Washington Annual Report on Conservation Acquisition

January 1, 2017 – December 31, 2017

Filed June 1, 2018

PACIFIC POWER
A DIVISION OF PACIFICORP

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List of Abbreviations and Acronyms

BPA	Bonneville Power Administration
CFL	Compact Fluorescent Lighting
DSM	Demand-side Management
Schedule 191	Schedule 191 System Benefits Charge Adjustment
EM&V	Evaluation, Measurement & Verification
GWh	Gigawatt-hour(s)
HVAC	Heating, Ventilation and Air Conditioning
IRP	Integrated Resource Plan
kWh	Kilowatt-hour
LED	Light-emitting Diode
MW	Megawatt
MWh	Megawatt-hour
NEEA	Northwest Energy Efficiency Alliance
NEEM	Northwest Energy Efficiency Manufactured Homes
NEF	National Energy Foundation
NTG	Net-to-Gross
PCT	Participant Cost Test
PTRC	PacifiCorp Total Resource Cost test
RIM	Ratepayer Impact Measure test
TRC	Total Resource Cost test
TRL	Technical Resource Library
UCT	Utility Cost Test
VFD	Variable-Frequency Drive

Executive Summary

PacifiCorp is a multi-jurisdictional electric utility providing retail service to customers in Washington, California, Idaho, Oregon, Utah, and Wyoming. Pacific Power & Light Company (Pacific Power or Company), a division of PacifiCorp, serves approximately 130,000 customers in Washington. The Company works with its customers to reduce the need for investment in supply side resources and infrastructure by reducing energy and peak consumption through cost effective energy efficiency programs.

The Company is required to comply with the requirements of the Energy Independence Act (also known as I-937) codified in RCW19.285 and WAC 480-109. This report provides information on the Company's 2017 activities and expenditures related to pursuing all conservation in accordance with the I-937 framework, including Washington Utilities and Transportation Commission (Commission) orders and administrative rules.

In 2017, the Company offered four energy efficiency programs in Washington approved by the Commission, and received energy savings and market transformation benefits through its affiliation with the Northwest Energy Efficiency Alliance (NEEA). The Company recovers expenditures associated with these programs through the System Benefits Charge Adjustment, Schedule 191.

This report also provides details on Schedule 191 revenue for the performance period from January 1, 2017, through December 31, 2017. The Company, on behalf of its customers, invested $11m in energy efficiency information, services, and incentives during the reporting period. The investment yielded approximately 54 gigawatt-hours (GWh) in first year savings[1] and approximately 7.1 megawatts (MW) of energy efficiency savings related capacity reductions.[2] Net benefits over the life of the individual measures are estimated at $15.6m.[3]

The portfolio was cost effective based on four of the five standard cost effectiveness tests for the reporting period. The ratepayer impact measure test was less than 1.0, indicating near-term upward pressure was placed on the price per kilowatt-hour (kWh) given a reduction in sales. The cost effectiveness of the Company's Washington energy efficiency program portfolio from various perspectives is provided in Table 1 below.

[1] Gross reported savings at the generation.
[2] See Energy Efficiency section for explanation on how the capacity contribution savings values are calculated.
[3] See Appendix 1 – Total Resource Cost Test plus 10% Net Benefits including NEEA and Non-Energy Impacts.

Table 1
Cost Effectiveness for the Portfolio[4]

Benefit/Cost Test	B/C Ratio with NEEA	B/C Ratio without NEEA
PacifiCorp Total Resource Cost Test ("PTRC") plus 10%[5]	1.95	2.01
Total Resource Cost ("TRC") Test[6]	1.79	1.84
Utility Cost Test ("UCT")[7]	2.60	2.76
Participant Cost Test ("PCT")[8]	3.79	3.66
Ratepayer Impact Cost Test ("RIM")[9]	0.63	0.65

All cost effectiveness calculations assume a net-to-gross (NTG) of 1.0, consistent with the Northwest Power and Conservation Council's methodology. Portfolio level cost effectiveness includes portfolio costs such as the Process and Impact Evaluations, Class 2 demand-side management (DSM) Potentials Assessment, and the DSM system database. Consistent with the Northwest Power and Conservation Council's methodology, the Company includes quantifiable non-energy benefits at the portfolio and residential level, as well as the *Home Energy Savings* and *Low Income Weatherization* program levels. *Low Income Weatherization* is not included in the portfolio or sector-level cost effectiveness analysis per WAC 480-109-100(10)(b). Appendix 1 provides 2017 cost effectiveness performance.

[4] Ratios include select quantifiable and directly attributable Non-Energy Impacts, but excludes costs as outlined in the Company's EM&V Framework (e.g. Class 1 & 3 of the potential study).
[5] The PTRC includes the 10 percent conservation benefit and risk adder in addition to quantifiable and directly attributable non-energy benefits. PTRC is consistent with the Northwest Power Council's cost effectiveness methodology and complies with the cost effectiveness definition (RCW 80.52.030(7)).
[6] The TRC compares the total cost of a supply side resource to the total cost of energy efficiency resources, including costs paid by the customer in excess of the program incentives. The test is used to determine if an energy efficiency program is cost effective from a total cost perspective.
[7] The UCT compares the total cost incurred by the utility to the benefits associated with displacing or deferring supply side resources.
[8] The PCT compares the portion of the resource paid directly by participants to the savings realized by the participants.
[9] The RIM examines the impact of energy efficiency expenditures on non-participating ratepayers overall. Unlike supply-side investments, energy efficiency programs reduce energy sales. Reduced energy sales can lower revenue requirements while putting upward pressure on rates as the remaining fixed costs are spread over fewer kilowatt-hours.

Compliance

An external conservation advisory group of stakeholders is required to be maintained and used by the Company to advise it about conservation issues including program designs, incentive levels, third party evaluations, program marketing, and pilots. WAC 480-109-110 provides the scope of issues for the advisory group. The Company refers to their conservation advisory group as the Washington DSM Advisory Group. Meetings are typically held at the Commission offices in Olympia and include a call in number so stakeholders can participate remotely.

In compliance with I-937, the Company continuously reviews and updates, as appropriate, the conservation programs and portfolio to adapt to changing market conditions. Steps taken to adaptively manage the conservation programs during 2017 are included within program specific sections of this report. In the *Home Energy Savings* program, efforts were made to engage a local contractor to deliver duct sealing services, revise smart thermostat redemption processes and continue increasing the online mobile applications for contractors. In the *watt*smart Business program, changes were made to improve program cost-effectiveness and restructure light-emitting diode (LED) incentives for continuous improvement as lighting evolves.

Pilot projects are implemented when appropriate and are expected to be cost effective within the current or immediately subsequent biennium as long as the overall portfolio remains cost effective. The Company, after consultation with its DSM Advisory Group, offers initiatives or offers within two programs: *Home Energy Savings* and *watt*smart Business. This focus is administratively efficient and uses existing program awareness—both important considerations in the Company's rural territory. To further leverage other efforts, the Company has linked its pilot efforts with regional work supported by NEEA whenever possible.

Regulatory Activities

During the 2017 reporting period, the Company filed a number of compliance and/or informational reports, updates, and requests with the Commission in support of Company DSM programs. The following is a list of those filings:

- January 6, 2017 – Supplemental Information on the Direct Benefit to Customer's in 2017 Annual Conservation Plan in Docket UE-152072.
- June 1, 2017 – Washington Annual Report on Conservation Acquisition for 2016 as set forth in Docket UE-152072. The report provided details on program results and activities, expenditures, and Schedule 191 revenue for the performance period 2016.
- June 1, 2017 - The 2017 Conservation Report (Washington Department of Commerce Report). The report detailed the Company's progress in meeting the targets established in RCW 19.285.040 (EIA requirements).
- June 1, 2017 – Schedule 191-System Benefits Charge adjustment, related to WAC 480-109-130(2), to increase Schedule 191 by approximately 0.3 percent (from $12.9m to $13.9m). Docket UE- 170678. The request was approved at the July 27, 2017 per the no action agenda.
- July 28, 2017 – Revised 2016 Annual Report on Conservation Acquisition in Docket UE-152072
- November 1, 2017 – Pacific Power's 2018-2019 Biennial Conservation Plan in Docket UE-171092.
- December 13, 2017 – Substitute Biennial Conservation Plan in Docket UE-171092.
- December 18, 2017 – Joint utility comments regarding NEEA savings in 2018-2019 Biennial Conservation Plan in Docket UE-171092.

Advisory Group Activities

At least four times per year, the Company seeks input regarding its energy efficiency programs from its Washington DSM Advisory Group. This group includes representatives from a variety of constituent organizations. The Company collaborated with its DSM Advisory Group throughout 2017 on the following matters:

April 5, 2017

- Review of preliminary energy savings and expenditures for 2016
- Non-energy impacts/benefits
- On-bill repayment and financing

June 29, 2017

- Conservation target development process overview
- Wood smoke benefits for 2018-2019
- Review of conservation potential assessment scope of work comments
- Home Energy Reports for next biennial period

August 18, 2017

- Draft 10-year conservation forecast
- Conservation adjustments:
- Regional Technical Forum (RTF)
- Distribution efficiency
- Production efficiency
- High efficiency co-generation (as defined in WAC rules)
- NEEA forecast
- Initial conservation target

September 19, 2017

- Revisions to 2018-2019 conservation forecasts/targets
- Home Energy Reports
- Pilots
- Initial 2018-2019 cost effectiveness/budgets
- Staff areas of interest
- EM&V framework

DSM Expenditures

System Benefits Charge Balancing Account Summary

DSM activities are funded through Schedule 191, the System Benefits Charge Adjustment collections. Expenditures are charged as incurred and collected through Schedule 191. The balancing account is the mechanism used for managing the revenue collected and expenses incurred in the provision of DSM resources. The balancing account activity for 2017 is outlined in Table 2. The end of year balance in the balancing account, on an accrual basis, was an under-collection of expenses of $91,604.

Table 2
System Benefit Charge Balancing Account Summary

Month	Deferred Expenditures	Revenue Collected	Accumulative Balance	Monthly Net Accrued Costs	Accrual Basis Accumulative Balance
Dec-16			$ 1,322,816	$ 1,153,091	$ 2,475,907
Jan-17	$ 1,150,972	$ (1,523,019)	$ 950,769	$ (458,874)	$ 1,644,986
Feb-17	$ 578,637	$ (1,324,980)	$ 204,426	$ 172,695	$ 1,071,338
Mar-17	$ 751,797	$ (1,091,488)	$ (135,265)	$ (135,104)	$ 596,543
Apr-17	$ 955,357	$ (894,774)	$ (74,683)	$ 346,210	$ 1,003,335
May-17	$ 1,011,604	$ (877,103)	$ 59,819	$ (246,906)	$ 890,930
Jun-17	$ 971,755	$ (941,013)	$ 90,561	$ (166,906)	$ 754,767
Jul-17	$ 780,353	$ (1,092,621)	$ (221,707)	$ 499,362	$ 941,860
Aug-17	$ 857,569	$ (1,228,474)	$ (592,612)	$ (520,125)	$ 50,830
Sep-17	$ 853,022	$ (1,175,827)	$ (915,417)	$ 209,840	$ (62,134)
Oct-17	$ 449,405	$ (1,031,795)	$ (1,497,808)	$ 41,216	$ (603,309)
Nov-17	$ 1,005,391	$ (1,140,115)	$ (1,632,531)	$ 255,011	$ (483,021)
Dec-17	$ 1,942,431	$ (1,351,981)	$ (1,042,081)	$ (15,826)	$ 91,604
TOTAL	**$ 11,308,293**	**$ (13,673,190)**		**$ 1,133,685**	

Note: December 2017 Accrual was $1,133,685.

Column Explanations:

Deferred Expenditures: Monthly expenditures for all program activities posted in 2017, including funding for the Northwest Energy Efficiency Alliance.

Revenue Collected: Revenue collected through Schedule 191, System Benefits Charge Adjustment.

Accumulative Balance: A running total of account activities on a "cash" basis. A negative accumulative balance means cumulative revenue exceeds cumulative expenditures; positive accumulative balance means cumulative expenditures exceed cumulative revenue.

Monthly Net Accrued Costs: Two accrual entries are made each month for expenditures of energy efficiency programs. One estimates the incurred cost not yet processed, and the other reverses the estimate from the previous month. The amount shown here is the net of the two entries.

Accrual Basis Accumulative Balance: Current balance of account including accrued costs.

Planning Process

Integrated Resource Plan

The Company develops a biennial integrated resource plan ("IRP") as a means of balancing cost, risk, uncertainty, supply reliability/deliverability and long-run public policy goals.[10] The plan presents a framework of future actions to ensure the Company continues to provide reliable, reasonably priced service to customers. Energy efficiency and peak management opportunities are incorporated into the IRP based on their availability, characteristics and costs.

PacifiCorp divides energy efficiency and peak management resources into four general classes:

- **Class 1 DSM – Resources from fully dispatchable or scheduled firm capacity product offerings/programs** – After a customer agrees to participate in a Class 1 DSM program, the timing and persistence of the load reduction is involuntary on their part within the agreed upon limits and parameters of the program. Program examples include residential and small commercial central air conditioner load control programs that are dispatchable, and irrigation load management and interruptible or curtailment programs (which may be dispatchable or scheduled firm, depending on the particular program design or event noticing requirements).

- **Class 2 DSM – Resources from non-dispatchable, firm energy and capacity product offerings/programs** – Class 2 DSM programs are those for which sustainable energy and related capacity savings are achieved through facilitation of technological advancements in equipment, appliances, lighting and structures, or repeatable and predictable voluntary actions on a customer's part to manage the energy use at their facility or home. Class 2 DSM programs generally provide financial or service incentives to customers to improve the efficiency of existing or new customer-owned facilities through: (1) the installation of more efficient equipment, such as lighting, motors, air conditioners, or appliances; (2) upgrading building efficiency through improved insulation levels, windows, etc.; or (3) behavioral modifications, such as strategic energy management efforts at business facilities and home energy reports for residential customers. The savings endure (are considered firm) over the life of the improvement or customer action. Program examples include comprehensive commercial and industrial new and retrofit energy efficiency programs, comprehensive home improvement retrofit programs, strategic energy management and home energy reports.

- **Class 3 DSM – Resources from price responsive energy and capacity product offerings/programs** – Class 3 DSM programs seeks to achieve short-duration (hour by hour) energy and capacity savings from actions taken by customers voluntarily, based on a financial incentive or signal. As a result of their voluntary nature, participation tends to be low and savings are less predictable, making Class 3 DSM resources less suitable to incorporate into resource planning, at least until their size and customer behavior profile

[10] Information on the Company's integrated resource planning process can be found at the following address: http://www.pacificorp.com/es/irp.html

provide sufficient information for a reliable diversity result (predictable impact) for modeling and planning purposes. Savings typically only endure for the duration of the incentive offering and, in many cases, loads tend to be shifted rather than being avoided. The impacts of Class 3 DSM resources may not be explicitly considered in the resource planning process; however, they are captured naturally in long-term load growth patterns and forecasts. Program examples include time-of-use pricing plans, critical peak pricing plans, and inverted block tariff designs

- **Class 4 DSM—Non-incented behavioral-based savings achieved through broad energy education and communication efforts –** Class 4 DSM programs promote reductions in energy or capacity usage through education. These efforts seek to help customers better understand how to manage their energy usage through no-cost actions such as conservative thermostat settings and turning off appliances, equipment and lights when not in use. The programs are also used to increase customer awareness of additional actions they might take to save energy and the service and financial tools available to assist them. Similar to Class 3 DSM resources, the impacts of Class 4 programs may not be explicitly considered in the resource planning process; however, they are captured naturally in long-term load growth patterns and forecasts. Program examples include Company brochures with energy savings tips, customer newsletters focusing on energy efficiency, case studies of customer energy efficiency projects, and public education campaigns.

Class 1 and 2 DSM resources are included as resource options in the resource planning process. Class 3 and 4 DSM actions are not considered explicitly in the resource planning process, however, the impacts are captured naturally in long-term load growth patterns and forecasts.

As technical support for the IRP, the Company engages a third-party consultant to conduct a DSM Potential Assessment ("Potential Assessment"). [11] The study primarily seeks to develop reliable estimates of the magnitude, timing and cost of DSM resources likely available to PacifiCorp over the 20-year planning horizon of the IRP. The main focus of the Potential Assessment is on resources with sufficient reliability characteristics that are anticipated to be technically feasible and considered achievable during the IRP's 20-year planning horizon. By definition, the estimated achievable technical potential is the energy efficiency potential that may be achievable to acquire during the 20-year planning horizon prior to cost-effectiveness screening.

The achievable technical potential of Class 2 (energy efficiency) resources for Washington by sector is shown in Table 3. The 2015 Potentials Assessment indicates that approximately nine percent of the achievable technical potential for the Company, excluding Oregon,[12] is available within its Washington service area.[13]

[11] PacifiCorp's Demand-side Resource Potential Assessments can be found at http://www.pacificorp.com/es/dsm.html.
[12] Oregon energy efficiency potentials assessments are performed by the Energy Trust of Oregon.
[13] Volume 1, Page 4-2, PacifiCorp Demand-Side Resource Potential Assessment for 2015-2034.

Table 3
Washington Energy Efficiency Achievable Technical Potential by Sector

Sector	Cumulative GWh in 2034	Percent of Baseline Sales
Residential	392	21%
Commercial	395	26%
Industrial	145	13%
Irrigation	13	9%
Street Lighting	3	30%

Demand-side resources vary in their reliability, load reduction and persistence over time. Based on the significant number of measures and resource options reviewed and evaluated in the Potential Assessment, it is impractical to incorporate each as a stand-alone resource in the IRP. To address this issue, Class 2 DSM measures and Class 1 DSM programs are bundled by cost for modeling against competing supply-side resource options reducing the number of discrete resource options the IRP must consider to a more manageable number.

Cost Effectiveness

The Company evaluates program implementation cost-effectiveness (both prospectively and retrospectively) under a variety of tests to identify the relative impact and/or value (*e.g.*, near-term rate impact, program value to participants, etc.) to customers and the Company.

Program cost-effectiveness is performed using a Company specific modeling tool, created by a third party consultant. The tool is designed to incorporate PacifiCorp data and values such as avoided costs, and generally follows the methodology specified in California's Standard Practice Manual. The analysis assesses the costs and benefits of DSM resource programs from different stakeholder perspectives, including participants and non-participants, based on four tests described in the Stand Practice Manual (TRC, UCT, PCT and RIM) as well as an additional fifth test, PTRC. Washington observes the PTRC as the primary cost effectiveness test.

Energy Efficiency Programs

The Company offered energy efficiency programs to all major customer sectors: residential, commercial, industrial, and agricultural. The Company's energy efficiency portfolio included four programs: *Home Energy Savings*, Schedule 118*; Home Energy Reports; Low Income Weatherization*, Schedule 114*;* and *Non-Residential Energy Efficiency (watt*smart Business*)*, Schedule 140. The Company also helps fund NEEA. In addition to the energy efficiency programs, the Company, on behalf of customers, invested in outreach and education for the purpose of promoting the efficient use of electricity and improving program performance. Results for 2017 are provided in Table 4.

Table 4
Washington Results January 1, 2017 – December 31, 2017

Program	kWh/Yr Savings (at site)	kWh/Yr Savings (at generator)	Systems Benefits Charge Expenditures
Low Income Weatherization	276,750	303,512	$ 1,098,065
Home Energy Savings	8,289,259	9,090,831	$ 2,490,647
Home Energy Reports	12,225,593	13,407,808	$ 499,806
Total Residential Programs	**20,791,602**	**22,802,150**	**$ 4,088,518**
wattsmart Business Agricultural	695,299	762,534	173,104
wattsmart Business Commercial	14,126,041	15,472,394	3,382,070
wattsmart Business Industrial	11,380,788	12,309,574	1,873,533
Total Business Programs	**26,202,128**	**28,544,503**	**$ 5,428,708**
Northwest Energy Efficiency Alliance	2,586,952	2,835,368	$ 843,255
Total	**49,580,682**	**54,182,021**	**$ 10,360,481**
		Portfolio Evaluation	$ 572,538.27
		Portfolio Potential Study	$ 9,488.36
		Portfolio System Support	$ 33,421
		Portfolio Level Expenditures (Evaluation, Potential Study, System Support)	**$ 615,447**
		School Energy Education	$ 61,509
		Outreach and Communication	$ 229,735
		Total System Benefits Charge expenditures	**$ 11,267,172**

In 2017, the Company delivered preliminary results of 54,182 MWh in first year energy savings at generation against the 2017 business plan forecast savings of 44,612 MWh, a positive variance of approximately 21%. At an individual program level, the largest variances from the plan were due to the following:

- Home Energy Savings results were 23.5% less than forecast. Two primary factors contributed to the short falls: energy kits and lighting. The energy savings kit campaign

delivered fewer redemptions overall since the offer has been available for multiple years and fewer customers are now eligible as prior participants are not eligible to receive additional kits. In addition, redemptions were slower than expected which pushed some of the savings into 2018. Lighting savings were less than forecasted in part because of a sub-optimal response to the Feit national promotion at Costco stores. The end-of-the-year promotion failed to generate the sales volume the program administrator (and Costco and Feit) expected.

- Savings reported by NEEA were approximately 7% less overall than originally forecasted for 2017 developed in August 2015. NEEA initiatives with less savings are Reduced Wattage Lamp Replacement, Residential Lighting and Ductless Heat Pumps. Initiatives with additional savings include Next Step Homes and Heat Pump Water Heaters.

- Consistent with 2016-2017 biennial planning assumptions, a two year measure life is used to assess costs effectiveness. The 2017 Annual Conservation Plan included the assumption there were no incremental savings in 2017 beyond those reported in 2016. The actual Home Energy Reports savings included in the table below are the first year reported savings achieved, not incremental savings beyond 2016. Incremental savings for 2017 will be updated in the 2016-2017 Biennial Conservation Report to reflect the reconciled savings against the 2016-2017 conservation target.

Consistent with requirements under WAC 480-109-120 (3)(b)(ii) and (iii), Table 5 provides a comparison of the Company's 2017 Business Plan filed on November 15, 2016, to actual 2017 program performance.

Table 5
Washington 2017 Annual Conservation Plan compared to Actual

	2017 PacifiCorp Washington Annual Conservation Plan			2017 PacifiCorp Washington DSM Actual		
Program	**kWh/Yr Savings (at site)**	**kWh/Yr Savings (at generation)**	**Estimated Systems Benefit Expenditures**	**kWh/Yr Savings (at site)**	**kWh/Yr Savings (at generation)**	**Systems Benefits Charge Expenditures**
Low Income Weatherization	243,540	267,090	$ 1,000,000	276,750	303,512	$ 1,098,065
Home Energy Savings	10,835,081	11,882,833	$ 3,397,403	8,289,259	9,090,831	$ 2,490,647
Home Energy Reports *			$ 376,907	12,225,593	13,407,808	$ 499,806
Total Residential Programs	**11,078,621**	**12,149,923**	**4,774,310**	**20,791,602**	**22,802,150**	**4,088,518**
wattsmart Business Agricultural	1,215,000	1,332,491	$ 349,076	695,299	762,534	$ 173,104
wattsmart Business Commercial	12,928,739	14,160,977	$ 3,188,791	14,126,041	15,472,394	$ 3,382,070
wattsmart Business Industrial	12,850,775	13,899,527	$ 2,993,858	11,380,788	12,309,574	$ 1,873,533
Total Business Programs	**26,994,514**	**29,392,995**	**6,531,725**	**26,202,128**	**28,544,503**	**5,428,708**
Northwest Energy Efficiency Alliance	**2,799,506**	**3,069,263**	**$ 911,483**	**2,586,952**	**2,835,368**	**$ 843,255**
TOTAL	**40,872,641**	**44,612,181**	**$ 12,217,518**	**49,580,682**	**54,182,021**	**$ 10,360,481**
Portfolio Evaluation			$ 333,667			$ 572,538
Portfolio Potential Study			$ 25,000			$ 9,488
Portfolio Support Summary			$ 44,536			$ 33,421
School Energy Education			$ 60,947			$ 61,509
Outreach and Communication			$ 250,000			$ 229,735
Total System Benefits Charge Expenditures			**$ 12,931,668**			**$ 11,267,172**

Estimated Peak Contributions

The Company estimates its capacity reduction during PacifiCorp's system peak period from the 2017 energy efficiency portfolio. An energy-to-capacity conversion factor, developed from Class 2 DSM selections in the 2015 IRP, is used to translate 2017 energy savings to estimated demand reduction during the system peak. The use of this factor in the MW calculation assumes that the energy efficiency resources acquired through the Company's programs have the same average load profile as those energy efficiency resources selected in the 2015 IRP.

Table 6
Estimated Peak Contribution

Description	Value
First year Energy Efficiency program MWh savings acquired during 2017 (@ Generation)	54,182
Conversion factor: Coincident MW/MWh	0.0001310
Estimated coincident peak MW contribution of 2017 Energy Efficiency acquisitions	7.10

Direct Benefits to Customers

Estimates of direct benefits to customers delivered from 2017 expenditures are provided in Table 7. This additional metric to assess program impacts is consistent with conversations between Commission Staff and the Company that occurred during the preparation of the 2017 annual conservation plan.

Table 7
2017 Direct Benefits to Customers

Prorgam or Initiative	Expenditures	Direct Benefit to Customers	Direct Benefit to Customers
Low Income Weatherization	$ 1,098,065	$ 930,299	85%
Home Energy Savings	$ 2,490,647	$ 1,456,592	58%
Home Energy Reports	$ 499,806		
Total Residential Programs	**$ 4,088,518**		
	$ -		
wattsmart Business Agricultural	$ 173,104		
wattsmart Business Commercial	$ 3,382,070		
wattsmart Business Industrial	$ 1,873,533		
Total Business Programs	**$ 5,428,708**	$ 2,993,770	55%
	$ -		
Northwest Energy Efficiency Alliance	$ 843,255	$ 578,848	69%
TOTAL	**$ 10,360,481**		
	$ -		
Portfolio Evaluation	$ 572,538		
Portfolio Potential Study	$ 9,488		
Portfolio Support Summary	$ 33,421		
School Energy Education	$ 61,509		
Outreach and Communication	$ 229,735		
Total System Benefits Charge Expenditures	**$ 11,267,172**	**$ 5,959,508**	**53%**

Notes:

Low Income Weatherization: In 2017 payments to community action agencies for measure installation were classified as incentives. The value can be found in the cost effectiveness tables included in Appendix 1.

Home Energy Savings: Customer incentives, upstream, mid-stream and mail by request buy downs are included in the direct benefit to customer calculation. This information is provided in the Incentives column for the Home Energy Savings program in Appendix 1.

*watt*smart Business: Customer incentives and expenditures for customer site specific energy engineering and inspections s included in the direct benefit to customer calculation. Both amounts are provided in Appendix 1.

NEEA: Company subtracted $16,330 in internal management costs and then applied the 70 percent estimate provided by staff to NEEA funding to calculate the direct benefit to customers.

Pilot Projects

The Company offers pilot projects to residential and nonresidential sectors. This section briefly describes the pilots underway in the biennial period and key activities that occurred in 2017.

RESIDENTIAL

Heat Pump Dryers
In partnership with NEEA, the Company provided outreach and incentives to increase eligible heat pump dryer uptake at smaller independent retailers.

During 2017, Home Energy Savings program partnered with NEEA and Whirlpool to increase the availability of eligible machines at Bemis Appliance & TV. Pilot efforts centered on Whirlpool's WED7990F heat pump dryer. In addition to the existing incentive for the target product, Home Energy Savings program was prepared to provide a sales associate with an incentive from a Sales Person Incentive Fund (SPIF) for sales that occurred at Bemis. Other contributions from Home Energy Savings included paying for washer/dryer pairs to be stocked on the floor, providing a free washer and dryer set for the top salesperson, and/or paying for expedited shipping. NEEA also offered an incentive on the WED7990 dryer and planned to contribute other resources to the pilot in the form of marketing budget and design support. Whirlpool had approved special pricing on the WED7990 units ordered by Bemis through March of 2018, prior to the pilot being postponed. Bemis was committed to dedicating floor space to the WED7990, and to participating in sales associate training in order to better promote the products. The Marketing Account Manager for Bemis was also prepared to incorporate targeted promotions for the dryers into Bemis' marketing platforms.

Although there was interest from all stakeholders in moving this pilot forward, there were issues on Whirlpool's end with getting the product stocked in time for a 2017 implementation. NEEA's incentive on the WED7990 dryer ended at the end of 2017, and a new incentive was not yet in place for 2018. Without the NEEA incentive, the price on the hybrid heat pump dryers was too high for Bemis to stock them. The stakeholders will reconvene around 2nd quarter of 2018 to determine whether there is opportunity to implement this pilot in 2018.

New Manufactured Homes
In collaboration with NEEA, the Company focused on increasing the sale of efficient manufactured homes using incentives available through the Home Energy Savings program and targeted outreach tactics.

The manufactured homes offer was updated in August 2017 to clarify the payment options for midstream, provide program flexibility regarding incentive splits, and retire high performance new manufactured homes. Program field staff, as part of their normal outreach, increased in-person visits to local distributors: Clayton Homes, Columbia Homes, and Valley Quality Homes to explain the changes. Initial rounds of meetings were focused on familiarizing the distributors with the program's offering and application process. Dealers were interested and thought that there was good potential for eligible customers. Once the August updates were made, dealers were excited to participate. By the end of 2017, the Program had processed 5 applications, resulting in 24,808 kWh and are poised for more aggressive engagement in 2018.

NONRESIDENTIAL

Waste Heat to Power
The waste heat to power pilot program is designed to increase the technical talent pool to assess and conduct site analyses for business customer installations of waste heat to power technologies. To promote this, incentives for waste heat to power and regenerative technologies were added to the *watt*smart Business program in January 2016. During 2017, a customer with interest in waste heat to power received a preliminary savings and incentive report for a waste heat to power measure. The Company continues to screen for opportunities at customer sites as part of broader energy efficiency technical and financial assessments and to track waste heat to power projects.

Tier the wattsmart Business Trade Ally Network
The Company developed a premium tier for the existing *watt*smart Business trade ally network with the intent that it will increase trade allies' technical expertise and performance. Additionally, the premium tier is intended to encourage local trade allies to engage in NEEA's advanced lighting trade ally training and achieve *NXT* Level 1 designation.

During 2017, messaging for the premium tier began in March 2017 at the *watt*smart Business vendor events in Walla Walla and Yakima. The premium tier benefits and minimum requirements for consideration for premium status were formally announced September. Throughout 2017, trade ally coordinators worked with the trade allies to encourage them to complete the minimum requirements, including achieving the NXT Level 1 designation (both an individual and their firm must be designated). Achieving the NXT Level 1 designation proved to be the most challenging requirement. Once there were two vendors who met this requirement in December 2017, the premium trade ally selection was completed and the first premium trade allies (Columbia Electric Supply and Stusser Yakima) were notified in early 2018. Since the first two Washington vendors to earn premium designation were not announced until early 2018, a comparison of 2017 projects completed by the premium vendors to projects completed by the universe of vendors was not completed.

Targeted Delivery
The Company targeted businesses through customer outreach efforts to increase measure installation and program participation in a specific area where additional value, such as possible infrastructure investments, has been identified.

The targeted delivery pilot was brought before the DSM Advisory Group in September 2016 and focused on business customers. In 2016, planning for the commercial and residential efforts started with efforts being deployed in 2017. The effort is focused on geographic areas in the Yakima Valley.

The 2017 outreach efforts for business customers used utility, customer and third party data and virtual energy assessment analysis to help focus outreach activities. Outreach included "boots on the ground", direct mail and direct email. Ten projects totaling 1,041,833 kWh in annual savings were completed in 2017 with additional projects identified for potential installation in 2018.

Outreach also targeted residential customers with direct mail and program administrator field staff outreach to multi-family owners. In 2017, 84 projects totaling 58,943 kWh in annual savings were completed.

Manufactured Homes

To support regional efforts in providing information about underserved markets or hard-to-reach segments, the Company has included information about its manufactured homes participation. The information provided below shows its historical manufactured home customers who have participated in the Company's Low Income Weatherization and Home Energy Savings programs.

Table 8
Participation by Manufactured Home Residents

	2014	2015	2016	2017
Low Income Weatherization homes	40	44	49	45
Home Energy Savings participants	256	1,028	403	
Appliances	34	10	10	4
Duct Sealing	197	187	12	795
Heat Pump	24	26	18	79
Heat Pump Water Heater	4	-	1	3
Kits	-	817	362	73
Lighting	12	17	1	
Lighting buy down	72,646	86,318	54,508	50,953
Weatherization	30	8	3	1

A third party contractor, Home Energy Experts was hired by the program administrator to conduct outreach and seal ducts at no cost to manufactured homes residents in the Walla Walla and Yakima

areas. Over 1,900 mailers were sent to customers to generate interest and secure appointments, and 776 homes received the direct install offering. Residents in another 19 manufactured homes had their duct sealed using a contractor they selected and paid.

Heat pump installations in manufactured homes in 2017 increased compared to the prior year. Available information on installed costs suggest a decline in installed system costs and the number of contractors actively engaged in installations has increased to 12. The manufactured home installations include upgrades to more efficient equipment and converting electric furnaces to heat pumps.

Information on all participants except the lighting buy down was compiled by matching customer identifiers (concatenated service location and agreement numbers) of participants with the same information in residential customer accounts bearing the manufactured home dwelling code flag.

Information about the portion of lighting buy down participants who reside in manufactured homes follows the same calculation used in 2016 and uses information from the general population survey from the latest evaluation.[14]

The Company also analyzed manufactured home customers who are also participants in the *Home Energy Reports* program. Table 9 below provides information on current 2017 behavioral program (Home Energy Reports) participation by manufactured home residents.

Table 9
Home Energy Reports Participation by Manufactured Home Residents

	Recipient	Control	Total
Legacy	2,012	1,934	3,946
Expansion	3,785	1,189	4,974
Refill	361	385	745

Information on the behavioral program participation was compiled in 2016 in the same manner (matching customer account number information) as described above for energy efficiency program participation. For 2017, the analysis was not re-run, but the customer attrition rate (end of 2016 to end of 2017) for each wave of the overall program was applied to arrive at an updated estimate of the 2017 behavioral program participants residing in manufactured homes.

In addition, the Advisory Group agreed that income data used to help categorize participants would also be useful for the regional efforts described above. Further, providing income information is not a program participation requirement and that available third party data would be used.

[14] Lighting buy down information was compiled from survey information from the 2015-2016 Home Energy Savings evaluation. Customer prior year purchases for both CFLs and LEDs were added to arrive at a per-home purchase that was assumed to apply equally to all manufactured homes (approximately 15,300) and calculate and estimate of total purchases for manufactured homes. Manufactured home customers purchased approximately fourteen percent of the units receiving incentives in the buy down channel.

Accordingly, this information is included in Table 11. The information in Table 11 uses zip code information for all *Home Energy Savings* program participants and those participants residing in manufactured homes as well as income information from the US Census Bureau. This comparison does not illustrate a strong correlation between lower income levels and manufactured home participation. Alternately stated, it appears program participation by manufactured home residents is similar to overall program participation by zip code/income level. Similar information was included in last year's report and 2017 was added for this report.

Table 10
Manufactured Home Income Data

ZIP	Median Household Income- U.S. Census Bureau American Community Survey	Project Count - All DSM Projects 2014 - 2017	% Total DSM Projects	Project Count - MANUFACTURED Projects 2014 - 2017	% Total Manufactured Projects
98921	$ 23,636	23	0%	9	0%
98948	$ 37,191	255	2%	23	1%
98902	$ 39,653	2313	14%	88	3%
98901	$ 40,493	1164	7%	189	6%
98944	$ 40,803	839	5%	110	4%
98932	$ 41,087	203	1%	12	0%
98952	$ 42,754	26	0%	7	0%
98603	$ 43,057	2	0%	0	0%
98951	$ 43,450	349	2%	38	1%
98947	$ 44,750	158	1%	23	1%
98930	$ 45,011	711	4%	176	6%
99329	$ 45,625	8	0%	6	0%
98938	$ 46,209	63	0%	11	0%
99343	$ 46,477	0	0%	0	0%
98935	$ 46,846	62	0%	11	0%
99348	$ 47,251	52	0%	30	1%
99328	$ 47,965	330	2%	31	1%
99350	$ 49,110	5	0%	1	0%
99347	$ 49,418	157	1%	25	1%
99324	$ 49,765	794	5%	323	11%
98933	$ 50,011	38	0%	11	0%
99362	$ 51,934	2956	18%	462	16%
98903	$ 52,368	1076	6%	335	11%
98937	$ 53,665	384	2%	59	2%
98953	$ 55,329	337	2%	72	2%
98923	$ 55,566	63	0%	10	0%
99361	$ 56,690	184	1%	74	3%
98936	$ 57,561	317	2%	86	3%
99301	$ 58,016	0	0%	0	0%
98942	$ 58,840	1060	6%	147	5%
98908	$ 62,282	2240	13%	229	8%
99360	$ 66,759	101	1%	34	1%
99323	$ 68,410	393	2%	292	10%
98950	$ 68,625	0	0%	0	0%
98939	data not available	9	0%	1	0%
99363	data not available	18	0%	16	1%

Residential Programs

The residential energy efficiency portfolio is comprised of four programs: *Home Energy Savings*, *Home Energy Reports*, *Low Income Weatherization*, and *NEEA.* As shown in Table 11, the residential portfolio was cost effective based on four of the five standard cost effectiveness tests for the reporting period. The ratepayer impact test was less than 1.0 indicating that there is near term upward pressure placed on the price per kilowatt-hour given a reduction in sales.

Table 11
Cost Effectiveness for Residential Portfolio[15]

Benefit/Cost Test	B/C Ratio with NEEA	B/C Ratio without NEEA
PTRC	2.06	2.21
TRC	1.93	2.07
UCT	1.92	2.13
PCT	4.80	4.51
RIM	0.51	0.53

Individual program performance, program management and program infrastructure is provided on the following pages.

[15] Excludes *Low Income Weatherization* and includes select quantifiable and directly attributable non-energy benefits.

Home Energy Savings

The *Home Energy Savings* program provides access to and incentives for more efficient products and services installed or received by customers residing in newly constructed homes, existing homes, multi-family housing units or manufactured homes. The program was cost effective as shown in Table 12.

Table 12
Cost Effectiveness for Home Energy Savings[16]

Benefit/Cost Test	B/C Ratio
PTRC	2.20
TRC	2.06
UCT	2.14
PCT	3.76
RIM	0.58

Program participation by measure category is provided in Table 13.

Table 13
Eligible Program Measures (Units)

Measure Category	Total kWh/Yr Savings @ Site	Total Incentive	Total Quantity
Appliances	20,613	$8,200	162
Building Shell	74,057	$59,303	153,837 (sq ft)
Energy Kits	655,954	$22,438	1,957
HVAC	2,036,915	$786,464	1,354
Lighting	5,340,901	$514,269	359,958
Water Heating	90,640	$36,918	58
Whole Home	70,180	$29,000	21
Total	**8,289,259**	**$1,456,592**	

Program Management

The program manager who is responsible for the program in Washington is also responsible for the *Home Energy Savings* program in California and *Home Energy Reports* program in Washington. For each program and in each state the program manager is responsible for the cost effectiveness of the program, contracting with the program administrator monitoring program

[16] Includes quantifiable and directly attributable non-energy impacts.

performance and compliance, and recommending changes in measures, incentives, or delivery requirements as set out in the tariff and/or posted on the Company's website.

Program Administration

The *Home Energy Savings* program is administered by CLEAResult. CLEAResult is responsible for the following:

- Retailer and trade ally engagement – CLEAResult identifies, recruits, supports, and assists retailers to increase the sale of energy efficient lighting, appliances and electronics. CLEAResult enters into promotion agreements with each lighting manufacturer and retailer for the promotion of discounted lighting equipment. The agreements include specific retail locations, lighting products receiving incentives and not-to-exceed annual budgets. Weatherization and HVAC trade allies engaged with the program are provided with program materials, training, and regular updates.

- Inspections – CLEAResult recruits and hires inspectors to verify on an on-going basis the installation of measures. A summary of the inspection process is in Appendix 2.

- Incentive processing and call-center operations – CLEAResult receives all requests for incentives, determines whether the applications are completed, works directly with customers when information is incorrect or missing from the application and processes the application for payment.

- Program specific customer communication and outreach – A summary of the communication and outreach is outlined in the Communication, Outreach and Education section.

Program Changes

A new manufactured homes offer was updated on August 1, 2017. Several clarifications were incorporated to better engage dealers. One standards reference was removed since it is no longer widely used in the market.

Adaptive Management
The Company made substantial changes through an adaptive management approach which included the following 2017 activities:

- In preparation for the manufactured homes duct sealing work, numerous efforts were made to engage with local contractors and recruit them to perform these services. Local contractors either did not have the resources to participate or were unsure of customer participation at the set incentive (in this case the contractor reimbursement) level. The successful contractor respondent was based in Utah and fielded local crews managed by experienced crew leaders. While these crews were cost efficient and focused, it added pressure to fill each day with work to avoid downtime. Out of area crews also presented challenges for effectively managing clean-up tasks before the crews left the area. This

reinforced the need for qualified local providers and the recruitment efforts will continue next year.

- In 2017, smart thermostat redemptions were substantially below the forecasted unit count. Subsequently, CLEAResult worked to obtain sales data from key retailers to better understand purchases. The sales data indicated higher activity than originally estimated for smart thermostats and revealed significant breakage (low incentive redemptions compared to sales). In response, CLEAResult developed new point of purchase materials to highlight the ease of participation through the online application and the redemptions increased by 30% compared to 2016.

- The Online Mobile Contractor (OMC) applications platform was expanded to include customer capability appliances, smart thermostats, and window incentive applications. The platform provides instant validation for customers, alerting them to the completeness of their application and if any required information is missing. Overall, this improvement reduced costs and improved processing times while providing an enhanced customer experience.

Infrastructure

Multiple retailers and trade allies help deliver energy efficient products on behalf of the Company. The list of participating and non-participating retailers and trade allies by delivery channel and measure is provided in Appendix 3.

Evaluation

A process and impact evaluation for program years 2015-2016 was published in 2017. Notable findings include:

- For non-lighting participants, retailers were the highest source of program awareness. For the general population, bill inserts and Pacific Power's website/social media were the most commonly cited ways they learned about program offerings.
- Non-lighting participants expressed program satisfaction with the program overall, and reported high satisfaction with installed measures, their contractors and incentive amounts.
- General population survey respondents reported higher levels of satisfaction with LEDs.
- High satisfaction with energy kits participants.
- Overall realization rate was 78 percent.
- Program was cost effective with a PTRC of 1.93 over the two-year period, including non-energy impacts.

The results of the evaluation can be viewed at www.pacificorp.com/es/dsm/washington.html.

Home Energy Reports

The *Home Energy Reports* program is a behavioral program designed to decrease participant energy usage by providing comparative energy usage data for similar homes located in the same geographical area. Additionally, the report provides the participant with information on how to decrease their energy usage. Equipped with this information, participants can modify behavior or make structural equipment, lighting, or appliance modifications to reduce their overall electric energy consumption.

Reports were initially provided to approximately 13,500 customers (referred to as "legacy" group). The number of participants decreased over time due to customer attrition from general customer churn (customer move-outs)[17] and customers requesting to be removed from the program. In 2014, the program was expanded to 38,500 additional customers (referred to as "expansion" group).[18] Another group of customers (referred to as "legacy refill" group) were added in January 2015 to offset attrition and lower energy savings than expected from the initial legacy group.[19]

Monthly reports are mailed to all new program participants for the initial three months to build program awareness. Following this initial three-month period, report frequency is moved to a bi-monthly schedule for the remainder of the program. All participants may request an electronic version delivered via email and have access to a web portal containing the same information about their usage and past usage provided in the report. The web portal also contains other functions such as a home energy audit tool, the ability for customers to update their home profile (for more accurate comparisons) and suggestions on more ways to save energy around their home.

Results are shown in Table 14.

Table 14
Cost Effectiveness for *Home Energy Reports*

Benefit/Cost Test	B/C Ratio Combined	B/C Ratio Legacy + Refill Groups	B/C Ratio Expansion Group
PTRC	2.31	3.81	1.65
TRC	2.10	3.46	1.50
UCT	2.10	3.46	1.50
PCT	N/A	N/A	N/A
RIM	0.39	0.42	0.36

[17] At the end of 2017 approximately 8,800 customers in the legacy group were still participating and receiving home energy reports.
[18] At the end of 2017, approximately 25,000 customers in the expansion group were still participating and receiving home energy reports.
[19] At the end of 2017, approximately 3,600 customers in the legacy refill group were still participating and receiving home energy reports.

Program savings by group is provided in Table 15.

Table 15
Program Savings

Home Energy Reports Group	Total kWh/Yr Savings @ Site
Expansion	6,090,309
Legacy + Refill	6,135,284
Grand Total	**12,225,593**

Consistent with 2016-2017 biennial planning assumptions, a two year measure life is used to assess costs effectiveness. The 2017 Annual Conservation Plan included the assumption there were no incremental savings in 2017 beyond those reported in 2016. The actual Home Energy Reports savings included in the table above are first year reported savings achieved, not incremental savings beyond 2016. Incremental savings for 2017 will be updated in the 2016-2017 Biennial Conservation Report to reflect the reconciled savings against the 2016-2017 conservation target.

Program Management

The program manager overseeing program activity in Washington is also responsible for *the Home Energy Savings* program in California and Washington. For each program in each state, the program manager is responsible for the cost effectiveness of the program, contracting with the program administrator, monitoring program performance and compliance, and recommending changes measures, incentives or delivery requirements as set in the tariff or posted on the Company's website.

Program Administration

The *Home Energy Reports* program is administered by OPower. OPower's software creates individualized energy reports for utility customers that analyze their energy usage and offers recommendations on how to save energy and money by making small changes to their energy consumption. The Company contracts with OPower to provide energy savings, software services, and printing and delivery of energy reports to customers.

The Company's contract with OPower ended in 2017. Subsequently, a request for proposal was issued to deliver Home Energy Report services for the next three years, beginning in 2018. The successor contract is designed to initially use the same treatment and control groups used by OPower. The Company will closely track the performance of program as a successor provider is brought on board to start delivery in 2018.

Evaluation

A process and impact evaluation will be published in 2018.

Low Income Weatherization

The *Low Income Weatherization* program provides energy efficiency services through a partnership between the Company and local non-profit agencies to residential customers who meet income-eligible guidelines. Services are at no cost to the program participants. Cost effectiveness for the *Low Income Weatherization* program was not included in the portfolio or sector-level analysis per WAC 480-109-100 (10)(b).

In 2017, 125 homes were treated, saving 276,750 kWh (at site). Total homes treated, as well as the type and frequency of specific energy efficiency measures installed in each home, is provided in Table 16.

Table 16
Eligible Program Measures (Units)

Participation – Total # of Completed/Treated Homes	**125**
Number of Homes Receiving Specific Measures	
Aerators	65
Attic Ventilation	111
Caulk/Weather-stripping	83
Ceiling Insulation	83
Compact Fluorescent Light Bulbs	57
Duct Insulation	74
Floor Insulation	95
LED Light Fixtures	8
LED Light Bulbs	43
Ground Cover	69
Infiltration	121
Repairs	55
Replacement Refrigerators	13
Showerheads	44
Thermal Doors	1
Timed Thermostat	4
Wall Insulation	31
Water Heater Blankets	2
Water Heater Replacement	17
Water Pipe Insulation and Sealing	97

Program Management

The program manager overseeing program activity in Washington is also responsible for the *Low Income Weatherization* programs in California, Idaho, Utah, and Wyoming; the bill discount programs in Washington, California, and Utah; and energy assistance programs in Washington, California, Idaho, Oregon, Utah, and Wyoming. For each program in each state, the program manager is responsible for the cost effectiveness of the energy efficiency programs, partnerships, and agreements in place with local agencies that serve income eligible households, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions set out in the tariff.

Program Administration

The Company partners with three local non-profit agencies to provide weatherization services to income-qualifying households throughout its Washington service territory. These agencies include Blue Mountain Action Council located in Walla Walla, Northwest Community Action Center in Toppenish, and Opportunities Industrialization Center of Washington in Yakima. The leveraging of Company funding along with Washington Match Maker Program funds allows the agencies to provide these energy efficiency services to more households at no cost to participating customers. The Company provides rebates to partnering agencies for 50 percent of the cost of services while Match Maker funds are available, and will cover 100 percent of costs when these state funds are depleted. In 2017, 64 homes were funded at 50% and 61 at 100%. Match Maker funding was approved by the state legislature in mid-2017, but monies were not released until early 2018, resulting in the significant number of completions covered at the 100% level. Participants qualify if they are homeowners or renters residing in single-family homes, manufactured homes, or apartments. Over 7,600 homes have been completed with Pacific Power funding since the program's inception in the mid-1980s.

By contract with the Company, the agencies are responsible for the following:

- Income Verification – Agencies determine participant income eligibility based on Washington Department of Commerce guidelines. Households interested in obtaining weatherization services apply through the agencies. The 2017 income guidelines can be viewed on the Washington Department of Commerce website[20].
- Energy Audit – Agencies use a U.S. Department of Energy approved audit tool or priority list to determine the cost effective measures to install in the participant's homes (audit results must indicate a savings to investment ratio of 1.0 or greater).
- Installation of Measures – Agencies install the energy efficiency measures.
- Post Inspections – Agencies inspect 100 percent of completed homes. A sample of 5 -10 percent are inspected by a Pacific Power inspector. See Appendix 2 for verification summary.
- Billing Notification – Agencies are required to submit a billing to Company within 90 days after job completion. A homeowner agreement and invoice form indicating the measures installed and associated cost is submitted on each completed home.

On September 1, 2016, the Commission issued Order 12 in Docket UE-152253 and ordered:

> Pacific Power must also initiate a stakeholder collaborative to discuss changes to its low–income weatherization program. This collaborative may be conducted in concert with the LIBA collaborative; or separately, as resources permit. In addition to Staff and the Energy Project, the Company should invite Public Counsel, Boise, and NWEC to participate. Any mutually agreed-upon modifications or additions should be filed with the Commission by April 1, 2017. [21]

http://www.commerce.wa.gov/wp-content/uploads/2017/04/HIP-Weatherization-2017-WA-Income-Eligibility-Guidelines.pdf

[21] *WUTC v. Pacific Power & Light Company*, Docket UE-152253, Order 12, ¶ 255 (Sept. 1, 2016).

Representatives from the organizations mentioned in the order as well as from our partnering weatherization agencies discussed program changes separately from the LIBA collaborative. Meetings took place on December 15, 2016 and February 2, 2017. The following program revisions were mutually agreed upon and filed in Advice 17-03 on March 16, 2017:

- Eliminate the $1 million annual funding cap. The cap has been in place since 2001 and has not been met, however there is an expectation that it will be reached in the near future based upon agency production levels and budget utilization. The program is cost-effective, so a cap is not necessary.
- Eliminate the requirement that water pipe wrap be allowed only when installed with floor insulation. The agencies find pipe wrap is often determined to be cost-effective per their energy audit results even when floor insulation is not installed.
- Add water heater blankets to the list of approved measures. This measure was eliminated as newer water heater models have greater insulation built in to the units so that wraps are not needed. Agency staff are still serving homes with older models in working condition that would benefit from the installation of a water heater blanket. The measure is installed in compliance with the Washington Department of Commerce Weatherization Manual.
- Remove references to measure life and "always considered cost-effective" throughout the Energy Efficiency Measure section in the tariff.

Revisions were approved and effective May 1, 2017.

Evaluation

The program underwent a process and impact evaluation for program years 2013 – 2015. The evaluation was published in early 2018.

Northwest Energy Efficiency Alliance

The Northwest Energy Efficiency Alliance (NEEA) is a non-profit corporation that works collaboratively with its funders and other strategic market partners to accelerate the innovation and adoption of energy-efficient products, services, and practices. NEEA is supported by BPA, Energy Trust of Oregon, and more than 100 Northwest utilities, including Pacific Power

Program performance for 2017 is being reported based on NEEA's results for Pacific Power of 2,587 MWh (at site). Consistent with the reporting convention approved in Docket UE-132047 the savings represent Pacific Power's portion of Total Regional Savings less the Company's local program savings (adjustment to total movement in the market baseline for measures impacted by NEEA's efforts to account for savings already captured and reported through Pacific Power's Washington programs).

Program Administration

The Company has a representative on the NEEA board of directors as well as representatives on each of the sector advisory committees, residential, commercial and industrial. The Company also has representation on NEEA's broader Regional Portfolio Advisory Committee and participates in relevant Northwest Research Group meetings. Collectively the representatives work collaboratively with the other funders, advisory group members, and NEEA to direct the efforts of NEEA in the best interest of the region in the achievement of the region's market transformation objectives.

Non-Residential Program

The Non-Residential Energy Efficiency program is promoted to the Company's commercial, industrial and agricultural customers as *watt*smart Business.

The *watt*smart Business program[22] is intended to maximize the efficient use of electricity for new and existing non-residential customers through the installation of energy efficiency measures and energy management protocols. Qualifying measures are any measures which, when implemented in an eligible facility, result in verifiable electric energy efficiency improvements.

The program was cost effective in 2017 as shown in Table 17 below.

Table 17
Cost Effectiveness for *watt*smart Business

Benefit/Cost Test	Benefit/Cost Ratio
PTRC	2.10
TRC	1.91
UCT	3.57
PCT	3.32
RIM	0.72

Sector level performance for 2017 is provided in Table 18.

Table 18
Program Performance by Sector

Sector	Total kWh/Yr Savings @ Site	Total Incentive	Total kW Savings @ Site	Total Projects
Commercial	14,126,041	$1,483,978	1,265	341
Industrial	11,380,788	$930,825	805	53
Irrigation	695,299	$72,963	201	32
Total	**26,202,128**	**$2,487,766**	**2,271**	**426**

[22] The program brochure is available at https://www.pacificpower.net/content/dam/pacific_power/doc/Business/Save_Energy_Money/WA_wattsmartBusiness_Brochure.pdf . Program detail (in addition to the program tariff, Schedule 140) maintained on the Company website is available at https://www.pacificpower.net/content/dam/pacific_power/doc/Business/Save_Energy_Money/WA_wattsmartBusiness_Incentive_tables_information.pdf.

Program performance by measure category is provided in Table 19.

Table 19
Program Performance by Measure Category

Measure Category	Total kWh/Yr Savings @ Site	Total Incentive	Total kW Savings @ Site	Total Projects
Additional Measures	207,094	$28,647	-	3
Building Shell	16,069	$11,713	-	3
Compressed Air	473,237	$58,710	9	10
Energy Management	510,472	$10,209	36	5
Food Service Equipment	2,089	$100	0	1
HVAC	280,547	$33,506	55	11
Irrigation	578,561	$57,662	185	30
Lighting	14,040,890	$1,415,063	1,450	327
Motors	281,641	$39,767	39	9
Refrigeration	9,811,528	$832,389	497	27
Total	**26,202,128**	**$2,487,766**	**2,271**	**426**

Services and incentives offered through the *watt*smart Business program include:

- Typical Upgrades: Incentives for lighting, HVAC, compressed air and other equipment upgrades that increase electrical energy efficiency and exceed energy code requirements.
- Custom analysis: Offers energy analysis studies, services and incentives for more complex projects.
- Energy Management: Provides expert facility and process analysis and incentives to help lower energy costs by optimizing customer's energy use.
- Enhanced incentives for small businesses: Provides enhanced incentives for lighting upgrades installed by an approved *watt*smart Small Business Contractor at an eligible existing small business customer facility.
- Midstream/Lighting Instant Incentive: Provides instant, point-of-purchase incentive for qualifying LED lamps sold through participating distributors. Customers purchasing lamps from non-participating suppliers can apply for incentives after purchase.
- Energy Project Manager Co-funding: Available to customers who commit to an annual goal of completing energy projects resulting in at least 1,000,000 kWh/year in energy savings.

Program Management

The program manager overseeing program activity in Washington is also responsible for the *watt*smart Business program in California. For each state the program manager is responsible for the cost-effectiveness of the program, identifying, and contracting with the program administrators

through a competitive bid process, program marketing, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions of the program set out in the tariff and/or posted on the Company's website.

Program Administration

The program includes several delivery channels, including Trade Ally, Small Business Enhanced Incentive Offer, Midstream/Lighting Instant Incentive, and Project Manager delivery.

Trade Ally
In this channel, the program is primarily marketed through local trade allies who receive support from one of two program administrators. The Company contracts with Nexant, Inc. (Nexant) and Cascade Energy (Cascade) for trade ally coordination, training and application processing services for commercial measures and industrial/agricultural measures, respectively.

Nexant and Cascade are responsible for the following:

- Trade ally engagement – identify, recruit, train, support and assist trade allies to increase sales and installation of energy efficient equipment at qualifying business customer facilities.
- Incentive processing and administrative support – handle incoming inquiries as assigned, process incentive applications, develop and maintain simplified analysis tools and provide program design services, evaluation and regulatory support upon request.
- Direct customer outreach and project facilitation for smaller customer projects.
- Inspections – verify on an on-going basis the installation of measures.[23] A summary of the inspection process is in Appendix 2.

Small Business Enhanced Incentive Offer
In this channel, the program is primarily marketed through local contractors approved specifically for this offer who receive support from the program administrator, Nexant. Nexant is responsible for the following:

- Management of approved contractors – identify, recruit, contract with, train, support, and assist contractors to increase sales and installation of energy efficient lighting equipment at qualifying small business customer facilities.
- Incentive processing and administrative support – handle incoming inquiries as assigned, process incentive applications, develop and maintain simplified analysis tool and provide program design services, evaluation and regulatory support upon request.
- Inspections – verify on an on-going basis the installation of measures. A summary of the inspection process is in Appendix 2 to this report.

[23] The Company contracts with firms from the energy engineering consultant list to perform required pre- and post-installation inspections for lighting retrofit and new construction/major renovation projects.

Midstream/Instant Incentive Offer
In this channel, the program is primarily marketed through distributors approved specifically for this offer who receive support from the program administrator, Nexant. The program is also marketed through installation contractors, who also receive support from Nexant. Nexant is responsible for the following:

- Management of approved distributors – identify, recruit, contract with, train, support, and assist distributors to increase sales of energy efficient lighting equipment at qualifying business customer facilities.
- Incentive processing and administrative support – handle incoming inquiries as assigned, process incentive applications, and provide program design services, evaluation and regulatory support upon request.
- Inspections – verify on an on-going basis the installation of measures at eligible customer facilities. A summary of the inspection process is in Appendix 2 to this report.

Project Manager
In this channel, the Company's project manager manages a subset of more complex projects. The project manager works directly with the customer or through the Company's regional business managers.[24] The project manager provides customers with program services and incentives using a pre-contracted group of energy engineering consultants. A current list of these consultants is included in the Infrastructure section below.

Infrastructure

To help increase and improve the supplier and installation contractor infrastructure for typical energy efficient equipment and services, the Company established and continues to develop and support trade ally networks for lighting, HVAC, motors/VFDs, and irrigation. This work includes identifying and recruiting trade allies, providing program and technical training and providing sales support on an ongoing basis.

In March 2017, Pacific Power launched the *watt*smart Business Vendor Network which replaced the Energy Efficiency Alliance. The new network elevated minimum participation requirements, moving beyond participation and reference checks to add industry training and proof of insurance requirements. Increasing participation requirements is intended to improve the quality of trade allies in the network. As a result, the number of trade allies listed with the program is about half of what it was in 2016.

The current searchable list of trade allies who have applied and been approved as participating *watt*smart Business vendors are available on the Company website[25] and is included as Appendix

[24] Regional business managers are responsible for directly working with Washington commercial and industrial/ag customers.
[25] Searchable participating vendor lists are available from the Company website. Direct link to the "Find a Vendor" search tool: http://pacificpower-tradeally.energyefficiencyalliance.net/tradeally/jspx/Contractor_Search/ContractorSearch.jspx

4 to this report. In most cases, customers are not required to select a vendor from these lists to receive an incentive.[26]

The total number of participating trade allies is currently 40. The current count of participating trade allies by technology are in Table 20.

Table 20
Participating Trade Allies[27]

Lighting	HVAC	Motors and VFD	Irrigation	Small Business – approved contractors	LED Instant Incentive – approved distributors
33	4	16	1	4	6 distributors, 14 branch locations

For the project manager delivery channel supporting larger customers, a pre-approved, pre-contracted group of engineering firms can be used to perform facility specific energy efficiency analysis, quality assurance and verification. Table 21 lists the engineering firms currently under contract with the Company.

Table 21
Energy Engineering Firms

Engineering Firm	Main Office Location
Cascade Energy	Portland, OR
Compression Engineering Corp	Beaverton, OR
EMP2, Inc.	Richland, WA
Energy 350	Portland, OR
Energy Resources Integration, LLC	Sausalito, CA
4Sight Energy Group, LLC	Post Falls, ID
Evergreen Consulting Group	Portland, OR
kW Engineering, Inc.	Oakland, CA
Lincus Inc.	Emeryville, CA
Nexant, Inc.	Portland, OR
Solarc Energy Group	Eugene, OR

Program Changes

The Company made programmatic changes on three separate dates. Effective January 1, 2017, changes were made to:

- Refine and enhance measure and eligibility requirements to maintain program cost effectiveness due to the new, lower avoided costs/decrement values from the 2017 Integrated Resource Plan;

[26] For the *watt*smart Small Business enhanced incentives, customers are required to choose one of the approved contractors for this offer.
[27] Some trade allies may participate in more than one technology so the count of unique participating firms is less than the total count provided.

- Restructure lighting retrofit offerings for continuous improvement as the lighting market evolves;
- Adjust LED case lighting and other measures to align with current Regional Technical Forum (RTF) analysis;
- Restructure Enhanced Incentives for Small Business customers;
- Add new measures and revise existing measures receiving instant incentives from qualifying distributors;
- Remove measures that were not cost effective and measures with low/no participation; and
- Make other minor administrative changes.

Effective April 28, 2017, changes were made to:

- Add Street Lighting Service Schedules 51, 52, and 57 (Company-owned street lighting service) to the list of applicable rate schedules in Schedule 140, Non-Residential Energy Efficiency
- Add note to program details to clarify for Rate Schedules 51, 52, and 57 Street Lighting Service, the street light owner (Pacific Power) is not eligible for incentives.

Effective May 22, 2017, changes were made to:

- Remove the sunset date for incentives for commercial refrigerator and freezer measures (except the smallest size categories) and reduce incentives for the larger size categories in alignment with federal standards and the aligning Energy Star specification that was effective March 27, 2017.
- Revise the maximum incentive for one small business lighting measure to align with recent market cost data.
- Revise small business lighting LED Relamp measure name and eligibility requirements
- Add two small business lighting LED measures: LED Delamp and LED Fixture Replacement – High Bay.

Adaptive Management

The Company made substantial changes through an adaptive management approach. The following bullets summarize the changes.

- *Increase wattsmart Business program results*
  The program forecast was monitored throughout 2017 to track performance targets. When the *watt*smart Business 2017 forecast fell below 100% in August, the Company leveraged its program administrators to increase savings. This resulted in delivery teams revisiting their pipelines and increasing follow-up on projects underway. The program fell 3% short of its 2017 forecast and developed a pipeline of projects for 2018.

- *Cost-effectiveness improvement*
  Due to the 2017 IRP's new lower decrement values, work began in June to identify ways to improve program cost-effectiveness. Several improvements went into the Business Plan for 2018-2019 and were effective January 1, 2018:

1. Add a maximum simple payback threshold at the project level to incentive eligibility requirements. Allow projects that exceed the threshold to be eligible for incentives if the project passes the Commission approved test (i.e., the TRC Test as modified by the Northwest Power and Conservation Council).
2. Remove TLED, T8 and T5 Relamp measures and add Lamp Replacement category at the same incentive levels as the mid-market offer. This improves cost-effectiveness by moving most lamp replacement-only measures to mid-market, which has lower administrative costs.
3. Remove some measures from the program that were not cost-effective, had low participation, or both.

Trade Ally Network Improvements

- Increased network requirements - In March 2017, Pacific Power launched the *watt*smart Business Vendor Network which replaced the Energy Efficiency Alliance. The new network elevated minimum participation requirements, moving beyond participation and reference checks to add industry training and proof of insurance requirements. Increasing participation requirements is intended to improve the quality of trade allies in the network.

    - Added a Premium Tier – Added a premium tier to the lighting vendor network to increase the overall performance of the network. To be considered for Premium status, an approved *watt*smart Business Vendor has to install a minimum number of projects in the past twelve months and hold a lighting credential such as the NEEA's NXT Level 1 Designation for both the company and an employee. Pacific Power established the following performance categories that align with program objectives to assess and rank lighting trade ally performance. Top ranked firms meeting the minimum requirements are selected for the Premium tier, such as participation levels (project count and savings), customer satisfaction, program satisfaction, project submission quality, and experience/training.

- Added formal feedback - A trade ally performance snapshot was introduced to provide feedback on a quarterly basis to each approved lighting vendor on the above categories. The main purpose is to provide each vendor with a summary of their performance and help them with continuous improvement. The first scorecards were provided to approved lighting vendors in October 2017 and trade ally coordinators followed up to review the snapshots with vendors individually.

Trade Ally Portal

An updated trade ally portal went live on March 17, 2017. The new portal is linked to Nexant's instance of DSM Central allowing approved *watt*smart Business Vendors to now see the status of their projects online. In July 2017, the portal was updated so approved vendors can download current marketing materials, insert their contact information on materials set up for co-branding, and order printed materials (for co-branded materials, printing can commence once approved by Nexant).

- *Financing*

Nexant operates optional financing and the full launch occurred in 2017. The launch included completion of the following:

- Financing handout and web page[28]
- Trade ally webinars on the financing offer and how to integrate it into their sales process
- Customer webinar

Three Washington trade allies, including two small business contractors, leveraged the financing offer as a sales tool. Sixteen indicative offers were issued and four *watt*smart Business projects were completed with financing in 2017.

- *Lighting Tool*
  The contract signed in 2016 with Nexant included provisions to move the current Excel based lighting tool to an iPad-based assessment platform (iEnergy Onsite). In 2017, an adaptive management decision was made to modify the Excel-based tool with improvements and additional functionality. Examples of additional functionality include:

  - Revised the energy savings calculation methodology to include an adjustment for HVAC interaction resulting from the lighting upgrade to align with the RTF's Standard Protocol for Estimating Energy Savings of Non-Residential Lighting Retrofits.
  - Improved and streamlined fixture selection
  - Customer eligibility functionality

  The upgraded tool was launched for the program changes effective in January 2018.

Evaluation

A process and impact evaluation for program years 2014 - 2015 was published in 2017. Notable findings include:

- A high percentage of participants in small business lighting, typical upgrades and custom analysis reported being very satisfied with the work provided by their vendor/contractor.
- Participants in the Small business lighting and typical upgrades channels reported low awareness levels of the *watt*smart Business Program name. Participants in the custom delivery channel reported high name recognition.
- The program was cost effective over the two-year period with a PTRC of 1.53 and an overall realization rate of 99%.

The results of the evaluation can be viewed at www.pacificorp.com/es/dsm/washington.html.

[28] https://www.pacificpower.net/bus/se/washington/project_financing.html

Communications, Outreach and Education

The Company uses earned media, customer communications, paid media, and program specific media to communicate the value of energy efficiency, and provide information regarding low-cost and no-cost energy efficiency measures. The Company endeavors to educate customers on the availability of technical assistance, services, and incentives with the overall goal to engage customers in reducing their energy usage.

Earned Media

Earned media is managed by the Company's external communications department in cooperation with the regional business managers located in Washington. "Earned media" generally refers to favorable television, radio, newspaper, or internet news coverage gained through press releases, media events, opinion pieces, story pitches, or other communication with news editors and reporters.

Customer Communications

As part of the Company's regular communications to its customers, newsletters promote energy efficiency initiatives. Inserts and outer envelopes featuring energy efficiency messages have also been used on a consistent basis. The Company uses its website and social media, such as Twitter and Facebook, to communicate and engage customers on DSM offers and incentives.

Paid Media/wattsmart campaign

In 2017 the Company developed a new *watt*smart advertising campaign in English and Spanish to inform and educate residential customers about the benefits energy efficiency contributes to the greater good in addition to saving money. The overall paid media objective is to effectively reach our customers through a multi-faceted campaign with programs aimed at specific customer groups and the unifying theme "Being wattsmart saves me money, and it's good for Washington." This communication campaign aims to create awareness of the importance and benefits of being energy efficient, and to help increase participation in the Company's DSM programs.

The Company's 2017 research showed that among Pacific Power customers:

- Seventy-three percent of respondents think Pacific Power is doing a good job offering solutions to help customers use energy efficiently and providing information on how to control electricity costs.
- Sixty-five percent of the respondents report taking action to save energy in the past year.
- The main reason for taking action is to save money (79 percent) and to help protect the environment (23 percent).

Of those taking action, the most common actions are installing energy-efficient lights, shutting off lights when not in use, and lowering heating thermostat settings. Key strategies included:

- Implementing an advertising campaign that features *watt*smart energy efficiency messaging and connects it to saving money and the benefits for Washington.
- Promoting customer conservation (behavioral changes) and increasing participation and savings through the Company's *watt*smart DSM programs.
- Motivating customers to reduce consumption independently or to do so by participating in at least one of the Company's *watt*smart DSM programs.
- Educating customers on how these programs can help them save money on their utility bills and reduce energy consumption to help Washington thrive.

The *watt*smart advertising campaign is comprised of a multi-media mix designed to reach as many customers as possible with the greatest frequency. Various communication channels were used to optimize effectiveness, frequency and coverage and to build on the messages. Table 22 outlines the Washington media channels used, the value of each channel, and the impressions achieved.

Table 22
2017 Media Channels

Communication Channel	Value to Communication Portfolio	2017 Placements
Television	Television has the broadest reach and works as the most effective media channel	1,527,319 residential impressions 601,671 business impressions
Radio	Given the cost relative to television, radio builds on communications delivered via television while providing for increased frequency of messages	641,280 residential impressions 200,400 business impressions
Newspaper/Magazine	Supports broadcast messages and guarantees coverage in areas harder to reach with broadcast	262,600 residential impressions 144,800 business impressions
Online advertising	Digital display and Google Search	3,387,573 residential impressions 1,211,047 business impressions and 25,178 search impressions
Social Advertising	Advertising on Facebook	941,332 residential impressions 57,549 business impressions
Twitter @PacificPower_WA	Awareness for early adopters regarding energy efficiency tips Tweets posted on a weekly basis	837 followers through December 2017
Facebook www.facebook.com/pacificpower	Awareness for early adopters regarding energy efficiency tips and a location to share information	19,235 fans through December 2017 (for all Pacific Power states)

The total number of impressions for the campaign in 2017 was 9,000,749.

Links to the Company's current portfolio of advertisements are included in Appendix 5. The audiences for these messages were prioritized as follows:

- Primary - Households in Pacific Power's service area.
- Secondary - Small and large business in Pacific Power's service area.

Program Specific

All energy efficiency program communications are branded under the *watt*smart umbrella to reinforce the campaign and to link changes in behavior to actions customers can take by participating in specific programs. Separate marketing activities administered by and specific to the programs ran in conjunction with the *watt*smart campaign in 2017.

Home Energy Savings

Information on the *Home Energy Savings* program is communicated to customers, retailers and trade allies through a variety of channels including bill inserts, newsletters, website and social media.

Using a strategic approach, the Company communicates select program measures during key selling seasons and promotes *watt*smart Starter Kits to targeted customers throughout the year to achieve savings goals.

In January 2017, the Company sent a bill insert to customers promoting its online Home Energy Advisor tool for customers to get personalized energy-saving recommendations.

Program communications from June through October promoted free *watt*smart Starter Kits through a direct mail piece and emails to targeted Washington residents.

A summary of outreach is displayed in Table 23.

Table 23
Home Energy Savings Communication Impressions

Communications Channel	2017
Bill insert	106,000
Direct mail	4,800
Email #1	15,401
Email #2	6,306
Total	**132,507**

In addition, a flyer for the *watt*smart Starter Kits was included in packets distributed to students through the Washington school education program.

Home Energy Reports

Home Energy Reports were mailed to about 40,000 customers several times throughout 2017. Many of these customers also received email reports with customized energy-saving tips. In addition, customers could access the program web portal with additional tools, insights and ways to save energy.

*watt*smart Business

In 2017, customer communications and outreach supported *watt*smart Business using radio, print, paid digital display and search advertising, direct mail, email and social media. This was in addition to customer direct contact by Company project managers and regional community managers, as well as trade ally partners; articles in the Company newsletters and content on the Company's website.

During 2017, radio communications encouraged business customers to make energy efficiency upgrades and print ads featured case study examples from program participants. Eblasts and digital search ads directed viewers to the Company's website[29]. Targeted direct mail was also sent to irrigation customers in the spring and fall to encourage energy-saving retrofits. Emails were sent to let customers know about available incentives, including one targeted to reach grocery/convenience stores. Repeated email communications focused on the benefits and incentives for HVAC assessments. Customers were also invited via email to a free webinar regarding a new optional finance tool available for energy efficiency projects.

Two customers were recognized as *watt*smart Business Partners of the year, presented with a trophy, one of which was announced in a press release. In 2017, the program garnered 2,194,911 impressions. A breakdown of impressions by media type is shown in Table 24.

Table 24
*watt*smart Business

Communications Channel	2017 Impressions
Radio	1,442,880
Newspaper	201,125
Magazine	137,900
Digital Display	359,845
Google Search	39,261
Eblasts	8,884
Direct Mail	5,016

Energy Education in Schools

The Company offers a *watt*smart Schools education program through the National Energy Foundation (NEF). The program is designed to develop a culture of energy efficiency among

[29] www.pacificpower.net/wasave

teachers, students, and families. The centerpiece is a series of one hour presentations with hands-on, large group activities for 4th and 5th grade students. Teachers are provided instructional materials for use in their classrooms, and students are sent home with a Household Report Card to explore energy use in their homes and to encourage efficient behaviors.

In 2017, NEF conducted presentations in Washington schools in the fall. Between October 9 and November 10, 2017, the program met its outreach goals of reaching 4,040 students and 157 teachers with 55 school presentations with 67 percent of "Household Report Cards", which are used as part of a home energy audit activity, completed, and returned. The NEF 2017 Report can be found in Appendix 5.

Evaluations

Evaluations are performed by independent external evaluators to validate energy and demand savings derived from the Company's energy efficiency programs. Industry best practices are adopted by the Company with regards to principles of operation, methodologies, evaluation methods, definitions of terms, and protocols including those outlined in the National Action Plan for Energy Efficiency Program Impact Evaluation and the California Evaluation Framework guides.

A component of the overall evaluation effort is aimed at the reasonable verification of installations of energy efficient measures and associated documentation through review of documentation, surveys and/or ongoing onsite inspections.

Verification of the potential to achieve savings involves regular inspection and commissioning of equipment. The Company engages in programmatic verification activities, including inspections, quality assurance reviews, and tracking checks and balances as part of routine program implementation and may rely upon these practices in the verification of installation information for the purposes of savings verifications in advance of more formal impact evaluation results. A summary of the inspection process is included in Appendix 2.

Evaluation, measurement and verification tasks are segregated within the Company to ensure they are performed and managed by personnel who are not directly responsible for program management.

Information on evaluation activities completed or in progress during 2017 is summarized in the chart below. Summary of the recommendations are provided in Appendix 6. The evaluation reports are available at www.pacificorp.com/es/dsm/washington.html.

Program / Activities	Years Evaluated	Evaluator	Progress Status
Home Energy Savings	2015-2016	Cadmus	Completed
*watt*smart Business	2014-2015	Cadmus	Completed
Low Income Weatherization	2013-2015	Opinion Dynamics	Completed early 2018
Home Energy Reports	2016-2017	ADM	Completed in 2018
*watt*smart Business	2016-2017	Cadmus	In Progress

PACIFIC POWER
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Appendix 1
Washington Cost Effectiveness

Pacific Power

NAVIGANT

Memorandum

Navigant estimated the cost-effectiveness for the overall energy efficiency portfolio and component sectors, based on 2017 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall energy efficiency portfolio and the two sector components.

The program passes the cost-effectiveness for all the tests except the RIM test. The memo consists of the following tables.

1375 Walnut Street
Suite 200 | Boulder, CO 80302
303.728.2500 main
navigant.com

Table 1 - Utility Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Commercial Line Loss	9.53%
Industrial Line Loss	8.16%
Irrigation Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0906
Commercial Energy Rate ($/kWh)[1]	$0.0849
Industrial Energy Rate ($/kWh)[1]	$0.0694
Irrigation Energy Rate ($/kWh)[1]	$0.0843
Inflation Rate	1.90%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Portfolio Level Costs 2017

Expense	Cost
School Energy Education	$61,509
Outreach and Communication	$229,735
Portfolio Evaluation	$572,538
Portfolio Potential Study	$9,488
Portfolio System Support	$33,421
Total Costs	**$906,691**

Table 3 – NEEA Inputs 2017

Sector	Savings at Meter (kWh)	NEEA Expenses ($)
Residential	1,677,232	$546,719
Industrial	874,904	$285,188
Commercial	34,815	$11,349
Total	**2,586,952**	**$843,255**

Table 4 - Benefit/Cost Ratios by Portfolio Type

Measure Group	PTRC	TRC	UCT	RIM	PCT
Total Portfolio	1.82	1.66	2.76	0.65	3.38
Total Portfolio (Including NEEA)	1.78	1.62	2.60	0.63	3.51
Total Portfolio (Including NEBs)	2.01	1.84	2.76	0.65	3.66
Total Portfolio (Including NEEA & NEBs)	1.95	1.79	2.60	0.63	3.79
C&I Programs	2.10	1.91	3.57	0.72	3.32
C&I Programs (Including NEEA)	2.07	1.88	3.44	0.71	3.38
Residential Programs	1.57	1.43	2.13	0.53	3.54
Residential Programs (Including NEEA)	1.49	1.36	1.92	0.51	3.82
Residential Programs (Including NEBs)	2.21	2.07	2.13	0.53	4.51
Residential Programs (Including NEEA & NEBs)	2.06	1.93	1.92	0.51	4.80

*Portfolio and Residential results exclude the Low Income Program from the analysis.

Table 5 – 2017 Total Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0446	$15,546,562	$28,348,883	$12,802,321	1.82
Total Resource Cost Test (TRC) No Adder	$0.0446	$15,546,562	$25,771,712	$10,225,150	1.66
Utility Cost Test (UCT)	$0.0267	$9,325,852	$25,771,712	$16,445,860	2.76
Rate Impact Test (RIM)		$39,769,948	$25,771,712	-$13,998,236	0.65
Participant Cost Test (PCT)		$10,165,068	$34,388,454	$24,223,386	3.38
Lifecycle Revenue Impacts ($/kWh)					$0.0000123720
Discounted Participant Payback (years)					1.66

Table 6 – 2017 Total Portfolio Cost-Effectiveness Results (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0453	$16,389,817	$29,134,272	$12,744,455	1.78
Total Resource Cost Test (TRC) No Adder	$0.0453	$16,389,817	$26,485,702	$10,095,885	1.62
Utility Cost Test (UCT)	$0.0281	$10,169,107	$26,485,702	$16,316,595	2.60
Rate Impact Test (RIM)		$41,895,512	$26,485,702	-$15,409,810	0.63
Participant Cost Test (PCT)		$10,165,068	$35,670,763	$25,505,695	3.51
Lifecycle Revenue Impacts ($/kWh)					$0.0000127985
Discounted Participant Payback (years)					1.56

Table 7 – 2017 Total Portfolio Cost-Effectiveness Results (Including NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0446	$15,546,562	$31,200,372	$15,653,810	2.01
Total Resource Cost Test (TRC) No Adder	$0.0446	$15,546,562	$28,623,201	$13,076,639	1.84
Utility Cost Test (UCT)	$0.0267	$9,325,852	$25,771,712	$16,445,860	2.76
Rate Impact Test (RIM)		$39,769,948	$25,771,712	-$13,998,236	0.65
Participant Cost Test (PCT)		$10,165,068	$37,239,943	$27,074,875	3.66
Lifecycle Revenue Impacts ($/kWh)					$0.0000123720
Discounted Participant Payback (years)					1.66

Table 8 – 2017 Total Portfolio Cost-Effectiveness Results (Including NEEA and NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0453	$16,389,817	$31,985,761	$15,595,944	1.95
Total Resource Cost Test (TRC) No Adder	$0.0453	$16,389,817	$29,337,191	$12,947,374	1.79
Utility Cost Test (UCT)	$0.0281	$10,169,107	$26,485,702	$16,316,595	2.60
Rate Impact Test (RIM)		$41,895,512	$26,485,702	-$15,409,810	0.63
Participant Cost Test (PCT)		$10,165,068	$38,522,252	$28,357,184	3.79
Lifecycle Revenue Impacts ($/kWh)					$0.0000127985
Discounted Participant Payback (years)					1.56

Table 9 – 2017 C&I Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0396	$10,171,833	$21,334,984	$11,163,151	2.10
Total Resource Cost Test (TRC) No Adder	$0.0396	$10,171,833	$19,395,440	$9,223,607	1.91
Utility Cost Test (UCT)	$0.0211	$5,428,707	$19,395,440	$13,966,732	3.57
Rate Impact Test (RIM)		$26,939,493	$19,395,440	-$7,544,053	0.72
Participant Cost Test (PCT)		$7,230,892	$23,998,552	$16,767,660	3.32
Lifecycle Revenue Impacts ($/kWh)					$0.0000148319
Discounted Participant Payback (years)					2.44

Table 10 – 2017 C&I Energy Efficiency Portfolio Cost-Effectiveness Results (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0400	$10,468,370	$21,648,747	$11,180,378	2.07
Total Resource Cost Test (TRC) No Adder	$0.0400	$10,468,370	$19,680,679	$9,212,310	1.88
Utility Cost Test (UCT)	$0.0219	$5,725,244	$19,680,679	$13,955,436	3.44
Rate Impact Test (RIM)		$27,686,962	$19,680,679	-$8,006,282	0.71
Participant Cost Test (PCT)		$7,230,892	$24,449,484	$17,218,592	3.38
Lifecycle Revenue Impacts ($/kWh)					$0.0000143730
Discounted Participant Payback (years)					2.34

Table 11 – 2017 Residential Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0486	$4,468,038	$7,013,899	$2,545,861	1.57
Total Resource Cost Test (TRC) No Adder	$0.0486	$4,468,038	$6,376,272	$1,908,234	1.43
Utility Cost Test (UCT)	$0.0325	$2,990,453	$6,376,272	$3,385,819	2.13
Rate Impact Test (RIM)		$11,923,764	$6,376,272	-$5,547,492	0.53
Participant Cost Test (PCT)		$2,934,176	$10,389,903	$7,455,726	3.54
Lifecycle Revenue Impacts ($/kWh)					$0.0000089073
Discounted Participant Payback (years)					0.82

Table 12 – 2017 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0498	$5,014,757	$7,485,524	$2,470,768	1.49
Total Resource Cost Test (TRC) No Adder	$0.0498	$5,014,757	$6,805,022	$1,790,266	1.36
Utility Cost Test (UCT)	$0.0352	$3,537,172	$6,805,022	$3,267,850	1.92
Rate Impact Test (RIM)		$13,301,859	$6,805,022	-$6,496,837	0.51
Participant Cost Test (PCT)		$2,934,176	$11,221,279	$8,287,103	3.82
Lifecycle Revenue Impacts ($/kWh)					$0.0000100415
Discounted Participant Payback (years)					0.75

Table 13 – 2017 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0486	$4,468,038	$9,865,388	$5,397,350	2.21
Total Resource Cost Test (TRC) No Adder	$0.0486	$4,468,038	$9,227,761	$4,759,723	2.07
Utility Cost Test (UCT)	$0.0325	$2,990,453	$6,376,272	$3,385,819	2.13
Rate Impact Test (RIM)		$11,923,764	$6,376,272	-$5,547,492	0.53
Participant Cost Test (PCT)		$2,934,176	$13,241,392	$10,307,215	4.51
Lifecycle Revenue Impacts ($/kWh)					$0.0000089073
Discounted Participant Payback (years)					0.82

Table 14 – 2017 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA and NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0498	$5,014,757	$10,337,014	$5,322,257	2.06
Total Resource Cost Test (TRC) No Adder	$0.0498	$5,014,757	$9,656,511	$4,641,755	1.93
Utility Cost Test (UCT)	$0.0352	$3,537,172	$6,805,022	$3,267,850	1.92
Rate Impact Test (RIM)		$13,301,859	$6,805,022	-$6,496,837	0.51
Participant Cost Test (PCT)		$2,934,176	$14,072,768	$11,138,592	4.80
Lifecycle Revenue Impacts ($/kWh)					$0.0000100415
Discounted Participant Payback (years)					0.75

The table below summarizes the non-energy benefits for the Home Energy Savings program.

Table 15 – Home Energy Savings Non-Energy Benefits (2017)

Non-Energy Benefits	Non-Energy Benefits Water ($/yr)	Non-Energy Benefits Other ($/yr)	Measure Life	Quantity	Total Present Value Benefits
Appliances with NEBs	$3,748	$54	14.0	162	$36,166
Energy Kits - DHW with NEBs	$53,706	$4,061	10.1	1,562	$442,021
Energy Kits - Lighting with NEBs	$0	$1,027	12.0	395	$8,860
HVAC with NEBs	$0	$5,486	16.7	1,354	$57,879
Lighting with NEBs	$0	$267,059	12.0	359,958	$2,306,564
Total HES NEBs	**$57,455**	**$277,687**	**-**	**363,431**	**$2,851,489**

NAVIGANT

Memorandum

Navigant estimated the cost-effectiveness results for the Washington Home Energy Savings Program, based on 2017 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 8 measure categories.

Cost-effectiveness was tested using the 2015 IRP west residential whole house 64%, west residential lighting 45%, west residential heating 17%, and west water heating – 53% decrements. The program passes the cost-effectiveness for all test except the RIM. The memo consists of the following tables.

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Table 1 - Home Energy Savings Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0906
Inflation Rate	1.90%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Home Energy Savings Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Appliances	$0	$102	$6,676	$74	$8,200	$15,052	$20,680
Building Shell	$0	$367	$23,987	$264	$59,303	$83,921	$187,219
Energy Kits - DHW	$0	$3,125	$103,042	$2,253	$20,147	$128,568	$20,147
Energy Kits - Lighting	$0	$124	$4,079	$89	$2,291	$6,583	$2,291
HVAC	$0	$10,088	$659,747	$7,274	$786,464	$1,463,573	$1,303,891
Lighting	$0	$26,450	$113,780	$19,074	$514,269	$673,573	$1,300,421
Water Heating	$0	$449	$29,358	$324	$36,918	$67,048	$46,482
Whole Home	$0	$348	$22,731	$251	$29,000	$52,329	$53,045
Total	**$0**	**$41,051**	**$963,400**	**$29,603**	**$1,456,592**	**$2,490,647**	**$2,934,176**

Table 3 – Home Energy Savings – Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Appliances	20,613	100%	20,613	100%	20,613	14
Building Shell	74,057	100%	74,057	100%	74,057	45
Energy Kits - DHW	630,974	100%	630,974	100%	630,974	10
Energy Kits - Lighting	24,980	100%	24,980	100%	24,980	12
HVAC	2,036,915	85%	1,731,378	100%	1,731,378	17
Lighting	5,340,901	85%	4,539,766	100%	4,539,766	12
Water Heating	90,640	89%	80,670	100%	80,670	13
Whole Home	70,180	100%	70,180	100%	70,180	27
Total	**8,289,259**	**87%**	**7,172,617**	**100%**	**7,172,617**	**14**

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Group	PTRC	TRC	UCT	RIM	PCT
Appliances with NEBs	1.92	1.86	1.00	0.43	3.12
Appliances	0.60	0.55	1.00	0.43	1.37
Building Shell	0.43	0.39	1.00	0.38	1.03
Energy Kits with NEBs - DHW	6.38	6.12	2.68	0.57	46.69
Energy Kits - DHW	2.95	2.68	2.68	0.57	24.75
Energy Kits with NEBs - Lighting	3.97	3.74	2.39	0.55	14.38
Energy Kits - Lighting	2.63	2.39	2.39	0.55	10.51
HVAC with NEBs	1.08	0.98	1.29	0.56	2.13
HVAC	1.05	0.95	1.29	0.56	2.09
Lighting with NEBs	3.73	3.54	4.24	0.62	5.22
Lighting	2.15	1.96	4.24	0.62	3.44
Water Heating	0.80	0.73	0.83	0.39	2.40
Whole Home	0.94	0.86	1.25	0.42	2.49
Total with NEBs	**2.20**	**2.06**	**2.14**	**0.58**	**3.76**
Total	**1.48**	**1.34**	**2.14**	**0.58**	**2.79**

Table 5 – Home Energy Savings Program Level (without NEBs) Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0573	$3,968,232	$5,861,021	$1,892,790	1.48
Total Resource Cost Test (TRC) No Adder	$0.0573	$3,968,232	$5,328,201	$1,359,969	1.34
Utility Cost Test (UCT)	$0.0360	$2,490,647	$5,328,201	$2,837,554	2.14
Rate Impact Test (RIM)		$9,216,961	$5,328,201	-$3,888,760	0.58
Participant Cost Test (PCT)		$2,934,176	$8,182,905	$5,248,729	2.79
Lifecycle Revenue Impacts ($/kWh)					$0.0000064100
Discounted Participant Payback (years)					2.30

Table 6 through Table 12 provides cost-effectiveness results without NEBs for all 8 measures.

Table 6 - Home Energy Savings Appliances Cost-Effectiveness Results
(Decrement - West Water Heating – 53%, Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1329	$27,532	$16,590	-$10,942	0.60
Total Resource Cost Test (TRC) No Adder	$0.1329	$27,532	$15,082	-$12,450	0.55
Utility Cost Test (UCT)	$0.0726	$15,052	$15,082	$30	1.00
Rate Impact Test (RIM)		$35,190	$15,082	-$20,108	0.43
Participant Cost Test (PCT)		$20,680	$28,338	$7,658	1.37
Lifecycle Revenue Impacts ($/kWh)					$0.0000003558
Discounted Participant Payback (years)					7.60

Table 7 - Home Energy Savings Building Shell Cost-Effectiveness Results
(Decrement - West Residential Whole House - 64%, Load Shape – WA_Single_Family_Heating)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1553	$211,837	$91,984	-$119,853	0.43
Total Resource Cost Test (TRC) No Adder	$0.1553	$211,837	$83,622	-$128,215	0.39
Utility Cost Test (UCT)	$0.0615	$83,921	$83,622	-$299	1.00
Rate Impact Test (RIM)		$217,487	$83,622	-$133,865	0.38
Participant Cost Test (PCT)		$187,219	$192,869	$5,650	1.03
Lifecycle Revenue Impacts ($/kWh)					$0.0000007336
Discounted Participant Payback (years)					n/a

Table 8 - Home Energy Savings Energy Kits – DHW Cost-Effectiveness Results
(Decrement - West Water Heating - 53%, Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0261	$128,568	$378,670	$250,102	2.95
Total Resource Cost Test (TRC) No Adder	$0.0261	$128,568	$344,245	$215,677	2.68
Utility Cost Test (UCT)	$0.0261	$128,568	$344,245	$215,677	2.68
Rate Impact Test (RIM)		$606,998	$344,245	-$262,752	0.57
Participant Cost Test (PCT)		$20,147	$498,577	$478,430	24.75
Lifecycle Revenue Impacts ($/kWh)					$0.0000065146
Discounted Participant Payback (years)					n/a

Table 9 - Home Energy Savings Energy Kits – Lighting Cost-Effectiveness Results
(Decrement - West Residential Lighting - 45%, Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0293	$6,583	$17,301	$10,718	2.63
Total Resource Cost Test (TRC) No Adder	$0.0293	$6,583	$15,728	$9,145	2.39
Utility Cost Test (UCT)	$0.0293	$6,583	$15,728	$9,145	2.39
Rate Impact Test (RIM)		$28,381	$15,728	-$12,652	0.55
Participant Cost Test (PCT)		$2,291	$24,088	$21,797	10.51
Lifecycle Revenue Impacts ($/kWh)					$0.0000002613
Discounted Participant Payback (years)					n/a

Table 10 - Home Energy Savings HVAC Cost-Effectiveness Results
(Decrement - West Residential Heating - 17%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0997	$1,981,001	$2,079,056	$98,055	1.05
Total Resource Cost Test (TRC) No Adder	$0.0997	$1,981,001	$1,890,051	-$90,950	0.95
Utility Cost Test (UCT)	$0.0736	$1,463,573	$1,890,051	$426,477	1.29
Rate Impact Test (RIM)		$3,397,020	$1,890,051	-$1,506,969	0.56
Participant Cost Test (PCT)		$1,303,891	$2,719,911	$1,416,019	2.09
Lifecycle Revenue Impacts ($/kWh)					$0.0000219373
Discounted Participant Payback (years)					3.43

Table 11 - Home Energy Savings Lighting Cost-Effectiveness Results
(Decrement - West Residential Lighting - 45%, Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0358	$1,459,724	$3,144,277	$1,684,552	2.15
Total Resource Cost Test (TRC) No Adder	$0.0358	$1,459,724	$2,858,433	$1,398,709	1.96
Utility Cost Test (UCT)	$0.0165	$673,573	$2,858,433	$2,184,861	4.24
Rate Impact Test (RIM)		$4,634,952	$2,858,433	-$1,776,518	0.62
Participant Cost Test (PCT)		$1,300,421	$4,475,648	$3,175,227	3.44
Lifecycle Revenue Impacts ($/kWh)					$0.0000366889
Discounted Participant Payback (years)					1.92

Table 12 - Home Energy Savings Water Heating Cost-Effectiveness Results
(Decrement - West Water Heating - 53%, Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0996	$76,612	$61,238	-$15,375	0.80
Total Resource Cost Test (TRC) No Adder	$0.0996	$76,612	$55,671	-$20,942	0.73
Utility Cost Test (UCT)	$0.0872	$67,048	$55,671	-$11,377	0.83
Rate Impact Test (RIM)		$141,746	$55,671	-$86,075	0.39
Participant Cost Test (PCT)		$46,482	$111,616	$65,134	2.40
Lifecycle Revenue Impacts ($/kWh)					$0.0000016406
Discounted Participant Payback (years)					1.30

Table 13 - Home Energy Savings Whole Home Cost-Effectiveness Results
(Decrement - West Res. Whole House - 64%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0724	$76,374	$71,906	-$4,468	0.94
Total Resource Cost Test (TRC) No Adder	$0.0724	$76,374	$65,369	-$11,005	0.86
Utility Cost Test (UCT)	$0.0496	$52,329	$65,369	$13,040	1.25
Rate Impact Test (RIM)		$155,188	$65,369	-$89,819	0.42
Participant Cost Test (PCT)		$53,045	$131,859	$78,814	2.49
Lifecycle Revenue Impacts ($/kWh)					$0.0000008215
Discounted Participant Payback (years)					3.97

In addition to the energy benefits reported above, appliances, energy savings kits, HVAC and lighting in the Home Energy Savings program offer significant non-energy benefits (NEBs). Table 14 through Table 20 detail the non-energy benefits and cost-effectiveness results.

Table 14 - Home Energy Savings Non-Energy Benefits by Measure

Measure Category	Non-Energy Benefits Water ($/yr)	Non-Energy Benefits Other ($/yr)	Quantity	Measure Life	Total NEBs ($/yr)	Discount Rate	Total Net Present Value Benefits
Appliances	$3,748	$54	162	14.0	$3,802	6.66%	$36,166
Energy Kits - DHW	$53,706	$4,061	1,562	10.1	$57,768	6.66%	$442,021
Energy Kits - Lighting	$0	$1,027	395	12.0	$1,027	6.66%	$8,860
HVAC	$0	$5,486	1,354	16.7	$5,486	6.66%	$57,879
Lighting	$0	$267,059	359,958	12.0	$267,059	6.66%	$2,306,564
Total NEBs	**$57,455**	**$277,687**	**363,431**	**-**	**$335,142**	**-**	**$2,851,489**

The following tables provide the cost-effectiveness results after adding in the non-energy benefits detailed above beginning with the overall program results.

Table 15 - Home Energy Savings Program (with NEBs) Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0573	$3,968,232	$8,712,510	$4,744,279	2.20
Total Resource Cost Test (TRC) No Adder	$0.0573	$3,968,232	$8,179,690	$4,211,459	2.06
Utility Cost Test (UCT)	$0.0360	$2,490,647	$5,328,201	$2,837,554	2.14
Rate Impact Test (RIM)		$9,216,961	$5,328,201	-$3,888,760	0.58
Participant Cost Test (PCT)		$2,934,176	$11,034,395	$8,100,218	3.76
Lifecycle Revenue Impacts ($/kWh)					$0.0000064100
Discounted Participant Payback (years)					2.30

Table 16 - Home Energy Savings Appliances (with NEBs) Cost-Effectiveness Results (Decrement - West Water Heating - 53%, Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1329	$27,532	$52,756	$25,224	1.92
Total Resource Cost Test (TRC) No Adder	$0.1329	$27,532	$51,248	$23,716	1.86
Utility Cost Test (UCT)	$0.0726	$15,052	$15,082	$30	1.00
Rate Impact Test (RIM)		$35,190	$15,082	-$20,108	0.43
Participant Cost Test (PCT)		$20,680	$64,504	$43,824	3.12
Lifecycle Revenue Impacts ($/kWh)					$0.0000003558
Discounted Participant Payback (years)					7.60

Table 17 - Home Energy Savings Energy Kit – DHW (with NEBs) Cost-Effectiveness Results (Decrement - West Water Heating - 53%, Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0261	$128,568	$820,690	$692,122	6.38
Total Resource Cost Test (TRC) No Adder	$0.0261	$128,568	$786,266	$657,698	6.12
Utility Cost Test (UCT)	$0.0261	$128,568	$344,245	$215,677	2.68
Rate Impact Test (RIM)		$606,998	$344,245	-$262,752	0.57
Participant Cost Test (PCT)		$20,147	$940,598	$920,450	46.69
Lifecycle Revenue Impacts ($/kWh)					$0.0000065146
Discounted Participant Payback (years)					n/a

Table 18 - Home Energy Savings Energy Kit – Lighting (with NEBs) Cost-Effectiveness Results (Decrement - West Residential Lighting - 45%, Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0293	$6,583	$26,161	$19,578	3.97
Total Resource Cost Test (TRC) No Adder	$0.0293	$6,583	$24,589	$18,005	3.74
Utility Cost Test (UCT)	$0.0293	$6,583	$15,728	$9,145	2.39
Rate Impact Test (RIM)		$28,381	$15,728	-$12,652	0.55
Participant Cost Test (PCT)		$2,291	$32,949	$30,658	14.38
Lifecycle Revenue Impacts ($/kWh)					$0.0000002613
Discounted Participant Payback (years)					n/a

Table 19 - Home Energy Savings HVAC (with NEBs) Cost-Effectiveness Results (Decrement - West Residential Heating - 17%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0997	$1,981,001	$2,136,935	$155,934	1.08
Total Resource Cost Test (TRC) No Adder	$0.0997	$1,981,001	$1,947,929	-$33,071	0.98
Utility Cost Test (UCT)	$0.0736	$1,463,573	$1,890,051	$426,477	1.29
Rate Impact Test (RIM)		$3,397,020	$1,890,051	-$1,506,969	0.56
Participant Cost Test (PCT)		$1,303,891	$2,777,789	$1,473,898	2.13
Lifecycle Revenue Impacts ($/kWh)					$0.0000219373
Discounted Participant Payback (years)					3.43

Table 20 - Home Energy Savings Lighting (with NEBs) Cost-Effectiveness Results (Decrement - West Residential Lighting - 45%, Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0358	$1,459,724	$5,450,840	$3,991,116	3.73
Total Resource Cost Test (TRC) No Adder	$0.0358	$1,459,724	$5,164,997	$3,705,273	3.54
Utility Cost Test (UCT)	$0.0165	$673,573	$2,858,433	$2,184,861	4.24
Rate Impact Test (RIM)		$4,634,952	$2,858,433	-$1,776,518	0.62
Participant Cost Test (PCT)		$1,300,421	$6,782,212	$5,481,791	5.22
Lifecycle Revenue Impacts ($/kWh)					$0.0000366889
Discounted Participant Payback (years)					1.92

NAVIGANT

Memorandum

Navigant estimated the cost-effectiveness results for the Washington Home Energy Reporting Program, based on 2017 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2015 IRP west residential whole house 64% load factor decrement. The program passes the cost-effectiveness for all the tests except the RIM and PCT tests.

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Table 1 - Home Energy Reporting Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0906
Inflation Rate	1.90%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Home Energy Reporting Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Development	Incentives	Total Utility Costs	Gross Customer Costs
Expansion	$0	$3,484	$334,159	$10,211	$0	$347,854	$0
Legacy + Refill	$0	$3,510	$138,156	$10,287	$0	$151,952	$0
Total	**$0**	**$6,994**	**$472,315**	**$20,498**	**$0**	**$499,806**	**$0**

Table 3 – Home Energy Reporting Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Expansion	6,090,309	100%	6,090,309	100%	6,090,309	2
Legacy + Refill	6,135,284	100%	6,135,284	100%	6,135,284	2
Total	**12,225,593**	**100%**	**12,225,593**	**100%**	**12,225,593**	**2**

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Category	PTRC	TRC	UCT	RIM	PCT
Expansion	1.65	1.50	1.50	0.36	0.00
Legacy + Refill	3.81	3.46	3.46	0.42	0.00
Total	**2.31**	**2.10**	**2.10**	**0.39**	**0.00**

Table 5 - Home Energy Reporting Program Level Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0219	$499,806	$1,152,878	$653,072	2.31
Total Resource Cost Test (TRC) No Adder	$0.0219	$499,806	$1,048,071	$548,265	2.10
Utility Cost Test (UCT)	$0.0219	$499,806	$1,048,071	$548,265	2.10
Rate Impact Test (RIM)		$2,706,803	$1,048,071	-$1,658,732	0.39
Participant Cost Test (PCT)		$0	$2,206,997	$2,206,997	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0001028453
Discounted Participant Payback (years)					n/a

Table 6 and Table 7 provide cost-effectiveness results for both measures.

Table 6 – HER Expansion Measure Cost-Effectiveness Results
(Decrement - West Res. Whole House - 64%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0306	$347,854	$574,318	$226,464	1.65
Total Resource Cost Test (TRC) No Adder	$0.0306	$347,854	$522,108	$174,254	1.50
Utility Cost Test (UCT)	$0.0306	$347,854	$522,108	$174,254	1.50
Rate Impact Test (RIM)		$1,447,293	$522,108	-$925,185	0.36
Participant Cost Test (PCT)		$0	$1,099,439	$1,099,439	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0001147274
Discounted Participant Payback (years)					n/a

Table 7 – HER Legacy + Refill Cost-Effectiveness Results
(Decrement - West Res. Whole House - 64%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0133	$151,952	$578,560	$426,607	3.81
Total Resource Cost Test (TRC) No Adder	$0.0133	$151,952	$525,963	$374,011	3.46
Utility Cost Test (UCT)	$0.0133	$151,952	$525,963	$374,011	3.46
Rate Impact Test (RIM)		$1,259,510	$525,963	-$733,547	0.42
Participant Cost Test (PCT)		$0	$1,107,558	$1,107,558	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000909633
Discounted Participant Payback (years)					n/a

NAVIGANT

Memorandum

Navigant estimated the cost-effectiveness results for the Washington Low Income Weatherization Program, based on 2017 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2015 IRP west residential whole house 49% load factor decrement. The program does not pass any of the cost-effectiveness tests.

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Table 1 - Home Energy Savings Inputs

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0906
Inflation Rate	1.90%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 - Low Income Weatherization Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Inspection Costs	Incentives	Total Utility Costs	Gross Customer Costs
Low Income Weatherization	$0	$23,640	$134,214	$5,868	$4,043	$930,299	$1,098,065	$0
Total	**$0**	**$23,640**	**$134,214**	**$5,868**	**$4,043**	**$930,299**	**$1,098,065**	**$0**

Table 3 - Low Income Weatherization Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Low Income Weatherization	276,750	76%	210,330	100%	210,330	30
Total	**276,750**	**76%**	**210,330**	**100%**	**210,330**	**30**

Table 4 - Low Income Weatherization Program Level Cost-Effectiveness Results
(Decrement - West Res. Whole House - 64%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3304	$1,098,065	$229,692	-$868,373	0.21
Total Resource Cost Test (TRC) No Adder	$0.3304	$1,098,065	$208,811	-$889,254	0.19
Utility Cost Test (UCT)	$0.3304	$1,098,065	$208,811	-$889,254	0.19
Rate Impact Test (RIM)		$1,422,569	$208,811	-$1,213,758	0.15
Participant Cost Test (PCT)		$0	$1,254,803	$1,254,803	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000099876
Discounted Participant Payback (years)					n/a

In addition to the energy benefits reported above, the Low Income program offers significant non-energy benefits (NEBs). Table 5 details the non-energy benefits and Table 6 provides the cost-effectiveness results.

Table 5 - Low Income Weatherization Non-Energy Benefits

Non-Energy Benefit	Program Impact	Perspective Adjusted
External Payment Reduction	$25,725	PTRC, TRC, UCT, RIM
Home Repair Costs	$30,817	PTRC, TRC, PCT
Economic Impact	$303,506	PTRC, TRC
Total	**$360,048**	**-**

Table 6 - Low Income Weatherization Program (with NEBs) Level Cost-Effectiveness Results (Decrement - West Res. Whole House - 64%, Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3304	$1,098,065	$589,740	-$508,325	0.54
Total Resource Cost Test (TRC) No Adder	$0.3304	$1,098,065	$568,859	-$529,206	0.52
Utility Cost Test (UCT)	$0.3304	$1,098,065	$234,536	-$863,529	0.21
Rate Impact Test (RIM)		$1,422,569	$234,536	-$1,188,033	0.16
Participant Cost Test (PCT)		$0	$1,285,620	$1,285,620	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000097759
Discounted Participant Payback (years)					n/a

NAVIGANT

Memorandum

Navigant estimated the cost-effectiveness results for the Washington Wattsmart Business Program, based on 2017 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 10 measure categories.

Cost-effectiveness was tested using the 2015 IRP west commercial cooling – 13%, west commercial lighting – 46%, west residential cooling – 4%, west water heating – 53%, west industrial – 44% decrements. The program passes PTRC, TRC, UCT and PCT cost-effectiveness tests. The memo consists of the following tables.

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Table 1 - Utility Inputs

Parameter	Value
Discount Rate	6.66%
Commercial Line Loss	9.53%
Industrial Line Loss	8.16%
Irrigation Line Loss	9.67%
Commercial Energy Rate ($/kWh)[1]	$0.0849
Industrial Energy Rate ($/kWh)[1]	$0.0694
Irrigation Energy Rate ($/kWh)[1]	$0.0843
Inflation Rate	1.90%

[1] Future rates determined using a 1.9% annual escalator.

Table 2 – Annual Wattsmart Business Program Costs by Measure Category

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Inspection Cost	Total Utility Costs	Gross Customer Costs
Additional Measures	$4,157	$3,195	$2,562	$1,282	$28,647	$0	$39,843	$98,170
Building Shell	$0	$194	$1,765	$99	$11,713	$0	$13,771	$25,877
Compressed Air	$6,118	$7,111	$26,807	$2,930	$58,710	$0	$101,676	$216,813
Energy Management	$75,999	$8,820	$0	$3,160	$10,209	$0	$98,188	$41,962
Food Service Equipment	$0	$25	$229	$13	$100	$0	$368	$120
HVAC	$0	$3,379	$28,577	$1,737	$33,506	$0	$67,198	$96,565
Irrigation	$6,242	$7,353	$70,306	$3,582	$57,662	$0	$145,145	$193,129
Lighting	$0	$184,156	$1,551,534	$86,921	$1,415,063	$103,841	$3,341,514	$4,618,633
Motors	$16,776	$3,715	$8,365	$1,744	$39,767	$0	$70,367	$100,064
Refrigeration	$292,871	$160,553	$204,087	$60,739	$832,389	$0	$1,550,639	$1,839,559
Total	**$402,164**	**$378,501**	**$1,894,231**	**$162,205**	**$2,487,766**	**$103,841**	**$5,428,707**	**$7,230,892**

Table 3 – Annual Wattsmart Business Program Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Additional Measures	207,094	100%	207,094	100%	207,094	13
Building Shell	16,069	100%	16,069	100%	16,069	17
Compressed Air	473,237	93%	440,110	100%	440,110	15
Energy Management	510,472	100%	510,472	100%	510,472	3
Food Service Equipment	2,089	100%	2,089	100%	2,089	10
HVAC	280,547	100%	280,547	100%	280,547	14
Irrigation	578,561	100%	578,561	100%	578,561	11
Lighting	14,040,890	94%	13,198,437	100%	13,198,437	14
Motors	281,641	100%	281,641	100%	281,641	14
Refrigeration	9,811,528	100%	9,811,528	100%	9,811,528	15
Total	**26,202,128**	**97%**	**25,326,548**	**100%**	**25,326,548**	**14**

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Category	PTRC	TRC	UCT	RIM	PCT
Additional Measures	1.34	1.22	3.35	0.70	1.84
Building Shell	1.18	1.08	2.18	0.98	1.10
Compressed Air	1.35	1.23	3.14	0.67	1.99
Energy Management	0.79	0.72	0.95	0.46	2.74
Food Service Equipment	3.17	2.88	3.04	0.60	13.20
HVAC	3.12	2.84	5.50	1.14	3.01
Irrigation	4.36	3.96	7.66	1.97	2.46
Lighting	1.57	1.42	2.79	0.61	2.87
Motors	1.68	1.53	2.84	0.63	2.88
Refrigeration	3.36	3.06	5.04	0.81	4.85
Total	**2.10**	**1.91**	**3.57**	**0.72**	**3.32**

Table 5 – Wattsmart Business Program Level Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0396	$10,171,833	$21,334,984	$11,163,151	2.10
Total Resource Cost Test (TRC) No Adder	$0.0396	$10,171,833	$19,395,440	$9,223,607	1.91
Utility Cost Test (UCT)	$0.0211	$5,428,707	$19,395,440	$13,966,732	3.57
Rate Impact Test (RIM)		$26,939,493	$19,395,440	-$7,544,053	0.72
Participant Cost Test (PCT)		$7,230,892	$23,998,552	$16,767,660	3.32
Lifecycle Revenue Impacts ($/kWh)					$0.0000148319
Discounted Participant Payback (years)					2.44

Table 6 through Table 15 provide cost-effectiveness results for all 10 measures.

Table 6 - Wattsmart Business Additional Measures Cost-Effectiveness Results (Decrement - West Industrial - 44%, Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0571	$109,366	$146,714	$37,348	1.34
Total Resource Cost Test (TRC) No Adder	$0.0571	$109,366	$133,376	$24,010	1.22
Utility Cost Test (UCT)	$0.0208	$39,843	$133,376	$93,534	3.35
Rate Impact Test (RIM)		$191,895	$133,376	-$58,519	0.70
Participant Cost Test (PCT)		$98,170	$180,699	$82,529	1.84
Lifecycle Revenue Impacts ($/kWh)					$0.0000011154
Discounted Participant Payback (years)					4.76

Table 7 - Wattsmart Business Building Shell Cost-Effectiveness Results (Decrement - West Commercial Cooling - 13%, Load Shape – WA_Small_Office_Space_Cool)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1514	$27,935	$33,058	$5,123	1.18
Total Resource Cost Test (TRC) No Adder	$0.1514	$27,935	$30,053	$2,118	1.08
Utility Cost Test (UCT)	$0.0747	$13,771	$30,053	$16,282	2.18
Rate Impact Test (RIM)		$30,587	$30,053	-$534	0.98
Participant Cost Test (PCT)		$25,877	$28,529	$2,652	1.10
Lifecycle Revenue Impacts ($/kWh)					$0.0000000078
Discounted Participant Payback (years)					13.30

Table 8 - Wattsmart Business Compressed Air Cost-Effectiveness Results
(Decrement - West Industrial - 44%, Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0574	$259,779	$351,351	$91,573	1.35
Total Resource Cost Test (TRC) No Adder	$0.0574	$259,779	$319,410	$59,632	1.23
Utility Cost Test (UCT)	$0.0225	$101,676	$319,410	$217,734	3.14
Rate Impact Test (RIM)		$474,187	$319,410	-$154,777	0.67
Participant Cost Test (PCT)		$216,813	$431,222	$214,409	1.99
Lifecycle Revenue Impacts ($/kWh)					$0.0000025555
Discounted Participant Payback (years)					5.05

Table 9 - Wattsmart Business Energy Management Cost-Effectiveness Results
(Decrement - West Industrial - 44%, Load Shape – WA_Warehouse_CA_Refrigeration)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0931	$129,941	$102,809	-$27,132	0.79
Total Resource Cost Test (TRC) No Adder	$0.0931	$129,941	$93,463	-$36,478	0.72
Utility Cost Test (UCT)	$0.0703	$98,188	$93,463	-$4,725	0.95
Rate Impact Test (RIM)		$202,973	$93,463	-$109,510	0.46
Participant Cost Test (PCT)		$41,962	$114,995	$73,032	2.74
Lifecycle Revenue Impacts ($/kWh)					$0.0000090518
Discounted Participant Payback (years)					0.87

Table 10 - Wattsmart Business Food Service Equipment Cost-Effectiveness Results
(Decrement - West Water Heating - 53%, Load Shape – WA_Restaurant_Water_Heat)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0237	$388	$1,228	$841	3.17
Total Resource Cost Test (TRC) No Adder	$0.0237	$388	$1,116	$729	2.88
Utility Cost Test (UCT)	$0.0225	$368	$1,116	$749	3.04
Rate Impact Test (RIM)		$1,852	$1,116	-$735	0.60
Participant Cost Test (PCT)		$120	$1,584	$1,464	13.20
Lifecycle Revenue Impacts ($/kWh)					$0.0000000182
Discounted Participant Payback (years)					0.11

Table 11 - Wattsmart Business HVAC Cost-Effectiveness Results
(Decrement - West Commercial Cooling - 13%, Load Shape – WA_Small_Office_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0462	$130,257	$406,398	$276,142	3.12
Total Resource Cost Test (TRC) No Adder	$0.0462	$130,257	$369,453	$239,196	2.84
Utility Cost Test (UCT)	$0.0238	$67,198	$369,453	$302,255	5.50
Rate Impact Test (RIM)		$324,041	$369,453	$45,413	1.14
Participant Cost Test (PCT)		$96,565	$290,348	$193,784	3.01
Lifecycle Revenue Impacts ($/kWh)					-$0.0000008035
Discounted Participant Payback (years)					2.71

Table 12 - Wattsmart Business Irrigation Cost-Effectiveness Results
(Decrement - West Residential Cooling - 4%, Load Shape – WA_Irrigation_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0582	$280,612	$1,222,834	$942,222	4.36
Total Resource Cost Test (TRC) No Adder	$0.0582	$280,612	$1,111,667	$831,055	3.96
Utility Cost Test (UCT)	$0.0301	$145,145	$1,111,667	$966,522	7.66
Rate Impact Test (RIM)		$563,480	$1,111,667	$548,188	1.97
Participant Cost Test (PCT)		$193,129	$475,997	$282,867	2.46
Lifecycle Revenue Impacts ($/kWh)					-$0.0000123551
Discounted Participant Payback (years)					2.94

Table 13 - Wattsmart Business Lighting Cost-Effectiveness Results
(Decrement - West Commercial Lighting - 46%, Load Shape – WA_Small_Office_Lighting & Streetlight_ALL-7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0486	$6,545,085	$10,245,253	$3,700,169	1.57
Total Resource Cost Test (TRC) No Adder	$0.0486	$6,545,085	$9,313,867	$2,768,782	1.42
Utility Cost Test (UCT)	$0.0248	$3,341,514	$9,313,867	$5,972,352	2.79
Rate Impact Test (RIM)		$15,197,008	$9,313,867	-$5,883,141	0.61
Participant Cost Test (PCT)		$4,618,633	$13,270,556	$8,651,923	2.87
Lifecycle Revenue Impacts ($/kWh)					$0.0001040983
Discounted Participant Payback (years)					3.05

Table 14 - Wattsmart Business Motors Cost-Effectiveness Results
(Decrement - West Industrial - 44%, Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0462	$130,663	$220,149	$89,485	1.68
Total Resource Cost Test (TRC) No Adder	$0.0462	$130,663	$200,135	$69,472	1.53
Utility Cost Test (UCT)	$0.0249	$70,367	$200,135	$129,769	2.84
Rate Impact Test (RIM)		$318,465	$200,135	-$118,330	0.63
Participant Cost Test (PCT)		$100,064	$287,865	$187,802	2.88
Lifecycle Revenue Impacts ($/kWh)					$0.0000020938
Discounted Participant Payback (years)					2.68

Table 15 - Wattsmart Business Refrigeration Cost-Effectiveness Results
(Decrement – West Industrial - 44%, Load Shape – WA_Warehouse_CA_Refrigeration)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0247	$2,557,809	$8,605,189	$6,047,380	3.36
Total Resource Cost Test (TRC) No Adder	$0.0247	$2,557,809	$7,822,899	$5,265,090	3.06
Utility Cost Test (UCT)	$0.0150	$1,550,639	$7,822,899	$6,272,261	5.04
Rate Impact Test (RIM)		$9,635,006	$7,822,899	-$1,812,107	0.81
Participant Cost Test (PCT)		$1,839,559	$8,916,756	$7,077,197	4.85
Lifecycle Revenue Impacts ($/kWh)					$0.0000299195
Discounted Participant Payback (years)					1.40

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Appendix 2
Washington Measure Installation Verifications

Washington Measure Installation Verifications

Home Energy Savings

Site inspections by Program Administrator staff for the following retrofit and/or new homes measures. Inspections are performed on >=5 percent of single family homes, >=5 percent of manufactured homes, 100 percent of multifamily projects, and 20 percent of new homes projects.

- Air sealing
- Central air conditioning best practices installation and sizing
- Duct sealing
- Duct sealing and insulation
- Ductless heat pumps
- Heat pump conversion
- Heat pump upgrade
- Heat pump performance tested comfort systems, commissioning, controls, and sizing
- Heat pump water heaters
- Insulation (attic, floor, wall)
- Whole Homes Performance Path

No site inspections are conducted for the following measures. However, all post-purchase incented measures undergo a quality assurance review prior to the issuance of the customer/dealer incentive and recording of savings (e.g. proof of purchase receipt review) and eligible equipment review. Additionally, customer account and customer address are checked to ensure the Company does not double pay for the same measure or double count measure savings.

- Central air conditioners
- Clothes washers
- Electric water heaters
- Evaporative coolers
- Freezers
- Light fixtures (post-purchase)
- Refrigerators
- Smart thermostats
- Windows

No site inspections are conducted for the following measures, which are delivered via an upstream, manufacturer buy-down model. Promotion agreement contracts are signed with manufacturers and retailers to set incentive levels, final product prices, and limits to the total number of units that can be purchased per customer. Program Administrator verifies measures for product eligibility and correct pricing. Pricing is also verified by Program Administrator field visits to retail locations.

- CFL bulbs
- LED bulbs
- Light fixtures (upstream)
- Room air conditioners

Customer eligibility for wattsmart Starter Kits is verified using the customer's account number and last name and cross-verifying with the current PacifiCorp customer database.

Low Income Weatherization

All projects

- All measures are qualified through US Department of Energy approved audit tool or priority list.
- 100 percent inspection by agency inspector of all homes treated, reconciling work completed and quality (corrective action includes measure verification) prior to invoicing Company.
- State inspector follows with random inspections.

The Company hires independent inspector to inspect between 5-10 percent of homes treated (post treatment and payment).

wattsmart Business

Lighting projects (typical upgrades, small business and midmarket/instant incentive offer)

- Retrofits - 100 percent pre- and post-installation site inspections of all projects with incentives over a specified dollar amount. Project cost documentation reviewed for all projects.
- New construction - 100 percent post-installation site inspections of all projects with incentives over a specified dollar amount.
- A percent of post-installation site inspections by program administrator of projects with incentives under a specified dollar amount. For the midmarket/instant incentive offer, these inspections are done by phone.

For typical upgrades, required inspections are performed by a third party consultant. For the small business and instant incentive offers, required inspections are performed by the program administrator.

Non-lighting projects (typical upgrades/listed measures where savings is deemed)

- 100 percent of applications with an incentive that exceeds a specified dollar amount will be inspected (via site inspection) (typically by program administrator).
- A minimum of a specified percent of remaining non-lighting applications will be inspected, either in person or via telephone interview, (typically by program administrator).

Non-lighting projects (typical upgrades/listed measures where savings is determined using a simplified analysis tool)

- 100 percent of applications with project savings that exceeds a specified threshold will be inspected (via site inspection) (typically by program administrator).
- A minimum of a specified percent of remaining non-lighting applications will be inspected, either in person or via telephone interview, (typically by program administrator).

Custom projects

- 100 percent pre/post-installation inspections, invoice reconciled to inspection results. On-site pre/post inspections are required for projects with savings over a specified threshold. For projects with savings below the threshold, inspection information may be collected by phone or email.
- No pre-inspection for new construction.

- Inspections are conducted by third party energy engineering firms for the in-house project manager/consultant delivery channel.
- Inspections are conducted by outsourced delivery team for projects delivered by third party outsourced program delivery teams.

All Programs

As part of the third-party program evaluations (two-year cycle) process, the Company has implemented semi-annual customer surveys to collect evaluation-relevant data more frequently to cure for memory loss and other detractors such as customers moving and data not be readily available at evaluation time). This will serve as a further check verifying customer participation and measures installed.

Additional record reviews and site inspections (including metering/data logging) is conducted as part of the process and impact evaluations, a final verification of measure installations.

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Appendix 3
Home Energy Savings Retailers

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Table 1[1]
Participating Upstream/Midstream Lighting Retailers and Redemptions

The Company worked with 14 lighting retailers in 2017 to promote efficient lighting. Table 1 lists the retailer and the type of redemption(s) provided.

Retailer	City	State	LEDs	Fixtures
Ace Hardware - Stein's #7047	Yakima	WA	x	
Ace Hardware #15365	Kennewick	WA	x	
Bi-Mart #619	Walla Walla	WA	x	
Corner Grocery & Hardware	Yakima	WA	x	
Costco 486	Kennewick	WA	x	x
Costco #1013	Union Gap	WA	x	x
Dollar Tree #2387	Yakima	WA	x	
Dollar Tree #2696	Kennewick	WA	x	
Dollar Tree #5342	Yakima	WA	x	
Dollar Tree #5863	Walla Walla	WA	x	
Fred Meyer #163	Kennewick	WA	x	
Grigg's Department Store	Pasco	WA	x	
Home Depot #4727	Yakima	WA	x	x
Home Depot #4735	College Place	WA	x	x
Home Depot #4739	Kennewick	WA	x	x
Hometown Ace Hardware #11909	Yakima	WA	x	
Lowe's #249	Kennewick	WA	x	
Lowe's #3240	Yakima	WA	x	x
Lowes 2344	Pasco	WA	x	x
Roy's Ace Hardware #10640	Yakima	WA	x	x
Safeway #1123	Hood River	WA	x	
True Value (Helms)	Selah	WA	x	
True Value Hardware - L&G Ranch Supply	Walla Walla	WA	x	
True Value Hardware #5353	Selah	WA	x	x
Wal-Mart - Supercenter #2101	Kennewick	WA	x	
Wal-Mart - Supercenter #3380	Pasco	WA	x	
Wal-Mart - Supercenter #5078	Yakima	WA	x	x
Wal-Mart #2269	Yakima	WA	x	

[1] To be considered as a participating retailer for discounted lighting products, the retailer's sales coming from Pacific Power customers must be a significant majority of their total sales.

Table 2
Participating Upstream/Midstream Retailers and Redemptions

Table 2 provides the list of 2017 participating Upstream/Midstream retailer and the product types that were redeemed at each location.

Retailer	City	State	Room Air Conditioners
Black's Appliance Audio & Video	Yreka	CA	x

Table 3
Downstream Retailers

Twelve **participating** retailers provided redemptions for downstream clothes washers, hybrid heat pump clothes dryers, self-installed heat pump water heaters, attic insulation, floor insulation, and smart thermostats.

Participating Retailer (Retailers who are actively enrolled in the program)	City	State	Clothes Washer	Hybrid Heat Pump Dryer	Heat Pump Water Heater, Self-installed	Insulation-Attic	Insulation-Floor	Smart Thermostat
Bemis Home Appliance & Tv Ctr	Yakima	WA	X					
Best Buy #590	Kennewick	WA						X
Best Buy #831	Yakima	WA	X					X
Elgin's Appliance Center	Milton-Freewater	WA	X					
Home Depot #4735	College Place	WA	X		X	X	X	X
Lowe's #3240	Yakima	WA	X	X	X	X	X	X
Lowe's of Kennewick	Kennewick	WA	X		X			X
Lowe's of Pasco	Pasco	WA	X		X			
Sears #2029	Union Gap	WA	X					
Sears #6914	Walla Walla	WA	X					
Target – Yakima	Yakima	WA						X
Walmart #2476	College Place	WA						X

Nineteen **non-participating** retailers provided redemptions for downstream clothes washers, evaporative coolers, heat pump water heaters, attic insulation, floor insulation, and smart thermostats. Some retailers are located outside Pacific Power's service territory. However, the customer resides with the service territory.

Redemptions from Non-Participating Retailer's (*Retailer may not be located in the service territory)	City	State	Clothes Washer	Evaporative Cooler - Tier 2	Heat Pump Water Heater, Self-installed	Insulation-Attic	Insulation-Floor	Smart Thermostat
Amazon.com	Seattle	WA	X					X
Appliancesconnection.com	Brooklyn	NY	X					
Costco.com	N/A		X					
Dell.com	Round Rock	TX						X
George Morlan - Salem	Salem	OR			X			
Helliesen Lumber & Supply Company	Yakima	WA						
Home Depot #1512	Fort Collins	CO			X			
Home Depot #4014	Troutdale	OR	X					

Redemptions from Non-Participating Retailer's (*Retailer may not be located in the service territory)	City	State	Clothes Washer	Evaporative Cooler - Tier 2	Heat Pump Water Heater, Self-installed	Insulation-Attic	Insulation-Floor	Smart Thermostat
Home Depot #4727	Yakima	WA	X	X	X	X	X	X
Home Depot #4746	Richland	WA			X			
HomeDepot.com	N/A		X			X		X
Keller Supply Company #11	Union Gap	WA			X			
KIE Supply	Walla Walla	WA			X			
Lowe's #1108	Tigard	OR			X			
Lowe's Home Centers Inc.	Coeur D'Alene	ID			X			
Lowes.com	N/A		X					X
Nest.com	Palo Alto	CA						X
Sears #1069	Yakima	WA	X					
Sears.com	N/A		X					

Table 4
HVAC Trade Ally

The Company worked with 34 HVAC trade allies. Some trade allies are located outside Pacific Power's service territory. However, the customer resides with the service territory.

Trade Ally (Trade ally may be located outside of the territory)	City	State	Central Air Conditioner	Duct Sealing	Duct Sealing and Duct Insulation	Electric System to Heat Pump	Heat Pump to Heat Pump Upgrade	Heat Pump - PTCS Commissioning, Controls, and Sizing	Heat Pump, Ductless
Absolute Comfort Technology, LLC	Yakima	WA				X	X		X
Ackerman Heating & Air	Colfax	WA				X			
AEH Inc.	Kennewick	WA							X
All Seasons Heating & Air Conditioning	Yakima	WA				X	X		X
Allard Enterprises	Yakima	WA					X		
American Air Heating and Conditioning	Walla Walla	WA				X			X
AmeriCool Heating and Air Conditioning	Kennewick	WA					X		X
Apollo Sheet Metal Inc.	Kennewick	WA						X	X
Bos Refrigeration	Sunnyside	WA				X			
Campbell & Company	Pasco	WA		X	X	X	X	X	X
Chapman Heating & Air Conditioning Inc	Dayton	WA							X
CK Home Comfort Systems	Grandview	WA				X			
College Place Heating & Air Conditioning	College Place	WA				X	X	X	X
Comfort Pro's Heating & Air Conditioning	Yakima	WA							X
Dayco Inc	Kennewick	WA				X		X	
Delta Heating and Cooling, Inc.	Richland	WA				X			
Farwest Climate Control	Yakima	WA				X	X		X
Four Seasons HVAC	Yakima	WA				X			
Grassi Refrigeration	Walla Walla	WA							X
Mike's Heating & AC	Clarkston	WA							X
Miller & Team Heating & AC	Zillah	WA				X			X
Nico Enterprises, LLC	Walla Walla	WA							X
Panchos Heating & Cooling LLC	Kennewick	WA				X		X	
Paul's Air F/X	Yakima	WA							X
Platte Heating & AC	Yakima	WA							X
Quality Comfort	Yakima	WA							X
Roger L Gibson	Kennewick	WA					X		
Smith Insulation	Walla Walla	WA		X	X				
ThermAll Heating & Cooling Inc	Yakima	WA			X	X			

Trade Ally (Trade ally may be located outside of the territory)	City	State	Central Air Conditioner	Duct Sealing	Duct Sealing and Duct Insulation	Electric System to Heat Pump	Heat Pump to Heat Pump Upgrade	Heat Pump - PTCS Commissioning, Controls, and Sizing	Heat Pump, Ductless
Thermex Valley Heating and AC	Yakima	WA				X			
Total Comfort Solutions, LLC	Walla Walla	WA	X			X	X		X
Vance Heating and AC	Yakima	WA				X	X		X
Young's Heating & Cooling, LLC	Walla Walla	WA				X	X		X

Table 5
Manufactured Homes Trade Ally

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Manufactured Homes Duct Sealing	Energy Star Manufactured Homes
Columbia Homes	Union Gap	WA		X
Gillespie Homes	Kennewick	WA		x
Home Energy Experts	Clearfield	UT	x	
Valley Quality Homes	Yakima	WA		x

Table 6
Plumbing Trade Ally

Table 6 lists 5 plumbing trade allies the Company worked with to promote efficient plumbing technologies.

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Heat Pump Water Heaters
A-1 Plumbing & Emergency Rooter	Walla Walla	WA	X
Central Mechanical Services	Yakima	WA	X
Ellensburg Solar, LLC	Ellensburg	WA	X
Ray's Plumbing, Inc.	Yakima	WA	X
Shephard Plumbing, LLC	Yakima	WA	X

Table 7
Weatherization Trade Ally

Table 7 lists 7 weatherization trade allies the Company worked with.

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Air Sealing	Insulation-Attic	Insulation-Floor	Insulation-Wall	Windows
Don Jordan Energy Systems	Yakima	WA		X	X	X	
Intermountain West Insulation	Kennewick	WA		X	X	X	
K-5 Contracting, Inc.	Yakima	WA		X			
McKinney Glass Inc.	Yakima	WA					X
Probuild Northwest	Yakima	WA		X	X		
Smart Energy Today	Olympia	WA		X			
Smith Insulation	Walla Walla	WA	X	X	X	X	

Table 8
Applications by Customer City and Measure Category

Customer City	% of All Applications	% of Appliance & Fixture Applications	% of HVAC Applications	% of Manufactured Homes Applications	% of Kits Applications
BROWNSTOWN	0.00%	0.00%	0.00%	0.00%	0.05%
BURBANK	1.18%	0.00%	1.69%	19.95%	1.07%
COLLEGE PLACE	7.36%	5.56%	4.32%	14.99%	2.86%
COWICHE	0.01%	0.62%	0.19%	0.00%	0.51%
DAYTON	1.55%	1.85%	1.31%	0.23%	1.43%
DIXIE	0.00%	0.00%	0.00%	0.00%	0.05%
GRANDVIEW	2.35%	1.85%	2.25%	8.19%	3.68%
GRANGER	0.01%	0.00%	2.06%	0.00%	0.56%
HARRAH	0.00%	0.00%	0.19%	0.12%	0.26%
LOWDEN	0.00%	0.00%	0.19%	0.00%	0.00%
MABTON	0.01%	0.00%	0.00%	0.00%	0.41%
MOXEE	0.05%	2.47%	1.69%	1.73%	2.71%
NACHES	1.14%	1.85%	1.50%	0.12%	2.04%
OUTLOOK	0.01%	0.00%	0.94%	0.00%	0.31%
PARKER	0.53%	0.00%	0.00%	0.00%	0.00%
POMEROY	0.01%	0.00%	0.56%	0.00%	0.46%
PRESCOTT	2.80%	0.00%	0.75%	1.38%	0.10%
SELAH	6.25%	9.26%	7.50%	1.15%	6.85%
SUNNYSIDE	4.31%	1.85%	1.69%	0.12%	4.09%
TIETON	0.21%	1.85%	0.94%	0.00%	0.77%
TOPPENISH	0.03%	1.23%	0.94%	0.12%	1.89%
TOUCHET	1.17%	0.62%	1.13%	3.23%	0.61%
UNION GAP	0.05%	0.62%	0.75%	5.07%	1.28%
WAITSBURG	2.31%	1.23%	0.56%	4.61%	0.56%
WALLA WALLA	38.26%	28.40%	35.27%	17.07%	16.96%
WALLULA	0.01%	0.00%	0.00%	1.38%	0.00%
WAPATO	0.04%	0.62%	0.94%	0.23%	2.50%
YAKIMA	29.49%	38.89%	30.96%	17.65%	45.73%
ZILLAH	0.89%	1.23%	1.69%	2.65%	2.25%

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Appendix 4

*watt*smart Business Vendor Network

wattsmart® Business Vendor Network

The following is a list of contractors, distributors, manufacturers and other vendors participating in Pacific Power's wattsmart® Business Vendor Network displayed in random order (unless sorted by the user) based on the search criteria selected. This listing is provided solely as a convenience to our customers. Pacific Power does not warrant or guarantee the work performed by these participating vendors. You are solely responsible for any contract with a participating vendor and the performance of any vendor you have chosen.

Search Criteria:

State(s)	[Washington]
Program(s)	[Commercial]
Specialties	[Appliances, Building envelope, Compressed air, Controls, Farm and dairy, Food service, HVAC - evaporative, HVAC - unitary, Irrigation, Lighting, Lighting instant incentives, Motors and VFDs, Office equipment, Other Specialty, Small business lighting]
Service Address	
Business Name	

Search Results: 37 record(s) found

Company name	Contact information	Specialty	Projects completed	Distance (miles)
All-Phase Electric, Inc. Address: 2500 S 12th Ave Union Gap, WA 98903 Website: http://allphaseelectric.org	Phone: 509-454-5093 Name: Andrew Lea Email: andrew@allphaseelectric.org	Lighting, Motors and VFDs		
Batteries Plus Bulbs - Kennewick Address: 321 N Columbia Center Blvd. Kennewick, WA 99336 Website: https://www.batteriesplus.com/	Phone: 509-783-3400 Name: Kristie Midili Email: mgr250@batteriesplus.net	Lighting, Lighting instant incentives		
Batteries Plus Bulbs - Walla Walla Address: 632 S 9th Ave Walla Walla, WA 99362 Website: https://www.batteriesplus.com/	Phone: 509-924-6645 Name: Michelle Russell Email: mrussell@batteriesplus.net	Lighting, Lighting instant incentives		

wattsmart® Business Vendor Network

Batteries Plus Bulbs - Yakima Address: 1731 South 1st Street Yakima, WA 98901 Website: https://www.batteriesplus.com	Phone: 509-571-1322 Name: Jessie Hottell Email: mgr654@batteiresplus.net	Lighting, Lighting instant incentives	
BITS LIMITED Address: 700 N. Valley St, Suite B-41123 Anaheim,, CA 92801 Website: http://www.bitsltd.net	Phone: 831-419-1627 Name: Scott Markshausen Email: kurt.markshausen@bitsltd.net	Lighting, Office equipment, Other Specialty	
CED - Yakima Address: 131 S 1st Ave YAKIMA, WA 98903 Website:	Phone: 509-248-0872 Name: Dan Derosier Email: DAN@CEDYAKIMA.COM	Lighting, Lighting instant incentives	7
Columbia Electric Supply Address: 3211 Allen Rd Sunnyside, WA 98944 Website: https://www.ced-columbia.com	Phone: Name: Tye Kaple Email: tkaple@ces-sunnyside.com	Controls, Lighting, Motors and VFDs	6
Columbia Electric Supply Address: 1913 Washington Street Pasco, WA 99301 Website: http://www.columbiaelectricsupplypasco.com	Phone: 509-547-9733 Name: Teri Bostock Email: twade@ces-pasco.com	Controls, Lighting, Motors and VFDs	
Columbia Electric Supply - Walla Walla Address: 932 N 13TH AVE Walla Walla, WA 99362 Website: http://www.ced-columbia.com/	Phone: 509-522-1419 Name: Daron Waldon Email: dwalden@ces-ww.com	Lighting, Motors and VFDs	1
Core Northwest LLC Address: 1413 River Road Yakima, WA 98902 Website: http://www.corenorthwest.com	Phone: 509-248-2673 Name: Rod Cassel Email: rod@corenorthwest.com	Controls, Irrigation, Lighting, Motors and VFDs	6
ecomodus, LLC Address: 5110 Tieton Drive Yakima, WA 98908 Website:	Phone: 509-307-4363 Name: Dan Richards Email: ecomodus@msn.com	Lighting	18
FGI Address: 733 Lake Street South, 1A Kirkland, WA 98033 Website: http://www.forevergreenindoors.com	Phone: 509-951-2290 Name: Kathleen Sullivan Email: ksullivan@forevergreenindoors.com	Lighting	

wattsmart® Business Vendor Network

KIE Supply Address: 113 E Columbia Dr Kennewick, WA 99336 Website: https://www.kiesupply.com	Phone: 509-582-5156 Name: Leigh Kluthe Email: leigh@kiesupply.com	Controls, Lighting	
Knobel's Address: 801 Tennant ln Yakima, WA 98901 Website:	Phone: 509-452-9157 Name: Steve Soderstrom Email: knobelselectric@msn.com	Lighting, Motors and VFDs, Small business lighting	
Lake Shore Electric, Inc. Address: 9702 Tieton Drive Yakima, WA 98908 Website: http://www.lakeshoreelectric.com	Phone: 509-965-4281 Name: Bill Ross Email: billjr@lakeshoreelectric.com	Lighting, Motors and VFDs	2
Leidos Engineering, LLC. Address: 301 Plainfield Rd. Suite 310 Syracuse, NY 13212 Website: https://energy.leidos.com/	Phone: 855-926-7543 Name: Christopher Piechuta Email: AMPLIFY@Leidos.com	Appliances, Compressed air, Controls, Food service, HVAC - evaporative, HVAC - unitary, Lighting, Motors and VFDs, Office equipment, Other Specialty	
Linden Electric Address: 9401 Mieras Rd Yakima, WA 98901 Website: http://www.lindenelect.com	Phone: 509-575-1191 Name: Marvin Breshears Email: mb@lindenelect.com	Lighting	
Lumenal Lighting LLC Address: 21706 66th ave W Mountlake Terrace, WA 98043 Website: https://www.Lumenal.com	Phone: 425-224-2718 Name: Mike Mornoney Email: MMoroney@lumenal.com	Controls, Lighting	0
M & R Electric Inc Address: 3806 Oak Ave. Yakima, WA 98903 Website:	Phone: 509-952-8339 Name: Richard Corkins Email: rcorkins@charter.net	Controls, Lighting, Motors and VFDs, Office equipment, Small business lighting	1
M. Campbell & Company Address: 2828 W Irving St Pasco, WA 99301 Website: http://www.callcampbell.com	Phone: 509-545-9848 Name: Becky Tenny Email: beckyt@callcampbell.com	HVAC - unitary	1
MH Electric Inc. Address: P.O. Box 11224 Yakima, WA 98909 Website:	Phone: 509-452-6039 Name: Walt Wenda Email: ww@mhelectricinc.com	Lighting, Motors and VFDs, Small business lighting	14
North Coast Electric - Seattle Address: 2424 8th Ave S Seattle, WA 98134 Website: http://www.NorthCoastElectric.com	Phone: 206-442-9846 Name: Zack Boucher Email: zboucher@ncelec.com	Building envelope, Controls, Lighting, Motors and VFDs, Other Specialty	

wattsmart® Business Vendor Network

North Coast Electric - Yakima Address: 215 N 3rd Ave Building A Yakima, WA 98902 Yakima, WA 98902 Website: http://www.northcoastelectric.com	Phone: 630-639-3084 Name: Jay Claussner Email: JClaussn@nclec.com	Controls, Lighting, Lighting instant incentives	
Pacific Energy Concepts, LLC Address: 210 W 3rd St Vancouver, WA 98660 Website: http://www.pacificenergyconcepts.com/	Phone: Name: Victoria Marchenko Email: incentives@pecnw.com	Controls, Lighting	
Picatti Brothers Inc. Address: 2309 South 3rd Avenue Union Gap, WA 98901 Website: http://picatti.com/	Phone: 509-248-2540 Name: Mike Leppa Email: mikel@picatti.com	Lighting, Motors and VFDs	4
Platt Electric - Grandview Address: 100 Stover Loop Rd. Grandview , WA 98930 Website: https://www.platt.com/	Phone: 509-882-1616 Name: Rolando Solis Email: rolly.solis@platt.com	Lighting, Lighting instant incentives	
Platt Electric - Walla Walla Address: 415 west main Walla Walla, WA 99362 Website: https://www.platt.com	Phone: 509-522-0611 Name: Robert Kinion Email: robert.kinion@platt.com	Lighting, Lighting instant incentives	11
Platt Electric Supply - Yakima Address: 16 S. 1st Avenue Yakima, WA 98902 Website: http://www.platt.com	Phone: 509-452-6444 Name: Jeremy Sandino Email: jlsandino@platt.com	Lighting, Lighting instant incentives	68
Primary Electric and Design Address: 509 North 18th Ave Yakima, WA 98902 Website:	Phone: 509-823-4442 Name: Darek Merrill Email: darekmerrill@gmail.com	Lighting	2
Stoneway Electric Supply Address: 44 s Palouse St. Walla Walla, WA 99362 Website: http://www.stoneway.com	Phone: 509-522-1550 Name: Tom Vinti Email: Tom.Vinti@stoneway.com	Lighting, Lighting instant incentives	7
Stoneway Electric Supply - Yakima Address: 23 N. 3rd Ave Yakima, WA 98902 Website: http://www.stoneway.com/	Phone: 509-469-6154 Name: Tyler Hicks Email: tyler.hicks@stoneway.com	Controls, Lighting, Lighting instant incentives, Motors and VFDs	2
Stusser Yakima Address: 116 N. 2nd Ave. Yakima, WA 98902 Website: https://www.www.com	Phone: 509-453-0378 Name: Steve DiBenedetto Email: steved@stusseryakima.com	Lighting, Lighting instant incentives	8

wattsmart® Business Vendor Network

Tjs Address: 329 South 6th Street Sunnyside, WA 98944 Website:	Phone: 509-839-8840 Name: Brittan Brittan Moore Email: tjsref@hotmail.com	Appliances, Building envelope, Controls, Food service, HVAC - evaporative, HVAC - unitary, Motors and VFDs	
Total Digital Systems Address: 13433 NE 20th St STE O Bellevue, WA 98005 Website: http://www.totaldigitalsystems.com	Phone: 425-533-0112 Name: Ken Kang Email: kyungk@totaldigitalsystems.com	Lighting	
Transformative Wave Address: 1012 Central Ave S Kent, WA 98032 Website: http://transformativewave.com/	Phone: 253-867-2333 Name: Joe Schmutzler Email: joe.s@twavetech.com	Controls, HVAC - unitary, Motors and VFDs	
Walla Walla Electric* Address: 1225 W. Poplar Walla Walla, WA 99362 Website: http://www.wwelectric.com	Phone: 509-525-8672 Name: Spike Teal Email: spike@wwelectric.com	Lighting, Small business lighting	12
Yakima Air Compressor Address: 2535 S. 12th Ave Yakima, WA 98903 Website: http://www.wedonthaveone.com	Phone: 509-453-5059 Name: Evan Bohannon Email: yakimaair@outlook.com	Compressed air, Motors and VFDs	

*watt*smart® Business - Washington

LED Instant Incentives - Approved Distributors

wattsmart Business LED Instant Incentives

LED instant incentives make the investment in this technology easy, and we're covering up to 70 percent of the cost to purchase qualifying LED lamps. Instant incentives are available for select, easy-to-install LEDs that fit in many existing light fixtures. Speak to your lighting distributor about the right kind of lamps for your fixtures.

Below is a list of approved lighting distributors that can assist you through the LED selection, incentive and purchase process. Please visit bewattsmart.com for more information.

Distributor Name	Branch Address	Phone Number	Website
Batteries Plus Bulbs	321 N. Columbia Center Blvd. Kennewick, WA 99336	509-783-3400	www.batteriesplus.com
	1731 South 1st Street Yakima, WA 98901	509-571-1322	
	632 S 9th Ave Walla Walla, WA 99362	509-529-7001	
CED	1920 Fowler St Richland, WA 99352	509-737-8282	www.cednw.com
	131 S First Ave Yakima, WA 98902	509-248-0872	
North Coast Electric	215 N. 3rd Ave, Bldg A Yakima, WA 98902	509-452-2221	www.northcoastelectric.com
	1928 W. A St Pasco, WA 99301	509-547-9514	
Platt Electric	16 S. 1st Ave Yakima, WA 98902	509-452-6444	www.platt.com
	100 Stover Loop Rd, Ste A Grandview, WA 98930	509-882-1616	
	415 W. Main St Walla Walla, WA 99362	509-522-0611	
Stoneway	44 S Palouse Street Walla Walla, WA 99362	509-522-1550	www.stoneway.com
	23 N 3rd Ave Yakima, WA 98902	509-469-6154	
	630 Railroad Street Richland, WA 99352	509-943-4664	
Stusser	116 N 2nd Ave Yakima, WA 98902	509-453-0378	N/A

*The Approved Distributor list is subject to change. If you have questions about the LED Instant Incentive or require assistance finding an Approved Distributor in your area please contact 1-800-222-4335.
**Pacific Power does not warrant the performance of qualifying purchased equipment or the quality of the product sold by the Approved Distributor.

PACIFIC POWER

Premium *watt*smart® Business Lighting Vendors Washington

Winter 2017

PACIFIC POWER

The wattsmart Business Vendor Network is a resource for Pacific Power customers to find qualified and knowledgeable vendors to help with their energy efficiency projects. Vendors on our list meet Network requirements such as holding appropriate licenses and insurance, having knowledge of lighting technology and the wattsmart Business program and having good business references.

Continued on the other side

The following Vendors earned Premium Vendor status based on their top performance in the Network:

Columbia Electric Supply, Sunnyside
Sunnyside, WA
Lighting Distributor
Phone: 509-837-6033
Email: **tkaple@ces-sunnyside.com**
Online: **www.ced-columbia.com**

Stusser Electric
Yakima, WA
Lighting Distributor
Phone: 509-453-0378
Email: **steved@stusseryakima.com**

We update the list of Premium Vendors quarterly based on the previous 12 months of wattsmart Business participation. Top performing Vendors are selected based on:

- Program participation
- Project quality
- Application submission quality
- Industry training (e.g. achieving NXT Level 1 designation)
- Customer and program feedback

To find a complete searchable list of wattsmart Business Vendors, visit **bewattsmart.com**. We do not guarantee the work performed by these participating vendors. You are responsible for any contract or the performance of any vendor you have chosen.

Continued on the other side

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Appendix 5
Communications

Energy Efficiency Communications 2017

Creative *(click on the hyperlinks below to see the creative)*

TV

- Washington summer 78-degree – English
- Washington fall 68-degree :30 – English
- Washington fall 68-degree :15 – English
- Washington winter 68-degree :30 – English
- Washington winter 68-degree :15 – English

- Washington summer 78-degree – Spanish
- Washington fall 68-degree :30 – Spanish
- Washington fall 68-degree :15 – Spanish
- Washington winter 68-degree :30 – Spanish
- Washington winter 68-degree :15 – Spanish

- Washington efficiency for business customers" Baker"
- Washington hidden savings for business customers "Vet"

Radio

- Washington Better :60 – English
- Washington Better :60 – Spanish
- Hidden Savings for business customers
- Well-oiled machine for business customers

Print

- Yakima summer – "Good"
- Yakima summer– "Helps
- Yakima summer 78-degrees – "Better"
- Yakima winter – "Good"
- Yakima winter – "Helps"
- Yakima winter – "Better"
- Walla Walla summer – "Good"
- Walla Walla summer– "Helps"
- Walla Walla summer 78-degrees – "Better"
- Walla Walla winter – "Good"

- Walla Walla winter – “Helps”
- Walla Walla winter – “Better”
- Spanish Eco-flower
- Spanish wattsmart Family
- Spanish summer “Bueno”
- Spanish summer “Ayuda”
- Spanish summer “Meyor”
- Spanish winter “Bueno”
- Spanish winter “Ayuda”
- Spanish winter “Meyor”
- Farm Bureau ad
- Ad to thank business customers and vendors for being wattsmart last year
- Newspaper ad (b/w) featuring business customer CPC International
- Color ad featuring business customer CPC International
- Newspaper ad (b/w) featuring Walla Walla Public Schools
- Newspaper ad (b/w) featuring Splash Express Car Wash
- Color ad featuring Splash Express Car Wash
- Newspaper ad (b/w) featuring Basel Cellars Estate Winery & Resort
- Newspaper ad (b/w) featuring The City of Selah
- Color ad featuring The City of Selah
- Newspaper ad featuring several business customers – Spring 2017
- Newspaper ad featuring several business customers – Fall 2017

Digital Ads

- Cooling – ceiling fan
- Cooling – 78-degree thermostat
- Being wattsmart is “good”
- Being wattsmart “helps”
- Being wattsmart is “better”

- “Hidden Savings for business" (Static)
- Big business, Small Business
- Bottom line
- Energy efficiency is GOOD for your bottom line and Washington

Social

- Winter wattsmart tips Facebook ads – January
- Cooling – ceiling fan
- Cooling – thermostat
- NEST Thermostat Promotion Facebook – residential – mobile
- NEST Thermostat Promotion Facebook – residential – desktop
- Facebook and YouTube – summer video thumbnail
- Facebook and YouTube – winter video thumbnail
- Facebook winter “good”
- Business on Facebook

Inserts:

- *Home Energy Savings* - January

Press releases:

- Colder Weather Can Bring Higher Bills in the Northwest – December 28, 2017
- Colder Than Average Winter in Store for Northwest – November 15, 2017
- Heat Wave: Tips from Pacific Power To Be Safe, Stay Cool and Use Less Energy – August 10, 2017
- Selah Named Pacific Power Business Partner of the Year for Energy Efficiency Leadership – July 24, 2017
- Get a Free wattsmart Starter Kit from Pacific Power – July 10, 2017
- Don’t Lose Money on the Biggest Myths in Saving Energy – June 23, 2017

Newsletters:

- January *Voices*
- March Energy Insights
    - Walla Walla Winery toasts LEDs
    - Solar project enlightens school
    - The best of all energy
    - Building stronger communities
- March *Voices*
- April *Voices*

- May *Voices*
- July *Voices*
- September *Voices*
- October *Voices*
- November *Voices*

Direct mail:

- wattsmart Starter Kit
- wattsmart Starter Kit – included with materials for School program
- Monthly low-income weatherization mailing
- Mailing to irrigation customers encouraging application for incentives:
    - Letter – April
    - Application – April
    - Letter – October
    - Application – October

Emails:

- wattsmart Starter Kit
- Thank you for being wattsmart last year - January
- Grocery/convenience store eblast 3/7/17
- wattsmart Business lighting 6/8/17
- HVAC Assessment 8/8/17
- HVAC Assessment (mobile) 9/20/17
- HBC Finance Offer webinar 10/26/17
- HVAC Assessment 10/31/17 and 11/17

Collateral:

- Winter wattsmart handout
- Summer wattsmart handout
- wattsmart Business - overview
- wattsmart Business - brochure
- wattsmart Business – instant incentives for lighting
- wattsmart Business – HBC Finance Overview

- wattsmart Small Business lighting incentives
- wattsmart Business wastewater incentives

2017

NEF

BE *WATT*SMART, BEGIN AT HOME

WASHINGTON

Program Report

Prepared for:

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PacifiCorp

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Prepared by:

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Program Director

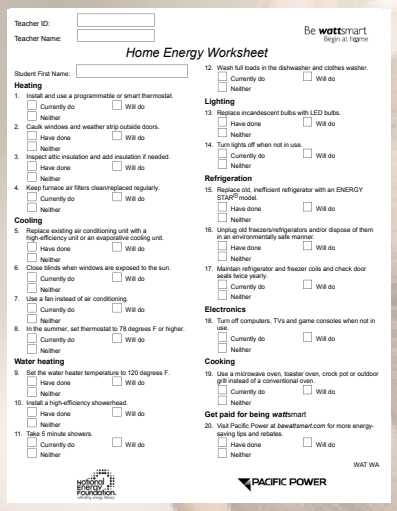
National Energy Foundation

4516 South 700 East, Suite 100

Salt Lake City, UT 84107

March 20, 2018

Savings



Teacher ID:
Teacher Name:

Be wattsmart Begin at home

Home Energy Worksheet

Student First Name:

Heating

1. Install and use a programmable or smart thermostat.
   ☐ Currently do ☐ Will do ☐ Neither
2. Caulk windows and weather strip outside doors.
   ☐ Have done ☐ Will do ☐ Neither
3. Inspect attic insulation and add insulation if needed.
   ☐ Have done ☐ Will do ☐ Neither
4. Keep furnace air filters clean/replaced regularly.
   ☐ Currently do ☐ Will do ☐ Neither

Cooling

5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit.
   ☐ Have done ☐ Will do ☐ Neither
6. Close blinds when windows are exposed to the sun.
   ☐ Currently do ☐ Will do ☐ Neither
7. Use a fan instead of air conditioning.
   ☐ Currently do ☐ Will do ☐ Neither
8. In the summer, set thermostat to 78 degrees F or higher.
   ☐ Currently do ☐ Will do ☐ Neither

Water heating

9. Set the water heater temperature to 120 degrees F.
   ☐ Have done ☐ Will do ☐ Neither
10. Install a high-efficiency showerhead.
    ☐ Have done ☐ Will do ☐ Neither
11. Take 5 minute showers.
    ☐ Currently do ☐ Will do ☐ Neither
12. Wash full loads in the dishwasher and clothes washer.
    ☐ Currently do ☐ Will do ☐ Neither

Lighting

13. Replace incandescent bulbs with LED bulbs.
    ☐ Have done ☐ Will do ☐ Neither
14. Turn lights off when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Refrigeration

15. Replace old, inefficient refrigerator with an ENERGY STAR® model.
    ☐ Have done ☐ Will do ☐ Neither
16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner.
    ☐ Have done ☐ Will do ☐ Neither
17. Maintain refrigerator and freezer coils and check door seals twice yearly.
    ☐ Currently do ☐ Will do ☐ Neither

Electronics

18. Turn off computers, TVs and game consoles when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Cooking

19. Use a microwave oven, toaster oven, crock pot or outdoor grill instead of a conventional oven.
    ☐ Currently do ☐ Will do ☐ Neither

Get paid for being wattsmart

20. Visit Pacific Power at bewattsmart.com for more energy-saving tips and rebates.
    ☐ Have done ☐ Will do ☐ Neither

WAT WA

National Energy Foundation

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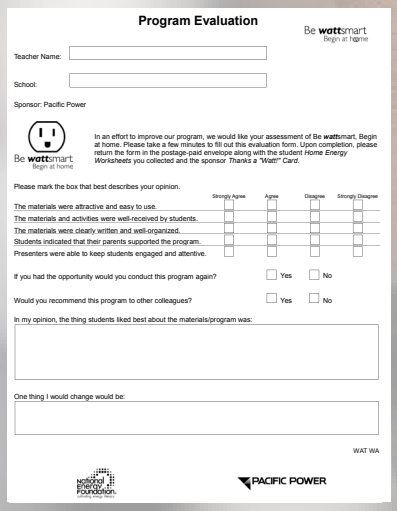
Home Energy Worksheets

– Returned: 2,625 –

– 65.03% –



Program Evaluation

Be wattsmart Begin at home

Teacher Name:

School:

Sponsor: Pacific Power

Be wattsmart Begin at home

In an effort to improve our program, we would like your assessment of Be wattsmart, Begin at home. Please take a few minutes to fill out this evaluation form. Upon completion, please return the form in the postage-paid envelope along with the student *Home Energy Worksheets* you collected and the sponsor *Thanks a "Watt"* Card.

Please mark the box that best describes your opinion.

	Strongly Agree	Agree	Disagree	Strongly Disagree
The materials were attractive and easy to use.	☐	☐	☐	☐
The materials and activities were well-received by students.	☐	☐	☐	☐
The materials were clearly written and well-organized.	☐	☐	☐	☐
Students indicated that their parents supported the program.	☐	☐	☐	☐
Presenters were able to keep students engaged and attentive.	☐	☐	☐	☐

If you had the opportunity would you conduct this program again? ☐ Yes ☐ No

Would you recommend this program to other colleagues? ☐ Yes ☐ No

In my opinion, the thing students liked best about the materials/program was:

One thing I would change would be:

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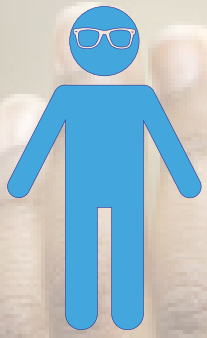
Teacher Packets

– Returned: 112 –

– 71.33% –

Participants

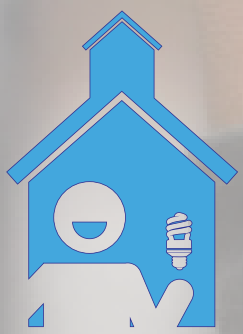


Students

– 4,036 –

Teachers

– 157 –



Schools

– 47 –

Table of Contents

Program Overview

Program Description

Be *watt*smart, Begin at home, an energy efficiency education program, is a collaborative partnership between PacifiCorp and the National Energy Foundation (NEF). This unique and interactive program teaches the importance of energy and natural resources and their impact on the environment. The objective is to expand and promote energy awareness through a school-based education program which encourages Washington students and teachers to change behaviors which will impact the energy consumption in their homes and community. Teachers are also provided teaching materials to support further classroom instruction on this valuable message.

Program Administration

Be *watt*smart, Begin at home is administered by NEF, a non-profit organization (established in 1976) dedicated to the development, dissemination and implementation of supplementary educational materials, programs and services relating primarily to energy, energy safety, the environment and natural resources. Our mission remains constant, to cultivate and promote an energy literate society. NEF is pleased to report on activities of the Be *watt*smart, Begin at home energy efficiency education program conducted during the 2017 – 2018 school year.

Anne Lowe, Vice President – Operations, oversees program organization. Gary Swan, Vice President – Development, oversees contract accounting. Janet Hatch, Program Director, is responsible for overseeing the scope of work. Patti Clark, Program Manager, is responsible for implementing the scope of work. Megan Hirschi, Program Manager, oversees school enrollment and communication with teachers and is responsible for scheduling presentations. A team of trained and seasoned presenters brought the interactive, hands-on program to Washington Schools.

Building Collaborations

Washington Office of Superintendent of Public Instruction Learning Standards correlate well to the content of Be *watt*smart, Begin at home. Teachers appreciate the collaborative efforts to align program components to their learning standards. Curriculum correlations were provided to teacher participants in their *Teacher Materials Folder* prior to the presentation date.

Program Implementation

During the month of May 2017 participating schools from the 2016 program were contacted and informed the registration for the 2017 program was available. In September 2017, a reminder email was sent to all priority unregistered 2016 participating schools. In August and September, Megan Hirschi made phone calls to all unregistered schools.

Program Registration

Registration for the program was online at bewattsmart.com/begin. Each registered school was checked against the qualified school list before communication was made with teachers to determine optimum presentation dates and student numbers.

After registration was qualified, a series of email communications with teachers, were sent automatically by the program registration website. The website calculated *Home Energy Worksheet* returns as well as earned gift card levels and communicated this information to the participant. Later communications were customized through programming to be sent only to teachers needing a reminder to return their program documents.

Be *watt*smart, Begin at home Presentation

Be *watt*smart, Begin at home presentations were given during the period of October 9th through November 10th 2017. The presentation featured a custom Keynote slideshow that brought energy concepts to the forefront of

Washington education. The presentation focused on important concepts, such as natural resources, electrical generation, the energy mix used by Pacific Power to generate electricity and tips for energy efficiency in the home.

The presentation provided interactive activities that involved and engaged the audience. Students participated in making a human electrical circuit, during which they learned key core curriculum concepts such as insulators and conductors of electricity and electrical generation. Student volunteers used props to demonstrate the process of electrical generation for their classmates. All students reviewed material learned with an "Energy Lingo" review activity at designated points throughout the presentation. To help students remember energy efficiency tips, participants watched Slim the Lineman energy efficiency video vignettes. At the end of each short video, students learned a rhyme about Slim's wise energy choice.

The last portion of the presentation communicated the importance of the program take-home pieces. These documents enabled households to participate in energy education along with students.

Program Materials

A *Parent Letter* was provided to explain the importance of Be *watt*smart, Begin at home. In addition, students took home a *Student Guide* and *Home Energy Worksheet* to share with their families. Students who returned their worksheet received an Energy Star© rated nightlight featuring the PacifiCorp logo as a reward.

Educators were also given helpful energy educational materials. Each teacher participant was provided a custom Be *watt*smart, Begin at home folder. The folder contained a custom *Teacher Guide* with additional information and activities to supplement and continue energy education in the classroom. Also in the folder were two NEF instructional posters, *Energy Efficiency in Action* and *Electricity Serves Our Community.*

A program *Implementation Steps Flier* assisted teachers in carrying out the program. It also gave simple steps for successfully returning *Home Energy Worksheets*, the *Program Evaluation* and the sponsor *Thanks a "Watt" Card* in the postage paid envelope provided in the *Teacher Materials Folder*. A *Rewarding Results Flier* gave information concerning the mini-grant that teacher participants could receive for returning their student surveys. Educators received a $50 gift card for an 80% return, or a $25 gift card for a 50 – 79% return by the December 1, 2017 deadline.

Program Accomplishments – Fall 2017

- 52 Be *watt*smart, Begin at home presentations completed at 47 schools (schools that had over 160 students were approved for two presentations).
- 1 school waitlisted
- 4,036 students and families reached
- 157 Washington teachers reached
- 65.03% student *Home Energy Worksheet* surveys return
- $50 mini-grant checks delivered to 88 Washington teachers
- $25 mini-grant checks delivered to 17 Washington teachers

Program Attachments – Fall 2017

- Fall 2017 Participating Schools
- Program Promotions
- Program Documents
    - Keynote Presentation
    - *Teacher Implementation Steps Flier*

    - *Rewarding Results Flier*
    - *Student Guide*
    - *Teacher Guide*
    - Lingo Card
    - Washington Core Curriculum Correlations
    - *Parent Letter*
- *Teacher Evaluation*
- *Teacher Evaluation* Compilation
- *Home Energy Worksheets*
- *Home Energy Worksheet* Summary – Pacific Power
- Wise Energy Behaviors in Pacific Power Washington Homes
- Sampling of Thanks a "Watt" Cards

Attachments

Fall 2017 Participating Schools

School Name	School Address	City	State	Zip
Adams Elementary - Wapato	1309 S. Camas Avenue	Wapato	WA	98951
Adams Elementary - Yakima	723 S. 8th St.	Yakima	WA	98901
Ahtanum Valley Elem School	3006 S. Wiley Rd	Yakima	WA	98903
Arthur H. Smith Elementary	205 Fir Avenue	Grandview	WA	98930
Artz-Fox Elementary	805 Washington	Mabton	WA	98935
Barge Lincoln	219 East I Street	Yakima	WA	98901
Blue Ridge Elementary	1150 W. Chestnut	Walla Walla	WA	99362
Camas Elementary	1010 S. Camas Avenue	Wapato	WA	98951
Chief Kamiakin Elementary	1700 E. Lincoln Ave	Sunnyside	WA	98944
Christ the Teacher Catholic School	5508 W. Chestnut Ave.	Yakima	WA	98908
Cottonwood Elementary	1041 S. 96th Ave	Yakima	WA	98908
Davis Elementary	31 SE Ash St	College Place	WA	99324
Dayton Elementary	302 E. Park St.	Dayton	WA	99328
Discovery Lab School	2810 Castlevale	Yakima	WA	98902
Dixie Elementary School	10520 E. Highway 12	Dixie	WA	99329
East Valley Elementary	1951 Beaudry Rd.	Yakima	WA	98901
Edison Elementary	1315 E. Alder	Walla Walla	WA	99362
Garfield Elementary - Toppenish	505 Madison Ave	Toppenish	WA	98948
Garfield Elementary - Yakima	612 N. 6th Ave	Yakima	WA	98902
Gilbert Elementary	4400 Douglas Drive	Yakima	WA	98908
Grace Lutheran School	1207 S. 7th Ave	Yakima	WA	98902
Green Park Elementary	1105 E. Isaacs Street	Walla Walla	WA	99362
Harriet Thompson Elementary	1105 W. 2nd St.	Grandview	WA	98930
Hoover Elementary	400 West Viola Avenue	Yakima	WA	98902
Lincoln Elementary	309 North Alder	Toppenish	WA	98948
Martin Luther King Jr.	2000 S 18th Street	Union Gap	WA	98903
McClure Elementary - Grandview	811 W. 2nd	Grandview	WA	98930
McClure Elementary - Yakima	1222 S. 22nd Ave	Yakima	WA	98902
McKinley Elementary	621 S. 13th Ave	Yakima	WA	98902
Naches Valley Elementary	151 Bonlow Drive	Naches	WA	98937
Nob Hill Elementary	801 South 34th Avenue	Yakima	WA	98902
Outlook Elementary	3800 Van Belle Rd	Outlook	WA	98938
Prospect Point Elementary	55 Reser Road	Walla Walla	WA	99362
Ridgeview Elementary	609 West Washington Ave	Yakima	WA	98903
Riverside Christian School	721 Keys Road	Yakima	WA	98901
Robertson Elementary	2707 West Lincoln	Yakima	WA	98902
Roosevelt Elementary	120 N. 16th Avenue	Yakima	WA	98902

School Name	School Address	City	State	Zip
Satus Elementary	910 S. Camas Ave	Wapato	WA	98951
Selah Intermediate School	1401 W. Fremont Avenue	Selah	WA	98942
Sharpstein Elementary	410 S. Howard St.	Walla Walla	WA	99362
St Joseph-Marquette School	202 N. 4th St	Yakima	WA	98901
Terrace Heights Elementary	101 N. 41st Street	Yakima	WA	98901
Tieton Intermediate School	711 Franklin Road	Tieton	WA	98947
Waitsburg Elementary	184 Academy	Waitsburg	WA	99361
Washington Elementary	800 E. Jackson Avenue	Sunnyside	WA	98944
Whitney Elementary	4411 W. Nob Hill Blvd.	Yakima	WA	98908
Wide Hollow Elementary	1000 S. 72nd Ave	Yakima	WA	98908
Zillah Intermediate	303 2nd Ave	Zillah	WA	98953

Program Promotions

Be *watt*smart
Begin at home

Be wattsmart, Begin at home is a free energy education program sponsored by Pacific Power that is available to you in the fall of 2017. This program utilizes local presenters to focus on the Washington Office of Superintendent of Public Instruction Standards while showing students and teachers how wise energy actions make a difference. Here is what local teachers have to say about the program:

> ***The students loved seeing their peers be an electric circuit.***

> ***This presentation was a perfect connection to our science unit on electricity.***

Please join us in this important effort. You may qualify to receive a **mini-grant of up to $50** depending upon participation.

What:	A 45 - 60 minute educational presentation with **FREE** wattsmart energy education posters, activities and student materials
When:	October 10 - November 10, 2017
Where:	Your school
Who:	Your school chooses either fourth- or fifth-grade, depending upon placement of learning standards
How:	Enroll at **bewattsmart.com/begin** at your earliest convenience to ensure a spot or contact Megan Hirschi at **megan@nef1.org**

National Energy Foundation®
cultivating energy literacy

PACIFIC POWER

bewattsmart.com

wattsmart is registered in the U.S. Patent and Trademark Office

Dear Be ***watt***smart, Begin at home 2016 program participant:

Thank you for participating in the Be ***watt***smart, Begin at home program. Pacific Power will once again be supporting teachers in educating students on required energy standards during the 2017-18 school year.

As a former program participant, you have the opportunity to enroll your fourth- or fifth-grade class in advance for the fall 2017 Be ***watt***smart, Begin at home program.

The 45 - 60 minute school presentations include **FREE** wattsmart energy education posters, activities and student materials. They will be scheduled during the weeks of **October 10 - November 10, 2017.** Teachers may qualify to receive a mini-grant of up to $50 depending upon participation.

Register soon at bewattsmart.com/begin to ensure your 2017 participation or email megan@nef1.org.

Thank you.

Program Documents

Keynote Presentation

Be **watt**smart,
Begin at home

wattsmart

PACIFIC POWER

What we will do today.

Learn about natural resources.

Learn how we make and use energy.

Learn how to use energy wisely by being **watt**smart.

Play energy LINGO.

wattsmart

What is ENERGY?

wattsmart

ENERGY is the ability to do **WORK**.

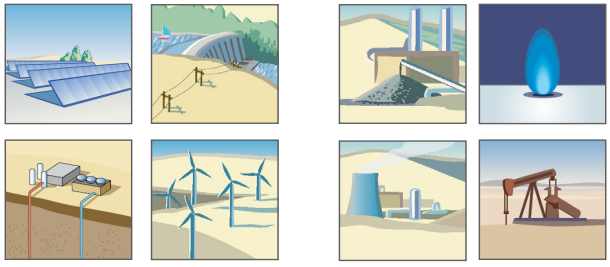
wattsmart

Natural resources

A **natural resource** is anything we use that comes from the earth or the sun.

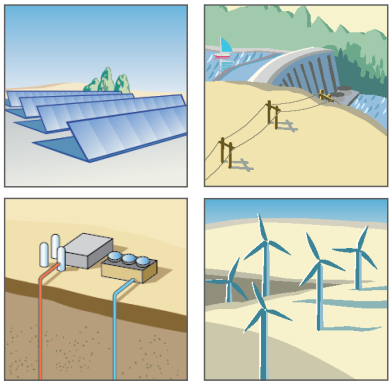
wattsmart

Renewable and nonrenewable resources

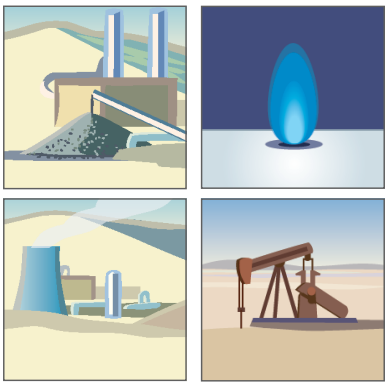


wattsmart

Renewable resources



Nonrenewable resources



Electricity

- The electricity we use is not a natural resource.
- It is made from natural resources.
- Since electricity is made from natural resources, it is called a **secondary energy source**.
- Power lines carry the electricity from where it is generated to where it is used.

Let's LINGO

Find the words on your LINGO board that match these definitions:

- The ability to do work. **Energy**
- A resource often found with oil. **Natural gas**
- A secondary energy source. **Electricity**
- Something useful from the earth or the sun. **Natural resource**

Pacific Power

Electric generation by energy source

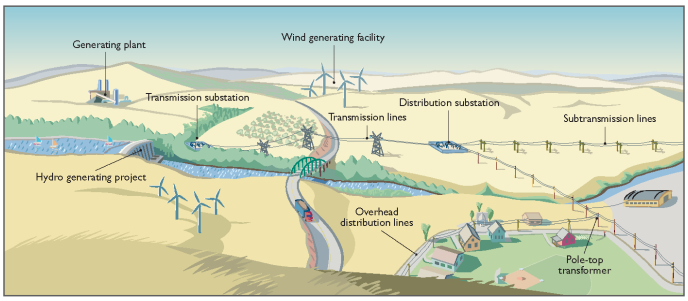
Coal 58.85%

Renewables 17.08%

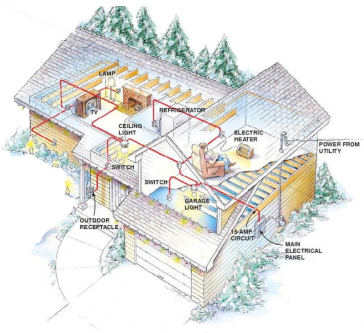
Natural gas 14.76%

Other sources 9.31%

Electric generation



What is a circuit?

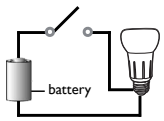


wattsmart

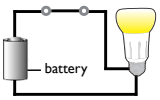
Let's make a circuit.

What things do we need to make an electrical circuit?

- An **energy source**, such as a battery.
- A **conductor** to carry electrical energy, such as wire.
- A **load** to use the energy, such as a light bulb.



Open circuit:
No electricity can flow



Closed circuit:
Electricity can flow

wattsmart

Energy efficiency

Energy efficiency

- Using less energy to accomplish the same amount of work.

Technology

- Install energy-efficient products, appliances and devices.

Behavior

- Use less energy through wise behaviors that conserve energy.

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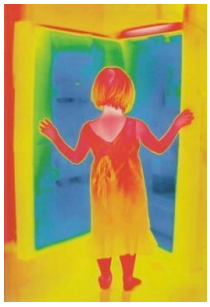
Know what you want before you open the refrigerator.

wattsmart

Refrigerators and freezers

What can you do to be ***watt***smart?



Decide what you want to eat quickly!

wattsmart

Use LEDs

wattsmart

Turn off the TV when you leave the room.

Electronics

What can you do to be ***watt***smart?

- Turn off TVs, computers and game consoles when not in use.
- Unplug the thug. Beware of **phantom loads**.

- Use advanced power strips to reduce phantom load.

Turn off the lights when you leave the room.

Lighting

What can you do to be ***watt***smart?

Turn off the lights when you leave a room.

Replace standard bulbs with **LED** (light-emitting diode) light bulbs.

Let daylight shine in.

Let's LINGO

Find the words on your LINGO board that match these definitions:

- Using less energy to accomplish the same amount of work. **Energy efficiency**
- An energy resource that is capable of being renewed or is replaceable. **Renewable**
- Fossil fuels – such as coal, natural gas and oil – are considered **Nonrenewable** resources.
- A resource used to produce gasoline. **Oil**

Home heating and cooling

What can you do to be ***watt***smart?

- Use a fan instead of an air conditioner.
- Install a smart or programmable thermostat.
- Change furnace filters.
- Insulate your home and seal air leaks.

Water heating

What can you do to be ***watt***smart?

- Install a water-efficient showerhead.
- Take shorter showers.
- Turn off the water when brushing teeth.
- Set your **water heater** to 120°F.

Dishwashers and laundry

What can you do to be ***watt***smart?

- Run these appliances only when full.
- Use low energy settings.
- Clean the lint filter on your dryer with each load.

Cooking

What can you do to be ***watt***smart?

- Use a microwave oven when possible.

- Use lids to shorten **cooking** time.

The 3 Rs

What can you do to be ***watt***smart?

- **Reduce**
  – use less of something.
- **Reuse**
  – use something again.
- **Recycle**
  – make something into another new thing.

Let's LINGO

Find the words on your LINGO board that match these definitions:

- A light that can last 25 times longer than an incandescent. **LED**
- Electricity consumed by an electronic device while it is turned off or in standby mode. **Phantom load**
- Using a toaster oven or microwave for **Cooking** is more energy-efficient than using the oven.
- Set this to 120°F for a comfortable shower. **Water heater**
- To use less of something. **Reduce**

What have we done today?

- **Learned** why energy is important.
- **Discussed** energy and where it comes from.

Engage

Review your **Be *watt*smart, Begin at home** booklet with your parent(s).

Complete the *Home Energy Worksheet* and return it to receive an energy-efficient nightlight.

Sign the *Thanks A "Watt" Card* and your teacher will mail it along with your worksheet and the teacher's *Program Evaluation*.

***YOU** can make a difference when you are **watt**smart!*

Visit **bewattsmart.com** for more energy-saving ideas.

Be ***watt***smart
Begin at home

Teacher Program Implementation Steps

1. Verify that you have received each of the following:
   - *Teacher Materials Folder*
     - Your **Be wattsmart, Begin at home** *Student Booklet*
     - Your **Be wattsmart, Begin at home** *Teacher Guide*
     - *Program Evaluation*
     - Sponsor *Thank You Card*
     - Teacher mini-grant announcement
     - Self-addressed postage-paid envelope
     - Instructional posters
   - *Home Energy Worksheets* for you and your students
   - **Be wattsmart, Begin at home** student booklets
   - Set of *Parent Letters*
   - *watt*smart nightlights (student incentive for returning the *Home Energy Worksheet*)
   - *watt*smart *Starter Kit Fliers*

2. Distribute to each student a:
   - **Be wattsmart, Begin at home** student booklet
   - *Home Energy Worksheet*
   - *Parent Letter*

3. Reward each student who returns a completed *Home Energy Worksheet* with a wattsmart nightlight.

4. Complete the *Program Evaluation* form.

5. Have each student sign the *Thank You Card* to Pacific Power.

6. Mail in the self-addressed postage-paid envelope:
   - Completed *Home Energy Worksheets*
   - The *Thank You Card*
   - The *Program Evaluation* form

To thank you for postmarking your envelope by December 1, 2017, you will receive a mini-grant for classroom use.
80% or greater return of registered students' *Home Energy Worksheets* **= $50**
50 – 79% return of registered students' *Home Energy Worksheets* **= $25**

For questions or additional information, please email Megan Hirschi at **megan@nef1.org**.

Dear Parent(s):

The **Be wattsmart, Begin at home** program assists teachers and students to learn about energy, discuss important energy topics and engage in energy efficiency actions now. Your child has participated in an assembly addressing natural resources, energy basics and energy efficiency. Your participation in this program will help you be wattsmart, enhance energy efficiency in your home and help save money on your utility bills. Here are three simple ways that you can help:

- Review this **Be wattsmart, Begin at home** booklet with your child.
- Assist your child with completing the activities on Page 7.
- Have your child return the ***Home Energy Worksheet*** to their teacher.
- Order a **wattsmart Starter Kit**

Thank you for being wattsmart and for your participation!

What's inside?

This booklet is divided into three sections that will help you:

1. Learn about sources of energy, how they get to your home and why they are important in your life.
2. Discuss wattsmart energy efficiency tips that will help you use energy wisely and save money.
3. Engage in energy efficiency by determining how energy can be saved in your home through a simple audit activity and the *Home Energy Worksheet*.

About Pacific Power

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The National Energy Foundation (NEF) is a 501 (c)(3) nonprofit organization, founded in 1976. It is dedicated to increasing energy literacy through the development, distribution and implementation of educational programs and materials. These resources relate primarily to energy, natural resources, energy efficiency, energy safety and the environment. Concepts are taught through science, math, art, technology and writing. NEF recognizes the importance of educating individuals about energy so they can make informed decisions about energy issues and use.

What does it mean to be ***watt***smart?

- Being wattsmart is all about taking steps to save energy – which in turn can help you save money.
- Pacific Power's wattsmart programs and incentives can help customers become more energy efficient in their homes and businesses and that's good for their wallets and the environment.

The importance of energy:

Energy is the ability to do work or produce change. Virtually everything we do or use at work and home uses energy.

- Heating and cooling systems
- Computers
- Electronic equipment such as gaming and entertainment systems and TVs
- Charging electronic tablets, music players and cell phones
- Appliances
- Lights
- Manufacturing
- Food storage and preparation
- Security systems

Where does energy come from?

Our energy comes from natural resources. There are two general categories of natural resources – nonrenewable and renewable. A nonrenewable resource is not capable of being renewed, replaced or takes a very long time to replace. A renewable resource is capable of being renewed or replaced.

PRIMARY NATURAL RESOURCES are used to convert energy into electricity. They can be either nonrenewable or renewable.

Nonrenewable examples are:

Coal is the most abundant nonrenewable energy source in the world. There is an estimated 129 year supply remaining.

Oil can be both refined and unrefined. Refined oil is transformed into petroleum products and unrefined oil remains as crude oil.

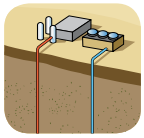
Natural Gas is usually captured alongside oil deposits and is a major source for electrical generation.

Uranium is the fuel most widely used by nuclear plants. Nuclear energy is the energy inside the nucleus (core) of the atom of uranium.

Renewable examples are:

Solar is energy from the sun.

Wind is energy from the wind captured by a group of wind turbines (generators).



Geothermal is energy derived from the heat of the earth.

Hydropower is energy from water that generates electricity.

SECONDARY ENERGY RESOURCES are created by using nonrenewable and renewable resources of energy.

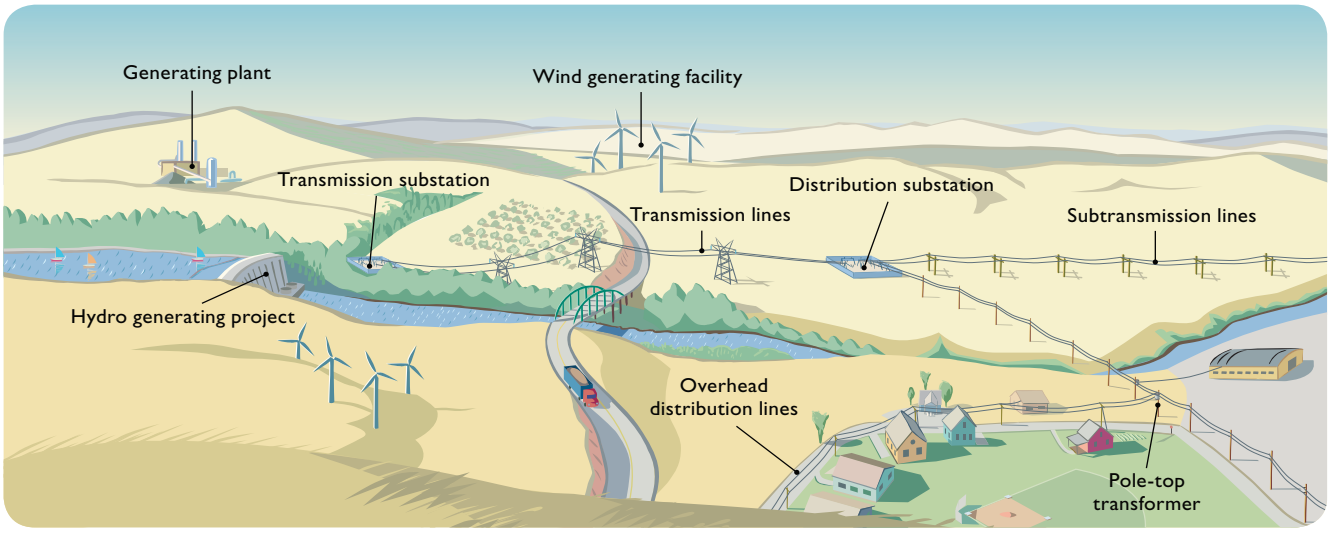
Electricity is the most abundant **secondary energy resource** used. It is the flow of electrical power or charge. It occurs in nature as lightning and static electricity. A generator uses energy resources to create mechanical energy that is then converted into electrical energy.

Energy efficiency

Energy efficiency is using less energy to accomplish the same amount of work – we call it being wattsmart. There are many technologies we can use today that decrease the amount of energy needed to do work. Good examples are ENERGY STAR® products and LED lighting.

You can save even more money if you start thinking about using energy wisely. Try turning off the lights when you leave the room, take shorter showers or turn off your electronics when you are not using them.

Using electricity



For more than 100 years, electricity has made our homes more comfortable and industries more productive. Today electricity is powering a world of electronics.

How is electricity generated? It begins with a fuel that heats water and turns it to steam. The steam drives the turbine that turns the generator motor to produce electricity.

How is electricity transmitted? Once the electricity is produced, the current flows from the generator to the power plant transformer where the voltage is increased to boost the flow of the electric current through the transmission lines. The transmission lines transport the electricity to Pacific Power's substations where the voltage is decreased. Power lines then carry the electricity from the substations to be used in our homes and businesses.

ELECTRICAL GENERATION

Energy resource	Pacific Power (2016 basic fuel mix)*	United States (U.S. EPA, 2013 data)
Coal	58.85%	39%
Natural gas	14.76%	27%
Renewables	17.08%	12%
Hydroelectric	5.58%	7%
Wind	8.97%	4%
Biomass	0.44%	1%
Geothermal	0.41%	--
Solar	1.68%	0%
Nuclear	0.00%	19%
Other/misc.	9.31%	3%
Total*	100%	100%

**This information is based on Federal Energy Regulatory Commission Form 1 data. The Pacific Power "basic fuel mix" is based on energy production and not resource capability, capacity or delivered energy. All or some of the renewable energy attributes associated with wind, solar, biomass, geothermal and qualifying hydro facilities in Pacific Power's basic fuel mix may be: (a) used in future years to comply with renewable portfolio standards or other regulatory requirements, (b) sold to third parties in the form of renewable energy credits and/or other environmental commodities or (c) excluded from energy purchased. Pacific Power's basic fuel mix includes owned resources and purchases from third parties.*

wattsmart tips to lower your energy use and help save money

Saving energy happens in two ways. First, you can use less energy through wise behaviors that conserve energy. Second, you can install energy-efficient products, appliances and devices that use less energy to accomplish the same task. Let's talk about the following areas of your home that have the largest potential to save energy.

Home heating and cooling

- Install a programmable thermostat or smart thermostat. Set your thermostat to 78°F or higher in the summer and 68°F or lower in the winter.
- Make sure your house is properly insulated. If you have less than 6 inches of insulation in your attic, you would benefit from adding more.
- You can save 10 percent or more on your energy bill by reducing the air leaks in your home with caulking and weather stripping.

- To help your furnace run more efficiently and cost-effectively, keep your air filters clean.
- For windows with direct sunlight, close your blinds in the summer to keep the heat out. Open blinds on winter days to let the warmth in.
- Small room fans are an energy-efficient alternative to air conditioning.
- Inspect and replace weather stripping and caulking in your home.
- For information about energy-saving programs and cash incentives, visit **bewattsmart.com**.

Water and water heating

- Check your faucets for leaks that can cost you hundreds of dollars each year.
- Install a water-efficient showerhead and save as much as $145 a year.
- Set the water heater at 120°F.
- Install faucet aerators to decrease water use.

Lighting

- Let the sun shine in. Use daylight and turn off lights near windows when possible.

- Replace your incandescent bulbs with LEDs (light-emitting diodes) and save $5 to $8 per year per bulb. These bulbs use up to 80 percent less energy than incandescent bulbs and last much longer.
- Use lighting controls such as motion detectors and timers.
- Turn off lights when you leave the room.
- Always use the lowest wattage bulb that still gives you the light you need.
- Keep your light bulbs clean. It increases the amount of light from the bulb and reduces the need to turn on more lights.

Safety note: Burned out CFLs, which contain a small amount of mercury, should be disposed of properly. To locate a collection site in your area, or to learn what to do if a CFL breaks, visit **earth911.com**.

Electronics

- Turn off your computer and game consoles when not in use.
- Home electronics are made to turn on and off many times. Always turn them off to save energy.
- Electronics with the ENERGY STAR® label use as much as 60 percent less energy while providing the same performance.
- Beware of phantom loads which continue to draw electricity when they are plugged in but not in use. Examples are telephone chargers, electronic games and television sets.
- Use advanced power strips for household electronics. One button will turn off multiple appliances, which conserves electricity.

Refrigerators and freezers

- When looking to replace your old refrigerator, do so with an ENERGY STAR® model, which requires approximately 40 percent less energy than conventional models and provides energy savings without sacrificing the features you want.
- The coils in the back or bottom of your refrigerator and freezer should be kept as clean as possible.

Dishwashers

- Only run dishwashers when full and use the "air dry" or "no heat dry" settings.
- ENERGY STAR® dishwashers use at least 41 percent less energy than the federal minimum standard for energy consumption.

Laundry

- Buy a moisture-sensitive dryer that automatically shuts off when clothes are dry.
- Use a clothesline whenever possible.

Cooking

- Use a microwave oven, toaster oven or crock pot instead of a conventional oven.
- Use the right-sized pan for the stove top element.
- Cover pans with lids to keep heat from escaping.

Reduce

- Use less.
- Purchase products with little packaging.

Reuse

- Use something again.
- Reuse a box or a grocery bag.

Recycle

- Make something into another new item.
- Participate in the recycling programs in your community.

Parents, be wattsmart and watch the energy savings add up.

An individual with a combined electric and heating fuel bill of $2,500 per year could save 20 percent or $42/month by using these and other energy efficiency tips. That is like getting a pay raise without having to work harder or longer.

The cost of lighting your home

Take a walk around your home with your family to learn about your lighting.

1. Count the types of bulbs in each room and record in Table 1; then total each column.
2. Transfer the total for each type of lighting into Column A on Table 2.

TABLE 1

Location	Incandescent	CFL	LED
Bedroom 1			
Bedroom 2			
Kitchen			
Dining room			
Living room			
Hallway			
Laundry room			
Family room			
Front porch			
Other			
TOTAL			

3. In Table 2, multiply the numbers in Column A by the given amounts in Column B. Place the answers in Column C.
4. Add the numbers in Column C to get the total approximate cost of electricity for lighting your home.
5. Discover how much money you will save if all the bulbs in your home were CFLs or LEDs. Add the numbers in Column A to get the total number of bulbs in your home. Transfer the total to both rows in Table 3, Column E as indicated by the arrows.

TABLE 2

	A	B	C
	Number of bulbs from Table 1	Annual cost of electricity for one bulb	Annual cost of electricity for lighting
Incandescent		× $3.84	
CFL		× $0.84	
LED		× $0.48	
TOTAL			

6. Multiply the total number of CFLs by the annual cost of electricity for one CFL provided in Column F and put your answer in Column G.
7. In the last row of Table 3, multiply the total number of LEDs in Column E by the annual cost of electricity for one LED bulb provided in Column F and put your answer in Column G.

   How do the amounts in Column G compare with your current total cost for lighting in Column C above?

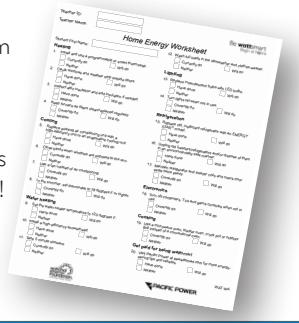
TABLE 3

	E	F	G
All CFLs		× $0.84	Annual cost of electricity with only CFLs
All LEDs		× $0.48	Annual cost of electricity with only LEDs

Cost figures are for an individual bulb (60 Watt incandescent), the lumens equivalent CFL (13 Watts) and LED (7 Watts) each used for 2 hours each day for 30 days. EEI Typical Bills and Rates Report, Winter 2016 (12 months ending 2015).

Be ***watt***smart – it's up to you

Together with your parent(s), complete the separate ***Home Energy Worksheet***. Return it to your classroom teacher and receive your wattsmart nightlight. You may find you are already practicing ways to be energy efficient but there is always room to do more.



Challenge yourself and your family to commit to practice energy efficiency by making wise energy choices and being wattsmart. You will not only help extend the life of our natural resources, but save money, too!

For other energy-saving ideas and incentives, visit **bewattsmart.com**. Congratulations to you and your family for making a difference.

Be *watt*smart

Begin at home

National Energy Foundation®
cultivating energy literacy

bewattsmart.com

PACIFIC POWER

wattsmart is registered in U.S. Patent and Trademark Office.

Be *watt*smart
Begin at home

TEACHER GUIDE

National Energy Foundation®
cultivating energy literacy

PACIFIC POWER

Welcome to Be ***watt***smart, Begin at home

This program teaches the importance of energy and assists students and their families in saving energy in their homes. For teachers, **Be *watt*smart, Begin at home** reinforces important electrical concepts from your curriculum.

This *Teacher Guide* was designed to supplement program instruction. A variety of tools have been provided to allow you to format **Be *watt*smart, Begin at home** to meet your instructional needs. These tools include:

- General guidelines and activity suggestions
- Classroom activities to further the impact of lessons
- Additional fun and interesting activities for students
- Activities containing STEM-related curriculum for your classroom

Table of Contents

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STEM Correlations

STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering and mathematics. Some of the skills include: problem-solving, innovation, invention, inquiry, logical reasoning, critical thinking, technological literacy, communication tools, research tools, design and modeling, data analysis and probability, collaboration and real world connection. This chart correlates *Teacher Guid*e activities to STEM skills and behaviors.

	Science				**Technology**				**Engineering**					**Math**			
Activity	Science as Inquiry	Energy Sources, Forms and Transformations	Science and Technology	Personal and Social Perspectives	Productivity Tools	Communication Tools	Research Tools	Problem-solving and Decision-making Tools	Historical Perspective	Design and Modeling	Invention and Innovation	Test Design and Troubleshooting	Use and Maintain	Numbers and Operations	Measurement	Data Analysis and Probability	Connection to the Real World
Conservation Cookie	X			X										X	X	X	X
Pass the Sack	X	X		X													
Energy Ticket	X	X		X				X						X	X	X	X
The Search for Energy	X	X	X	X										X		X	X
Where Do Fossil Fuels Come From?	X	X	X					X						X	X		
Energy for Electricity	X	X	X	X			X										
Insulation Tests	X	X	X	X			X	X		X	X	X	X	X	X	X	X
How Bright Is Your Light?	X	X	X				X		X					X		X	X
Energy in Math														X		X	X

Section One:
Energy Efficiency

Objective: Identify and explain types of natural resources, conservation and energy efficiency.

Vocabulary:

Natural resource: A material source of wealth, such as timber, fresh water or a mineral deposit that occurs in a natural state and has economic value.

Renewable resource: A natural resource that is capable of being renewed or is replaceable such as energy from the sun or wind.

Nonrenewable resource: A natural resource that is not capable of being renewed, replaced or takes a very long time to replace, such as fossil fuels.

Fossil fuel: A combustible material created naturally beneath the earth's surface over a long period of time from the remains of plants and animals. Examples include coal, natural gas and oil.

Conservation: The protection, preservation, management, or restoration of natural resources such as forests, soil and water.

Energy efficiency: Using less energy to accomplish the same amount of work.

Classroom Activities:

- "Conservation Cookie"
- "Pass the Sack"
- "Energy Tickets"
- "The Search for Energy"

Energy Challenge

Discussion Idea: Embodied energy in a glass of milk.

Objective: Trace the energy and resources needed to make a common product.

Review the steps that it takes to produce a glass of milk and bring it to the consumer.

- Feeding and raising a cow
- Milking a cow
- Packaging
- Refrigeration
- Transportation of milk (dairy to warehouses to store to home)

Discuss with Your Class:

1. What natural resources go into making and transporting a glass of milk?
2. The energy used to make and transport a product is called **embodied energy**.
3. What embodied energy sources are involved in producing and transporting milk?
4. How can understanding embodied energy in our daily lives encourage us to be energy-efficient?

Conservation Cookie

Objective:
To demonstrate the results of conservation of a resource.

Pre-activity Discussion:
- What is conservation?
- Why is conservation so important?

Materials:
- Two cookies (or other food item) for each person
- One watch or clock with a second hand for timing
- Computer or graph paper to graph results

STEM Connection
Science
- Science as Inquiry
- Personal and Social Perspectives

Math
- Numbers and Operations
- Measurement
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Tell students that this is the first of two rounds. In each round, they will be eating a cookie, which represents our natural resources. They are to stand at their desk and you say to eat the cookie as they normally would, then when the cookie has been completely swallowed, sit down. The activity will work better if you ask students NOT to put the entire cookie in their mouth at one time, to take at least two bites!
2. Give each student a cookie, with instructions not to eat it until you say. Start the watch and tell the students to eat the cookie as they would normally eat it. At 30 second intervals, count the number of students standing and record this data.
3. Individually or as a class, graph this data using a line graph.
4. Tell students they will now practice conservation with a second cookie. To represent conservation, students will only take a bite from their cookie when you say "BITE." Just as before, they will stand, take bites the same size they took last time, and sit after the entire cookie has been swallowed.
5. Pass out a second cookie to each student.
6. Start the watch and have everyone take a "BITE" and then wait 30 seconds. Record the number of students standing and again say "BITE." Repeat this procedure until almost everyone has finished his or her second cookie.
7. On the same graph used for the first cookie, add a second line graph for the conservation cookie.

Discussion:
- Compare the two graphs. If desired, have students calculate the slope of each graph from 0 to 30 seconds and from 30 seconds to 1 minute. How do the slopes vary over time and between graphs? What does a change in slope represent?
- Discuss the term "conservation" and its effects on our natural resources. Can we control how rapidly we use water or energy by conserving it? Water and energy are some of the most important things we use in our lives. If they are used up quickly, and all at once, we will not have enough left for the future.

Pass the Sack

Objective:
To demonstrate the difference between renewable and nonrenewable resources and the need for conservation of resources.

Materials:
- Two different kinds of candy or other objects students find desirable
- Sack to hold candy, such as a gallon size plastic bag

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Personal and Social Perspectives

Procedure:
1. Count out enough candy so that there is one piece per student (some of each type of candy – perhaps less of one so it will run out faster). Put it in the sack or bag. Save the remaining candy. If you have a very polite class, count enough candy for half of the class. You want the candy to run out before everyone gets some!
2. Tell students you will be demonstrating how resources get used over time by playing "Pass the Sack." Show students the sack and tell them when they get the sack, they should take some energy and pass the sack to the person next to them.
3. Before passing the sack to the first student, review renewable and nonrenewable resources. Have students give examples of each as you hand the sack to a student.
4. While this discussion is taking place, allow students to pass around the bag of candy without any rules about how many pieces students may take. Occasionally, add four or five pieces of one of the types of candy you are using. (This will be your renewable resource.) The sack will be empty before it reaches all the students.
5. Ask students that did not get any candy how they might obtain energy from other students. What if each student represented a country? How do countries obtain resources? Trade? Barter (trade for goods)? Buy (trade for currency)? Invade and take (go to war)? What effect did the availability of candy have on relationships between students? What effect might the availability of natural resources have on the relationship among nations, provinces, states, people, standards of living and quality of life?
6. Explain how our resources are like the candy. Which type was nonrenewable? How could you tell? (No more was added to the bag once it was being passed around.) Which type was renewable? How could you tell? (It was added to the bag periodically.)
7. Point out that resources have limits just like the candy. Emphasize that many resources, such as fossil fuels, are nonrenewable and are being consumed faster than they are being replaced by nature. Discuss the fact that it would be more difficult for students to eat the candy if they had to search the room to find it instead of just taking it from the sack. Energy companies must seek resource deposits and obtain rights to drill or mine for them; they do not just magically appear. Point out that natural gas, coal and oil companies are looking harder for more resources as supplies dwindle.
8. Now plan to pass out the remaining candy. Should rules be established? Do oil, coal and natural gas companies have rules (regulations) that they must follow to find resources? Should there be rules and regulations on how much oil, coal and natural gas people use? How would students get resources if they could not leave their desks? How do the students' social decisions influence the availability of candy?

Energy Tickets

Objective:
See how energy decisions affect our standard of living and our quality of life. This will help students realize how important it is to use energy efficiently.

Materials Needed:
- Energy Tickets – 25 per student
- Box to collect tickets (toll box)

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Personal and Social Perspectives

Technology
- Problem-solving and Decision-making Tools

Math
- Numbers and Operations
- Measurement
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Before class begins, copy a page of tickets from the master on page 8 for each student. Alternatively, you may use preprinted tickets available from retail stores.
2. Introduce the game to the students by listing several places the students use energy in the school, for example, in the classroom: lights, computers and heaters.
3. Provide each student with 25 Energy Tickets, and instruct them to write their name on all of their Energy Tickets.
4. Every time a student uses energy, have them write how the Energy Ticket was used on the back and put the ticket in the toll box. If they use heated water, it will cost two tickets, because they are using both energy and water. It also costs two tickets if they waste energy unnecessarily. For example, leaving lights or a computer on when not in use wastes energy.
5. Keep a record of how many tickets the students have left each day.
6. Optional: look at how the tickets were used and create a graph of tickets used for different categories (sharpening pencils or using computers, for example) out of the tickets deposited in the box.

Discussion:
- What would happen if there was a real energy shortage in the community and families were issued a certain number of Energy Tickets?
- What if after they used them, all of their electricity and gas were shut off?
- What would they do to adjust their use of energy?
- What are other alternate sources of energy?

Language Arts Connection:
- Quick write – Describe one thing you could do to reduce your personal energy usage.
- Creative writing – Write a story about life after our nonrenewable energy sources are gone.

ENERGY TICKET
This ticket allows one energy use.
______________ student name

ENERGY TICKET
This ticket allows one energy use.
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This ticket allows one energy use.
______________ student name

ENERGY TICKET
This ticket allows one energy use.
______________ student name

The Search for Energy

Objective:
To learn the difference between renewable and nonrenewable resources.

Materials Needed:
- About 1/4 cup seed beads (solar energy)
- Colored beads in the following proportions: 84 percent black beads (about 250 beads) for coal; 16 percent red (about 50 beads) for uranium; 2 percent white (about 7 beads) for natural gas; 1 percent blue (about 4 beads) for oil. These proportions approximately reflect the nonrenewable energy reserves in the U.S.
- Optional: large bed sheet or tarp to place beads on for easy cleanup

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology
- Personal and Social Perspectives

Math
- Numbers and Operations
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Divide the class into five equal groups. Each group will be a company going after a particular resource. The beads represent reserves of the various energy resources. Have students gather in a large circle around the sheet or other area where you will place the beads.
2. Scatter the large beads plus a spoonful of "solar" beads on the sheet so they are well spread out. Explain that this exercise shows how the amount of available resources changes over time. You may want to designate certain places as protected areas, where the resources are off limits to protect the environment.
3. Tell students you will do several trials, and look to see how the types of available resources change after each trial. Tell each group that they will have 30 seconds to pick up as many beads possible of their color, then you will stop and look at how things are changing. It is NOT a race! After checking for understanding, start timing.
4. After 30 seconds, have the groups stop and count the beads they have gathered. Record the results in a data table. If some groups have collected all of their available resource, point out that the resource is now depleted and they are unemployed. You can allow the students to join another group. Collect the beads students picked up in the first trial.
5. Scatter another spoonful of solar energy, helping students realize that since solar is a renewable resource, there is the same amount of it each time you look, whereas the fossil fuels are being depleted. Repeat the search period so students can get more beads.
6. Stop after 30 seconds and have the group count and record the beads collected again. Note that there are fewer fossil fuels found in the second round. Students have to look harder to find what is left. The solar count is slowly but surely catching up with the fossil fuels. Repeat with additional trials as needed.
7. Create a multi-line graph of the number of beads collected each trial. This can be done by individual students or as a class. Note that the nonrenewable resources decrease until they are depleted but the solar increases steadily.

Discussion:
- Why does the solar line differ from the others? Why does it go up rather than down?
- How do improvements in technology affect the extraction of resources from the earth?
- How do improvements in technology affect our usage of renewable resources?
- In the real world, can we extract ALL of one resource? Why do some deposits go unused?

Section Two:
Resources You Can Use Efficiently

Objective:
To discuss and identify various resources students use every day.

Vocabulary:
Electricity: The flow of electric charge used as power.

Green energy: Electricity produced by renewable energy sources that are nonpolluting, or that pollute very little.

Natural gas: A fossil fuel that is a mixture of gases occurring in underground deposits.

Classroom Activities:
- "Where Do Fossil Fuels Come From?"
- "Energy for Electricity"
- "Electrical Generation Poster"

Energy Challenge

Discussion Idea:
What natural resources can you save by recycling?

Optional Activity:
1. Have students keep track of each paper product that they use during one day with tally marks.
2. Compare amounts of paper used by students in the class. Ask students if they were surprised by the amount of paper they used.
3. Based on their usage of paper in one day, have students estimate how much paper they would use in a week, a month and a year.
4. Discuss the difference between reducing, reusing and recycling.
   - Reduce – using less of something
   - Reuse – using something again
   - Recycle – making something into another new item
5. Brainstorm several ways that paper use can be reduced, that paper can be reused and how paper can be recycled in your community.
6. Tell students that recycling 1 ton of paper saves the energy equivalent of 1,024 gallons of gasoline. Recycling just four aluminum cans saves enough energy to power a laptop for almost 21 hours. (EPA, 2017)

Where Do Fossil Fuels Come From?

Objective:
This activity investigates the production of natural gas and oil from ancient life. This activity models this process.

Materials per Student Group:
- A clear container to represent the ocean
- Sand or dirt
- Baking soda "plankton"
- Vinegar (20 percent) and water (80 percent) "ocean" mixture
- Cup or scoop
- Safety goggles

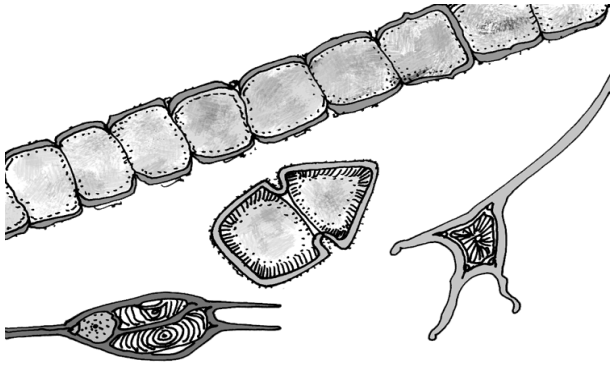
NOTE: You may do this as a demonstration, or have students do it in small groups.

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology

Technology
- Problem-solving and Decision-making Tools

Math
- Numbers and Operations
- Measurement

Procedure:
1. Explain to students that you will be showing them a model of how oil and natural gas form in the ocean. A very similar process takes place on land with plants to form coal.
2. Have students wear safety goggles to avoid splashing vinegar water in their eyes. It is harmless but uncomfortable.
3. Have students sprinkle a small amount of sand to cover the bottom of the container. The ocean floor is covered with sediments and the sand represents these sediments.
4. Next, have students sprinkle "plankton" over the sand, liberally covering the bottom of the container. This represents plankton (microscopic life plant and animal-like creatures called protists) that have died and settled to the bottom of the ocean.
5. Explain that over time, sediments are deposited on the ocean floor. Students should completely cover the plankton with sand. (You can gently push the sand around with your hands to simulate the pressure and weight the overlaying sediments have on the plankton.)
6. The ocean has water in it, so pour some of the vinegar/water (ocean mixture) into the container. Bubbles and foam begin to appear. You can see the bubbles bursting and can hear the gas being released to the air. Point out that this is a sign of a chemical change.



Discussion:
- Discuss with students that natural gas in the ocean is produced much in the same way as you have modeled, but that the process takes MANY years. In the ocean the plankton is buried under miles and miles of sediments which caused the weight of those sediments to "cook" the plankton under high temperature and pressure. The heat and pressure changes the plankton into oil and natural gas. Natural gas floats on top of the oil produced.
- Discuss how this model is different from real life. The gas produced in the experiment is carbon dioxide rather than natural gas, and since our container is open, the gas escapes into the air. In the ocean, there are usually impermeable layers that keep natural gas and oil trapped beneath the surface until we drill down and release it.

Energy for Electricity

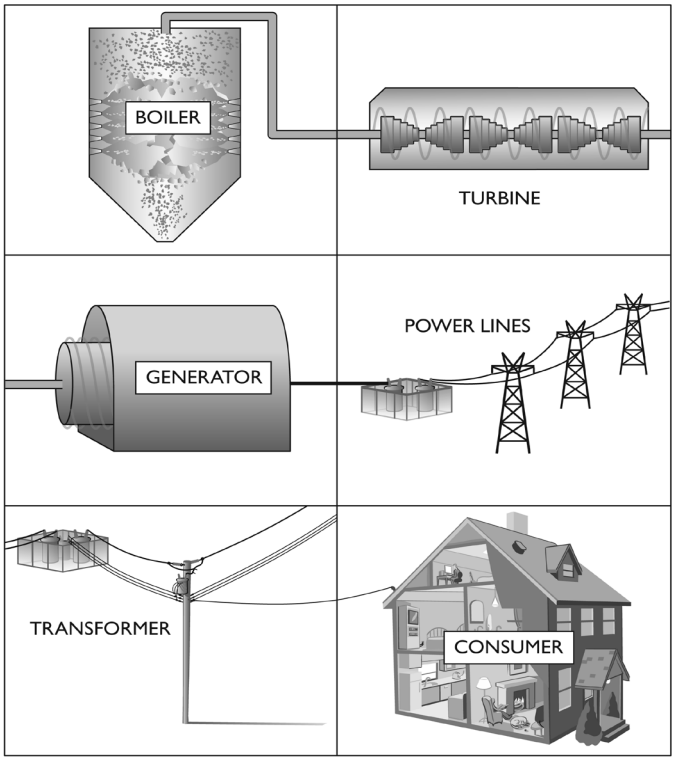
Objective:
Trace the flow of energy from a natural resource to electricity in our homes.

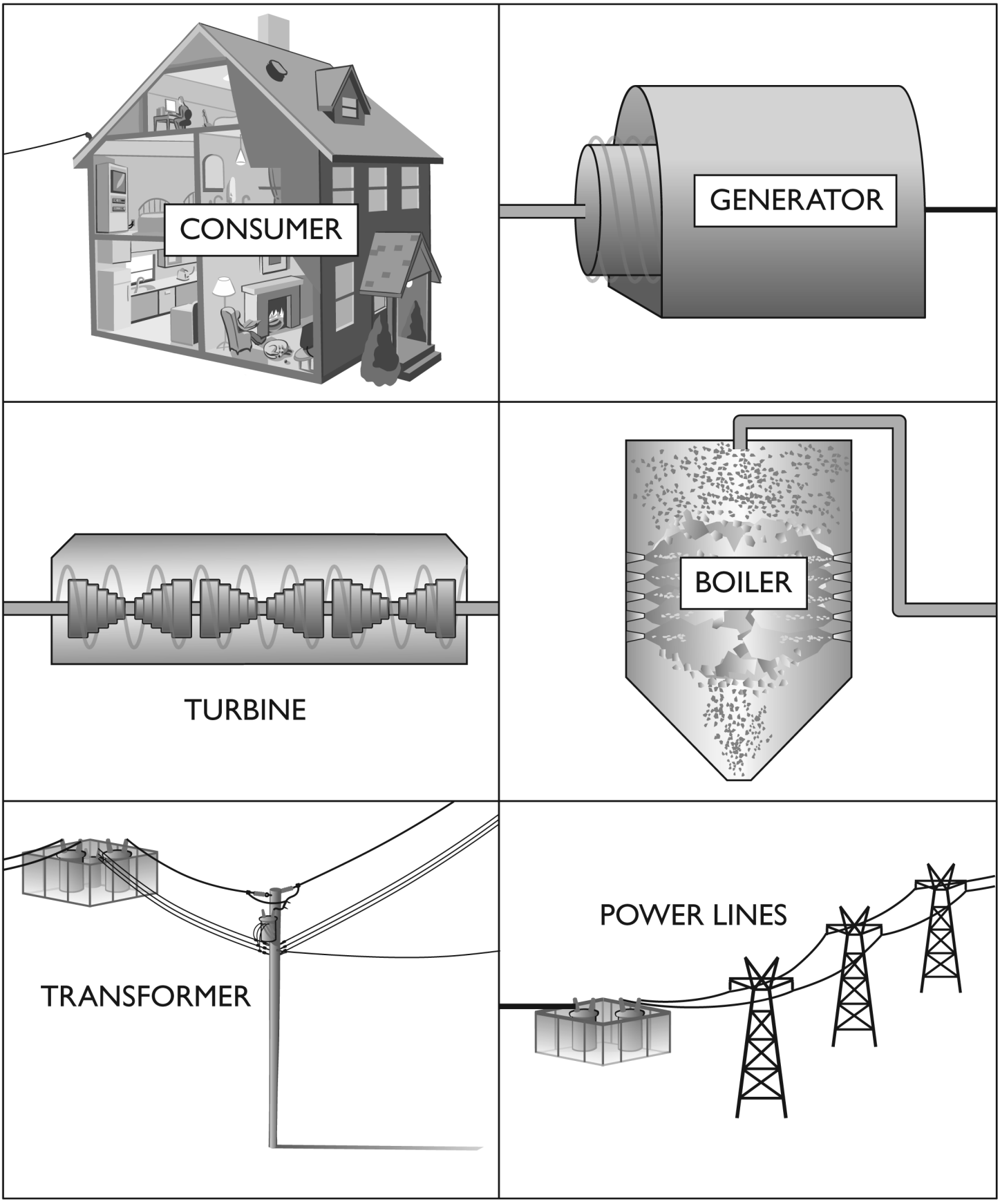
STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology
- Personal and Social Perspectives

Technology
- Research Tools

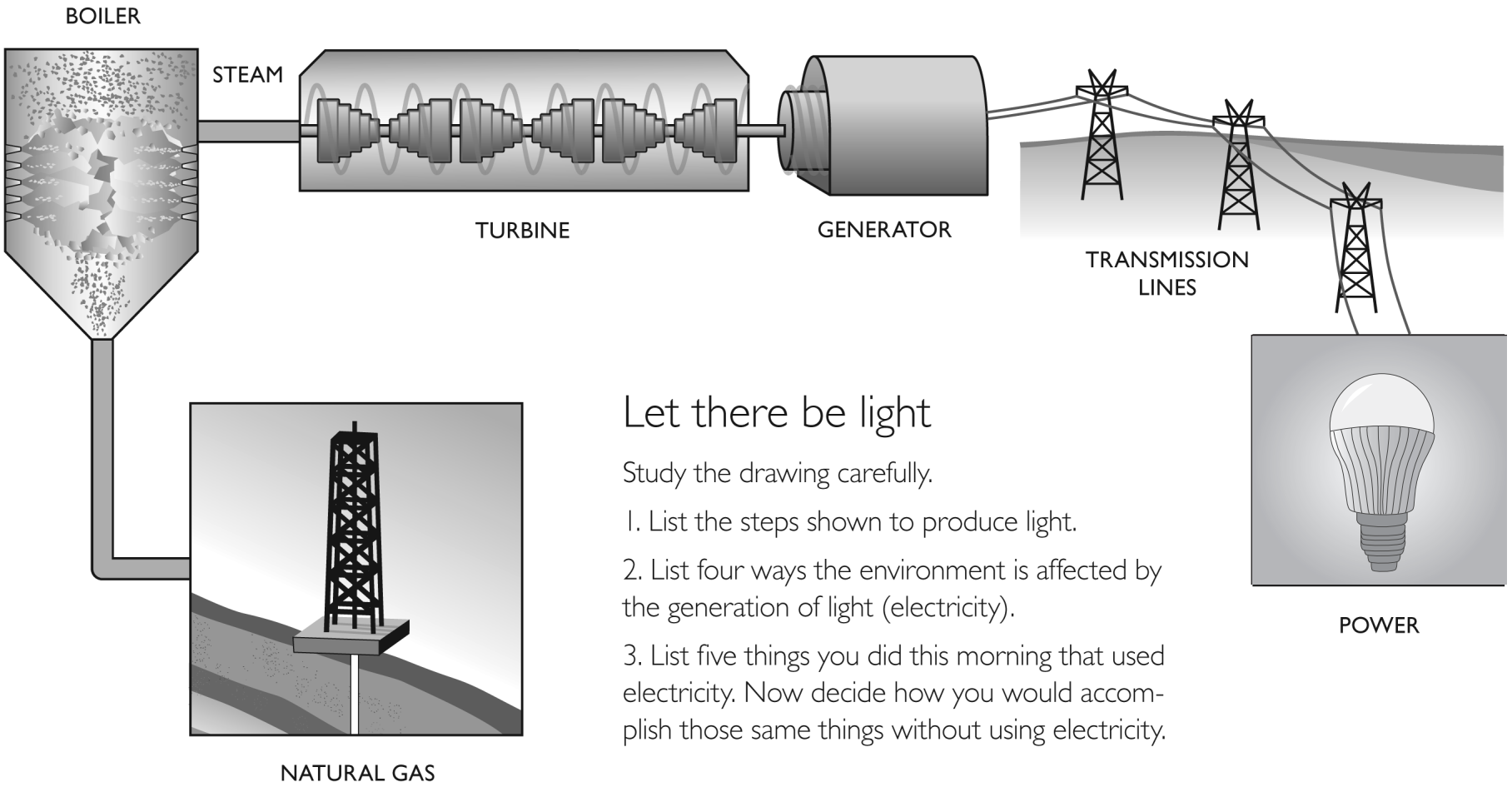
Procedure:
1. Ask students how their lives would be different without electricity. Where does electricity come from?
2. Pass out a copy of the "Electrical Generation Puzzle" found on the following page. Have students cut each part of the puzzle (transformer, turbine, generator, boiler, power lines and consumer) into separate pieces. Then, have them take a few minutes to put the puzzle pieces in order from the first to the last step of the process of electrical generation.
3. Go through each puzzle piece, explaining the process of each step:
   - Boiler – converts chemical energy from fuel (fossil fuels, biomass, hydrogen) to thermal energy, changing water to steam
   - Turbine – turned by steam, converting thermal energy to mechanical energy
   - Generator – turned by turbine, rotating coil of wire in a magnetic field, converts mechanical energy to electrical energy
   - Power lines – transmit electrical energy at several thousand Volts
   - Transformer – step-up transformers along the power lines increase voltage periodically; step-down transformers on poles or in yards reduce the voltage to a safe level for use
   - Consumer – converts electrical energy into many forms to run lighting and appliances

Completed puzzle for teacher reference





Electrical Generation



Let there be light

Study the drawing carefully.

1. List the steps shown to produce light.

2. List four ways the environment is affected by the generation of light (electricity).

3. List five things you did this morning that used electricity. Now decide how you would accomplish those same things without using electricity.

Section Three:
Be ***watt***smart, Begin at home

Objective:
To apply the principles of energy efficiency at home by changing habits.

Vocabulary:
Shell: The floors, windows, doors, walls and roof of a building that form a barrier between the indoor and outdoor environment.

Convection: Heat transfer in a gas or liquid by currents that circulate from one region to another. Convection works because heated fluids or gases expand, and since they are less dense, rise through the cooler materials around them.

Conduction: Heat transfer in a solid or liquid without any motion or flow of matter in the material. Heat is transferred by the motion of molecules and electrons. Higher speed particles from the warmer areas collide with slower ones from the cooler areas, causing a transfer of energy to the slower particles.

Radiation: Heat transfer between objects via electromagnetic waves. Photons traveling at the speed of light transfer the heat energy, so the objects do not have to be in contact with each other for heat to be transferred. Radiation can travel through space.

Insulation: A barrier that minimizes the transfer of heat energy from one material to another by reducing the effects of conduction, convection and/or radiation.

Classroom Activities:
- "Insulation Tests"
- "How Bright Is Your Light?"
- "Energy in Math"
- "Be wattsmart, Begin at home Poster"

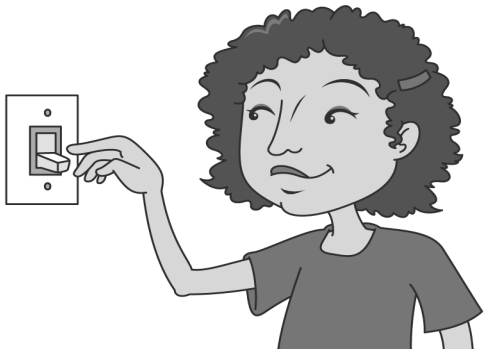
Energy Challenge

Discussion:
- What changes does your school need to make to save energy?

Optional Activity:
- Have students tour the school building to fill out the following checklist:

	Yes	No
1. Are outside doors weather stripped?	____	____
2. Are windows caulked to prevent air leaks?	____	____
3. Are lights turned off when no one needs them?	____	____
4. Is electrical equipment turned off when not in use?	____	____
5. Are faucets in bathrooms and kitchen areas free of leaks?	____	____

Discussion Idea:
- In which of the five areas does your school need the most improvement? How could students assist in making a change?



Insulation Tests

Objective:
To demonstrate the different types of materials that can be used for insulation.

Materials:
- Thermometer
- Graduated cylinder or measuring cup
- Large jug of water
- Large board or tray
- Baby food jars with lids (one for each material being tested)
- Insulation materials to test: gloves, socks of different materials, other types of clothing, plastic foam, paper, aluminum foil, leaves, etc.

STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology
- Personal and Social Perspectives

Technology
- Research Tools
- Problem-solving and Decision-making Tools

Engineering
- Design and Modeling
- Invention and Innovation
- Test Design and Troubleshooting
- Use and Maintain

Math
- Numbers and Operations
- Measurement
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. On a piece of paper, list all of the materials being tested.
2. Using the jug of water, fill each jar with 120 mL (1/2 cup) of water.
3. Measure the temperature of the water in each jar to make sure they are the same, then put on the lids.
4. Wrap all but one of the jars with the materials being tested. Label the unwrapped jar "control."
5. Place each jar on the large board or tray.
6. Carry the board or tray outside and leave it there.
7. Create a data table to record the beginning and ending temperature of the water in each jar.
8. After a pre-determined amount of time has passed, measure the new temperature of each jar and record the ending temperatures in the data table.
9. Calculate the change in temperature for each jar and add it to the data table. Graph the temperature change for each jar in a bar graph.

Discussion:
- What materials made the best/worst insulators?
- Could you use these to keep your home warm in the winter or cool in the summer?
- What materials are used in homes for insulation? (fiberglass, blown-in insulation, polyurethane foam, etc.)
- What do good insulating materials have in common? How does insulation work? (They have large pore spaces that block conduction of heat through surfaces.)

Language Arts Connection:
Quick write – Based on the information in your data table, give recommendations for insulating a tree house.

How Bright Is Your Light?

Objective:
To demonstrate which lighting sources are the most energy efficient.

Materials:
- Various light bulbs (incandescent, CFL and LED)
- Lamp or light socket
- Thermometer

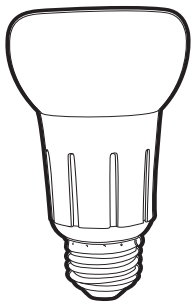
STEM Connection
Science
- Science as Inquiry
- Energy Sources, Forms and Transformations
- Science and Technology

Technology
- Research Tools

Engineering
- Historical Perspective

Math
- Numbers and Operations
- Data Analysis and Probability
- Connection to the Real World

Procedure:
1. Ask students what electrical item is used most often in any building and can also account for a lot of wasted energy (lights).
2. Put each light bulb in the lamp and leave it on for five minutes. Hold a thermometer at a distance from, not touching, the bulbs. Record the temperatures. Which bulb produces the most heat?



3. Not all light sources are created equal. Some are much more energy-efficient than others. The least efficient light bulbs are incandescents. These bulbs were invented by Thomas Edison and have changed very little in the last 100 years. Incandescent bulbs get very hot when they are turned on because about 90 percent of the energy that goes into an incandescent bulb is given off as heat instead of light.

   By contrast, the compact fluorescent light, or CFL, uses 75 percent less energy because it gives off less heat. A CFL can last up to 10 times longer. LED bulbs are even more efficient, using 75 – 85 percent less energy than traditional incandescent bulbs and can last 25 times longer.

Discussion:
- Does your family use energy-efficient CFLs or LEDs? How can heat from an incandescent bulb cause further energy waste during the summer?

Energy in Math

STEM Connection

Math

- Numbers and Operations
- Data Analysis and Probability
- Connection to the Real World

1. Jessie saved more energy than Michael. Michael saved more energy than Maggie. Maggie saved less energy than Jessie. Karen saved more energy than Jessie. List the kids' names in order of how much energy they saved, least to most:

   ☐ Jessie, Karen, Maggie, Michael
   ☐ Maggie, Michael, Jessie, Karen
   ☐ Michael, Jessie, Maggie, Karen
   ☐ Maggie, Karen, Michael, Jessie

2. The Maher family used 57,000 gallons of water a year, costing them $525 to heat it. Estimate how much money they would save in a year if they cut their hot water use by 30,820 gallons.

   ☐ $100
   ☐ $240
   ☐ $284
   ☐ $525

3. If each person in a house uses a 60 Watt bulb in their bedroom 4 hours a day, and there are three people living there, how many Watts will be used a day to light their room?

   ☐ 20 Watts
   ☐ 240 Watts
   ☐ 650 Watts
   ☐ 720 Watts

4. For every 10 degrees the water heater setting is turned down, you can save 6 percent of the energy used. If Charles turns his water heater down by 15 degrees, about what percent savings in energy will he save?

   ☐ 6%
   ☐ 9%
   ☐ 12%
   ☐ 15%

Energy in Math - Answer Key

1. Jessie saved more energy than Michael. Michael saved more energy than Maggie. Maggie saved less energy than Jessie. Karen saved more energy than Jessie. List the kids' names in order of how much energy they saved, least to most:

   ☐ Jessie, Karen, Maggie, Michael
   ■ Maggie, Michael, Jessie, Karen
   ☐ Michael, Jessie, Maggie, Karen
   ☐ Maggie, Karen, Michael, Jessie

2. The Maher family used 57,000 gallons of water a year, costing them $525 to heat it. Estimate how much money they would save in a year if they cut their hot water use by 30,820 gallons.

   ☐ $100
   ☐ $240
   ■ $284
   ☐ $525

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   ☐ 20 Watts
   ☐ 240 Watts
   ☐ 650 Watts
   ■ 720 Watts

4. For every 10 degrees the water heater setting is turned down, you can save 6 percent of the energy used. If Charles turns his water heater down by 15 degrees, about what percent savings in energy will he save?

   ☐ 6%
   ■ 9%
   ☐ 12%
   ☐ 15%

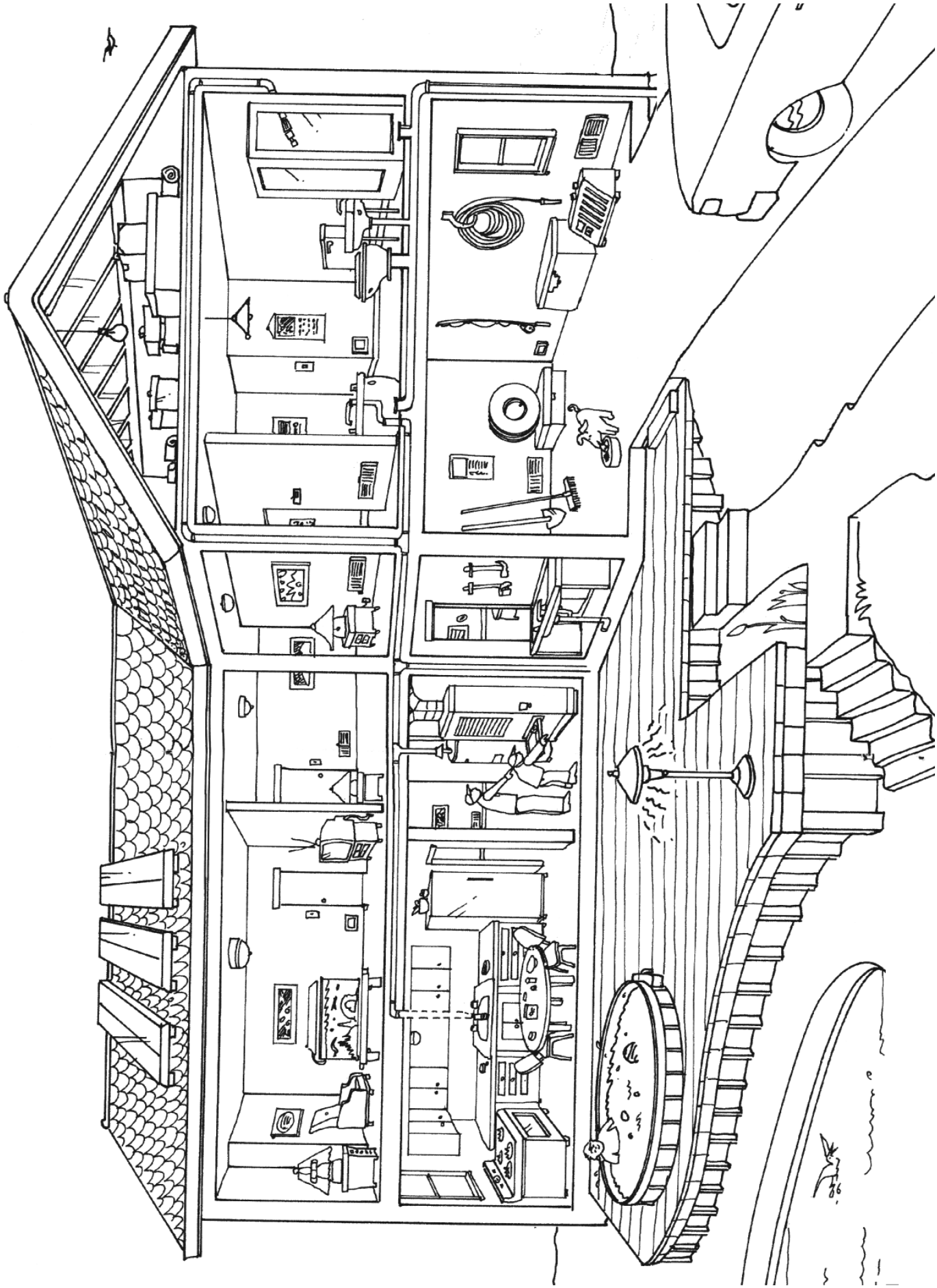
Be ***watt***smart, Begin at home Poster

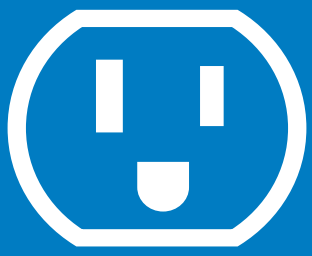
Materials:
- House poster found on the following page
- Colored markers or pens

Instructions:
- Add or color the items below. You may want to do different items each day as you cover different topics: electricity, natural gas, water, etc.
- Add a bicycle.
- Add some recycling bins in the garage.
- Add some trees to shade the house.
- Add a ceiling or floor fan to the home for cooling.
- Put a blue star (for ENERGY STAR® products) on the refrigerator, television and furnace.
- Color the energy-efficient shower head.
- Color all items that use electricity, yellow.
- Color the thermostat brown.
- Color the furnace filter that is being changed orange.
- Draw a purple water drop next to all items in the house that use water.

Language Arts Connection:
Quick write – Write a brief description of the things your family has done to improve the energy efficiency of your home. Add items that you will encourage your family to do in the future.

Social Studies Connection:
- Choose one natural resource used for energy and create a T-chart or Venn diagram comparing the positive and negative effects of the use of this resource on the physical environment.
- The more efficient your home is, the smaller your carbon footprint. Your carbon footprint is the total amount of carbon dioxide (CO_2) and other greenhouse gases you generate annually. The lower your footprint, the better!





Be *watt*smart

Begin at home

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bewattsmart.com

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Lingo Card

L	I	N	G	O
Water Heater	Natural Gas	Natural Resource	Incandescent	Reduce
Reuse	Phantom Load	Oil	Coal	ENERGY STAR®
Renewable	Energy	Be ***watt***smart Begin at home	Turn It Off!	Uranium
Energy Efficiency	LED	Recycle	68 Degrees	Embodied Energy
Cooking	78 Degrees	Solar	Programmable or Smart Thermostat	Electricity

http://print-bingo.com

L	I	N	G	O
Reuse	Natural Gas	Phantom Load	LED	78 Degrees
Cooking	Electricity	Renewable	Recycle	68 Degrees
Natural Resource	Water Heater	Be ***watt***smart Begin at home	ENERGY STAR®	Nonrenewable
Embodied Energy	Coal	Energy Efficiency	Heating	Incandescent
Programmable or Smart Thermostat	Reduce	Oil	Solar	Uranium

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L	I	N	G	O
Coal	Natural Gas	Solar	Turn It Off!	Renewable
Water Heater	Nonrenewable	Phantom Load	Electricity	Reuse
Energy	Oil	Be ***watt***smart Begin at home	68 Degrees	Cooking
Programmable or Smart Thermostat	Incandescent	Recycle	Uranium	Natural Resource
Reduce	78 Degrees	Embodied Energy	LED	Energy Efficiency

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L	I	N	G	O
Natural Resource	Water Heater	Natural Gas	Programmable or Smart Thermostat	78 Degrees
Turn It Off!	Reduce	Oil	Embodied Energy	Cooking
Phantom Load	ENERGY STAR®	Be ***watt***smart Begin at home	Uranium	Recycle
Energy	LED	68 Degrees	Energy Efficiency	Heating
Electricity	Renewable	Incandescent	Reuse	Solar

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Be wattsmart, Begin at home		Science (NextGen)		Social Studies	Math (Common Core)	Language Arts (Common Core)	
		PS3-4 Energy	ESS3-4 Earth and Human Activity	EALR 1	Number & Operations in Base Ten	Reading	Writing
Washington 4th Grade Correlations		Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat and electric currents.	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	Understands civic involvement.	Operations with multi-digit whole number & with decimals to hundredths.	Reading for information, speaking and listening.	Writing for effective communication.
	Activities						
Teacher Guide Activities	Energy Challenge - Embodied Energy		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1		SL.4.1	
	Conservation Cookie		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1	4.OA.A.1, 4.MD.A.2	SL.4.1	
	Pass the Sack		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1		SL.4.1	
	Energy Ticket		ESS3-4-1, ESS3-4-2, ESS3.A			SL.4.1	W.4.3
	The Search for Energy		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1	4.OA.A.1, 4.NBT.B.4-5, 4.MD.A.2	SL.4.1	
	Energy Challenge - Recycling		ESS3-4-2, ESS3.A	1.4.1		SL.4.1	
	Where Do Fossil Fuels Come From?		ESS3-4-1			SL.4.1	
	Energy for Electricity	PS3-4-1, PS3-4-2, PS3.D				SL.4.1	W.4.3
	Energy Challenge - Energy Efficient	PS3-4-2		1.4.1	4.MD.A.2	SL.4.1	
	Insulation Tests	PS3-4-2, PS3.D			4.OA.A.1, 4.MD.A.2	SL.4.1	W.4.3
	How Bright Is Your Light?	PS3-4-2, PS3.D	ESS3-4-2		4.MD.A.2	SL.4.1	
	Energy in Math		ESS3-4-2		4.OA.A.3, 4.NBT.B.4-5		
	Be ***watt*** smart, Begin at home Poster		ESS3-4-2	1.4.1		SL.4.1	W.4.3
Student Activities	**Presentation Information**		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1		RI.4.6	
	Student Booklet		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1	4.NBT.B.5	RI.4.6	
Posters	*Energy Efficiency in Action Poster*	PS1-5-3	ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1		RI.4.6	
	Electricity Serves Our Community Poster		ESS3-4-1, ESS3-4-2, ESS3.A	1.4.1		RI.4.6	

Be wattsmart, Begin at home		Science (NextGen)			Social Studies	Math (Common Core)	Language Arts (Common Core)	
		PS1-5 Physical Sciences	PS3-5 Energy	ESS3-5 Earth and Human Activity	EALR 1	Number & Operations in Base Ten	Reading	Writing
Washington 5th Grade Correlations		Make observations and measurements to identify materials based on their properties.	Use models to describe that energy in animals' food was once energy from the sun.	Support, obtain and combine information about ways individual communities use science ideas to protect the earth's resources and environment.	Understands civic involvement.	Operations with multi-digit whole number & with decimals to hundredths	Reading for information, Speaking and Listening	Writing for effective communication
	Activities							
Teacher Guide Activities	Energy Challenge - Embodied Energy		PS3-5-1	ESS3-5-1, ESS3.C	1.4.1		SL.5.1	
	Conservation Cookie	PS1-5-3		ESS3-5-1, ESS3.C	1.4.1	5.G.A.2	SL.5.1	
	Pass the Sack			ESS3-5-1, ESS3.C	1.4.1		SL.5.1	
	Energy Ticket		PS3-5-1	ESS3-5-1, ESS3.C		5.G.A.2	SL.5.1	W.4.3
	The Search for Energy	PS1-5-3	PS3-5-1	ESS3-5-1, ESS3.C	1.4.1	5.G.A.2	SL.5.1	
	Energy Challenge - Recycling			ESS3-5-1, ESS3.C	1.4.1		SL.5.1	
	Where Do Fossil Fuels Come From?		PS3-5-1	ESS3-5-1, ESS3.C			SL.5.1	
	Energy for Electricity						SL.5.1	W.4.3
	Energy Challenge - Energy Efficient				1.4.1	5.G.A.2	SL.5.1	
	Insulation Tests	PS1-5-3				5.G.A.2	SL.5.1	W.4.3
	How Bright Is Your Light?	PS1-5-3				5.G.A.2	SL.5.1	
	Energy in Math					5.NBT.B.5		
	Be ***watt*** smart, Begin at home Poster			ESS3-5-1, ESS3.C	1.4.1			W.4.3
Student Activities	**Presentation Information**			ESS3-5-1, ESS3.C	1.4.1		RI.5.6	
	Student Booklet			ESS3-5-1, ESS3.C	1.4.1	5.NBT.B.5	RI.5.6	
Posters	*Energy Efficiency in Action Poster*	PS1-5-3		ESS3-5-1, ESS3.C	1.4.1		RI.5.6	
	Electricity Serves Our Community Poster			ESS3-5-1, ESS3.C	1.4.1		RI.5.6	

Be *watt*smart
Begin at home

Dear Parent(s):

Today your child participated in the **Be *watt*smart, Begin at home** program sponsored by Pacific Power. In this engaging presentation, your child learned key concepts of his or her science curriculum as well as important ways to be more efficient with energy use at home.

As part of the **Be *watt*smart, Begin at home** program, your child received a:

- **Be *watt*smart, Begin at home** booklet
- *Home Energy Worksheet*
- *watt*smart *Starter Kit Flier*

Please take a moment to read through this informative booklet with your child. Then, fill out the *Home Energy Worksheet* and return it to your child's teacher. To thank you, Pacific Power will provide your child with a *watt*smart nightlight.

We appreciate your efforts to reinforce important **Be *watt*smart, Begin at home** energy knowledge and efficiency actions in your home!

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bewattsmart.com

Program Evaluation

Be *watt*smart
Begin at home

Teacher Name: _____

School: _____

Sponsor: Pacific Power

In an effort to improve our program, we would like your assessment of Be ***watt***smart, Begin at home. Please take a few minutes to fill out this evaluation form. Upon completion, please return the form in the postage-paid envelope along with the student *Home Energy Worksheets* you collected and the sponsor *Thanks a "Watt!" Card*.

Please mark the box that best describes your opinion.

	Strongly Agree	Agree	Disagree	Strongly Disagree
The materials were attractive and easy to use.	☐	☐	☐	☐
The materials and activities were well-received by students.	☐	☐	☐	☐
The materials were clearly written and well-organized.	☐	☐	☐	☐
Students indicated that their parents supported the program.	☐	☐	☐	☐
Presenters were able to keep students engaged and attentive.	☐	☐	☐	☐

If you had the opportunity would you conduct this program again? ☐ Yes ☐ No

Would you recommend this program to other colleagues? ☐ Yes ☐ No

In my opinion, the thing students liked best about the materials/program was:

One thing I would change would be:

WAT WA

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*watt*smart **Pacific Power program**

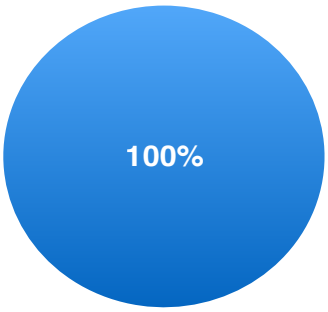
Program Evaluation Summary

Educators' impressions of the program from 87 educators.

	Strongly Agree	Agree	Disagree	Strongly Disagree	
Materials were attractive and easy to use	62	25	0	0	71% 29%
Materials/ activities were well received by students	68	19	0	0	78% 22%
Materials were clearly written and well organized	70	17	0	0	80% 20%
Students indicated that their parents supported the program	39	46	1	0	45% 53%
Presenters were able to keep the students engaged and attentive	67	20	0	0	77% 23%

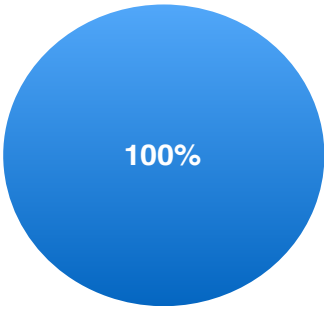
If you had the opportunity, would you conduct this program again?

	Yes	No
Mini-grant	87	0



Would you recommend this program to other colleagues?

	Yes	No
Mini-grant	87	0



In my opinion, the thing the students liked best about the materials/program was:
Being able to be actively involved in the presentation.
Being able to be part of the demonstrations model.
Being able to volunteer (being picked) to demonstrate.
Connecting the information to what they learned in their science.
Creating a human circuit by holding hands was their favorite.
Energy stick and being able to participate with their peer. They enjoyed the bing game
Everything went wonderful!
Going home and learning about all the energy they are using at home and learning about their family can be more energy efficient.
Great presenters!
Great presenters! My students like the participation activities. Thanks for coming!
Hands on activities and the LINGO game.
Hands on aspect of the presentation. The model of how energy is produced.
Hands on experiments. Thanks again! Great as always.
Human electric circuit
Interactive activities during the presentation
Kids love to participate in the activities especially the circuit!
Learned how we get power in different ways, circuit demonstration, learning how electricity travels
Learning from outside experts.
Lingo and the bulb night light
Lingo and the night lights
Lingo game
LINGO is always fun! Being a participant and part of the presentation keeps the students engaged!
Lingo, lineman slim, human circuit. I loved it! Keep it just as it is!
Love how this coincided with our electric circuit unit
My students enjoyed the program. They were really intrerested in the LED light bulb. They learned a lot of new information about energy, power, and how to conserve energy.
My students really enjoyed the presentation. The presenters did an amazing job.
Participating in the activities
Playing Lingo and the parts were you need volunteers to demonstrate
Posters and Dove Tails with up and coming science program.
Students always like the hands on demonstrations.
Students liked the LINGO game, night lights, and participation of students during the presentation.
That it was hands on - all students were engaged!
That it was interactive and it was something different than/special compared to a "normal" school day.
The activities.
The closed circuit demonstration. The Smith's are awesome presenters!
The demonstrations and the Lingo activity.
The demonstrations with props
The demonstrations with the students involved.
The electricity stick human circle/circuit. They like the energy Lingo and like the videos of the Lineman. Super good presenters. Keep up the good work! Please come back.
The engagement with the presenters.
The engaging games in the presentation.
The hands on activites like the human conductor.
The hands on activity/demonstration for how the circuit worked
The hands on learning activities.
The hands-on experiments/demonstrations! Night lights!
The human circuit example.
the human circuit was a hit! The whole presentation was awesome. I would not change any part of it.
The interactive activities like the open and closed circuit.
The interactive activities. We love this program!
The interactive parts of the presentation.
The kids enjoyed playing LINGO.
The knowledge of the presenters and the hands on activities.
The LINGO cards.
The LINGO game and actively participating and modeling.
The LINGO game and interesting facts in the presentation. They also thought it was fun to get the nighlights.
The night light.
The night lights and the human circuit.

In my opinion, the thing the students liked best about the materials/program was:

The offer of the night light.
The posters.
The presenters kept 100 4th graders engaged for an hour... not an easy thing to do. They were wonderful!
The presenters! Steve and Ariene Smith were great with the kids! They put the ideas and vocabulary in kid friendly terms so the kids could understand. They have great rapport with kids as well.
The slideshow, bingo, light stick, and hands on activites.
The student involvement!
The student-led presentation kept kids highly engaged.
The students enjoy them coming in and doing the presentation.
The students enjoyed having the opportunity to participate during the presentation! They also enjoyed the LINGO game.
The students liked the connection to what we are doing in class.
The videos the presenters showed and the energy stick.
They always like the participation parts.
They enjoyed applying the concepts learned into the Lingo game.
They enjoyed the experiments, especially the human circuit
They enjoyed the LINGO and student participation. Great information. It goes well with our science unit.
They enjoyed the powerpoint presentation and night lights. Most of all, they enjoyed participating with the presenters.
They enjoyed your activities and games during the presentation. Well connected to our learning in science class.
They liked the LINGO game, night lights, and the presentation.
They love the bingo game!
They loved being selected to complete a circuit demonstration.
They loved getting the lightbulbs and the night lights.
They loved the electric stick!
They really enjoyed Lingo and the human circuit!
understanding the concept of conductor, insulator, circuit and conserving energy
When the speaker talks about the different ways electricity comes to our homes.

In the future, one thing I would change would be:

Adding a microphone for the presenters as our acustics in our cafeteria is not the greatest.
All material provided should be in english and spanish
Enteract more with students. You don't have to stick to the script.
I don't remember the "wattsmart" name being explained. Both presenters used excellent teaching strategies. One presenter's manner was too preschoolish for grades 1-7 even though the content was level appropriate.
I think the students would have a greater science knowledge and vocabulary if the presentation was later in the school year.
I would add games to the presentation and a powerpoint demonstration.
I'm not sure how you would address this, but some parents were suspicious of free products. Thought it was a scam.
Just keep the hands on activites.
More hands on activities
More hands on presentations. The female presenter was good, but difficult to hear at times.
More interaction and examples.
More materials in Spanish like the booklet.
More student engagement or do something with lingo
More time for questions. Thank you so much!
Nothing at this time.
Nothing, it was well done! Thank you.
Nothing! It's a great program.
Nothing.
Nothing.
Nothing.
Nothing.
Nothing.
Nothing.
Nothing. I thought it was a great presentation.
Offer it more throughout the year. I would love to have this presentation during our electrical circuits unit!
Perhaps add a new feature as it seems to be the same program!
Present to smaller groups. One class at a time.
Print Spanish on the back of the surveys. Do multiple presentations in a day, so each class can have their own because three classes in one classroom doesn't work well.
Provide copies of the home energy worksheets in Spanish.
Provide us with extra surveys. Students are very poor at getting them to their parents.
Smaller group presentations - 100+ kids to watch and pay attention fo ran hour on the floor is difficult. Would love to see the presentations in class rooms or in a smaller grouping.
The more engaged the students, the better. The presenters could walk around a little more as they present. That is an easy thing that helps the kids with short attention spans keep focused.
The presentation was a little long.
The presentation was a little too much adults talking and not enough interaction for the kids.
This program is awesome!
Time of year, have it closer to our electric circuit unit/kit
We enjoyed the presentation! No change!
We need clearer instructions for the surveys in Spanish. Many students struggled to explain the sruvey to their parents. It was difficult to get them back because of this.

Teacher ID: _____

Teacher Name: _____

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Home Energy Worksheet

Student First Name: _____

Heating

1. Install and use a programmable or smart thermostat.
   ☐ Currently do ☐ Will do ☐ Neither
2. Caulk windows and weather strip outside doors.
   ☐ Have done ☐ Will do ☐ Neither
3. Inspect attic insulation and add insulation if needed.
   ☐ Have done ☐ Will do ☐ Neither
4. Keep furnace air filters clean/replaced regularly.
   ☐ Currently do ☐ Will do ☐ Neither

Cooling

5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit.
   ☐ Have done ☐ Will do ☐ Neither
6. Close blinds when windows are exposed to the sun.
   ☐ Currently do ☐ Will do ☐ Neither
7. Use a fan instead of air conditioning.
   ☐ Currently do ☐ Will do ☐ Neither
8. In the summer, set thermostat to 78 degrees F or higher.
   ☐ Currently do ☐ Will do ☐ Neither

Water heating

9. Set the water heater temperature to 120 degrees F.
   ☐ Have done ☐ Will do ☐ Neither
10. Install a high-efficiency showerhead.
    ☐ Have done ☐ Will do ☐ Neither
11. Take 5 minute showers.
    ☐ Currently do ☐ Will do ☐ Neither
12. Wash full loads in the dishwasher and clothes washer.
    ☐ Currently do ☐ Will do ☐ Neither

Lighting

13. Replace incandescent bulbs with LED bulbs.
    ☐ Have done ☐ Will do ☐ Neither
14. Turn lights off when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Refrigeration

15. Replace old, inefficient refrigerator with an ENERGY STAR® model.
    ☐ Have done ☐ Will do ☐ Neither
16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner.
    ☐ Have done ☐ Will do ☐ Neither
17. Maintain refrigerator and freezer coils and check door seals twice yearly.
    ☐ Currently do ☐ Will do ☐ Neither

Electronics

18. Turn off computers, TVs and game consoles when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Cooking

19. Use a microwave oven, toaster oven, crock pot or outdoor grill instead of a conventional oven.
    ☐ Currently do ☐ Will do ☐ Neither

Get paid for being *watt*smart

20. Visit Pacific Power at *bewattsmart.com* for more energy-saving tips and rebates.
    ☐ Have done ☐ Will do ☐ Neither

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Ser ***watt***smart
Empieza en casa

Nombre del profesor(a): _____

Verificación de la Energía Doméstica

Nombre del estudiante: _____

Calefacción

1. Instalar y usar un termostato programable o termostato inteligente.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
2. Calafatear ventanas e instalar burletes en el exterior de puertas.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
3. Inspeccionar el aislamiento del ático y agregar aislamiento si es necesario.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
4. Mantener los filtros de aire de la calefacción limpios/ reemplezados regularmente.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno

Enfriamiento

5. Reemplazar la unidad de aire acondicionado existente por una unidad de alta eficiencia o un enfriador evaporativa.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
6. Cerrar las persianas cuando las ventanas están expuestas al sol.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
7. Usar un ventilador en lugar del aire acondicionado.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
8. En el verano, ajustar el termostato a 78 grados F o más.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno

Calentadores de agua

9. Programar el calentador de agua a 120 grados F.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
10. Instalar un cabezal de ducha de alta eficiencia.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
11. Tomar duchas de 5 minutos.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno
12. Lavar cargas llenas en los lavaplatos y las lavadoras de ropa.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Iluminación

13. Reemplazar los focos incandescentes con focos LED.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
14. Apagar las luces cuando no estén en uso.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Refrigerador

15. Reemplazar refrigerador antiguo e ineficiente con modelo de ENERGY STAR®.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
16. Desenchufar viejos refrigeradores/congeladores y/o desecharlos de una manera ambientalmente segura.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
17. Mantener las bobinas del refrigerador y del congelador e inspeccionar el sello de las puertas dos veces al año.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Electrónicos

18. Apagar computadoras, televisores y consolas de juegos cuando no estén en uso.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Cocinar

19. Usar un horno microonda, un horno eléctrico, un olla de cocimiento lento o un parrilla de aire libre en lugar del horno convencional.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Reciba paga siendo *watt*smart

20. Visite Pacific Power en *bewattsmart.com* para obtener más consejos y rebajas de ahorro de energía.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno

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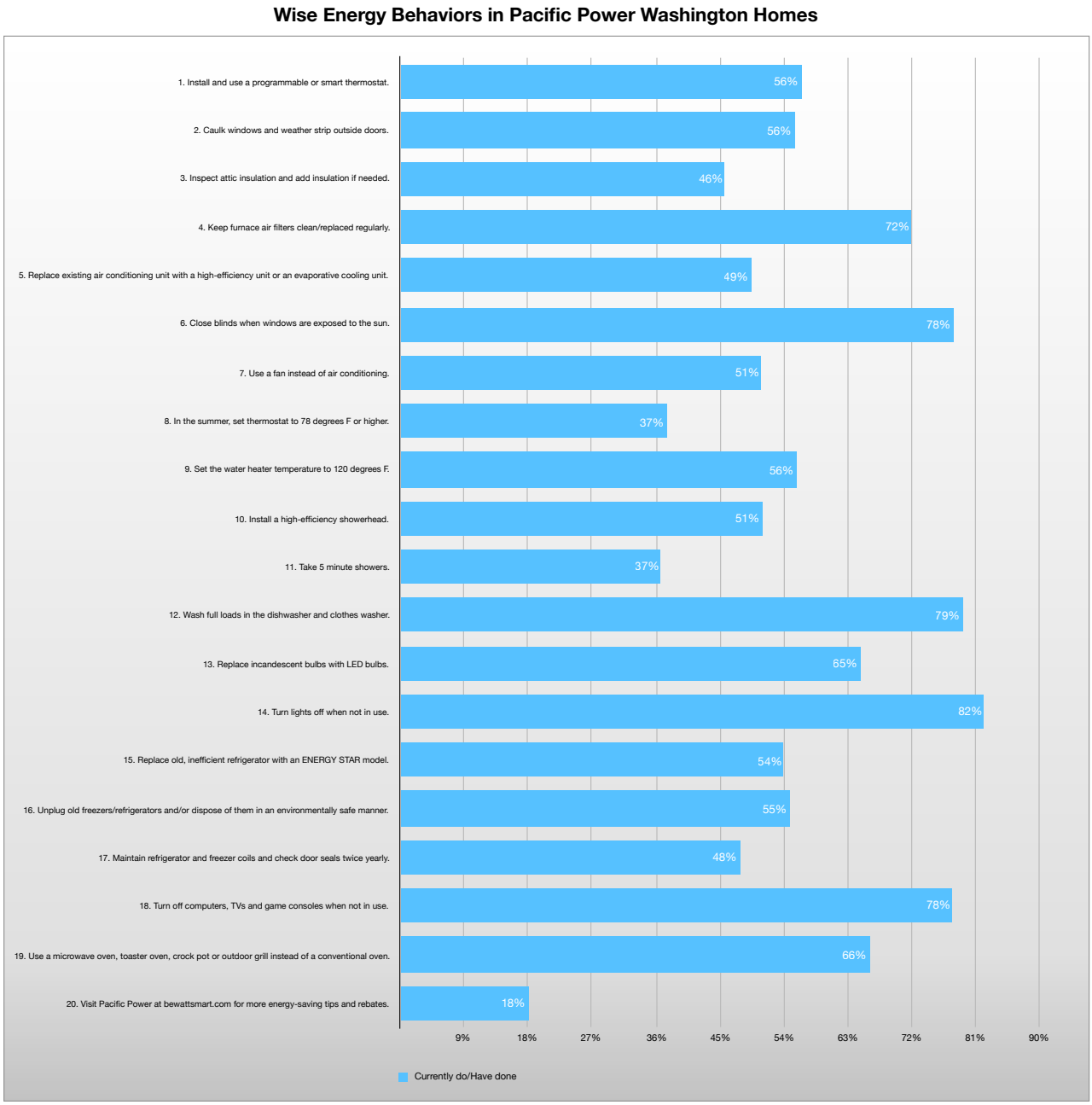
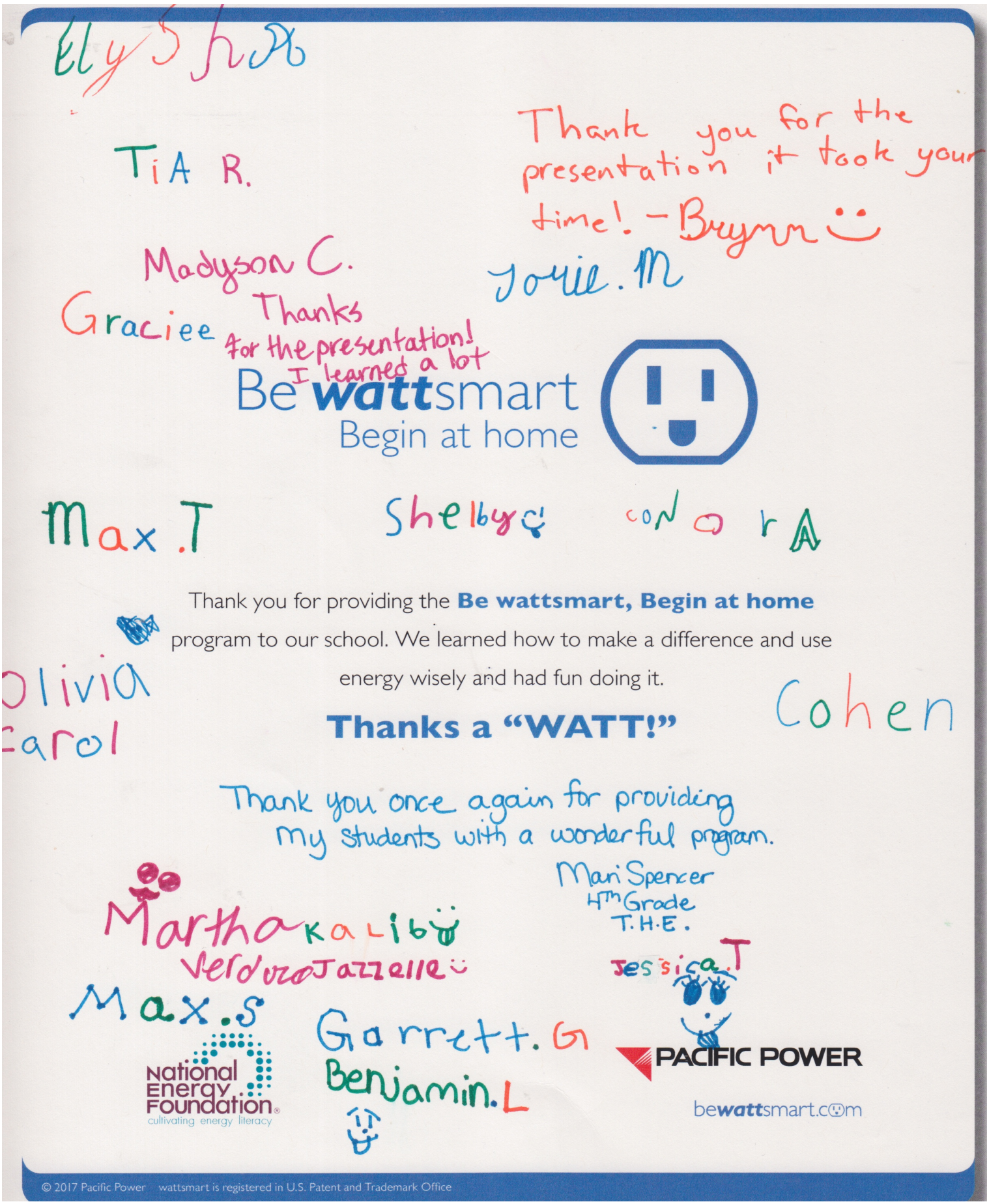
Home Energy Worksheet Summary – Pacific Power

Energy Efficient Activity	Currently do/Have done	Will do	Neither
1. Install and use a programmable or smart thermostat.	56%	18%	26%
2. Caulk windows and weather strip outside doors.	56%	26%	19%
3. Inspect attic insulation and add insulation if needed.	46%	23%	31%
4. Keep furnace air filters clean/replaced regularly.	72%	15%	13%
5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit.	49%	21%	30%
6. Close blinds when windows are exposed to the sun.	78%	13%	10%
7. Use a fan instead of air conditioning.	51%	20%	29%
8. In the summer, set thermostat to 78 degrees F or higher.	37%	24%	38%
9. Set the water heater temperature to 120 degrees F.	56%	22%	22%
10. Install a high-efficiency showerhead.	51%	26%	23%
11. Take 5 minute showers.	37%	32%	32%
12. Wash full loads in the dishwasher and clothes washer.	79%	9%	12%
13. Replace incandescent bulbs with LED bulbs.	65%	24%	11%
14. Turn lights off when not in use.	82%	14%	4%
15. Replace old, inefficient refrigerator with an ENERGY STAR model.	54%	22%	24%
16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner.	55%	20%	25%
17. Maintain refrigerator and freezer coils and check door seals twice yearly.	48%	37%	15%
18. Turn off computers, TVs and game consoles when not in use.	78%	17%	6%
19. Use a microwave oven, toaster oven, crock pot or outdoor grill instead of a conventional oven.	66%	18%	16%
20. Visit Pacific Power at bewattsmart.com for more energy-saving tips and rebates.	18%	63%	19%

Wise Energy Behaviors in Pacific Power Washington Homes



Sampling of *Thanks a "WATT" Cards*



Be **watt**smart
Begin at home

thank you so much for the electrifying presentation!
Ms. Krueger's Class !!

Efrain

Danica

Torres

Katherine

Jacelin

Noah thanks!!

Thank you for providing the **Be wattsmart, Begin at home** program to our school. We learned how to make a difference and use energy wisely and had fun doing it.

Thanks a "WATT!"

BJ

Jesus

cristian

Isael

Ethan

Brianna

Andy

Ramiro

Malea MahAnn.M

Arleth.Z

Carmar

Vialexis

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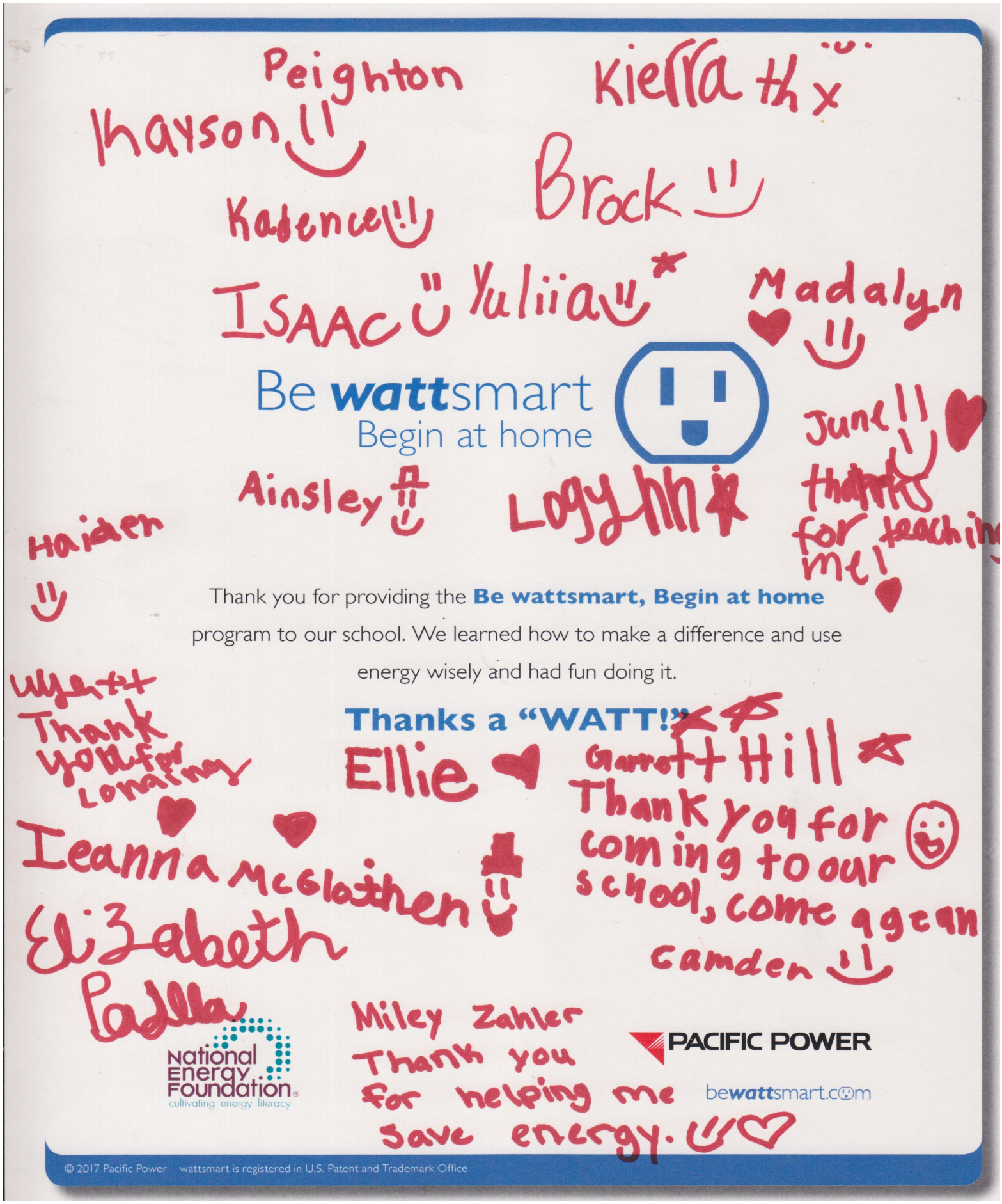
bewattsmart.com



Be **watt**smart
Begin at home

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Thanks a "WATT!"

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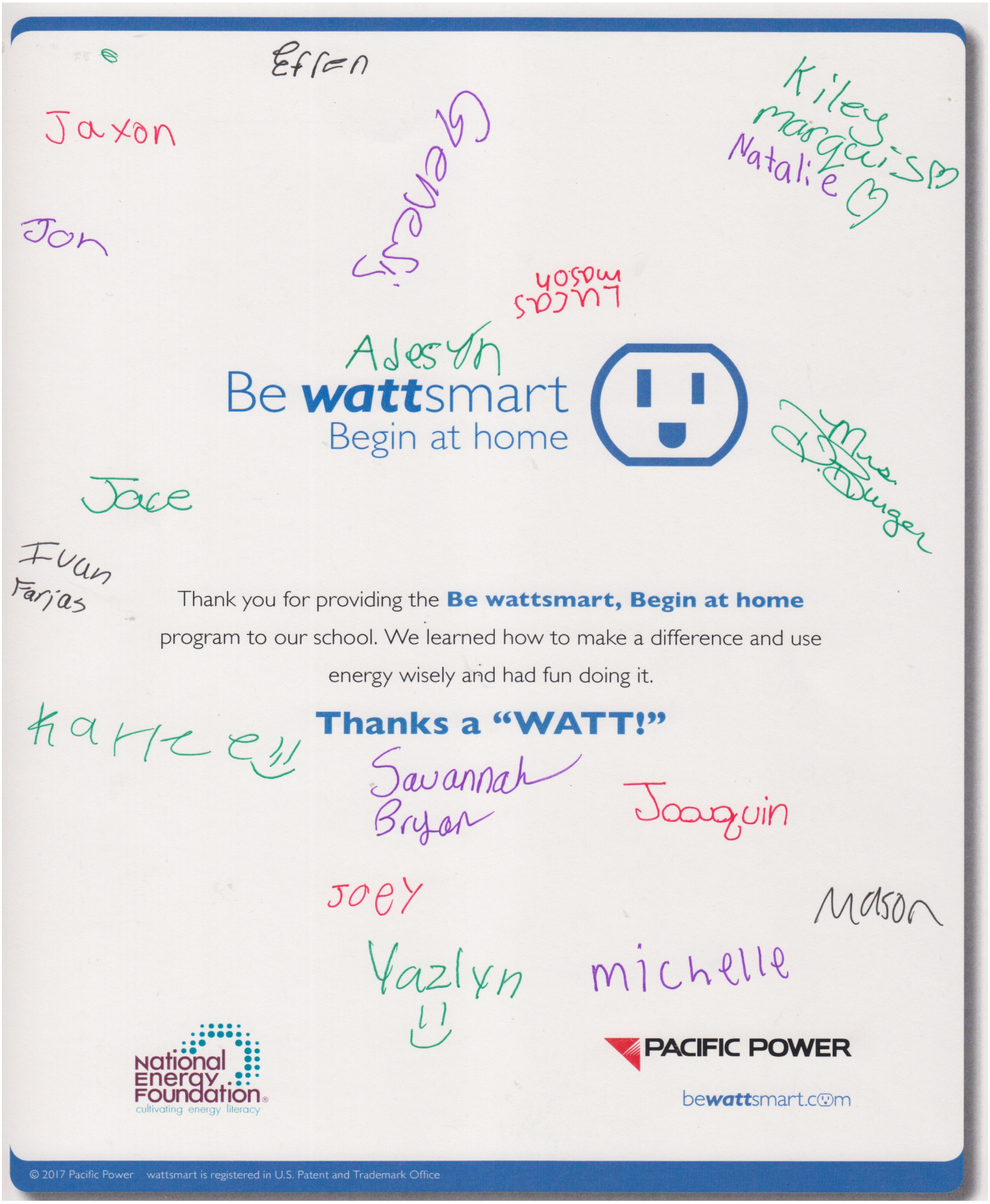

Appendix 6
Washington Program Evaluations

Washington 2017 Evaluations

Program Evaluation Recommendations and Company Responses

Evaluation reports provide detailed information on the process and impact evaluations performed on each program, summarizing the methodology used to calculate the evaluated savings as well as providing recommendations for the Company to consider for improving the process or impact of the program, as well as customer satisfaction.

Outlined below is a list of the programs, the years that were evaluated during 2017 and the third party evaluator who completed the evaluation. Program evaluations are available for review at www.pacificorp.com/es/dsm/washington.html

Program	Years Evaluated	Evaluator
Home Energy Savings	2015 - 2016	Cadmus
*watt*smart Business	2014 – 2015	Cadmus

Company responses to the program recommendations contained in the evaluations are provided below.

Table 1
Home Energy Savings Evaluation Recommendations

Evaluation Recommendations	Pacific Power Response
For wattsmart kits, have the program administrator collect kit participant phone numbers and e-mail addresses for kit program survey data collection activities. This information was not available during the evaluation.	As of April 18, 2017, the kit vendor, Energy Federation, Inc. (EFI) requires participant contact information in order to fulfill a kit request.
To quantify the lift of upstream lighting point-of-sale data, track dates and locations for all merchandising and product placement the program is responsible for. Providing model numbers, store locations, dates, and display types (e.g., end caps, pallet displays) allows more precise estimates of program-generated sales lift.	In 2017, the program administrator updated processes for tracking merchandising and product placement information. A Promotion and Activity Tracker was generated to keep tabs on precisely when SKUs have promotional activity and the data points recommended in the evaluation.
For the lighting savings, Cadmus used a recent RTF workbook (2016) to derive evaluated savings, creating a misalignment between the reported and evaluated savings. Cadmus recognizes program planning and the release of new RTF workbooks may not always align. Where feasible and applicable, use the latest RTF workbook.	Addressed in measure development for the 2018/2019 biennium. RTF workbooks current as of September 2017 were used. In addition, in a change from prior biennial periods, updates will be made on January 1, 2019 using RTF updates as of October 1, 2018.
Non-lighting participants reported (27%) long application processing times greater than 8 weeks. To help resolve long wait times, provide customers and contractors with clear, concise directions via applications and the website regarding submittal requirements specific for each measure. Monitor training and performance of administrator staff managing incentive processing. Review incentive payment timeframes compared to those at the end of 2016 to determine whether the number of projects paid in less than four weeks are increasing or those paid in more than eight weeks are decreasing.	During 2017, the program administrator streamlined internal processes and reduced the total process time (application received to check cut date) by 24 calendar days compared to 2016. As part of January 1, 2018 program changes, applications and website content were revised and further streamlined with a goal of further reducing processing time.

Table 2
*watt*smart Business Evaluation Recommendations

Evaluation Recommendations	Pacific Power Action Plan
Consider adding an HVAC interactive effect factor consistent with the Non-Residential Lighting Standard Protocol approved on December 14, 2016.	HVAC interactive effects have been added to the program lighting tool after enabling this with a program change.
Consider increasing the deemed savings for prescriptive HVAC VFD fan and pump motor projects.	The deemed savings for HVAC VFD fan and pump motors is under evaluation.
Consider additional training to participating motor service centers to provide a more accurate estimate for motor installation times (rather than always entering six months from the time of service). After delivering the training or new instructions, the program should review applications and track estimated reinstall dates to ensure motor service centers provide more reliable estimates and better understand when savings may be realized.	Recommendation was not implemented due to complexity, regional alignment and small impacts of recommendation on the program overall. Motors can be rewound and placed in inventory to be readily available when the motor in service needs replacement. In these situations, the motor service center cannot predict when a motor currently in service at the customer facility will fail and the rewound motor installed. The motor service centers are managed by the Green Motors Practices Group for the region (and beyond). It is important for Pacific Power's incentive requirements to be consistent with others in the region. The program is using Regional Technical Forum deemed savings for this measure. By implementing the current design, the program accepts the evaluation risk that a rewound motor may not be installed for a period of time.
Continue enhancing the existing, customer-facing vendor search tool. This could include a rating system of participating contractors for various measure categories, based on the quality of work performed and including ratings from program participants (an arrangement similar to Yelp).	Continued to enhance the customer facing vendor search tool. Began assessing vendor performance using a survey completed after the vendor completes an installation. There are plans to make feedback and links to other information (as recommended) available in a new "learn more" area of the vendor search. Added a premium tier in 2018 to identify the highest performing vendors in the vendor search. Pacific Power visited the recommended Energy Trust of Oregon website.
Assess the size of any data exchange inconsistencies and associated impacts between the implementer's database and DSMC, and identify the most appropriate solution.	Beginning in 2016, Nexant began using the same database software as Pacific Power and has modeled measure validations to match the Pacific Power database (DSMC). Improvement to the batch upload process continues to be a priority and revised upload processes/policies have been or will be developed as applicable to program implementation.
While an account management approach may not prove cost-effective in the SBL delivery channel, consider methods for increasing direct contact from Pacific Power or implementer staff.	Plans are in place to provide more direct to customer small business lighting marketing including site visits/lighting audits performed by or with program representatives.

To increase participation, talk to contractors, vendors and distributors to gain insights into how much they have penetrated their small business target market and to determine what additional resources Pacific Power could provide to help them increase outreach to customers without an active ongoing project.	In 2017, a direct customer mailer campaign was launched and a contractor/utility co-branded program marketing brochure was developed for contractors to leave behind with customers. After these efforts the SBL program began to see more participation. In addition to continuing a direct mailing campaign, plans are in place to provide more direct to customer SBL marketing through site visits/lighting audits.
If additional program growth is desired in any of the program delivery channels, consider performing a comprehensive marketing effectiveness assessment to both evaluate the impact of existing marketing and outreach activities, and to investigate how to better reach and motivate these customers.	Further efforts regarding the implementation of this recommendation is highly impacted by the savings targets assigned to the implementation team. As noted in the cell below, "Effective marketing can help achieve this goal. At this time there are no plans to create additional marketing goals…" Any additional marketing and market penetration plans will be considered as a method to achieve the delivery channel savings goals. If achieving exact savings targets is not an issue additional market research and evaluation can be performed as recommended.
Program Marketing and Outreach: 1) Create delivery channel-specific marketing goals, objectives, and Key Performance Indicators (KPIs) to ensure that each delivery channel performs as needed. 2) Communicate KPIs, goals, and objectives together on the calendar; so all parties remain aware of performance indicators. 3) Use a diverse mix of marketing touchpoints in the communication strategies.	1) Each delivery channel has a goal (could be called a key performance indicator) to meet a specific share of the biennial conservation target cost-effectively. Effective marketing can help achieve this goal. At this time, there are no plans to create additional marketing goals and key performance indicators by delivery channel. 2) Parties remain aware of their goals with the existing structure. 3) Parties make use of a diverse mix of marketing touchpoints.
Program Marketing and Outreach for SBL: Diversify marketing touchpoints beyond the approved trade ally network to encourage business owners to reach out to contractors.	Plans are in place to provide more direct to customer SBL marketing, such as social media campaigns and adding a "request a free lighting assessment" button to the small business website.
Program Marketing and Outreach for Custom Analysis: Develop an email blast or direct-mail communication similar to the email blasts used for the 2015 LED Instant Incentive marketing campaign.	In general, custom analysis is needed for larger, more complex customers. The primary method to approach these customers is by direct personal contact. These customers may also be included in email blasts, but the focus is something common to most customers such as lighting with a mention that the program includes more than lighting. Email blasts will continue.
Messaging and Calendar: 1) Create marketing messages targeted to specific delivery channels, but that remain in line with overall program key marketing messages. 2) Slightly space out newspaper and radio ads to accommodate more marketing time. Move email blasts closer to the year's start, right after the busy holiday season ends. 3) During January and February, extend lighting's paid media campaigns;	1) Marketing to specific delivery channels is always integrated with key program messages and branding. 2) The company's will implement this recommendation. 3) The company's will implement this recommendation.

during May and June, extend HVAC's paid media campaign to take advantage of slow periods.	
Savings Considerations: Consider adding an HVAC interactive effect factor consistent with the Non-Residential Lighting Standard Protocol approved on December 14, 2016.	HVAC interactive effects have been added to the program lighting tool after enabling this with a program change.