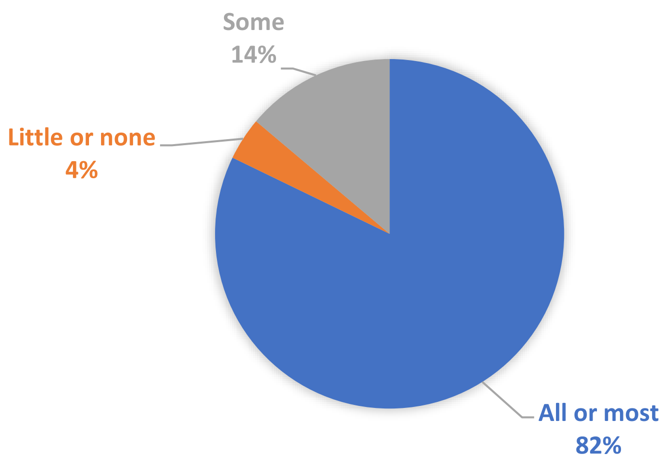
An 84% majority or N=168 said they remember receiving a Home Energy Report, including 85% from the year round and 83% from the winter sample.

The N=168 that answered yes were then asked a follow-up question, while those that said no (14%, N=27) or don't know (2%, N=5) skipped the remaining questions asked to the treatment sample.

Reading the Report

The N=168 that recalled receiving the Report were then asked about **how thoroughly they read them**.

"T2. How thoroughly did you read the Reports you received? Did you read…"



More than eight in ten or 82% (N=139) said they read all or most of the report, 14% (N=23%) some of it and 4% (N=6) little or none.

The N=6 that stated they read little or none of the report skipped the remaining questions asked to the treatment sample.

Experience with the Report

N=162 respondents (that received the Report & read some or all it) were asked to **rate their level of agreement with each of three statements** using a five-point rating scale. Figures in the following table include the total agree answers (5-strongly agree & 4-agree) for each indicator.

T3. "I am now going to read three statements related to your experience with the Reports. Please rate your level of agreement with each one using a scale from one to five where one means you strongly disagree and five means you strongly agree."

AGREEMENT STATEMENTS – TOTAL AGREE RESULTS	TOTAL SAMPLE	WINTER SAMPLE	YEAR-ROUND SAMPLE
a. The information presented in my Home Energy Report was easy to understand	85%	82%	87%
b. The information presented in my Home Energy Report seemed accurate	61%	57%	66%
c. The recommendations and tips on how to conserve were useful	64%	66%	63%

Those in the treatment sample surveyed most agreed that the information in the Report was easy to understand (85%) with a higher percentage of the year-round sample agreeing at 87%, compared to 82% for the winter group. Sixty-four percent agreed the recommendations and tips were useful (rough equal distribution) and slightly more than six in ten or 61% agreed the information appeared accurate – 66% for year-round versus 57% for the winter group.

Features Seen

Next, the N=162 respondents (that received the Report & read some or all it) were asked **<u>if they saw three features</u>**.

T4. "Do you recall seeing each of the following features of the Home Energy Report?"

FEATURES SEEN IN HOME ENERGY REPORT	TOTAL SAMPLE "YES"	WINTER SAMPLE "YES"	YEAR-ROUND SAMPLE "YES"
a. The comparison of your electricity uses in relationship to homes of similar type and size in your area	91%	87%	94%
b. The breakdown of your electricity use providing insights into how much your electricity uses	88%	85%	92%
c. Saving tips including personalized savings tips just for you	78%	73%	83%

There was strong recall for all three areas, with results overall being higher among the year-round sample. Most seen by 91% was the comparison of electricity uses in relation to other similar sized homes, closely followed by the breakdown of electricity use by 88%. Seventy-eight percent said they saw personalized savings tips.

There were N=146 customers that named more than one feature in T4 and these respondents were then asked to state **<u>which one they found most useful</u>**.

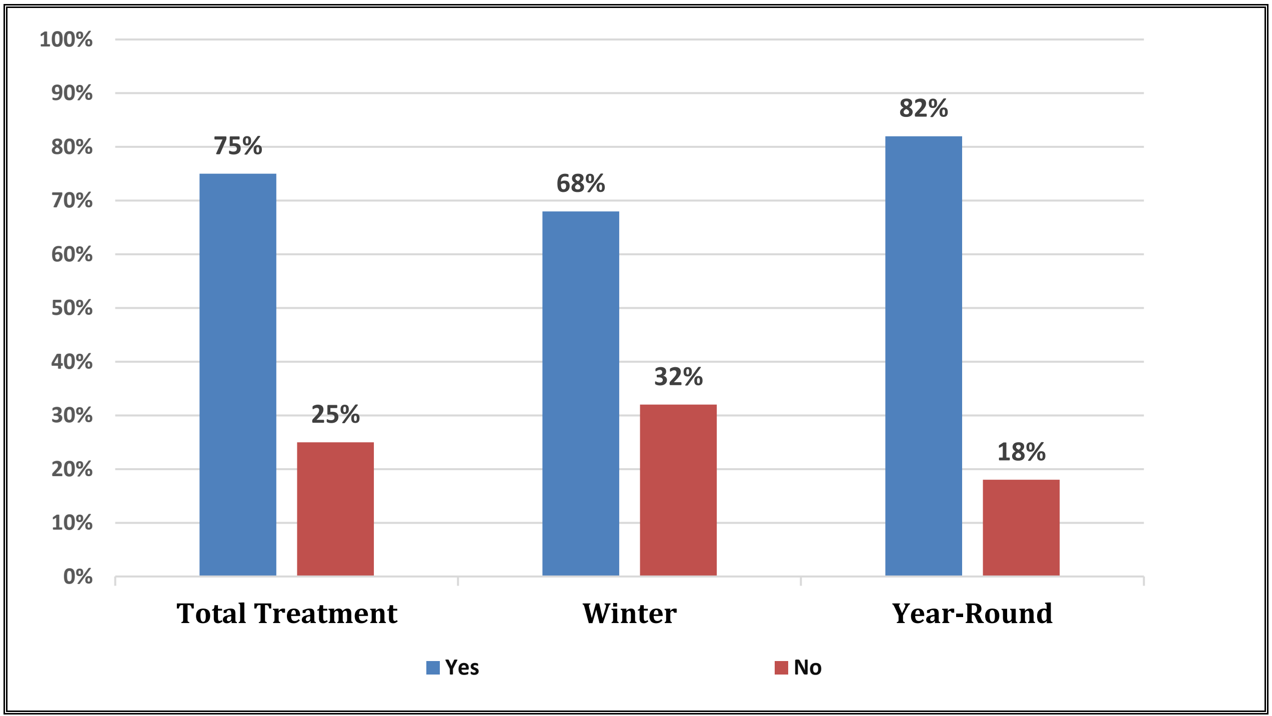
T5. "Which one of the features you named did you find the most useful?"

- *<u>Savings tips</u> were most mentioned by **49%** (Winter – 43% & Year-Round – 54%)*
- *<u>Comparison of electricity</u> use to other homes was next named by **27%** (Winter – 28% & Year-Round – 27%)*
- *The <u>breakdown of your electricity use</u> followed at **24%** (Winter – 28% & Year-Round – 19%)*

Acted on Report

Those that that received the Report & read some or all it (N=162) were questioned **<u>if they acted on any of the money and electricity suggestions or information provided</u>**.

T6. "Have you acted on any of the information and suggestions to save money and electricity that were included in the report?"

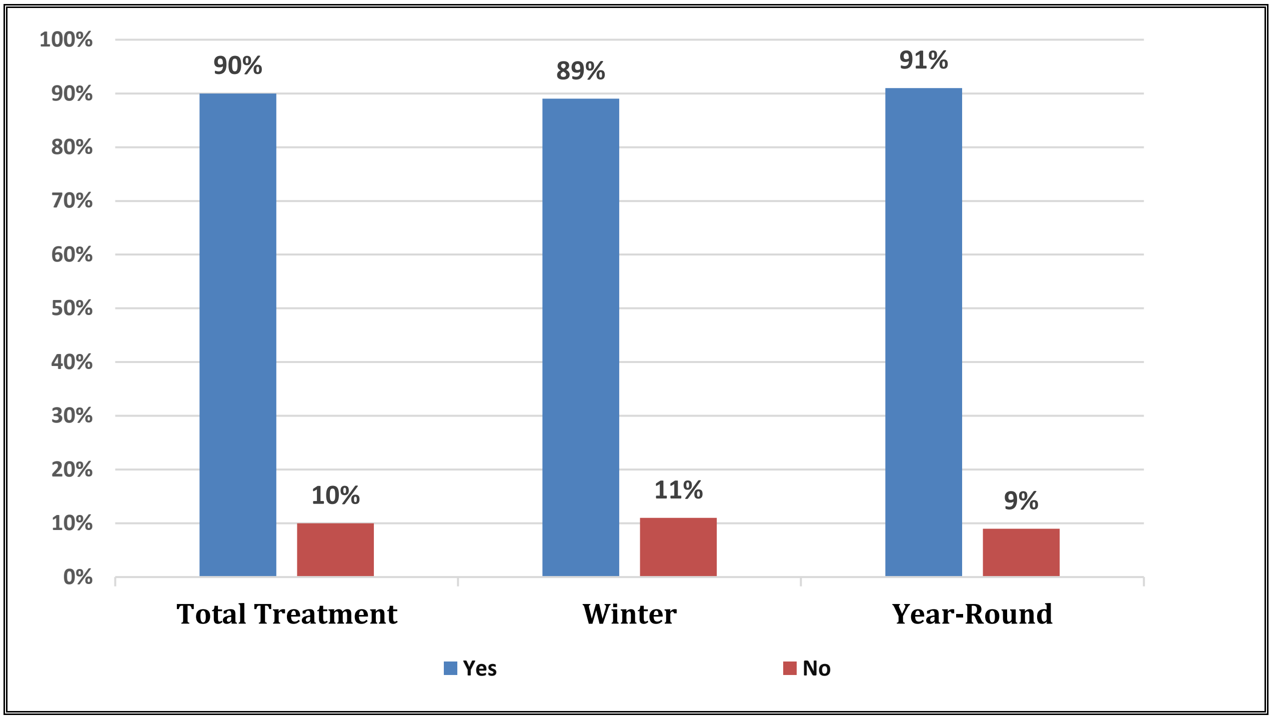


Three-quarters (75%) of all asked said that they took actions to save money or electricity. This included a very high 82% of the year-round sample and a lesser but still strong 68% of the winter group.

Continued Receipt

The N=162 respondents (that received the Report & read some or all it) were probed about their **interest in continuing to receive the Report**.

T7. "If the program remains in place, would you like to continue receiving Home Energy Reports at no charge?"



There is very strong interest among nine in ten or 90% (N=145) for continuing to receive the Reports with no significant variance among the sub-samples.

Those interested in wanting to continue to receive the Report (N=145) were then asked about **<u>how often they want to receive it</u>**.

T8. "At what frequency would you prefer to receive the Report?"

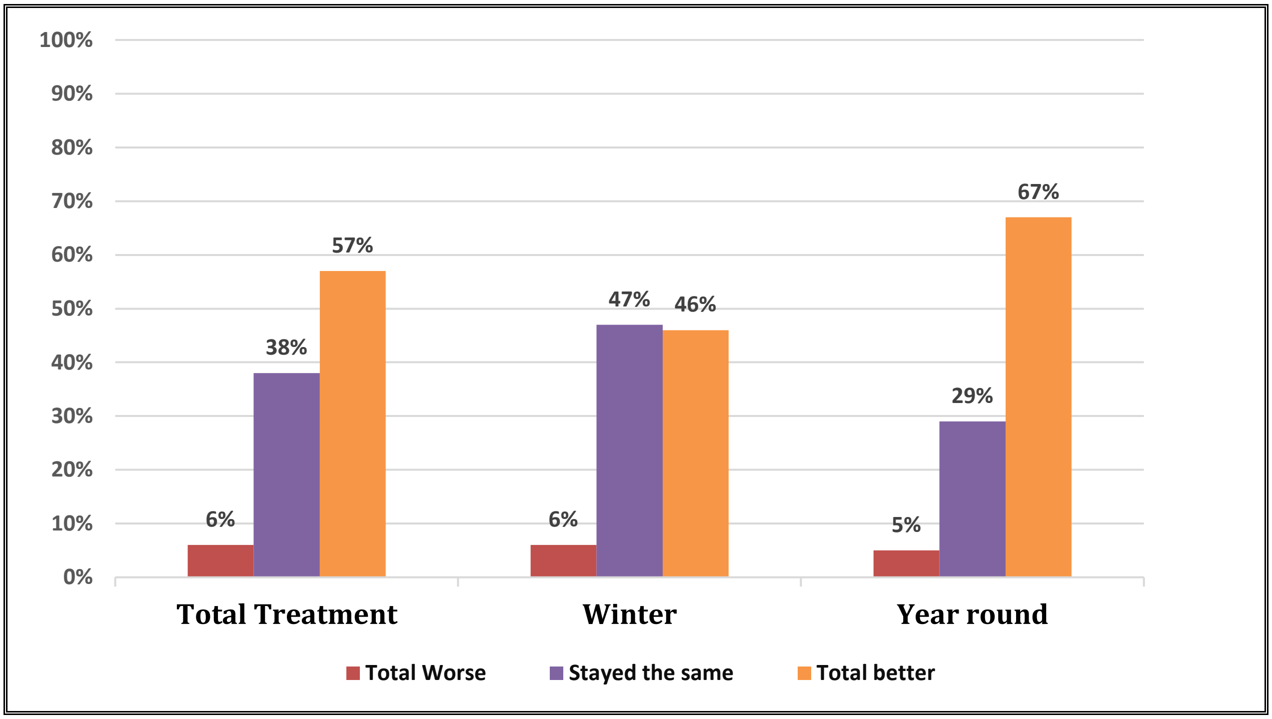
FREQUENCY	TOTAL SAMPLE	WINTER SAMPLE	YEAR-ROUND SAMPLE
Monthly	35%	46%	25%
Bi-Monthly	8%	4%	11%
Quarterly	26%	22%	29%
Twice a year	32%	28%	36%

Among all respondents there was a split between monthly (35%) and twice a year (32%), with more than a quarter or 26% naming quarterly – only 8% favor a bi-monthly schedule. Winter sample participants were most inclined to name monthly, while those from the year-round group had a higher preference for a longer time frame such as twice a year (36%) or quarterly (29%).

Impact of Report

The N=162 respondents that received and read the Report were asked **<u>how if at all it changed their opinion of Idaho Power</u>**. A five-point rating scale was used, and the graph below combines the total worse (1-much worse & 2-somewhat worse) as well as the total better (5-much better & 4-somewhat better) results.

T9. "How, if at all, has your opinion of Idaho Power changed since receiving the Home Energy Reports? Would you say it is: READ"?
(1=much worse, 2=somewhat worse, 3=stayed the same, 4=somewhat better, 5= much better)



The Report has had a positive impact on perceptions of Idaho Power with 57% saying they now have a better opinion of the utility, this especially among the year-round group (67%). Almost four in ten or 38% said their opinion has stayed the same, higher among the winter sample (47%) and only 6% stated their opinion is worse.

Most Useful Elements & Improvements

In an open-ended or unaided question, the N=162 respondents that received and read the Report were asked **to name what they felt was its most useful element.**

T10. "What was the most useful element in the Home Energy Reports received?"

Breakdown of usage & savings tips / how to save	*N=71*	*44%*
Amount used	*N=24*	*15%*
Comparison with other homes	*N=19*	*12%*
Comparison of use over time	*N=16*	*10%*
Information (in general)	*N=14*	*9%*
Don't know	*N=11*	*7%*
Everything	*N=7*	*4%*

Respondents find areas such as their consumption as well as comparisons and how to save most useful.

In another open-ended or unaided question, the N=162 respondents that received and read the Report were asked **what aspects could be improved.**

T11. "What aspect of the Reports could be improved?"

Nothing else	*N=58*	*36%*
Don't know	*N=55*	*34%*
More information / detail (in general)	*N=12*	*7%*
Clearer to read / understand	*N=11*	*7%*
Digital / electronic reports	*N=9*	*6%*
Explain why bill is still high (even after conserving)	*N=8*	*5%*
More info / details about other homes being compared	*N=7*	*4%*
Have month by month breakdown over time	*N=1*	*1%*
Send to different areas at different times	*N=1*	*1%*

Most claimed that nothing needed to be improved or did not know, while those with opinions provided varied answers from having more detail to explaining why their bill is still high.

Future Receipt

In a final question, respondents were asked **how else that they would like to receive the Report in addition to the paper copy in the mail**.

T12. "You are currently receiving the paper Home Energy Reports in the mail. Which other ways would you be interested in receiving the report?"

Responses	TOTAL SAMPLE	WINTER SAMPLE	YEAR-ROUND SAMPLE
Email	48%	53%	43%
My account Online	21%	17%	25%
Continue receiving them in the mail only	32%	31%	32%

Email was most named by almost half (48%), almost one-third (32%) prefer to maintain the hard copy format and 21% said their online account.

APPENDIX D – CUSTOMER SATISFACTION SURVEY

HOME ENERGY REPORT CUSTOMER SURVEY

Goals:
- Measure change in customer satisfaction with IPC between treatment and control
- Solicit feedback on reports

Methodology: Telephone survey – requires 7 to 10 days
Population: 200 Treatment and 200 Control
Timing: 5-7min
Number of questions: 20-25

Survey introduction: Hello, my name is [Interviewer] and I'm calling from the research firm Oraclepoll on behalf of Idaho Power. We're conducting a brief survey to evaluate customer feedback on communications from Idaho Power. The survey should take less than 7 minutes to complete and your input will help us improve our communications to customers regarding their energy use. Please be assured that this call is for research and all individual responses from participants will be kept in strict confidence.

May I please speak to <NAME>? (IF NOT AVAILABLE: Or may I speak with someone in your household who is responsible for making energy related decisions in your home?

[Screening Questions]

Are you a customer of Idaho Power that is 18 years of age or older?
(TERMINATE IF AGE IS LESS THAN 18]
- Yes **[CONTINUE]**
- No **[TERMINATE]**
- (Don't know) **[TERMINATE]**
- (Refused) **[TERMINATE]**

[If terminated]: Currently, we are looking for customers who meet a specific set of criteria to complete this survey. Thank you for your time and interest. Have a great day!

[SECTION 1. ALL RESPONDENTS]
Q1. Using a scale from one to five where one is very unfavorable and five is very favorable, how would you rate your overall opinion of Idaho Power?

Q2. Using a scale from one to five where one is very dissatisfied and five is very satisfied, what is your overall satisfaction with Idaho Power?

Q3. How motivated are you to reduce the amount of electricity you use in your home? Please respond using a scale from one to five where one is not at all motivated and five is very motivated.

Q4. Do you make any efforts to reduce your electricity use?

- Yes ASK Q5
- No SKIP TO Q6
- (Don't know) SKIP TO Q6
- Refused SKIP TO Q6
-

Q5. Please tell me if each of the following are reasons why you make efforts to reduce your electricity use.
[READ - LIST TO BE ROTATED] [Yes, No, (Don't know), (Refused) for each option]
a. Save money
b. Reduce waste
c. Make your home more comfortable
d. Help preserve the environment
e. Reduce your dependence on fossil fuels (propane, coal, wood, etc.)

Q6. I am now going to ask you to rate your level of agreement with a series of statements related to Idaho Power. For each one, please respond using a scale from one to five where one means you strongly disagree and five means you strongly agree.
[IF NEEDED READ: **[1-Strongly Disagree, 2-Somewhat Disagree, 3-Neither Agree nor Disagree, 4-Somewhat Agree, 5-Strongly Agree] 8-(Don't know), 9-(Refused)]**
a. Idaho Power provides excellent customer service.

b. Idaho Power provides service at a reasonable cost.

c. Idaho Power cares about its customers.

d. Idaho Power helps me understand how I'm using energy.

e. Idaho Power provides helpful tools to help me save money.

f. Idaho Power is a trusted resource for information on how to save energy.

g. Idaho Power helps me manage my energy usage.

h. Idaho Power helps me save electricity by providing useful energy-saving recommendations and programs.

i. I feel like my smart meter is providing valuable information.

Q7 Please indicate if you have completed or done any of the following actions at your residence within the last 6 months to save energy. (YES / NO ACCEPTED)

- ☐ A. Set your thermostat to a lower or higher temperature
- ☐ B. Avoided heating unused rooms
- ☐ C. Installed a high efficiency showerhead
- ☐ D. Added insulation to your home
- ☐ E. Used a clothesline to dry clothing
- ☐ F. Only used dryer when it's full
- ☐ G. Washed clothes in cold water
- ☐ H. Checked air ducts for leaks
- ☐ I. Purchased LEDs to install in your home

  [YES] How many?
  - a) 1-3
  - b) 4-6
  - c) 7-9
  - d) 10 or more

  [NO] GO TO T8

Q8. Did you do anything else to save electricity at your residence within the last 6 months? **[OPEN ENDED] [SECTION 2. TREATMENT GROUP ONLY]**

Next, we have some questions about the Home Energy Reports you receive from Idaho Power.

T1. Over the last couple months, Idaho Power sent Home Energy Reports to select customers in the mail. These reports provide a breakdown of your electricity use by major appliance, a comparison of your electricity use in relation to other homes similar to yours and recommendations on how you can save electricity. Do you recall receiving a Home Energy report?

1 Yes **[Go to T2]**
2 No **[Go to D1]**
8 (Don't know) **[Go to D1]**
9 (Refused) **[Go to D1]**

T2. How thoroughly did you read the Reports you received? Did you read…

1 All or most of them
2 Some of them or
3 Little to none of them? **[SKIP to D1]**
8 (Don't know)
9 (Refused)

T3. I am now going to read three statements related to your experience with the Reports. Please rate your level of agreement with each one using a scale from one to five where one means you strongly disagree and five means you strongly agree.

[IF NEEDED READ: **[1-Strongly Disagree, 2-Somewhat Disagree, 3-Neither Agree nor Disagree, 4-Somewhat Agree, 5-Strongly Agree] 8-(Don't know), 9-(Refused)]**

[Prompt with scale if needed]

a. The information presented in my Home Energy Report was easy to understand.

b. The information presented in my Home Energy Report seemed accurate.

c. The recommendations and tips on how to conserve were useful

T4. Do you recall seeing each of the following features of the Home Energy Report?
[YES / NO ACCEPTED] [READ / ROTATE]
a. The comparison of your electricity use in relationship to homes of similar type and size in your area
b. The breakdown of your electricity use providing insights into how much your electricity use goes towards the different major appliance categories in your home
c. Saving tips including personalized savings tips just for you
IF MORE THAN ONE FEATURE NAMED ASK T5 / OTHERS SKIP TO T6

T5. Which one of the features you named did you find the most useful?
CATI WILL DISPLAY ONLY MENTIONS PROVIDED IN T5 (TO INTERVIEWER) AND THEY WILL BE READ BACK TO RESPONDENT – ONE RESPONSE ACCEPTED
a. The comparison of your electricity use in relationship to homes of similar type and size in your area
b. The breakdown of your electricity use providing insights into how much your electricity use goes towards the different major appliance categories in your home
c. Saving tips including personalized savings tips just for you

T6 Have you acted on any of the information and suggestions to save money and electricity that were included in the report?
1 Yes
2 No

T7 If the program remains in place, would you like to continue receiving Home Energy Reports at no charge?
1 Yes
2 No [SKIP TO T9]

T8 At what frequency would you prefer to receive the report:
1 Monthly
2 Bi-monthly
3 Quarterly,
4 Twice a year
5 other?

T9 How, if at all, has your opinion of Idaho Power changed since receiving the Home Energy Reports? Would you say it is: READ
(1=much worse, 2=somewhat worse, 3=stayed the same, 4=somewhat better, 5= much better)
T10 What was the most useful element in the Home Energy Reports received? **[OPEN ENDED]**

T11. What aspect of the Reports could be improved? **[OPEN ENDED]**
(Interviewer Note: Probe for additional detail. Ask “is there anything else?”)

T12 You are currently receiving the paper Home Energy Reports in the mail. Which other ways would you be interested in receiving the report? **ACCEPT MULTIPLE RESPONSES**
1 Email
2 My Account online
3 Continue receiving them in the mail only
4 Other RECORD

(Optional Demographic Questions (ALL))

The final few questions are of a personal nature and involve collecting demographic information. Please be assured that this information will remain strictly confidential and will be used for statistical purposes only.

D1. Which of the following age groups may I place you in?
READ / STOP WHEN REACHED
1 18-24
2 25-34
3 35-44
4 45-54
5 55-64
6 65-74
7 75 or older
9 Prefer not to answer (Refused) [SHOW ON WEB]

D3. What is the highest level of education that you have completed?
READ / STOP WHEN REACHED
1 Some high school or less
2 Graduated high school or GED
3 Some college or technical school
4 Associate Degree
5 Bachelor's Degree (4 year)
6 Some graduate school
7 Graduate Degree
9 Prefer not to answer (Refused)

D5. Including yourself, how many people live in your home? **[Numeric Open End]**

D7. (Interviewer to record gender)
1 Male
2 Female
[Those are all the questions I have. Thank you for your time and help with this study

APPENDIX E – ADDITIONAL ANALYSIS OF KEY CUSTOMER SATISFACTION SURVEY QUESTIONS

7.1 QUESTION 1 RESULTS ANALYSIS

If the program remains in place, would you like to continue receiving Home Energy Reports at no charge?

7.1.1.1 BY TREATMENT GROUP

Treatment	1-Very unfavourable	2-Unfavourable	3-Neither favourable nor unfavourable	4-Favourable	5-Very favourable	Grand Total
No treatment group indicated	4	8	22	46	120	200
T1	6	4	8	26	56	100
T3	4	1	6	10	23	44
T4	1		7	6	19	33
T5			3	6	14	23
Grand Total	15	13	46	94	232	400

7.1.1.2 BY GENDER

	1-Very unfavourable	2-Unfavourable	3-Neither favourable nor unfavourable	4-Favourable	5-Very favourable	Grand Total
Female	5	6	14	47	120	192
Male	10	7	32	47	112	208
Grand Total	15	13	46	94	232	400

7.1.1.3 BY AGE

	1-Very unfavourable	2-Unfavourable	3-Neither favourable nor unfavourable	4-Favourable	5-Very favourable	Grand Total
18-24				1	7	8
25-34	2	2	2	7	50	63
35-44	10	4	12	16	52	94
45-54			7	24	46	77
55-64	2	5	14	15	26	62
65-74		1	7	6	29	43
75 or older			3	19	9	31
Prefer not to answer (Refused)	1	1	1	6	13	22
Grand Total	15	13	46	94	232	400

7.1.1.4 BY EDUCATION

	1-Very unfavourable	2-Unfavourable	3-Neither favourable nor unfavourable	4-Favourable	5-Very favourable	Grand Total
Associate Degree	1			7	28	36
Bachelor's Degree (4 year)	4	4	21	21	48	98
Graduate Degree	4	2	1	1	24	32
Graduated high school or GED	2	5	15	29	68	119
Prefer not to answer (Refused)	1	1	2	9	15	28
Some college or technical school	1	1	1	23	34	60
Some graduate school	2		6	1	5	14
Some high school or less				3	10	13

Grand Total	15	13	46	94	232	400

7.2 QUESTION 2 RESULTS ANALYSIS

Using a scale from one to five where one is very dissatisfied and five is very satisfied, what is your overall satisfaction with Idaho Power?

7.2.1.1 BY TREATMENT GROUP

Treatment	1-Very dissatisfied	2-Dissatisfied	3-Neither satisfied nor dissatisfied	4-Satisfied	5-Very satisfied	Grand Total
No treatment group indicated	6	6	16	60	112	200
T1	1	9	5	21	64	100
T3	1	2	9	9	23	44
T4		1	5	6	21	33
T5			1	4	18	23
Grand Total	8	18	36	100	238	400

7.2.1.2 BY GENDER

	1-Very dissatisfied	2-Dissatisfied	3-Neither satisfied nor dissatisfied	4-Satisfied	5-Very satisfied	Grand Total
Female	6	4	16	34	132	192
Male	2	14	20	66	106	208
Grand Total	8	18	36	100	238	400

7.2.1.3 BY AGE

	1-Very dissatisfied	2-Dissatisfied	3-Neither satisfied nor dissatisfied	4-Satisfied	5-Very satisfied	Grand Total
18-24				1	7	8
25-34	2	2	1	13	45	63
35-44	2	10	11	19	52	94
45-54				14	63	77
55-64	3	4	16	18	21	62
65-74	1		5	12	25	43
75 or older		1	2	18	10	31
Prefer not to answer (Refused)		1	1	5	15	22
Grand Total	8	18	36	100	238	400

7.2.1.4 BY EDUCATION

	1-Very dissatisfied	2-Dissatisfied	3-Neither satisfied nor dissatisfied	4-Satisfied	5-Very satisfied	Grand Total
Associate Degree		1	1	8	26	36
Bachelor's Degree (4 year)	2	5	17	22	52	98
Graduate Degree	3	3		5	21	32
Graduated high school or GED	3	4	11	28	73	119
Prefer not to answer (Refused)		1	2	9	16	28
Some college or technical school		1	3	23	33	60
Some graduate school		3	2	4	5	14
Some high school or less				1	12	13
Grand Total	8	18	36	100	238	400

7.3 TREATMENT GROUP QUESTION 7 RESULTS ANALYSIS

If the program remains in place, would you like to continue receiving Home Energy Reports at no charge?

7.3.1.1 BY TREATMENT GROUP

Treatment	No response	No	Yes	Grand Total	Percentage Yes
	200			200	
T1	22	9	69	100	69%
T3	8	5	31	44	70%
T4	7	1	25	33	76%
T5	1	2	20	23	87%
Grand Total	238	17	145	400	

7.3.1.2 BY GENDER

	No response	No	Yes	Grand Total	Percentage Yes
Female	98	13	81	192	42%
Male	140	4	64	208	31%
Grand Total	238	17	145	400	

7.3.1.3 BY AGE

	No response	No	Yes	Grand Total	Percentage Yes
18-24	2	1	5	8	63%
25-34	37	1	25	63	40%
35-44	50	2	42	94	45%
45-54	31	1	45	77	58%
55-64	58	1	3	62	5%
65-74	32	4	7	43	16%
75 or older	13	6	12	31	39%
Prefer not to answer (Refused)	15	1	6	22	27%
Grand Total	238	17	145	400	

7.3.1.4 BY EDUCATION

	No response	No	Yes	Grand Total	Percentage Yes
Associate Degree	20		16	36	44%
Bachelor's Degree (4 year)	60	2	36	98	37%
Graduate Degree	17	3	12	32	38%
Graduated high school or GED	63	4	52	119	44%
Prefer not to answer (Refused)	21	1	6	28	21%
Some college or technical school	38	7	15	60	25%
Some graduate school	13		1	14	7%
Some high school or less	6		7	13	54%
Grand Total	238	17	145	400	

7.4 TREATMENT GROUP QUESTION 9 RESULTS ANALYSIS

How, if at all, has your opinion of Idaho Power changed since receiving the Home Energy Reports?

7.4.1.1 BY TREATMENT GROUP

Treatment	No response	Much better	Much worse	Somewhat better	Somewhat worse	Stayed the same	Grand Total
No treatment group indicated	200						200
T1	22	18	2	18	3	37	100
T3	8	12	1	9	1	13	44
T4	7	14		7		5	33
T5	1	5	1	9	1	6	23
Grand Total	238	49	4	43	5	61	400

7.4.1.2 BY GENDER

Gender	No response	Much better	Much worse	Somewhat better	Somewhat worse	Stayed the same	Grand Total
Female	98	41	2	21	2	28	192
Male	140	8	2	22	3	33	208
Grand Total	238	49	4	43	5	61	400

7.4.1.3 BY AGE

	No response	Much better	Much worse	Somewhat better	Somewhat worse	Stayed the same	Grand Total
18-24	2	2		2		2	8
25-34	37	7	1	10	1	7	63
35-44	50	17	1	10	2	14	94
45-54	31	16	1	13	1	15	77
55-64	58	1		1		2	62
65-74	32	5		3		3	43
75 or older	13	1	1	3	1	12	31
Prefer not to answer (Refused)	15			1		6	22
Grand Total	238	49	4	43	5	61	400

7.4.1.4 BY EDUCATION

	No response	Much better	Much worse	Somewhat better	Somewhat worse	Stayed the same	Grand Total
Associate Degree	20	13		1		2	36
Bachelor's Degree (4 year)	60	6		14	3	15	98
Graduate Degree	17	1		6		8	32
Graduated high school or GED	63	22	2	15		17	119
Prefer not to answer (Refused)	21			1		6	28
Some college or technical school	38	4	1	5	2	10	60
Some graduate school	13		1				14
Some high school or less	6	3		1		3	13
Grand Total	238	49	4	43	5	61	400

APPENDIX F – QUARTERLY PROGRAM MONITORING SCHEDULE

Report #	Date Presented	Report Period
Q1	Nov 16, 2017	July 24, 2017 – September 30, 2017
Q2	Feb 7, 2018	July 24, 2017 – December 31, 2017
Q3	April 26, 2018	July 24, 2017 – March 31, 2018
Q4	July 31, 2018	July 24, 2017 – June 30, 2018

IDAHO POWER ENERGY WISE®
PROGRAM SUMMARY REPORT

2017-2018

SUBMITTED BY:

RESOURCEACTION
PROGRAMS
A FRANKLIN ENERGY COMPANY

Idaho Power Energy Wise®
Program Summary Report
2017-2018

Made possible by:

IDAHO POWER®

An IDACORP Company

Submitted by:

RESOURCEACTION PROGRAMS

July 2018

"The students loved being able to make a difference. This is something tangible they can do to make a difference in their homes and in the community."

Heather Mueller, Teacher
Washington Elementary School

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“This is my second child that has gone through the program and both of them were really eager about installing the kit and saving money.”

[redacted], Parent

Hunter Elementary School

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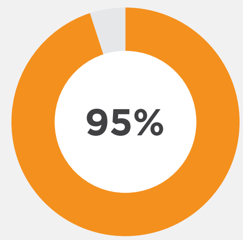
Executive Summary

Resource Action Programs® (RAP) is pleased to present this Program Summary Report to Idaho Power, which summarizes the 2017-2018 Idaho Power Energy Wise® Program. The program was implemented in the Idaho Power service area in the state of Idaho by 9,439 teachers, students, and their families.

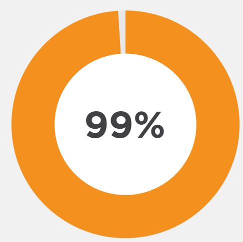
The following pages provide an overview of the program and materials, outline of program implementation, introduction to the program team, description of program enhancements, impact of the program, and summary of results from the home activities. In addition to this information, evaluations, letters, and comments are provided for a glimpse into actual participant feedback. Lastly, projected savings from the individual measures found within the Energy Wise Kit are also included.

Participant Satisfaction

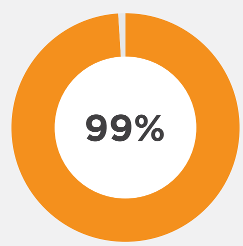
A successful program excites and engages participants. Students, parents, and teachers are asked to evaluate the program and provide personal comments. A sample of the feedback is given in the margin. ›



Teachers who indicated parents supported the program.

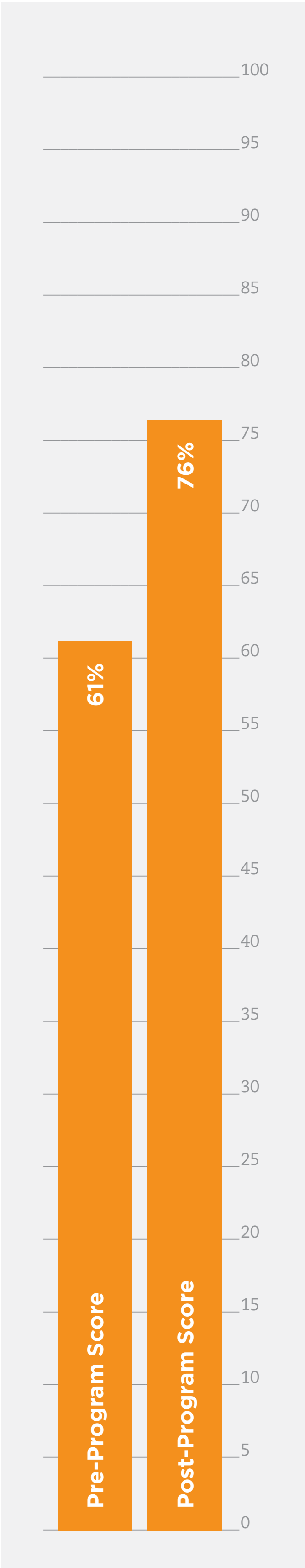


Teachers who indicated they would recommend this program to other colleagues.



Teachers who indicated they would conduct this program again.

A summary of responses can be found in Appendix D.



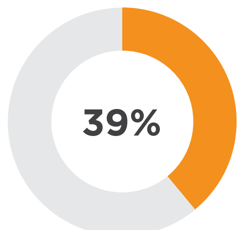
Knowledge Gained

Identical tests were administered to the students prior to the program and again upon program completion to measure knowledge gained. Scores and subject knowledge improved from **61%** to **76%**.

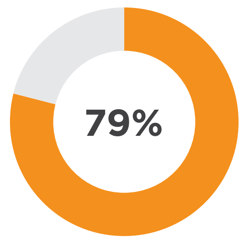
Measures Installed

Students completed take-home activities as part of the program and reported on the kit measures they installed in their homes.

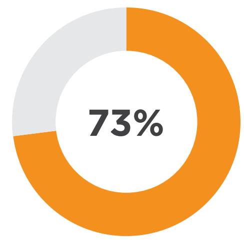
A summary of responses can be found in Appendix B.



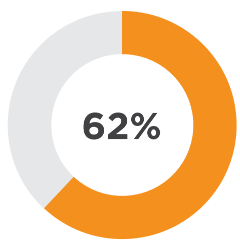
Students who reported they installed the High-Efficiency Showerhead.



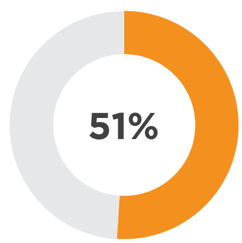
Students who indicated they installed the LED Night Light.



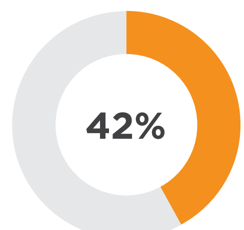
Students who reported they used the Shower Timer.



Students who reported they installed the first 9-watt LED.



Students who reported they installed the second 9-watt LED.



Students who reported they installed the third 9-watt LED.

Student Survey Response by Region

	Total	Capital	Canyon	Eastern	Southern	Western
Total Participants	9,439	2,678	3,067	1,212	1,408	1,074
Students	9,107	2,585	2,965	1,168	1,358	1,031
Surveys Received	5,252	1,133	2,139	737	766	477
Percent Response	56%	42%	70%	61%	54%	44%

Energy and Water Savings Results

In addition to educating students and their parents, a primary program goal is to generate cost-effective energy and water savings. Student home surveys not only provided the data used in the savings projections, but also reinforced the learning benefits.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

PROJECTED ANNUAL SAVINGS	
13,069,285	gallons of water saved
1,993,950	kWh of electricity saved
51,442	therms of gas saved
13,069,285	gallons of wastewater saved

PROJECTED LIFETIME SAVINGS	
130,692,848	gallons of water saved
21,415,686	kWh of electricity saved
514,415	therms of gas saved
130,692,848	gallons of wastewater saved

PROJECTED ANNUAL SAVINGS PER HOME	
1,385	gallons of water saved
211	kWh of electricity saved
5	therms of gas saved
1,385	gallons of wastewater saved

PROJECTED LIFETIME SAVINGS PER HOME	
13,846	gallons of water saved
2,269	kWh of electricity saved
54	therms of gas saved
13,846	gallons of wastewater saved

"I would like to say thank you. My child learned a lot from this program and I am also learning some great information about energy, etc."

[redacted], Parent
Sherman Elementary School

Program Overview

The Idaho Power Energy Wise® Program, a school-based energy efficiency education program, is designed to generate immediate and long-term resource savings by bringing interactive, real-world education home to students and their families. The 2017-2018 program was taught in grades 3-6 throughout the Idaho Power service area.

The Idaho Power Community Education Representative program team identifies and enrolls students and teachers within the designated service area. The program physically begins with classroom discussions in a Student Guide that provide the foundations of using energy and water efficiently, followed by hands-on, creative, problem solving activities led by the classroom teacher.

All program materials support state and national academic standards to allow the program to fit easily into a teacher's existing curriculum and requirements. The participating classroom teachers follow the Teacher Book and lesson plan. Information is given to guide lessons throughout the program in order to satisfy each student's individual needs, whether they are visual, auditory, or kinesthetic learners.

The Energy Wise Kit and Student Workbook comprise the take-home portion of the program. Students receive a kit containing high-efficiency measures they use to install within their homes. With the help of their parents/guardians, students install the kit measures and complete a home survey. The act of installing and monitoring new energy efficiency devices in their homes allows students to put their learning into practice. Here, participants and their parents/guardians realize actual water and energy savings within their home, benefitting two generations.

A critical element of RAP program design is the use of new knowledge through reporting. At the end of the program, the Idaho Power Energy Wise program team tabulates all participant responses—including home survey information, teacher responses, student letters, and parent feedback—and generates this Program Summary Report.

“This made my child aware of the dangers of electricity and that the power we use comes at some kind of cost. The timer was especially a point of interest.”

[redacted], Parent

Desert Sage Elementary

Program Materials

Each participant in the Idaho Power Energy Wise® Program receives classroom materials and energy efficiency kits containing high-efficiency measures to perform the program's take-home activities. Program materials for students, parents/guardians, and teachers are outlined below.

Each Student & Teacher Receives

Student Guide

Student Workbook

Parent Letter/Pledge Form

Student Survey Form

Certificate of Achievement

Energy Wise Kit Containing:

- High-Efficiency Showerhead
- Shower Timer
- LED Night Light
- (3) 9-watt LED Light Bulbs
- FilterTone® Alarm
- Digital Thermometer
- Reminder Stickers and Magnet Pack
- Flow Rate Test Bag
- Natural Resource Fact Chart
- Parent/Guardian Program Evaluation
- Illustrated Instruction Guide

Idaho Power Energy Wise Wristband

Website Access at:
http://www.idahopower.com/wise

Toll-Free HELP Line

Each Teacher/Classroom Receives

Teacher Book

Idaho Power Custom Introduction Video Flash Drive

Step-by-Step Program Checklist

Lesson Plans

Idaho State and National Academic Standards Chart

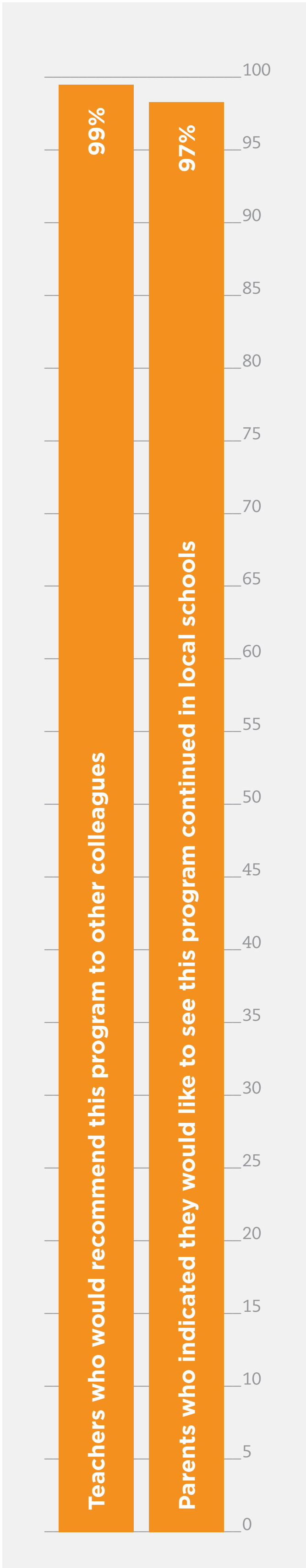
Extra Activities Booket

Teacher Survey Form

Pre/Post Student Survey Answer Keys

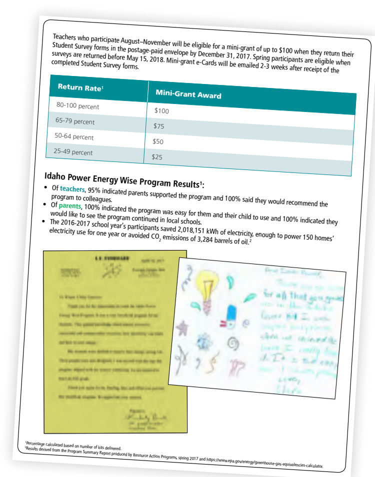
Electricity Poster

Self-Addressed Postage-Paid Envelope

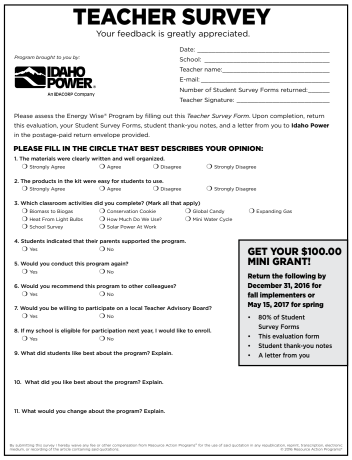


Custom Branding

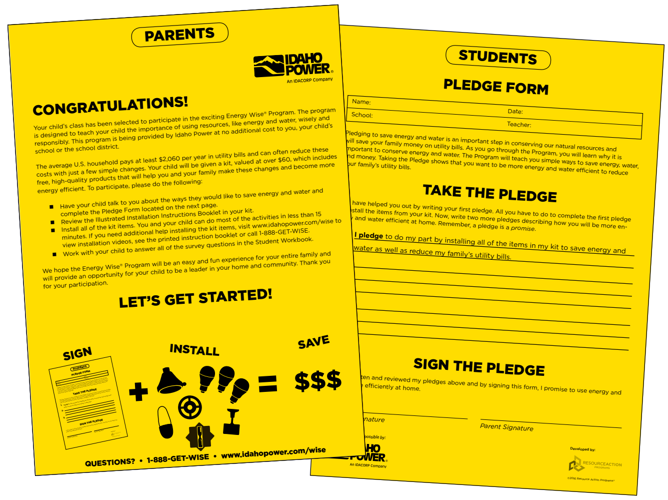
In addition to increasing resource awareness and efficiency, the program has been designed to strengthen bonds between Idaho Power and the community. One of the steps taken to ensure the greatest possible exposure is to feature the Idaho Power logo throughout each Energy Wise Kit. In addition to the kit, the Teacher Survey Form, Parent Letter/Pledge Form, Student Guide, Student Workbook, Teacher Book, and Idaho Power exclusive Introduction Video (flash drive) also feature Idaho Power branding. Further, a custom Teacher Solicitation Flyer was created for Community Education Representatives' program promotion.



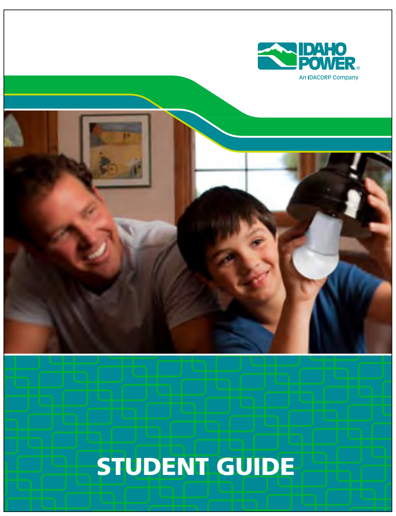
Program Materials



Teacher Evaluation Form

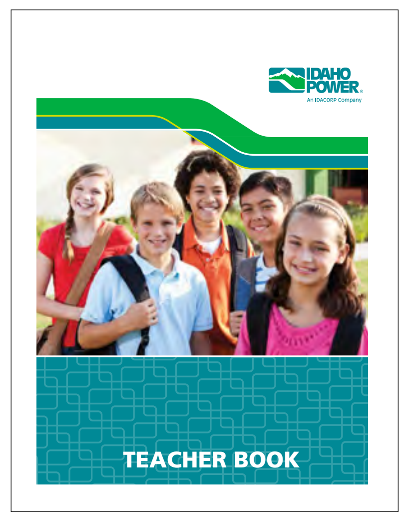


Parent Letter/Pledge Form



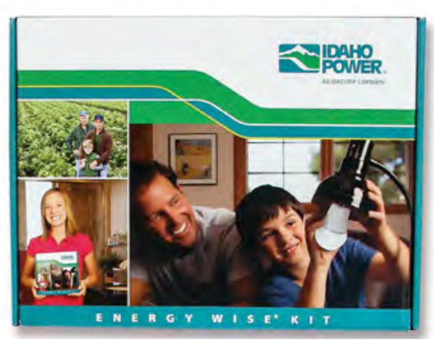
Student Guide

Student Take-Home Workbook



Teacher Book

Certificate of Achievement



Kit Box

Introduction Video (flash drive) Pen

"The students really liked that it was a project they could share with their families. They talked about the discussions they had with their parents."

Debbie Peterson, Teacher

Wilson Elementary School

Program Implementation

The 2017-2018 Idaho Power Energy Wise® Program followed this comprehensive implementation schedule:

1. Identification of Idaho state and national academic standards & benchmarks
2. Curriculum development and refinement (completed annually)
3. Curriculum correlation to Idaho state and national academic standards & benchmarks
4. Materials modification to incorporate Idaho Power branding
5. Incentive program development
6. Teacher outreach and program introduction by Idaho Power CERs
7. Teachers enrolled in the program individually by Idaho Power CERs
8. Implementation dates scheduled with teachers by Idaho Power CERs
9. Program material delivered to coincide with desired implementation date
10. Delivery confirmation
11. Periodic contact to ensure implementation and teacher satisfaction
12. Program completion incentive offered
13. Results collection
14. Program completion incentive delivered to qualifying teachers
15. Thank you cards sent to participating teachers
16. Data analysis
17. Program Summary Report generated and distributed

Participating teachers are free to implement the program to coincide with their lesson plans and class schedules. Appendix C provides a comprehensive list of classrooms in grades 3-6 that participated during the 2017-2018 school year.

For more than 25 years, Resource Action Programs (RAP) has designed and implemented Measure-Based Education® programs that inspire change in household energy and water use while delivering significant, measurable resource savings. All RAP programs feature a proven blend of innovative education, comprehensive implementation services, and hands-on activities to put efficiency knowledge to work in students' homes.

RAP has a strong reputation for providing a high level of client service as part of a wide range of energy efficiency education solutions for utilities, municipalities, states, community agencies, corporations, and more. In 2013, RAP was the only conservation services provider honored by the American Council for an Energy-Efficient Economy (ACEEE) and the Alliance for Water Efficiency (AWE) as one of 12 top programs that provides sustained achievement. RAP was honored for market penetration, innovative design, and its ability to achieve substantial/sustained energy and water savings.

ACEEE
American Council for an Energy-Efficient Economy

Alliance *for* Water Efficiency

Program Team

RAP implements nearly 300 individual programs that serve more than 650,000 households each year. All-inclusive program delivery occurs in its 80,000 square-foot Nevada Program Center where implementation teams and support departments work together to provide:

- 1:1 teacher support
- Curriculum development
- Customized materials
- Data tracking and reporting
- Energy and water efficiency measures
- Graphic and web design
- Kit assembly
- Marketing communications
- Shipping
- Printing
- Program management
- Participant enrollment
- Warehousing

The Implementation Team

For the Idaho Power Energy Wise® Program, RAP assigned a specific implementation team to Idaho Power made up of a PMP®-designated Program Manager, CEM®-designated energy analyst, graphic designer, outreach personnel, educator, and administrative staff. This team immersed themselves into the Idaho Power brand, and handled all program implementation for Idaho Power. Idaho Power also received the benefit of fully staffed support departments, which worked with the implementation team to define success for Idaho Power. These departments include education, marketing, information technology, and warehouse/logistics.

Continuous Improvement

In addition to successful implementation of the Idaho Power Energy Wise Program, RAP engages in continuous program improvement, as well as enhancements to educational materials, with modifications based on emerging technology, industry trends, and EM&V findings.

As part of this plan, RAP utilizes an extensive network of educators for program feedback. This feedback ensures that educational components meet the changing needs of educators, keep information relevant to students, and, in turn, provide increased water and energy literacy amongst program participants.

"The kit was very exciting for the students. The students asked several times if it was free. I believe the kit gave ownership to the students to conserve energy."

Marie Rockwood, Teacher
Melba Elementary

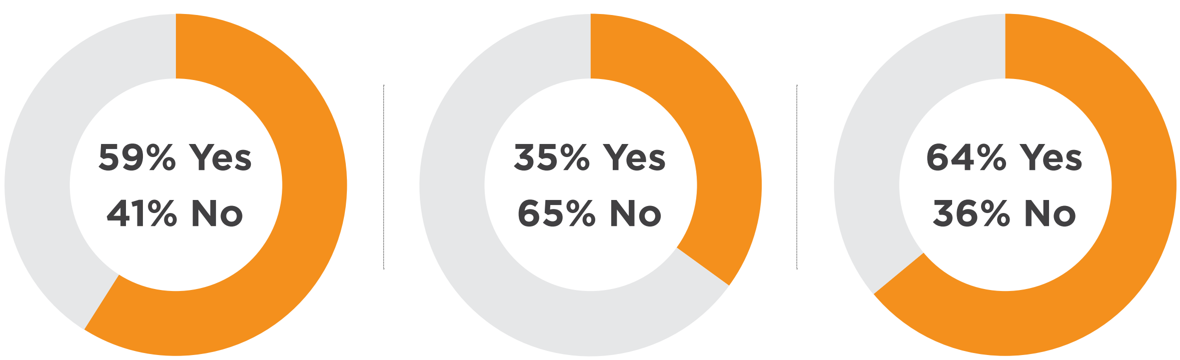
Program Impact

The Idaho Power Energy Wise® Program has had a significant impact within the community. As illustrated below, the program successfully educated participants about energy and water efficiency while generating resource savings through the installation of efficiency measures in homes. Home survey information was collected to track projected savings and provide household consumption and demographic data. Program evaluations and comments were collected from teachers, students, and parents. The following program elements were used to collect this data:

A. Home Survey for Capital Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 93 participating teachers in the Capital region, 34 (37%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 2,585 participating children in the Capital region, 1,133 (42%) returned completed surveys.

Did your family install the first 9-watt LED Light Bulb?	**Yes - 59%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 35%**
Did your family change the way they use energy?	**Yes - 64%**



Students who indicated they installed the first 9-watt LED Light Bulb.

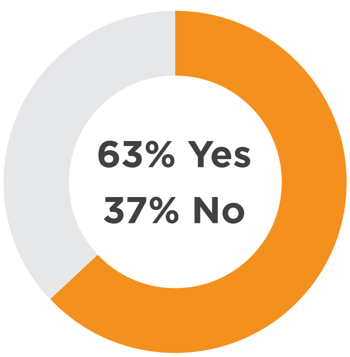
Students who indicated they installed the High-Efficiency Showerhead.

Students who indicated their family changed the way they use energy.

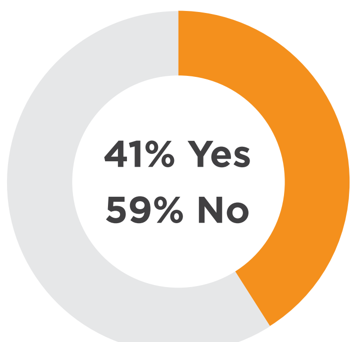
Home Survey for Canyon Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 102 participating teachers in the Canyon region, 64 (63%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 2,965 participating children in the Canyon region, 2,139 (70%) returned completed surveys.

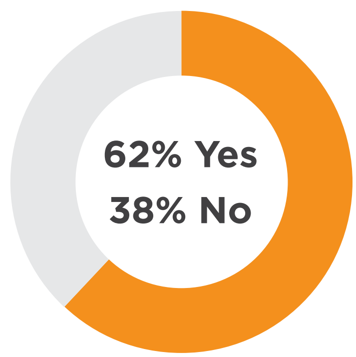
Did your family install the first 9-watt LED Light Bulb?	**Yes - 63%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 41%**
Did your family change the way they use energy?	**Yes - 62%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.

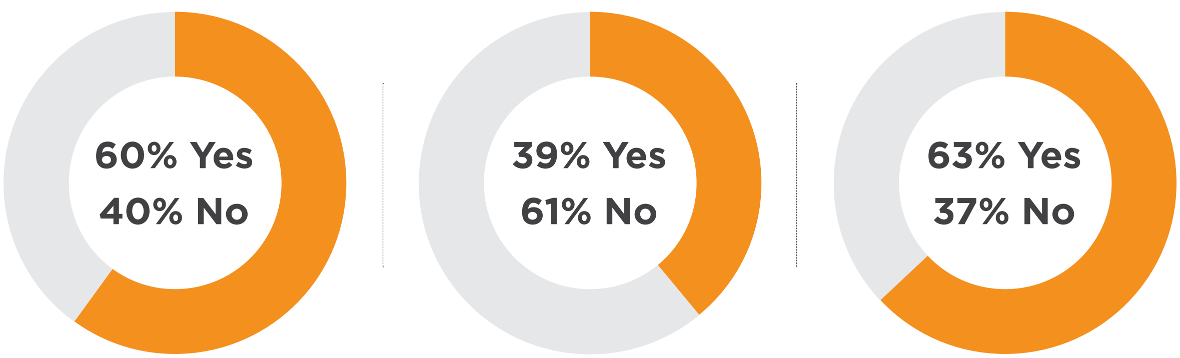


Students who indicated their family changed the way they use energy.

Home Survey for Eastern Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 44 participating teachers in the Eastern region, 25 (57%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 1,168 participating children in the Eastern region, 737 (61%) returned completed surveys.

Did your family install the first 9-watt LED Light Bulb?	**Yes - 60%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 39%**
Did your family change the way they use energy?	**Yes - 63%**



Students who indicated they installed the first 9-watt LED Light Bulb.

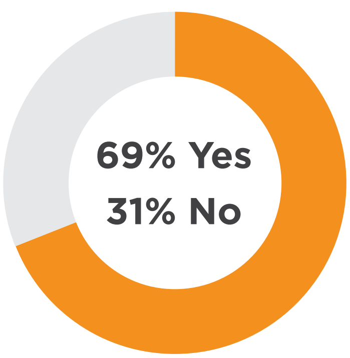
Students who indicated they installed the High-Efficiency Showerhead.

Students who indicated their family changed the way they use energy.

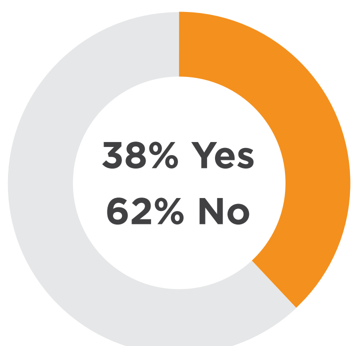
Home Survey for Southern Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 50 participating teachers in the Southern region, 20 (40%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 1,358 participating children in the Southern region, 766 (54%) returned completed surveys.

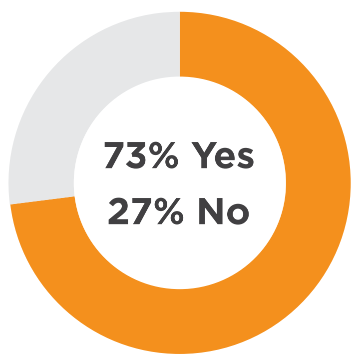
Did your family install the first 9-watt LED Light Bulb?	**Yes - 69%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 38%**
Did your family change the way they use energy?	**Yes - 73%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.

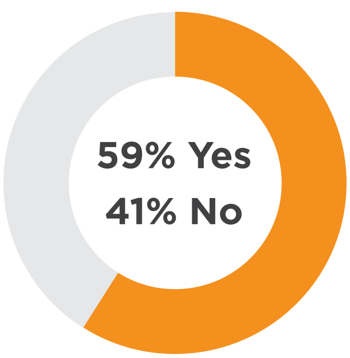


Students who indicated their family changed the way they use energy.

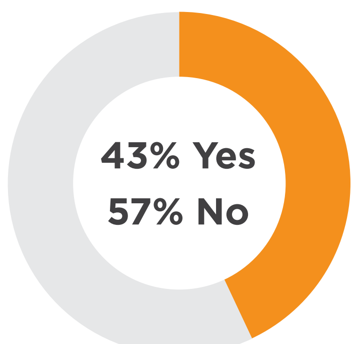
Home Survey for Western Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 43 participating teachers in the Western region, 16 (37%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 1,031 participating children in the Western region, 477 (44%) returned completed surveys.

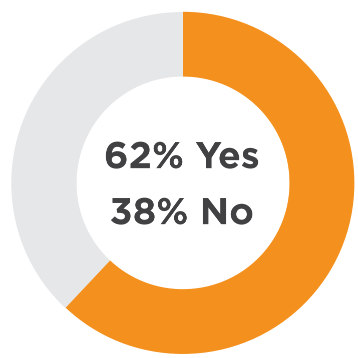
Did your family install the first 9-watt LED Light Bulb?	**Yes - 59%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 43%**
Did your family change the way they use energy?	**Yes - 62%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.

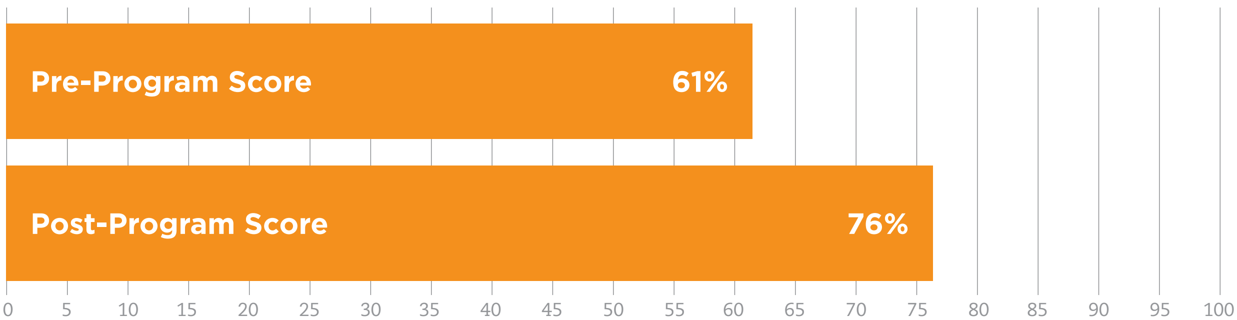


Students who indicated their family changed the way they use energy.

B. Pre-Program and Post-Program Tests

Students were asked to complete a 10-question test before the program was introduced and then again after it was completed to determine the knowledge gained through the program. The average student answered **6.1** questions correctly prior to being involved in the program and then improved to answer **7.6** questions correctly following participation. Of the 9,107 student households participating, 5,252 returned survey responses.

Scores improved from 61% to 76%.



Pre-Program and Post-Program Test Questions

		Pre	Post
1	Which layer of Earth do we live on?		
	Crust	70%	87%
	Mantle	7%	3%
	Inner Core	7%	2%
	Outer Core	17%	7%
2	Non-Potable water is safe to drink.		
	True	23%	13%
	False	77%	87%
3	Which of these is not a renewable resource?		
	Wind	19%	8%
	Plants	5%	3%
	Gold	59%	80%
	Animals	17%	8%
4	Saving water saves energy.		
	True	86%	94%
	False	14%	6%

Pre-Program and Post-Program Test Questions

		Pre	Post
5	Which are fossil fuels?		
	Coal	22%	14%
	Oil	12%	6%
	Natural Gas	13%	6%
	All of the above	54%	74%
6	Which type of energy is created in the process of Photosynthesis?		
	Nuclear Energy	19%	13%
	Thermal Energy	26%	22%
	Chemical Energy	30%	53%
	Electric Energy	24%	11%
7	Which Kit item will save the most natural resources?		
	Compact Fluorescent Lamp	39%	37%
	High-Efficiency Showerhead	31%	48%
	FilterTone® Alarm	15%	7%
	LED Night Light	15%	8%
8	Which major appliance uses the most energy?		
	Dishwasher	19%	13%
	Refrigerator	61%	67%
	Dryer	20%	20%
9	An LED (light emiting diode) light bulb uses more energy than an incandescent bulb.		
	True	32%	17%
	False	68%	83%
10	On-peak time is the best time to play video games.		
	True	28%	16%
	False	72%	84%

C. Home Activities—Summary

As part of the program, parents and students installed resource efficiency measures in their homes. They also measured the pre-existing devices to calculate savings that they generated. Using the family habits collected from the home survey as the basis for this calculation, 9,439 households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come. Of the 9,107 student households participating, 5,252 returned survey responses.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Number of Participants:	**9,439**		
	Annual	**Lifetime**	
Projected reduction from Showerhead retrofit:	13,069,285	130,692,848	gallons
Product Life: **10 years**	865,119	8,651,186	kWh
	42,609	426,093	therms
Projected reduction from first **9**-watt LED Light Bulb:	295,924	3,551,092	kWh
Product Life: **25,000 hours** (**12** years)			
Projected reduction from second **9**-watt LED Light Bulb:	243,629	2,923,553	kWh
Product Life: **25,000 hours** (**12** years)			
Projected reduction from third **9**-watt LED Light Bulb:	198,541	2,382,496	kWh
Product Life: **25,000 hours** (**12** years)			
Projected reduction from LED Night Light retrofit:	212,475	2,124,751	kWh
Product Life: **10,000 hours**			
Projected reduction from FilterTone® installation:	178,261	1,782,608	kWh
Product Life: **10 years**	8,832	88,323	therms
Projected reduction from Shower Timer installation:	8,613,793	17,227,586	gallons
Estimated Life: **2 years**	28,083	56,166	therms
	570,188	1,140,376	kWh
TOTAL PROGRAM SAVINGS:	13,069,285	130,692,848	gallons
	1,993,950	21,415,686	kWh
	51,442	514,415	therms
TOTAL PROGRAM SAVINGS PER HOUSEHOLD:	1,385	13,846	gallons
	211	2,269	kWh
	5	54	therms

**Projected reduction from Shower Timer installation not included in Total Program Savings.*

D. Teacher Program Evaluation

Program improvements are based on participant feedback received. One of the types of feedback obtained is from participating teachers via a Teacher Program Evaluation Form. They are asked to evaluate relevant aspects of the program and each response is reviewed for pertinent information. The following is feedback from the Teacher Program Evaluation for the Idaho Power Energy Wise Program. Of the 332 participating teachers, 159 returned teacher program evaluation surveys.

Teacher Response

(A summary of responses and regional data can be found in Appendix D)

99% of participating teachers indicated they would conduct the program again given the opportunity.

99% of participating teachers indicated they would recommend the program to their colleagues.

What did students like best about the program? Explain.

"They honestly loved the ability to take new things home. Some loved that they even got a new night light. They also enjoyed teaching their parents about easy ways to save money at home."
Tyler Keefe, Sherman Elementary School

"Students were very excited about the kits. Several of them indicated installing the light bulbs and other items immediately."
Octavio Dario, West Canyon Elementary

"The presentation and the at home kits."
Lauren Denny, Mill Creek Elementary School

"The students enjoyed the energy saving wise kit items the most because they got to help install them."
Brittany Woodworth, West Canyon Elementary

"They enjoyed the presentation and the hands-on activities."
Eva Filas, Pillar Falls Elementary School

"They loved the kits and getting to install the items using the instruction book."
Laura VanDerschaaf, Lake Ridge Elementary School

"The students enjoyed the take home kits and being able to teach their families at home."
Nicole Gibbs, Willow Creek Elementary School

"The free home kits are a great way to hook the students interest into their personal energy consumption."
Nick Channer, Willow Creek Elementary School

"The student interest was genuine, they were excited."
Judy Swain, Trail Wind Elementary School

"They liked the vocabulary activities, they also liked reading about how much energy appliances use."
Tanya Scheibe, Lake Ridge Elementary School

Teacher Response

(A summary of responses and regional data can be found in Appendix D)

"The kits were a hit! They loved having something tangible to work with."
Robyn Flint, Filer Intermediate School

"They liked the activities best, specifically the "how much do we use." They were amazed by what they learned."
Becki Wheeler, Owyhee Elementary

What did you like best about the program? Explain.

"I liked that everything was there to teach it. Even connecting it to the standards."
Debbie Peterson, Wilson Elementary School

"I loved that my students had the opportunity to take learning home and share it with their families."
Kayden Tague, Whitney Elementary School

"I liked how informational the student workbooks are. We easily read all of the materials I swear. I enjoyed receiving a kit for each student."
Jennifer Zamora, Filer Intermediate School

"I liked the presentation before I started teaching the program. I also liked the ease of the program."
Zachary Dwello, Nampa Christian School

"I loved the energy wise kits! My kids were so excited to change their light bulbs and put in their new showerheads and the timer!"
Sue Weber, Meadows Valley School

"I liked the vocabulary, pictures, and diagrams. Students need to expand their vocabulary. Also, students need to be able to interpret the materials."
Julie Rider, Groveland Elementary

What would you change about the program? Explain.

"Nothing! I love it!"
Carol Briggs, Birch Elementary School

"I wish the lessons were a little easier. The students book is a little challenging."
Sara Walsh, Owyhee Elementary School

"Put the post-test on a different page."
Judie Bradburn, Gateway School of Language

"Nothing! I would love to start the year with the kits. I will request them in August next year."
Laurie Harvey, Gateway School of Language

E. Parent/Guardian Program Evaluation

Parent involvement with program activities and their children is of paramount interest to both Idaho Power and teachers in the program. When parents take an active role in their child's education it helps the schools and strengthens the educational process considerably. When students successfully engage their families in retrofit, installation, and home energy efficiency projects, efficiency messages are powerfully delivered to two generations in the same household. The program is a catalyst for this family interaction, which is demonstrated by feedback from Parent/Guardian Program Evaluations. The following is feedback from the Parent/Guardian Program Evaluations for the Idaho Power Energy Wise Program. Of the 9,107 participating families, 92 parents returned program evaluation surveys.

Parent Response

(A summary of responses and regional data can be found in Appendix E)

100% of participating parents indicated that the program was easy to use.

99% of participating parents indicated they would continue to use the kit items after the completion of the program.

97% of participating parents indicated they would like to see this program continued in local schools.

As a parent, which aspect of the program did you like best?

"That my son got to bring home items that we use everyday. He was so excited to help install them."
[redacted], **Blackfoot Charter Community Learning Center**

"Checklist for children and parents — doing it together. Light bulbs, signs, and night light."
[redacted] **Edahow Elementary School**

"Water saver items. Items were a cool variety and peaked interest. He read the entire handout!"
[redacted], **Grace Jordan Elementary School**

"I liked the high efficiency shower head it will help save water and energy with all the showers we take."
[redacted], **Greenhurst Elementary School**

"The fact it brought awareness to my son about waste and the need to help the world."
[redacted], **Indian Creek & Ross Elementary School**

"I like the work book and the kit. The combo shows kids items, hands-on, that help save and the math that gives numbers to compare."
[redacted], **Prospect Elementary**

"The math exercises to find cost savings was really eye-opening. We loved the hands-on learning that took place."
[redacted], **Prospect Elementary**

Parent Response

(A summary of responses and regional data can be found in Appendix E)

Are there any comments you would like to express to your child's program sponsor?

"Thank you for making our children aware that energy is important to save. Turning off the lights, shorter showers, etc… My child immediately had ideas for the items in the kit and went right to 'work'."
[redacted], **Desert Sage Elementary**

"This is a great efficiency program to get the kids involved at home. Everything could be completed easily. Great interactive project."
[redacted], **Fruitland Elementary School**

"This was a fun, educational, and interesting activity. It's a great way to teach children about effects of our resource usage and ways we can effect change. Thanks!"
[redacted], **Grace Jordan Elementary School**

"Great program! We are always trying to teach our kids to not leave lights on and not take very long showers was very helpful to have it taught elsewhere and not just from nagging parents."
[redacted] **Homedale Elementary**

"Thank you for helping to teach children as well as helping parents conserve energy and save. Keep this program going. Thank you!"
[redacted], **Hunter Elementary School**

"Two of my kids have done this. They both came home very excited about checking our energy consumption. I think it is a wonderful concept to introduce and the kit. Tools are great!"
[redacted], **Lakevue Elementary School**

"This was a wonderful alternative to the weekly homework assignment. The real world application of math skills and environmental lessons of conservation were fantastic!!"
[redacted], **Prospect Elementary**

"This is a great program. I encourage you to keep engaging kids to help build a better tomorrow."
[redacted], **Prospect Elementary**

"I hope to see this program continue. The kids need this education. Thank you."
[redacted], **West Middle School**

"Thank you for taking time to show your students these valuable lessons."
[redacted], **William Thomas Middle School**

"A list of where to purchase the items would be good and cost of them."
[redacted]., **West Canyon Elementary**

F. Teacher Letters

Valley View Elementary School

3555 N. Milwaukee St., Boise, ID 83704 Phone# (208) 854-6370 Fax # (208) 854-6371

May 1, 2018

Dear Idaho Power,

Valley View Elementary fifth grade has been fortunate to participate in the Idaho Power Energy Wise Program. We volunteer to participate in this program each year because we clearly see the benefit of educating students on the importance of energy awareness and understanding.

Thank you for allowing us to be a part of a comprehensive program that provides useful resources and materials. The lessons are easy to understand and the home support materials are a nice extension to the lessons.

Parents appreciate the materials kit and information. Many students have commented on how they use the energy saving tools and their parents have saved money. Students have also reported family discussions regarding energy and power.

Once again, we are grateful for the opportunity to share this program with our students. As you know, they are our future and as such, we want to give them the best knowledge we can so they can positively contribute to helping our community and environment.

Sincerely,

Shawna Hiller + Meko Myers

Meko Myers & Shawna Hiller
Valley View Elementary

April 18, 2018

To Whom it May Concern,

My classroom participated in your 'Living Wise Program'. I have used this program over the last few years and I truly love it! My students learned quite a bit about energy and it went right along with what we have been learning in Science. The different types of energy lessons were very helpful and right at grade level. The kits were great! There were a few students that mentioned that their parents wouldn't let them install the shower head, but overall, the students used all of the items in the kit and parents responded well to the program.

I also loved that there were math concepts integrated into the lessons. I think the more you can include "everyday" math problems into your lessons, the better it would be.

This is a great program and my students benefited from your generosity. They came away knowing the value of conserving power and other natural resources.

Thank you again for providing our classroom with this valuable program.

Sherry VanEvery
5th Grade
Ellis Elementary

Sherry VanEvery

Dear Idaho Power,

Thank you so much for the opportunity to participate in this program! It was a great chance for the students to experience hands on how they can conserve energy and make our city a cleaner and better place to live.

The students really enjoyed receiving their kits and completing the activities at home. I know that many were excited about the simple ways that they can conserve such as using the shower timer, switching out light bulbs, and simply plugging in an LED night light. The ease of the Energy Kits was great for the students and teacher.

It was such a simple process to go through the text with the students. I loved how organized the materials were and how meaningful the activities were. As a whole, the program is organized extremely well. In fact, I recently sent in a request for an energy kit for my home through Idaho Power.

The students learned a lot about conservation through this program. In fact, during our Passion Project Time (a time students get to research and learn about a topic of their choice) many students were interested in related topics and what they could do to conserve energy and help the environment. It was great to see students take a real interest and dip deeper into a topic that was interesting to them.

I am excited to participate in this program again next year. I hope to be able to spend more time on activities to make the program even more meaningful for the students.

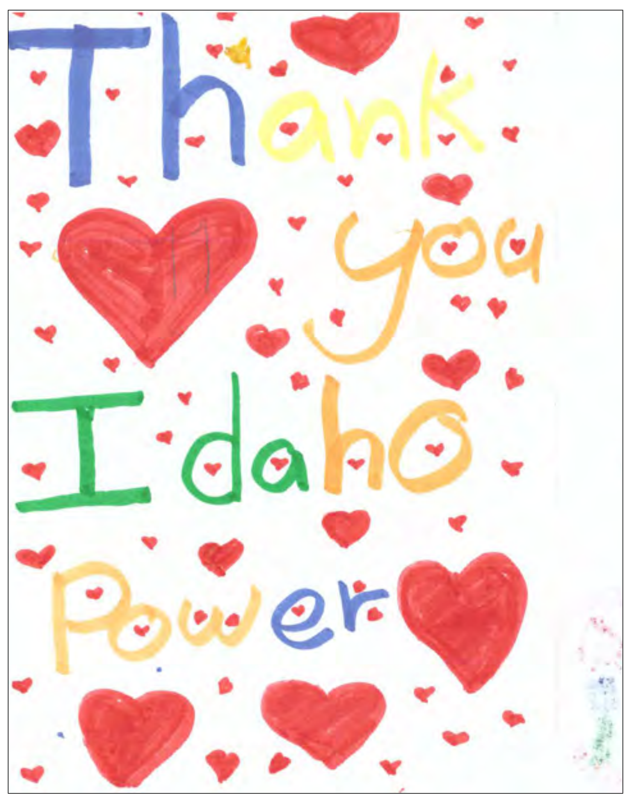
Thank you again for providing schools and students with such a simple, well organized, and meaningful way for students to learn about conservation and energy. It is a great experience for all students!

With much appreciation,

Laura VanDerschaaf

Laura VanDerschaaf
5th Grade – Lake Ridge Elementary

G. Student Letters



Student Letters

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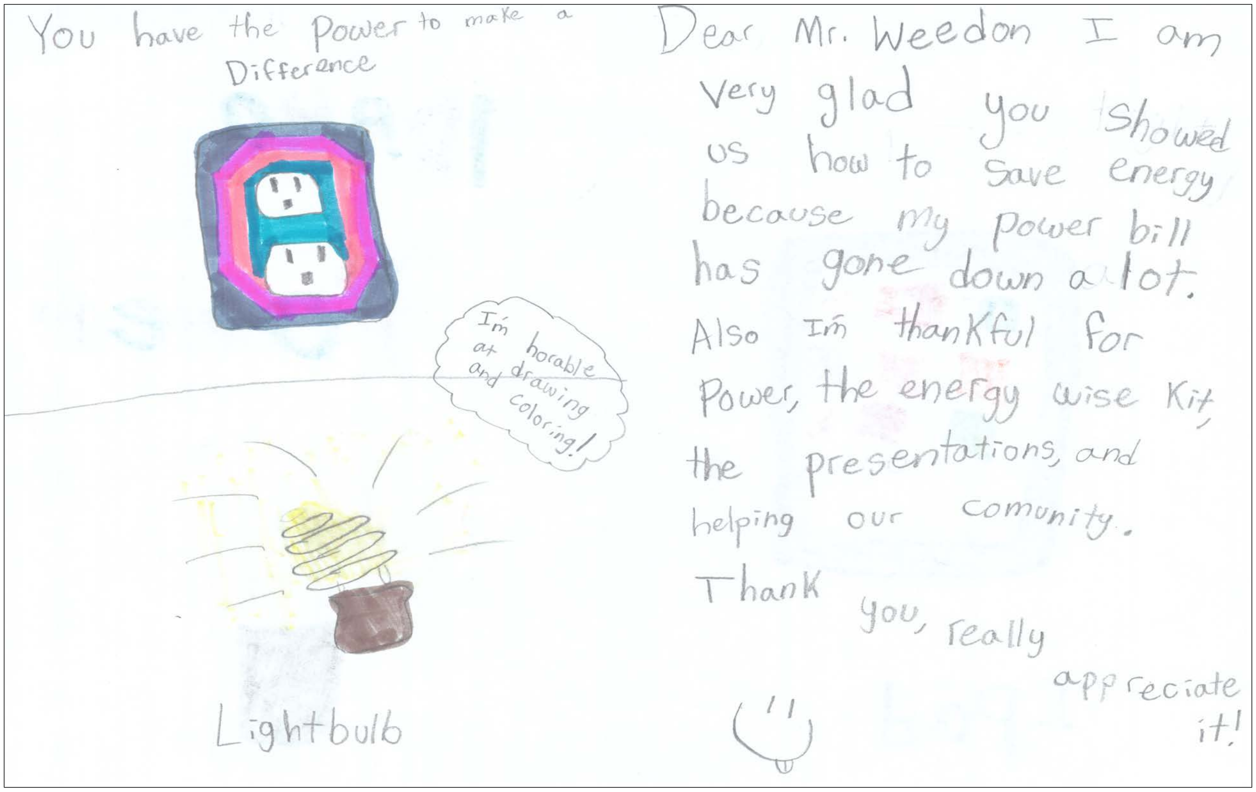
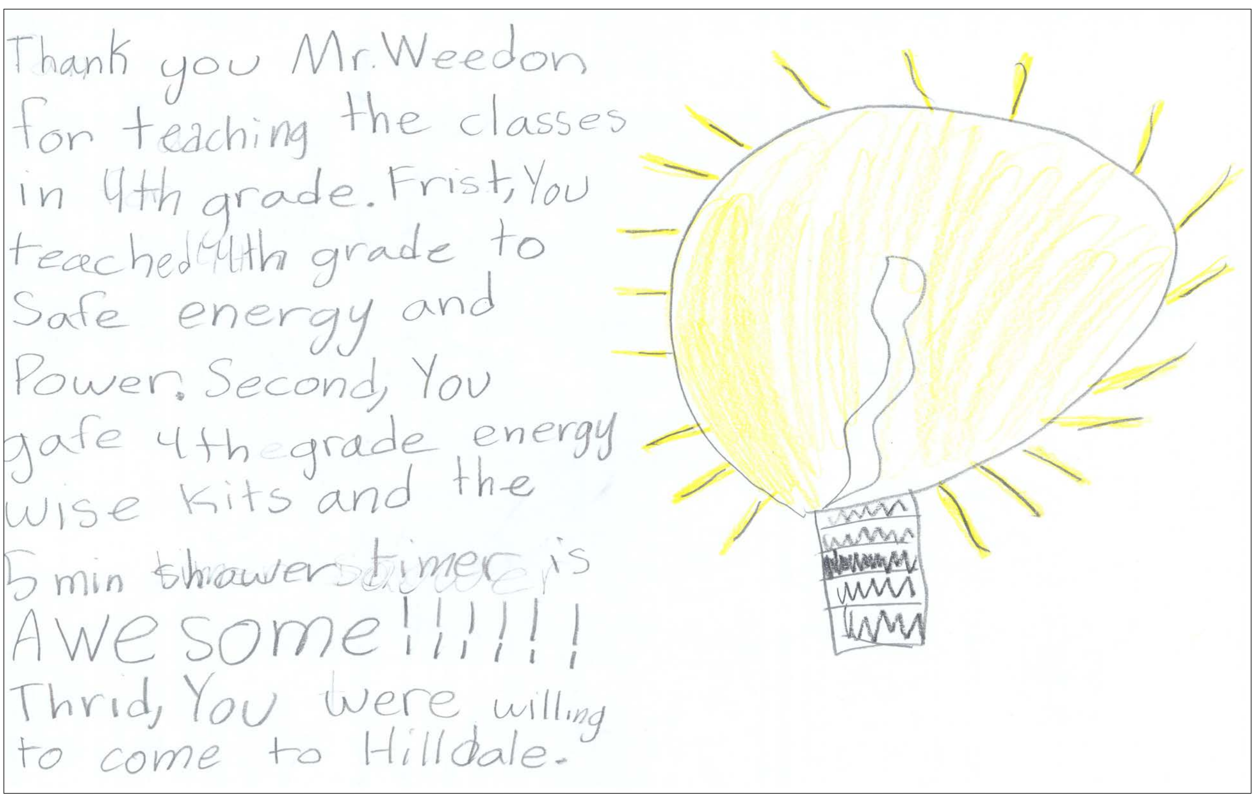


You have the Power to make a Difference

I'm horable at drawing and coloring!

Lightbulb

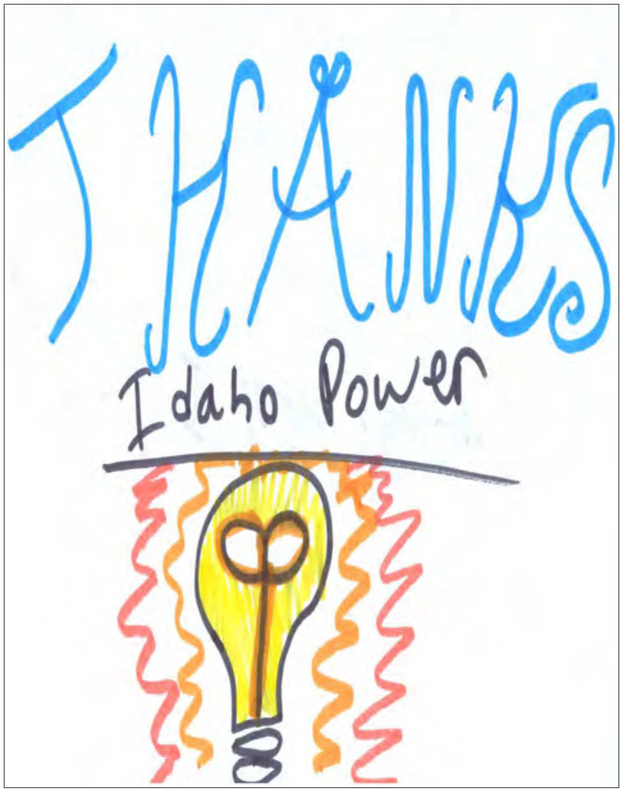
Dear Mr. Weedon I am very glad you Showed us how to Save energy because my power bill has gone down a lot. Also I'm thankful for Power, the energy wise Kit, the presentations, and helping our comunity. Thank you, really appreciate it!

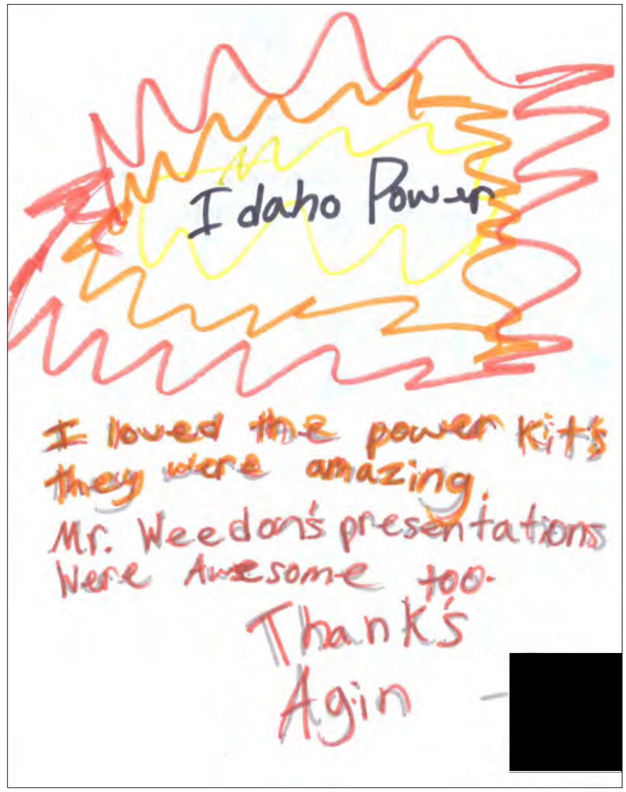


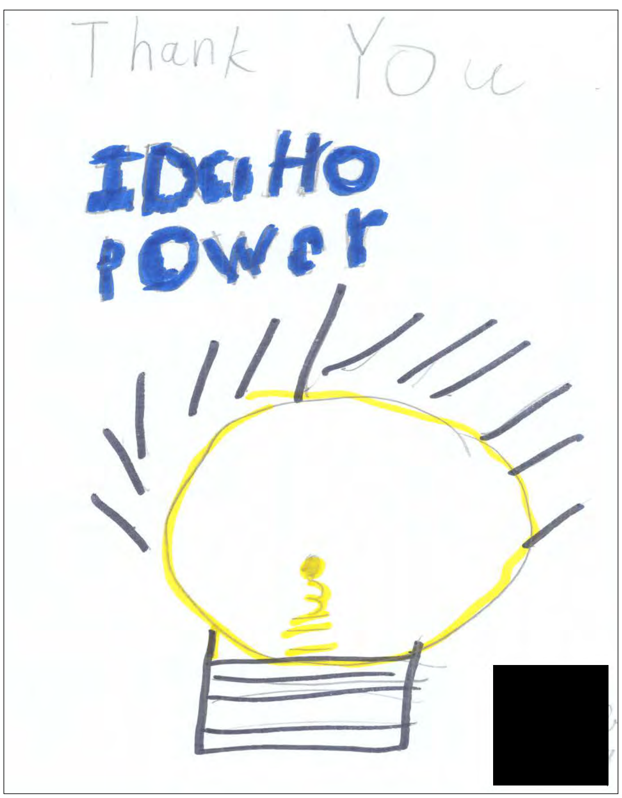
Thank you Mr. Weedon for teaching the classes in 4th grade. Frist, You teached 4th grade to Safe energy and Power. Second, You gafe 4th grade energy wise Kits and the 5 min shower timer is Awesome!!!!!! Thrid, You were willing to come to Hilldale.

Student Letters

(continued)







Student Letters

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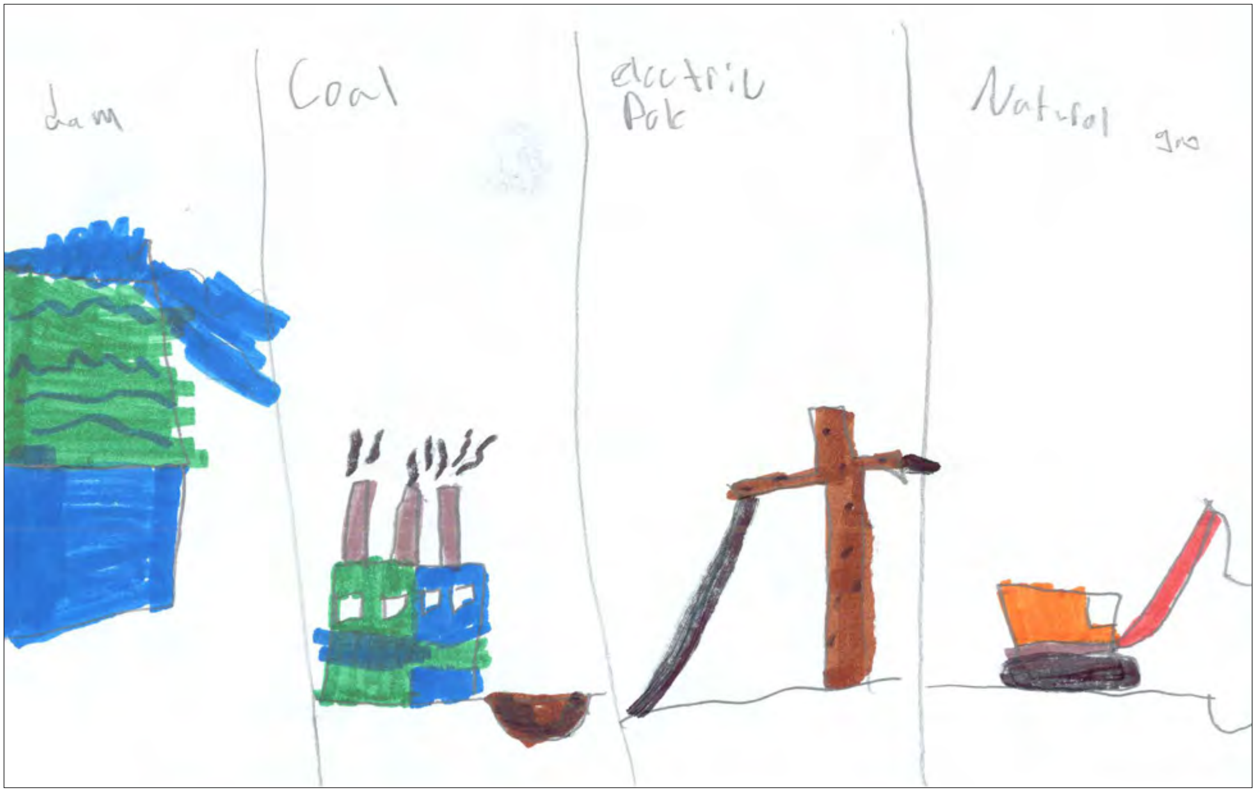
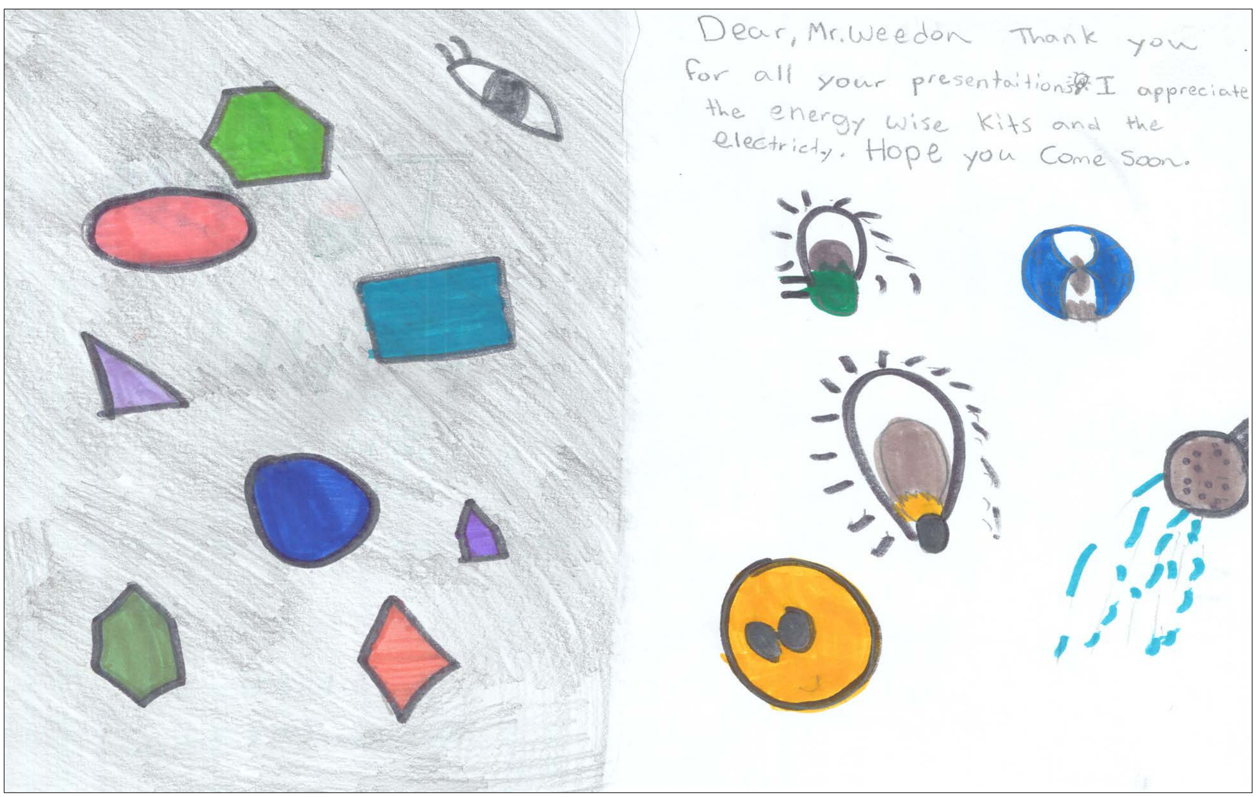
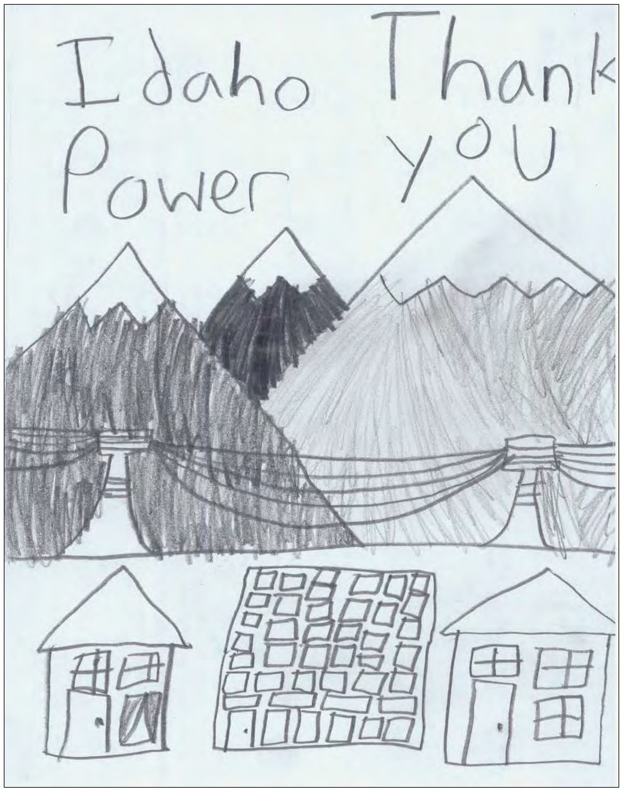
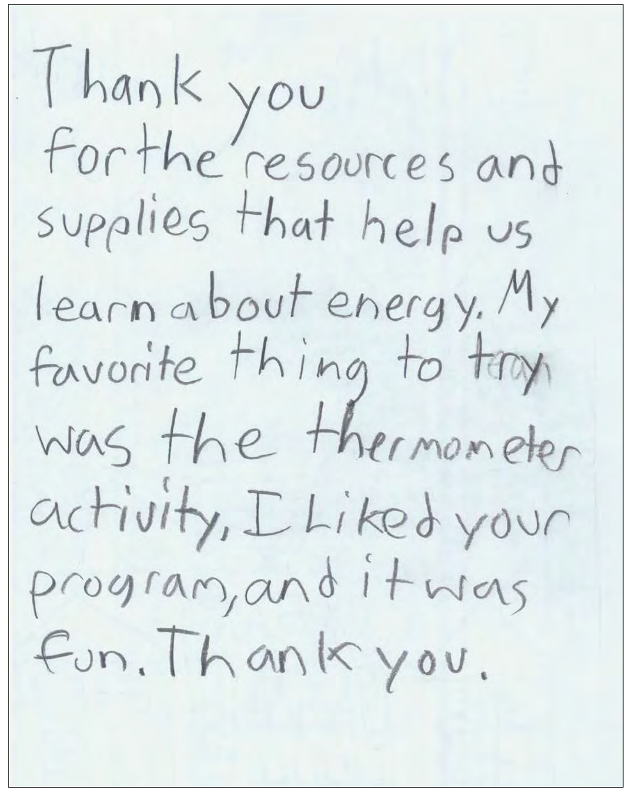


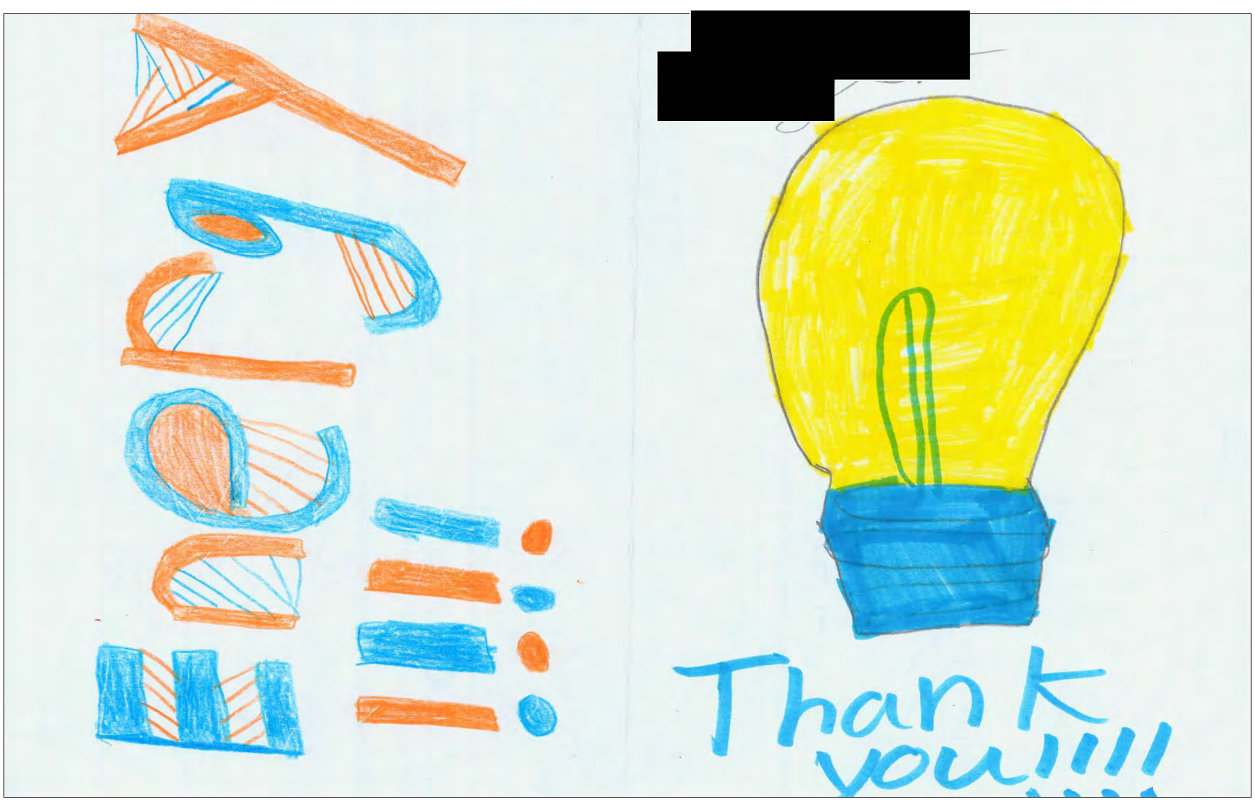


Student Letters

(continued)




Thank you for the resources and supplies that help us learn about energy. My favorite thing to try was the thermometer activity, I Liked your program, and it was fun. Thank you.



Student Letters

(continued)

4/19/18

Dear Idaho Power,

Thank you for the kits I loved them very much.

I used the shower head for my shower because my old shower head was rusty, never squirted out a bathtubs worth of water, and took forever to get hair wet. I used the shower timer for my shower because I used to take a 20-40 minutes in the shower and because of the timer I only can take a 5 min shower. Thank you for the shower timer and shower.

The other things I used were the room themonitor thingy and night light and the light bulbs. I use the night light for my room light its that good. I use the room thamonitorto yell at my mom when my room is 30 degrees Fahrenheit. Finally the light bulbs I haven't got to yet but I'm guessing that there as good as the LED night light. Thank you Idaho Power for the LED night light, the LED bulbs, and the room themonitor.

In conclusion I personally thank Idaho Power for the kits and the amazing things in them. Like the light bulbs, night light, room themonitor, shower head, and shower timer. Thank you so much Idaho Power for the gs.

Sincerely, [redacted]

Dear, Idaho Power 4/19/18

Thank you so much for all you have taught us about this year. Thank you for bringing us the Kit's, the work books, and Mrs. Boyd. Thank you for teaching us the importance of saving energy, water, and plenty of other stuff. I also want to say thanks for bringing Mrs. Boyd to this school. She was really helpful, and made me understand why all this was going to be so important in my life. It's going to be important to me my family my kids. These lessons are going to help me with life in general.

Let me just say this, the Kit's are amazing!! I just love the Kit's. On my Kit I used all of the stuff. I used the Filter Tone Alarm, I used the shower head for my restrume, I used the shower timer for when I need to shower, I used the lights for my bedroom because the lights went out yesterday, and finally I used the Thermometer for my bedroom because it has been really cold and I want to see if it gets any warmer. I also used the night light in my hall so i don't trip over my dogs. All this helps me so much in my life.

Sincerely

[redacted]

Dear Idaho Power,

4/19/18

Thank you for the Idaho power kits they are awesome. The shower timer is awesome and helps me keep track on how long I've been in the shower. Sometimes I have to keep on turning the shower timer and then I end up staying in the shower for like 20 minutes.

The Thamoniter is cool and it helps me tell what the temperature is in my bedroom or in the family room. It gets so cold at night in my bedroom so I look at my thermometer and see how cold it is in my room at night. When I go in my sisters room it is so cold and I bring my thamoniter and see what temperature it is in there room.

Sincerely,

[redacted]

Dear Idaho Power

Thank you for the idaho power kit it has help me save power. The first reason why it has help me is my basement is super dark so the nightlight has help. The nightlight made it brighter so I don't run into the wall when I'm trying to wake my sisters up. Also the LED lights have made my kitchen way brighter than it use to be. When my kitchen lights are on it makes it super bright until my bedroom.

The shower timer has help because I use to take 15 minutes but now I take 5 minutes. It help me save water because I use to just let the water poor on me so I could be warm while I did my hair. Also before I got in the shower I use to let it get warm while I just sat there. It has help my sister for sure SHE TAKES THE LONGEST SHOWER but now my mom said use the shower timer.

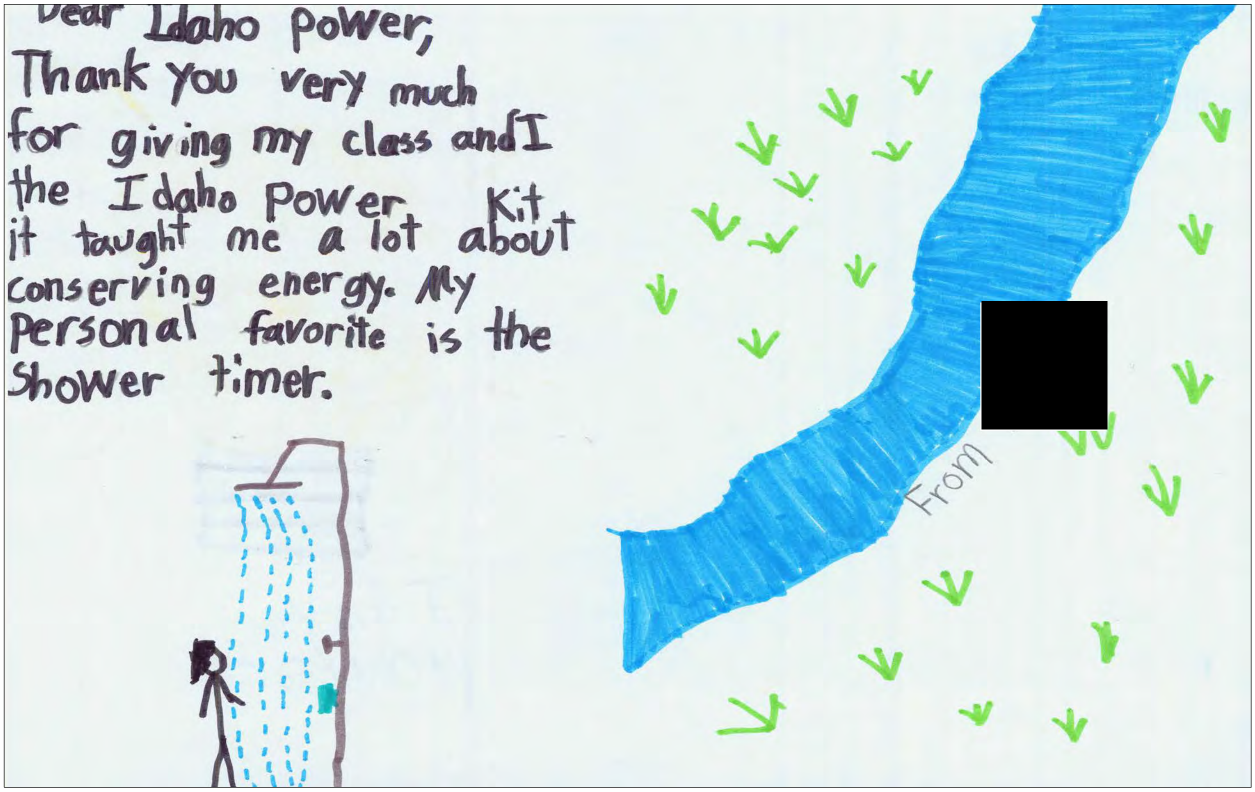
Thank you for sending Mrs. Boyd she taught us a lot. The very first lesson was about fish and how they help us save energy. Then she taught us about wires and DON'T TOUCH THEM or don't go inside the fence when there is big towers that have wires connected to them. She also let us put on a glove that electrician uses to fix the wires and let us crank a light thing.

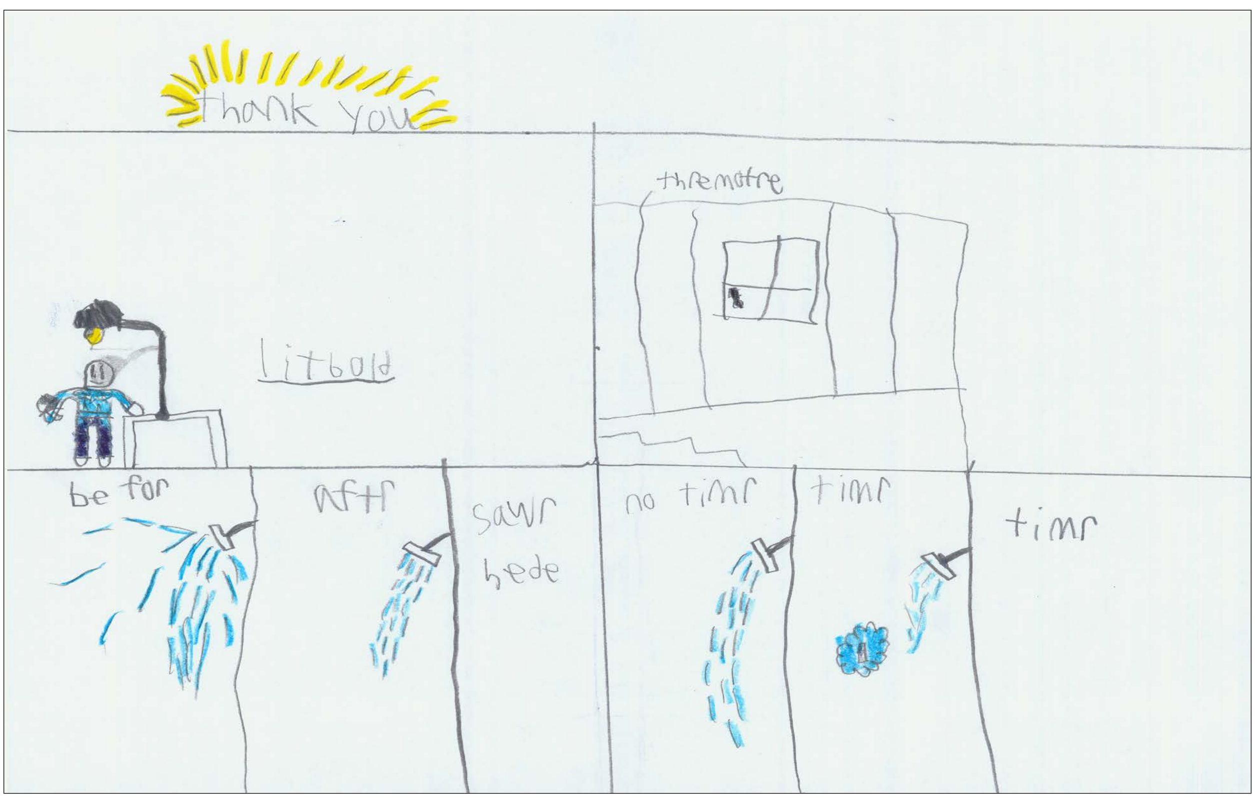
Sincerely,

[redacted]

Student Letters

(continued)





Student Letters

(continued)

March 13, 2018

Dear Idaho Power,

Thank you for giving the energy wise packets We appriciated it. My favorite item is the shower timer and the booklets. My Parents really appriciated for what you gave us. We always use it and we the light bulbs cause it makes it really bright in our home the shower head makes our Sprinkler work then the other one. I like the most is that my Parents don't waste money they are saving it. They aren't wasting any energy.

[redacted]

Thank You

March 13, 2018

Dear Idaho power,

I Appriciate you for giving us the Energy wise pakets, and so did my family Appriciate you guys. But my favorite thing was the Shower head and I also like the Presentation and teaching us about energy and hopefully you guys come back to teach us more about energy. Thank you for all the Stuff you gave us.

[redacted]

THANK YOU

Student Letters

(continued)

April 16th, 2018

To Whom It May Concern (Reader),

Thank you reader (or readers) for all the things that you have given me, and my classmates. Some of those things is a lessons book, and a kit. I especially like the Idaho Power Kit. It is very resourceful and can save my family hundreds of dollars. Well, it will save my family hundreds of dollars once I install all of the items. So far I have only used a few items, but don't be sad about that. The items I have used are very helpful to me and my family.

As I stated before, I am grateful for the IDPK (Idaho Power Kit) Anyway, you might be wondering what items I have been using are. If that is your question, then here is your answer. I have been using two things so far. The first one is the shower timer. The reason why it is first is because I have been using it the longest. Item number two is something I actually don't use. My eight-year-old brother uses it. It's the LED night light. I have addressed this as the second item because I have no idea when and how long he uses it. I do know, however that he uses it at night. Now, lets see why my brother and I use these items.

I use the shower timer because I am known for taking long showers. To prove my point, here is an example before I got the shower timer. Say that it is Thursday. (That is my usual shower time.) I just finished my ballet class and I am a sweaty, greasy mess. As I come home my mother orders me to take a shower. As I start the water, I adjust the temperature to be just the right amount of warmth. Now, I finally get in and lose track of time and take a shower for two hours. So, when I started using the timer things were different. Instead of taking a two hour shower, I would watch the timer and wash off until I was done, and this was accomplished without going over five minutes. Remember when I said that my brother uses the night light? Well, he uses it because he is scared of the dark. (Don't tell him that I told you that reader.) So there is what, and why I use the items from the IDPK. As you know it is very helpful and I am glad you gave to my class, so again, thank you.

Sincerely,

[redacted]

5-9-18

Dear Idaho Power,

Thank you for the take-home work-book and the kit. I learned that it is very important to turn off lights when your not using them or not to take to long in the shower. The only thing that my family used from the kit, and my family enough time to do all the things in the kit were, use the shower timer, use the night light, and save cold water when waiting for warm water. And once agen thank you for the stuff.

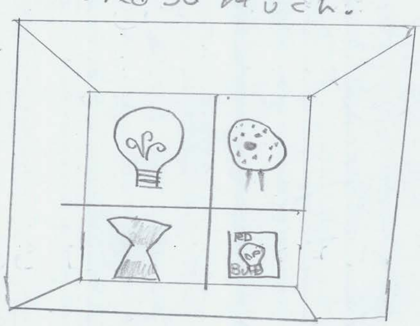
A Lake Ridge Elem. Student,

Nicole 5th grade

Thank You!

for the kits there were so useful and helpful

My favorite thing in the kit was the LeD lightBulB and. i learned so much.



Thank you!

So So So so so so so so so so so so so !!!!!!!

ESP;
5-9-18

Dear Idaho Power,

Thank you for providing this program to us. I learned so much about the Earth and things we rely on. I also learned about how to use the supplies in the kit. The most interesting I learned is that we can help save usefull stuff by many ways. I learned about the night light by installing it in my hall way and when ever I shut my bathroom door it turns on and when ever I open it, it turns off, thats because the hall way light is never on. Once again thank you so much.

— Sincerly [redacted]

Dear, Idaho power company

Thank you for the take home kit. It had some great helps for our family to learn to conselve energy. Also a thank you to Liz Haugee us about energy. I learned so much from you.

Sincerly, [redacted]

Filer 4th grade

Dear Idaho power company,

Thank you for the home kit. Thank you Liz Haugee for teaching us about how you help birds, squirls, and fish. Thanks for teaching us about how to save electricity.

sincerly

[redacted]

Dear Idaho Power

Thank you for the kit. It had some stuff that really helped our family learn to use less energy. My brother also got this kit in fourth grade. So some of the stuff had already been installed. Most of the stuff was used though.

Thank you to Liz Haugee for teaching us important lessons for saving energy. I tried to remember all of of her stuff she said. I do not know if I forgot any of it but I remember is very interesting.

[redacted] 4th grade

"I would like to say thank you for my child learning a lot from this program. I am also learning some great information about the energy, etc."

[redacted], Parent
Sherman Elementary School

Appendices

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Projected Savings from Showerhead Retrofit

Showerhead Retrofit Inputs and Assumptions:

Average household size:	5.09	people[1]
Average number of full bathrooms per home:	2.01	full bathrooms per home[1]
% of water heated by gas:	49.62%	[1]
% of water heated by electricity:	50.38%	[1]
Installation / participation rate of:	39.12%	[1]
Average Showerhead has a flow rate of:	1.95	gallons per minute[1]
Retrofit Showerhead has a flow rate of:	1.26	gallons per minute[1]
Number of participants:	9,439	[1]
Shower duration:	8.20	minutes per day[2]
Showers per day per person:	0.67	showers per day[2]
Product life:	10	years[3]

Projected Water Savings:

Showerhead retrofit projects an **annual** reduction of:	13,069,285	gallons[4]
Showerhead retrofit projects a **lifetime** reduction of:	130,692,848	gallons[5]

Projected Electricity Savings:

Showerhead retrofit projects an **annual** reduction of:	865,119	kWh[2,6]
Showerhead retrofit projects a **lifetime** reduction of:	8,651,186	kWh[2,7]

Projected Natural Gas Savings:

Showerhead retrofit projects an **annual** reduction of:	42,609	therms[2,8]
Showerhead retrofit projects a **lifetime** reduction of:	426,093	therms[2,9]

1 Data Reported by Program Participants.

2 (March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf

3 Provided by manufacturer.

4 [(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days

5 [(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days x Product Life

6 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity

7 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life

8 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas

9 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life

Projected Savings from Shower Timer Installation

Shower Timer Inputs and Assumptions:

% of water heated by gas:	49.62%	[1]
% of water heated by electricity:	50.38%	[1]
Installation / participation rate of Shower Timer:	72.70%	[1]
Average showerhead has a flow rate of:	1.95	gallons per minute[1]
Retrofit showerhead has flow rate of:	1.26	gallons per minute[1]
Number of participants:	9,439	[1]
Average of baseline and retrofit showerhead flow rate:	1.60	gallons per minute[2]
Shower duration:	8.20	minutes per day[3]
Shower timer duration:	5.00	minutes per day[4]
Showers per capita per day (SPCD):	0.67	showers per day[3]
Percent of water that is hot water:	73%	[5]
Days per year:	365.00	days
Product life:	2.00	years[5]

Projected Water Savings:

Shower Timer installation projects an **annual** reduction of:	8,613,793.12	gallons[6]
Shower Timer installation projects a **lifetime** reduction of:	17,227,586.23	gallons[7]

Projected Electricity Savings:

Shower Timer installation projects an **annual** reduction of:	570,188	kWh[8]
Shower Timer installation projects a **lifetime** reduction of:	1,140,376	kWh[9]

Projected Natural Gas Savings:

Shower Timer installation projects an **annual** reduction of:	28,083	therms[10]
Shower Timer installation projects a **lifetime** reduction of:	56,166	therms[11]

1 Data Reported by Program Participants.

2 Average of the baseline GPM and the retrofit GPM

3 (March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf

4 Provided by manufacturer.

5 Navigant EM&V Report for Super Savers Program in Illinois PY7

6 Annual water savings = Water Flow (Average of baseline and retrofit flow) × (Baseline Shower duration - Shower Timer duration) × Participants × Days per year × SPCD × Installation Rate of Shower Timer

7 Projected Annual Water Savings x Product Life

8 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Participants

9 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life x Participants

10 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Participants

11 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life x Participants

Projected Savings from FilterTone® Alarm Installation

FilterTone® Installation Inputs and Assumptions:

Annual energy (electricity) use by a central air conditioner:	**4,467**	kWh[1]
Annual energy (natural gas) use by a central space heating or furnace:	**421**	therms[1]
Projected increase in efficiency (electricity):	**1.75%**	[2]
Projected increase in efficiency (natural gas):	**0.92%**	[2]
Product life:	**10**	years[3]
Installation / participation rate of:	**24.16%**	[4]
Number of participants:	**9,439**	[4]

Projected Electricity Savings:

The FilterTone installation projects an **annual** reduction of:	**178,261**	kWh[5]
The FilterTone installation projects a **lifetime** reduction of:	**1,782,608**	kWh[6]

Projected Natural Gas Savings:

The FilterTone installation projects an **annual** reduction of:	**8,832**	therms[7]
The FilterTone installation projects a **lifetime** reduction of:	**88,323**	therms[8]

1 *U.S. Department of Energy, Energy Information Administration 2005 Residential Energy Consumption Web site for Mountain West States: http://www.eia.gov/consumption/residential/data/2005/*

2 *Reichmuth P.E., Howard. (1999). Engineering Review and Savings Estimates for the 'Filtertone' Filter Restriction Alarm.*

3 *Provided by manufacturer.*

4 *Data reported by program participants.*

5 *Annual energy (electricity) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (electricity) x Installation rate x Number of participants*

6 *Annual energy (electricity) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (electricity) x Installation rate x Number of participants x Product life*

7 *Annual energy (natural gas) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (natural gas) x Installation rate x Number of participants*

8 *Annual energy (natural gas) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (natural gas) x Installation rate x Number of participants x Product life*

Projected Savings from First 9-watt LED Light Bulb Retrofit

LED Retrofit Inputs and Assumptions:

Product life:	**25,000**	hours[1]
Watts used by the LED light bulb:	**9**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**58.29**	watts[3]
Installation / participation rate of:	**62.01%**	[3]
Number of participants:	**9,439**	[3]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**295,924**	kWh[2,4]
The LED retrofit projects a **lifetime** reduction of:	**3,551,092**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x 12 years] ÷ 1,000} x Number of participants x Installation rate

Projected Savings from Second 9-watt LED Light Bulb Retrofit

LED Retrofit Inputs and Assumptions:

Product life:	**25,000**	hours[1]
Watts used by the LED light bulb:	**9**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**58.11**	watts[3]
Installation / participation rate of:	**51.25%**	[3]
Number of participants:	**9,439**	[3]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**243,629**	kWh[2,4]
The LED retrofit projects a **lifetime** reduction of:	**2,923,553**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x 12 years] ÷ 1,000} x Number of participants x Installation rate

Projected Savings from Third 9-watt LED Light Bulb Retrofit

LED Retrofit Inputs and Assumptions:

Product life:	**25,000**	hours[1]
Watts used by the LED light bulb:	**9**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**58.11**	watts[3]
Installation / participation rate of:	**41.76%**	[3]
Number of participants:	**9,439**	[3]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**198,541**	kWh[2,4]
The LED retrofit projects a **lifetime** reduction of:	**2,382,496**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x 12 years] ÷ 1,000} x Number of participants x Installation rate

Projected Savings from LED Night Light Retrofit

Energy Efficient Night Light Retrofit Inputs and Assumptions:

Average length of use:	**4,380**	hours per year[1]
Average night light uses:	**7**	watts
Retrofit night light uses:	**0.5**	watts
Product life:	**10**	years[2]
Energy saved per year:	**28**	kWh per year
Energy saved over life expectancy:	**285**	kWh
Installation / participation rate of:	**79.07%**	[3]
Number of participants:	**9,439**	[3]

Projected Electricity Savings:

The Energy Efficient Night Light retrofit projects an **annual** reduction of:	**212,475**	kWh[4]
The Energy Efficient Night Light retrofit projects a **lifetime** reduction of:	**2,124,751**	kWh[5]

1 Assumption (12 hours per day)

2 Product life provided by manufacturer

3 Data reported by program participants

4(kWh per year x Number of participants) x Installation rate

5((kWh per year x Number of participants) x Installation rate) x Effective useful life

Home Check-Up

	Total	Capital	Canyon	Eastern	Southern	Western
Total Participants	9,439	2,678	3,067	1,212	1,408	1,074
Students	9,107	2,585	2,965	1,168	1,358	1,031
Surveys Received	5,252	1,133	2,139	737	766	477
Percent Response	56%	42%	70%	61%	54%	44%

	Total	Capital	Canyon	Eastern	Southern	Western
1 What type of home do you live in?						
Single Family Home (Mobile)	10%	7%	10%	12%	13%	13%
Single Family Home (Manufactured)	8%	5%	8%	8%	8%	11%
Single Family Home (Built)	66%	70%	64%	65%	63%	56%
Multi-Family (2-4 units)	11%	11%	11%	11%	8%	11%
Multi-Family (5-20 units)	5%	5%	5%	4%	7%	6%
Multi-Family (21+ units)	2%	2%	1%	1%	1%	2%
2 Was your home built before 1992?						
Yes	42%	42%	34%	59%	44%	53%
No	58%	58%	66%	41%	56%	47%
3 Is your home owned or rented?						
Owned	70%	76%	66%	74%	69%	73%
Rented	30%	24%	34%	26%	31%	27%
4 How many kids live in your home (age 0-17)?						
1	13%	17%	11%	12%	9%	15%
2	30%	38%	27%	29%	29%	27%
3	27%	24%	27%	26%	29%	26%
4	16%	12%	17%	16%	18%	17%
5+	15%	8%	18%	17%	16%	16%

Due to rounding of numbers, percentages may not add up to 100%

Home Check-Up

(continued)

		Total	Capital	Canyon	Eastern	Southern	Western
5	How many adults live in your home (age 18+)?						
	1	11%	11%	12%	12%	11%	13%
	2	69%	76%	65%	70%	69%	65%
	3	12%	8%	14%	12%	14%	13%
	4	5%	3%	6%	5%	4%	7%
	5+	3%	2%	3%	1%	3%	3%
6	Does your home have a programmable outdoor sprinkler system?						
	Yes	66%	80%	69%	54%	59%	44%
	No	34%	20%	31%	46%	41%	56%
7	Does your home have a programmable thermostat?						
	Yes	78%	85%	79%	73%	77%	71%
	No	22%	15%	21%	27%	23%	29%
8	What is the main source of heating in your home?						
	Natural Gas	43%	55%	46%	43%	33%	21%
	Electric Heater	42%	37%	39%	41%	49%	52%
	Propane	4%	2%	3%	7%	5%	5%
	Heating Oil	1%	1%	2%	1%	2%	1%
	Wood	5%	2%	5%	4%	6%	14%
	Other	5%	4%	6%	4%	4%	7%
9	What type of air conditioning unit do you have?						
	Central Air Conditioner	73%	87%	76%	54%	66%	64%
	Evaporative Cooler	6%	4%	5%	7%	7%	8%
	Room Unit	12%	7%	11%	18%	14%	19%
	Don't Have One	10%	3%	8%	21%	13%	10%
10	Does your home have a Dishwasher?						
	Yes	84%	95%	86%	78%	78%	73%
	No	16%	5%	14%	22%	22%	27%

Due to rounding of numbers, percentages may not add up to 100%

Home Check-Up

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
11 How many half-bathrooms are in your home?						
0	63%	55%	58%	74%	74%	73%
1	29%	38%	33%	21%	20%	21%
2	5%	5%	6%	4%	5%	4%
3	1%	1%	2%	1%	1%	1%
4+	0%	1%	1%	0%	0%	1%
12 How many full bathrooms are in your home?						
1	23%	14%	22%	28%	30%	37%
2	57%	59%	62%	44%	54%	51%
3	16%	22%	13%	24%	13%	9%
4	3%	4%	3%	3%	3%	1%
5+	1%	1%	1%	1%	0%	1%
13 How many toilets are in your home?						
1	16%	8%	14%	21%	22%	28%
2	46%	37%	46%	45%	52%	52%
3	30%	43%	32%	24%	18%	15%
4	6%	10%	5%	8%	5%	2%
5+	2%	3%	2%	2%	2%	2%
14 How is your water heated?						
Natural Gas	50%	63%	55%	44%	33%	30%
Electricity	50%	37%	45%	56%	67%	70%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

	Total	Capital	Canyon	Eastern	Southern	Western
Total Participants	9,439	2,678	3,067	1,212	1,408	1,074
Students	9,107	2,585	2,965	1,168	1,358	1,031
Surveys Received	5,252	1,133	2,139	737	766	477
Percent Response	56%	42%	70%	61%	54%	44%

	Total	Capital	Canyon	Eastern	Southern	Western
1 What is the flow rate of your old showerhead?						
0 - 1.0 GPM	13%	10%	11%	14%	18%	17%
1.1 - 1.5 GPM	21%	22%	19%	21%	20%	26%
1.6 - 2.0 GPM	20%	23%	20%	19%	20%	16%
2.1 - 2.5 GPM	21%	21%	23%	23%	19%	16%
2.6 - 3.0 GPM	15%	14%	17%	12%	15%	16%
3.1+ GPM	10%	10%	10%	11%	8%	8%
2 Did you install the new High-Efficiency Showerhead?						
Yes	39%	35%	41%	39%	38%	43%
No	61%	65%	59%	61%	62%	57%
3 If you answered "yes" to question 2, what is the flow rate of your new showerhead?						
0 - 1.0 GPM	26%	23%	24%	23%	32%	38%
1.1 - 1.5 GPM	40%	39%	44%	39%	39%	34%
1.6 - 1.75 GPM	33%	38%	32%	38%	29%	28%
4 Did you use the Shower Timer?						
Yes	73%	72%	74%	68%	78%	68%
No	27%	28%	26%	31%	22%	32%
5 Did your family install the first 9-watt LED Light Bulb?						
Yes	62%	59%	63%	60%	69%	59%
No	38%	41%	37%	40%	31%	41%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
6 If you answered "yes" to question 5, what is the wattage of the incandescent bulb you replaced?						
40-watt	17%	16%	16%	15%	19%	24%
60-watt	40%	42%	41%	44%	35%	32%
75-watt	15%	14%	18%	10%	15%	14%
100-watt	8%	10%	8%	5%	7%	12%
Other	19%	19%	16%	27%	24%	18%
7 Did your family install the second 9-watt LED Light Bulb?						
Yes	51%	49%	52%	48%	55%	50%
No	49%	51%	48%	51%	45%	50%
8 If you answered "yes" to question 7, what is the wattage of the incandescent bulb you replaced?						
40-watt	16%	14%	15%	16%	20%	17%
60-watt	40%	41%	41%	39%	37%	38%
75-watt	16%	18%	18%	11%	14%	17%
100-watt	7%	8%	7%	8%	6%	10%
Other	20%	19%	19%	27%	23%	18%
9 Did your family install the third 9-watt LED Light Bulb?						
Yes	42%	41%	42%	40%	43%	41%
No	58%	59%	58%	59%	57%	59%
10 If you answered "yes" to question 9, what is the wattage of the incandescent bulb you replaced?						
40-watt	16%	14%	17%	14%	18%	18%
60-watt	36%	40%	37%	35%	31%	34%
75-watt	16%	14%	17%	10%	17%	19%
100-watt	9%	11%	9%	9%	7%	10%
Other	23%	21%	20%	33%	27%	19%
11 Did your family install the FilterTone® Alarm?						
Yes	24%	22%	27%	23%	21%	24%
No	76%	78%	73%	77%	79%	75%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
12 How much did your family turn down the thermostat in winter for heating?						
1 - 2 Degrees	20%	24%	21%	17%	18%	14%
3 - 4 Degrees	18%	20%	19%	15%	16%	22%
5+ Degrees	13%	14%	13%	11%	9%	17%
Didn't Adjust Thermostat	49%	42%	47%	57%	57%	48%
13 How much did your family turn up the thermostat in summer for cooling?						
1 - 2 Degrees	18%	19%	18%	14%	17%	19%
3 - 4 Degrees	17%	20%	17%	12%	16%	15%
5+ Degrees	15%	17%	15%	9%	13%	20%
Didn't Adjust Thermostat	51%	44%	50%	64%	53%	45%
14 Did you install the LED Night Light?						
Yes	79%	76%	79%	80%	84%	73%
No	21%	24%	20%	19%	16%	27%
15 Did your family lower your water heater settings?						
Yes	23%	21%	24%	21%	22%	25%
No	77%	79%	76%	79%	78%	74%
16 Did your family raise the temperature on your refrigerator?						
Yes	18%	17%	22%	13%	16%	17%
No	81%	83%	78%	87%	84%	82%
17 Did you complete the optional online energy use activity?						
All of it	6%	4%	8%	3%	6%	8%
Some of it	15%	15%	17%	9%	15%	17%
None	78%	81%	75%	87%	79%	75%
18 Did you work with your family on this Program?						
Yes	62%	64%	60%	70%	64%	49%
No	38%	36%	39%	30%	36%	51%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
19 Did your family change the way they use water?						
Yes	56%	58%	54%	55%	61%	52%
No	44%	42%	45%	44%	39%	47%
20 Did your family change the way they use energy?						
Yes	64%	64%	62%	63%	73%	62%
No	36%	36%	38%	37%	27%	38%
21 How would you rate the Idaho Power Energy Wise® Program?						
Great	52%	54%	50%	52%	55%	54%
Pretty Good	37%	35%	38%	36%	38%	33%
Okay	9%	8%	10%	9%	6%	10%
Not So Good	2%	2%	2%	3%	1%	3%

Due to rounding of numbers, percentages may not add up to 100%

Participant List

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Alturas Elementary School	Kelly Michalec	1	49	Yes
Southern	Alturas Elementary School	Deborah VanLaw	1	25	No
Eastern	American Falls Intermediate School	Kristen Jensen	1	11	No
Capital	Amity Elementary School	Sharon Shaw	1	32	Yes
Capital	Amity Elementary School	Susie Cox	1	32	Yes
Capital	Amity Elementary School	Elizabeth Waldon-Brooks	1	32	Yes
Eastern	Arbon Valley Elementary School	Debbie Curry	1	7	Yes
Southern	Bickel Elementary	Maggie Wright	1	40	No
Southern	Bickel Elementary	Maggie Wright	1	44	No
Canyon	Birch Elementary School	Juilana Lookhart	1	28	Yes
Canyon	Birch Elementary School	MaryJo Pegram	1	28	Yes
Canyon	Birch Elementary School	Carol Briggs	1	28	Yes
Canyon	Birch Elementary School	Brenda Fly	1	28	Yes
Eastern	Blackfoot Charter Community Learning Center	Benjamin Parker	1	19	Yes
Eastern	Blackfoot Charter Community Learning Center	Britani Barrus	1	20	Yes
Eastern	Blackfoot Charter Community Learning Center	Krystal Murdock	1	19	Yes
Eastern	Blackfoot Charter Community Learning Center	Diane Ball	1	19	No
Southern	Bliss Elementary School	Angel Beutler	1	12	Yes
Western	Cambridge Elementary School	Danielle Petitmermet	1	12	Yes
Capital	Cecil Andrus Elementary	Kate Aschenbrenner	1	27	Yes
Canyon	Centennial Elementary School	Diane Gharring	1	28	No
Canyon	Centennial Elementary School	Doris Atherton	1	30	Yes
Canyon	Centennial Elementary School	Jessica Bowman	1	30	No
Canyon	Central Canyon Elementary School	Kim Engelbrecht	1	26	No
Canyon	Central Canyon Elementary School	Jessica Lillquist	1	27	Yes
Canyon	Central Canyon Elementary School	Liz Freeman	1	27	Yes
Canyon	Central Canyon Elementary School	Janet Anderson	1	28	Yes
Canyon	Central Elementary School	Courtney Craner	1	30	Yes
Canyon	Central Elementary School	Amber Vincent	1	29	No
Capital	Christine Donnell School of Arts	Debra Tiffany	1	30	Yes
Capital	Christine Donnell School of Arts	Amy Hymas	1	30	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Christine Donnell School of Arts	Cynthia Compton	1	30	Yes
Eastern	Claude A. Wilcox Elementary School	Tricia Hemsley	1	22	Yes
Eastern	Claude A. Wilcox Elementary School	Hailey Herron	1	23	Yes
Eastern	Claude A. Wilcox Elementary School	Krista Campos	1	24	Yes
Capital	Collister Elementary School	Gwendolyn Balmer	1	13	Yes
Canyon	Crimson Point Elementary	Amber Irvine	1	27	No
Canyon	Crimson Point Elementary	Tonia Burbank	1	30	Yes
Canyon	Crimson Point Elementary	Mary Holmes	1	27	Yes
Capital	Cynthia Mann Elementary School	Cindy Sundvik	1	30	Yes
Capital	Cynthia Mann Elementary School	Lisa Stitt	1	25	Yes
Capital	Cynthia Mann Elementary School	Michelle Steen	1	30	No
Capital	Danette Aston (Homeschool)	Danette Aston	1	0	No
Capital	Desert Sage Elementary	Janie Abramovich	1	27	No
Capital	Desert Sage Elementary	Courtney Parker	1	27	No
Capital	Desert Sage Elementary	Kari Porter	1	27	No
Capital	Desert Sage Elementary	Christina Zubizareta	1	27	No
Canyon	Desert Springs Elementary School	Lisa Jauregui	1	26	Yes
Canyon	Desert Springs Elementary School	Lindsay Mangum	1	26	Yes
Canyon	Desert Springs Elementary School	Jackie Sodaro	1	25	Yes
Canyon	Desert Springs Elementary School	Stacey Pearson	1	25	Yes
Eastern	Donald D. Stalker Elementary School	LaNita McRae	1	20	Yes
Eastern	Donald D. Stalker Elementary School	Lisa Clark	1	22	Yes
Canyon	East Canyon Elementary	Trisha Cramer	1	25	Yes
Canyon	East Canyon Elementary	Brett Mizuta	1	25	No
Canyon	East Canyon Elementary	Tiara Shippy	1	25	Yes
Canyon	East Canyon Elementary	Brian Constant	1	25	No
Eastern	Edahow Elementary School	Megan Bullock	1	28	Yes
Eastern	Edahow Elementary School	Debbie Nickel	1	28	Yes
Capital	Eliza Hart Spalding Elementary School	Shawna Brenna	1	32	Yes
Capital	Eliza Hart Spalding Elementary School	Jessica Burkhart	1	32	No
Capital	Eliza Hart Spalding Elementary School	Rachel Lindquist	1	32	Yes
Capital	Eliza Hart Spalding Elementary School	Stefawn Wester	1	27	Yes
Eastern	Ellis Elementary School	Sherry VanEvery	1	27	Yes
Eastern	Ellis Elementary School	Michael Gornichec	1	28	No
Eastern	Ellis Elementary School	Margo Lamont	1	28	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Ernest Hemingway STEM School	Kevin Quaderer	1	21	No
Southern	Filer Intermediate School	Sarah Wendell	1	28	Yes
Southern	Filer Intermediate School	Jennifer Zamora	1	28	Yes
Southern	Filer Intermediate School	Katelynn Hulsey	1	28	Yes
Southern	Filer Intermediate School	Cassie Royse	1	28	Yes
Southern	Filer Intermediate School	Austin Humphries	1	28	Yes
Southern	Filer Intermediate School	Susan Hamby	1	27	Yes
Southern	Filer Intermediate School	Robyn Flint	1	29	Yes
Southern	Filer Intermediate School	Jenni Jacobson	1	28	Yes
Southern	Filer Intermediate School	Jody Meeks	1	28	No
Southern	Filer Intermediate School	Tes Fields	1	28	No
Western	Fruitland Elementary School	Linda Langley	1	27	No
Western	Fruitland Elementary School	Stacy Wescott	1	25	No
Western	Fruitland Elementary School	Heather Heitz	1	26	Yes
Western	Fruitland Elementary School	Amber Bridgewater	1	27	Yes
Western	Fruitland Elementary School	Ish Green	1	26	Yes
Western	Garden Valley Elementary	Shannon Court	1	20	No
Eastern	Gate City Elementary School	Lacey Smart	1	31	No
Capital	Gateway School of Language	Laurie Harvey	1	23	Yes
Capital	Gateway School of Language	Judie Bradburn	1	27	Yes
Eastern	Gem Prep Pocatello	Mallory England	1	28	No
Capital	Glenns Ferry Elementary	Stacie Pollard	1	20	No
Capital	Grace Jordan Elementary School	Darwood Ashmead	1	27	No
Eastern	Grace Lutheran School	Katie Grant	1	30	Yes
Eastern	Green Acres Elementary School	Kathy Walker	1	28	Yes
Eastern	Green Acres Elementary School	Rachel Thomas	1	28	Yes
Canyon	Greenhurst Elementary School	Tami Ashley	1	30	Yes
Canyon	Greenhurst Elementary School	John Stull	1	30	Yes
Eastern	Groveland Elementary	Julie Rider	1	25	Yes
Eastern	Groveland Elementary	Kalli Johns	1	26	No
Southern	Hailey Elementary	Kristin Barsotti	1	20	No
Southern	Hansen Elementary School	Marcie Parkinson	1	30	Yes
Capital	Hawthorne Elementary School	Susie Noland	1	32	Yes
Southern	Heritage Academy School	Martice Fontes	1	14	Yes
Capital	Highlands Elementary School	Eileen Beatty	1	30	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Highlands Elementary School	Angela Troy	1	16	No
Capital	Hillsdale Elementary School	Michelle Montoya	1	31	Yes
Capital	Hillsdale Elementary School	Glenda Torfin	1	28	No
Capital	Hillsdale Elementary School	Jocelyn Robinson	1	31	No
Capital	Hillsdale Elementary School	Angie Fraas	1	32	Yes
Western	Homedale Elementary School	Jamie Bahem	1	26	Yes
Western	Homedale Elementary School	Toby Johnson	1	24	No
Western	Homedale Elementary School	Robyn Chandler	1	25	No
Western	Homedale Elementary School	Kayla Blackstock	1	26	No
Capital	Horizon Elementary School	Sherry Young	1	32	No
Capital	Horizon Elementary School	Jon Parrott	1	32	No
Capital	Horizon Elementary School	Breanna Knight	1	32	No
Western	Horseshoe Bend Elementary School	Suzette Womack	1	20	No
Capital	Hunter Elementary School	Diane Escandon	1	29	Yes
Capital	Hunter Elementary School	Rene Bilkiss	1	29	Yes
Capital	Hunter Elementary School	Angela Zweifel	1	29	Yes
Capital	Hunter Elementary School	Rebecca Lenon	1	29	Yes
Capital	Hunter Elementary School	Cinda Bodell	1	29	No
Southern	I.B. Perrine Elementary School	Rob Weaver	1	30	Yes
Southern	I.B. Perrine Elementary School	Emily Strom	1	30	Yes
Southern	I.B. Perrine Elementary School	Mary Fraley	1	30	No
Canyon	Indian Creek & Ross Elementary School	Karen Stear	1	29	No
Canyon	Indian Creek & Ross Elementary School	Katie Harding	1	30	Yes
Canyon	Indian Creek & Ross Elementary School	Stacy Saunders	1	29	No
Eastern	Indian Hills Elementary	Bridget Durante	1	25	No
Eastern	Indian Hills Elementary	Maria Coleman	1	24	Yes
Canyon	Iowa Elementary	Thea Marie	1	27	Yes
Canyon	Iowa Elementary	Pepper Allen	1	27	Yes
Canyon	Iowa Elementary	Veronica Knutson	1	28	No
Capital	Joplin Elementary School	Kirsten Grover	1	25	No
Capital	Joplin Elementary School	Amy Bass	1	25	No
Western	Kenneth Carberry Elementary School	Marrissa Keenan	1	30	No
Western	Kenneth Carberry Elementary School	Karen Nichols	1	30	Yes
Western	Kenneth Carberry Elementary School	Alissa Combe	1	30	Yes
Western	Kenneth Carberry Elementary School	Vicki Beckman	1	30	Yes

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Kimberly Elementary School	Nicole Kindred	1	27	No
Capital	Lake Hazel Elementary	Courtney Randall	1	26	No
Capital	Lake Hazel Elementary	Michelle Roach	1	26	No
Capital	Lake Hazel Elementary	Elizabeth McLaughlin	1	26	No
Canyon	Lake Ridge Elementary School	Deanna Menssen	1	27	Yes
Canyon	Lake Ridge Elementary School	Laura Crawford	1	28	Yes
Canyon	Lake Ridge Elementary School	Tanya Scheibe	1	28	Yes
Canyon	Lake Ridge Elementary School	Laura VanDerschaaf	1	28	Yes
Canyon	Lakevue Elementary School	Kimberly Reinecker	1	30	No
Canyon	Lakevue Elementary School	Heather Stanton	1	30	Yes
Canyon	Lakevue Elementary School	Nicole Underwood	1	30	Yes
Canyon	Lakevue Elementary School	Tara Daniel	1	30	Yes
Canyon	Lewis & Clark Elementary	Adam Trowbridge	1	30	Yes
Canyon	Lewis & Clark Elementary	Caitlyn McConnell	1	30	Yes
Canyon	Lewis & Clark Elementary	Meghan Willard	1	30	Yes
Eastern	Lewis and Clark Elementary	Tamara Palmer	1	25	Yes
Eastern	Lewis and Clark Elementary	Breanna Parker	1	27	Yes
Eastern	Lewis and Clark Elementary	Sabrina Mathews	1	26	Yes
Capital	Longfellow Elementary School	Toni Novotny	1	26	Yes
Capital	Longfellow Elementary School	Julie Albert	1	26	No
Capital	Maple Grove Elementary	Kaitlyn Ilg	1	25	No
Capital	Maple Grove Elementary	Erin Luthy	1	25	No
Capital	Maple Grove Elementary	Scott Roe	1	25	No
Western	Marsing Elementary School	Carol Dewitt	1	24	Yes
Western	Marsing Elementary School	Tammy Aranzamendi	1	24	No
Western	Marsing Elementary School	Scott Thornton	1	24	No
Western	May Roberts Elementary School	Patty Edison	1	18	No
Western	May Roberts Elementary School	Brenda Corder	1	20	No
Western	Meadows Valley School	Sue Weber	1	9	Yes
Canyon	Melba Elementary	Katie Strawser	1	34	Yes
Canyon	Melba Elementary	Marie Rockwood	1	34	Yes
Canyon	Mill Creek Elementary School	Lyna Butler	1	25	Yes
Canyon	Mill Creek Elementary School	Anne Kinley	1	25	Yes
Canyon	Mill Creek Elementary School	Kim Platt	1	25	Yes
Canyon	Mill Creek Elementary School	Lauren Denny	1	25	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	Mill Creek Elementary School	Terri Domme	1	25	Yes
Southern	Murtaugh Middle School	Brooke Stranger	1	31	Yes
Southern	Murtaugh Middle School	Eli Anderson	1	25	No
Canyon	Nampa Christian School	Zachary Dwello	1	16	Yes
Canyon	Nampa Christian School	Toni Brown	1	16	No
Western	New Plymouth Elementary School	Cherry Meckert	1	27	No
Western	New Plymouth Elementary School	Whitney Cowgill	1	24	Yes
Western	New Plymouth Elementary School	Dorothy Woods	1	27	Yes
Capital	North Elementary	Sherri Redmond	1	22	Yes
Capital	North Elementary	Rosemary Ash	1	24	Yes
Capital	North Elementary	Denise Weis	1	21	Yes
Capital	North Star Charter School	Carol Hendershot	1	30	No
Capital	North Star Charter School	Mariah Rodeghiero	1	31	No
Capital	North Star Charter School	Michelle Obenchain	1	30	No
Western	Notus Elementary School	Yvonne Golden	1	16	No
Western	Notus Elementary School	Amanda Cayler	1	17	No
Western	Nyssa Elementary School	Paula Barnhart	1	25	Yes
Western	Nyssa Elementary School	Trisha Bunker	1	42	Yes
Western	Ola Elementary School	Amy Davis	1	11	Yes
Southern	Oregon Trail Elementary School	Brian Johnson	1	25	No
Southern	Oregon Trail Elementary School	Shannon Youngman	1	25	Yes
Southern	Oregon Trail Elementary School	Charles Day	1	25	No
Southern	Oregon Trail Elementary School	Amy Hartwell	1	25	No
Canyon	Owyhee Elementary	Becki Wheeler	1	30	Yes
Canyon	Owyhee Elementary	Brenda Allen	1	30	Yes
Canyon	Owyhee Elementary	Christa Roesberry-Barber	1	30	Yes
Canyon	Owyhee Elementary School	Sara Walsh	1	20	Yes
Western	Park Intermediate	Grace Sharp	1	23	Yes
Western	Park Intermediate	Jenny Conant	1	21	No
Western	Park Intermediate	Kathleen Cahill	1	24	No
Western	Park Intermediate	Damon Courtois	1	23	No
Western	Park Intermediate	Jessica Mosley	1	24	Yes
Capital	Peregrine Elementary School	Trenna McCashland	1	34	Yes
Capital	Peregrine Elementary School	Barbara Nesbit	1	34	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Peregrine Elementary School	Britnie Winters	1	34	No
Capital	Pierce Park Elementary	Bill Hoffman	1	27	No
Capital	Pierce Park Elementary	Shannon Nicholson	1	30	Yes
Southern	Pillar Falls Elementary School	Eva Filas	1	24	Yes
Southern	Pillar Falls Elementary School	Stephanie Allred	1	24	No
Southern	Pillar Falls Elementary School	Alexandra Messmer	1	24	Yes
Southern	Pillar Falls Elementary School	Krista Vining	1	24	Yes
Southern	Pillar Falls Elementary School	Noelle Wagner	1	24	No
Capital	Ponderosa Elementary School	La Veny Stoddard	1	27	No
Capital	Prospect Elementary	Tara Skeesuck	1	30	Yes
Capital	Prospect Elementary	Kit Shuman	1	30	No
Capital	Prospect Elementary	Alyssa Finley	1	30	No
Capital	Prospect Elementary	Stephanie Lewis	1	30	No
Capital	Prospect Elementary	Megan Yates	1	30	No
canyon	Purple Sage Elementary School	Jenna Oien	1	22	Yes
canyon	Purple Sage Elementary School	Melody Craw	1	22	Yes
canyon	Purple Sage Elementary School	Melissa McPherson	1	21	Yes
canyon	Purple Sage Elementary School	Madeline Laan	1	21	Yes
Western	Riggins Elementary School	Tracy Travis	1	9	No
Capital	Riverside Elementary School	Courtney Calhoun	1	25	No
Capital	Riverside Elementary School	Tara Leach	1	25	No
Southern	Rock Creek Elementary	Julie Delia	1	23	No
Southern	Rock Creek Elementary	Andy Arenz	1	25	No
Southern	Rock Creek Elementary	Pauli Connelly	1	23	No
Southern	Rock Creek Elementary	Barb Christensen	1	23	Yes
Eastern	Rockland Elementary School	Kristi Thomas	1	25	No
Canyon	Ronald Reagan Elementary School	Lisa Martell	1	26	Yes
Canyon	Ronald Reagan Elementary School	Sheryll Sharp	1	28	Yes
Canyon	Ronald Reagan Elementary School	Kelsey Rogers	1	26	Yes
Capital	Roosevelt Elementary School	Alicia Bradshaw	1	27	Yes
Capital	Roosevelt Elementary School	Elizabeth Mills	1	27	No
Canyon	Sacajawea Elementary School	Deborah Storey	1	24	No
Canyon	Sacajawea Elementary School	Penny Washburn	1	24	Yes
Canyon	Sacajawea Elementary School	Jennifer Howell	1	24	No
Capital	Sage International School of Boise	Jennifer Laird	1	26	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Sage International School of Boise	Kadie Johnson	1	26	Yes
Capital	Sage International School of Boise	Angel Larson	1	26	Yes
Eastern	Salmon Middle/High School	Krystal Smith	1	36	No
Western	Shadow Butte Elementary School	Amberlea Doyle	1	28	No
Western	Shadow Butte Elementary School	Melissa Stringfield	1	27	No
Capital	Shadow Hills Elementary School	Christy Schwehr	1	32	Yes
Capital	Shadow Hills Elementary School	Shannon Cullen	1	32	Yes
Canyon	Sherman Elementary School	Tyler Keefe	1	35	Yes
Canyon	Sherman Elementary School	Kenneth Moore	1	35	Yes
Canyon	Sherman Elementary School	Jennifer Jensen	1	35	Yes
Canyon	Sherman Elementary School	Josephine Fisher	1	25	Yes
Canyon	Sherman Elementary School	Jennifer Castricone	1	24	No
Canyon	Sherman Elementary School	Meribeth Mathews	1	23	No
Capital	Silver Sage Elementary School	Lisa Jimenez	1	24	Yes
Capital	Silver Sage Elementary School	Ashley Rowe	1	27	No
Canyon	Silver Trail Elementary School	Justine Burgess	1	27	Yes
Canyon	Silver Trail Elementary School	Dan Blitman	1	28	Yes
Canyon	Silver Trail Elementary School	Dan Hoehne	1	29	Yes
Canyon	Snake River Elementary	Heather Packer	1	27	Yes
Canyon	Snake River Elementary	Lindsey Strong	1	27	Yes
Canyon	Snake River Elementary	Matea Schindel	1	26	Yes
Capital	Star Elementary School	Candy Franscella	1	29	Yes
Capital	Star Elementary School	Carmi Scheller	1	29	No
Capital	Star Elementary School	Angela Fulkerson	1	29	No
Eastern	Stoddard Elementary School	Kimberly Buck	1	27	No
Eastern	Stoddard Elementary School	Hallie Snyder	1	27	Yes
Eastern	Stoddard Elementary School	Alicia Cody	1	27	Yes
Southern	Summit Elementary School	Kimberly Wallace	1	28	Yes
Southern	Summit Elementary School	Tracy Park	1	28	Yes
Southern	Summit Elementary School	Audra Thompson	1	28	Yes
Southern	Summit Elementary School	Maggie Stump	1	28	Yes
Southern	Summit Elementary School	Trisha Neudorff	1	28	No
Southern	Summit Elementary School	Michele Putnam	1	28	Yes
Southern	Summit Elementary School	Keyli Gonzalez	1	28	Yes
Southern	Summit Elementary School	Jorma Fletcher	1	28	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Summit Elementary School	Todd Lakey	1	28	No
Southern	Summit Elementary School	Stacey Lakey	1	28	Yes
Southern	Summit Elementary School	Anne Winder	1	28	Yes
Southern	Summit Elementary School	Brad Winder	1	28	Yes
Eastern	Syringa Elementary School	Aubrey Eldredge	1	24	No
Eastern	Syringa Elementary School	Cindel Vasquez	1	21	Yes
Eastern	Syringa Elementary School	Andrea Gulden	1	21	No
Capital	Taft Elementary School	Jessica Rose	1	28	No
Capital	Taft Elementary School	Sarah Wright	1	28	Yes
Eastern	Tendoy Elementary	Diana Son	1	29	Yes
Eastern	Tendoy Elementary	Cody Perry	1	23	Yes
Capital	Trail Wind Elementary School	Chris Dinter	1	32	Yes
Capital	Trail Wind Elementary School	Lora Bushee	1	32	Yes
Capital	Trail Wind Elementary School	Judy Swain	1	32	Yes
Capital	Trail Wind Elementary School	Patti Wiseman-Adams	1	32	Yes
Eastern	Tyhee Elementary School	Jayne Johnson	1	26	Yes
Eastern	Tyhee Elementary School	Stefani Mitchell	1	27	No
Eastern	Tyhee Elementary School	Amy Hoesman	1	27	No
Capital	Valley View Elementary School	Meko Myers	1	25	Yes
Capital	Valley View Elementary School	Shawna Hiller	1	27	Yes
Canyon	Vision Charter School	Debra McDorman	1	30	No
Canyon	Vision Charter School	Andrea Martindale	1	32	No
Eastern	Wapello Elementary School	LaNae Porter	1	18	Yes
Eastern	Wapello Elementary School	Kristine Schnittgen	1	20	Yes
Capital	Washington Elementary	Jerad Relk	1	23	No
Capital	Washington Elementary	Maddie Johnson	1	23	Yes
Canyon	Washington Elementary School	Jalene Gilbert	1	27	Yes
Canyon	Washington Elementary School	Heather Mueller	1	27	Yes
Canyon	Washington Elementary School	Chris Wilcox	1	27	Yes
Canyon	Washington Elementary School	Tyler Maryon	1	25	Yes
Canyon	Washington Elementary School	Jan Damron	1	20	Yes
Canyon	Washington Elementary School	Teresa O'Toole	1	20	Yes
Canyon	West Canyon Elementary	Amy Ellis	1	25	Yes
Canyon	West Canyon Elementary	K'Ann Sanchez	1	25	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	West Canyon Elementary	Brittany Woodworth	1	26	Yes
Canyon	West Canyon Elementary	Octavio Dario	1	26	Yes
Canyon	West Middle School	Michelle DiPaula	1	80	Yes
Canyon	West Middle School	Melissa Ross	1	25	Yes
Canyon	West Middle School	Kristin Lira	1	80	No
Canyon	West Middle School	Veronica Maple	1	80	No
Canyon	West Middle School	Megan Kotter	1	80	Yes
Western	Westside Elementary School	Shauna Bain	1	28	Yes
Western	Westside Elementary School	Danielle Hayes	1	28	Yes
Western	Westside Elementary School	Paula McElroy	1	28	Yes
Western	Westside Elementary School	Sarah Nesbitt	1	28	Yes
Western	Westside Elementary School	Amy Brownell	1	28	Yes
Capital	Whitney Elementary School	Eden Rodriguez	1	33	Yes
Capital	Whitney Elementary School	Kayden Tague	1	28	Yes
Capital	Whitney Elementary School	Tasha Crowell	1	29	No
Eastern	William Thomas Middle School	Jamie Clark	1	122	Yes
Canyon	Willow Creek Elementary School	Nick Channer	1	27	Yes
Canyon	Willow Creek Elementary School	Kim Chierici	1	27	Yes
Canyon	Willow Creek Elementary School	Nicole Gibbs	1	27	Yes
Canyon	Willow Creek Elementary School	Kayla Stone	1	27	Yes
Canyon	Wilson Elementary School	Debbie Peterson	1	28	Yes
Canyon	Wilson Elementary School	Melissa Langan	1	28	Yes
Canyon	Wilson Elementary School	Sandra Otero	1	28	Yes
		TOTALS	332	9,107	
		TOTAL PARTICIPANTS	9,439		

TOTAL PARTICIPATING 2017-2018 TEACHERS	332	213	64%	YES
		119	36%	NO
TOTAL STUDENT SURVEYS RETURNED	5,252			
TOTAL INCENTIVE PAID OUT	$20,100			
FULL YEAR SURVEY RETURN PERCENTAGE	58%			

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Teacher Program Evaluation Data

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	332	93	102	44	50	43
Surveys Received	159	34	64	25	20	16
Percent Response	48%	37%	63%	57%	40%	37%

	Number	Percent
1 The materials were clearly written and well organized.		
Strongly Agree	113	71%
Agree	45	28%
Disagree	0	0%
Strongly Disagree	1	1%
2 The products in the Kit were easy for students to use.		
Strongly Agree	93	58%
Agree	62	39%
Disagree	4	3%
Strongly Disagree	0	0%
3 Students indicated that their parents supported the program.		
Yes	147	95%
No	8	5%
4 Would you conduct this Program again?		
Yes	158	99%
No	1	1%
5 Would you recommend this program to other colleagues?		
Yes	158	99%
No	1	1%
6 If my school is eligible for participation next year, I would like to enroll.		
Yes	157	99%
No	2	1%

Due to rounding of numbers, percentages may not add up to 100%

Parent/Guardian Program Evaluation Data

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	9,439	2,678	3,067	1,212	1,408	1,074
Surveys Received	92	32	27	12	8	13
Percent Response	1.0%	1.2%	0.9%	1.0%	0.6%	1.2%

Total Parent Responses	92	
	Number	**Percent**
1 Was the Program easy for you and your child to use?		
Yes	92	100%
No	0	0%
2 Will you continue to use the Kit items after the completion of the Program?		
Yes	91	99%
No	1	1%
3 Would you like to see this Program continued in local schools?		
Yes	89	97
No	3	3%

Due to rounding of numbers, percentages may not add up to 100%

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