



## Appendix 1

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# Energy Efficiency Cost Effectiveness

Pacific Power



## Memorandum

**To:** Nikki Karpavich, PacifiCorp/Rocky Mountain Power  
**From:** David Basak, Navigant  
**Date:** April 12, 2017  
**Re:** Cost-Effectiveness for the Portfolio and Sector Level - Washington

Navigant estimated the cost-effectiveness for the overall energy efficiency portfolio and component sectors, based on 2016 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.

Table 1 - Utility Inputs  
Table 2 – Portfolio Level Costs 201  
Table 3 – NEEA Inputs 201  
Table 4 - Benefit/Cost Ratios by Portfolio Type  
Table 5 – 2016 Total Portfolio Cost-Effectiveness Results  
Table 6 – 2016 Total Portfolio Cost-Effectiveness Results (Including NEEA)  
Table 7 – 2016 Total Portfolio Cost-Effectiveness Results (Including NEBs)  
Table 8 – 2016 Total Portfolio Cost-Effectiveness Results (Including NEEA and NEBs)  
Table 9 – 2016 C&I Energy Efficiency Portfolio Cost-Effectiveness Results  
Table 10 – 2016 C&I Energy Efficiency Portfolio Cost-Effectiveness Results (Including NEEA)  
Table 11 – 2016 Residential Energy Efficiency Portfolio Cost-Effectiveness Results  
Table 12 – 2016 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA)  
Table 13 – 2016 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEBs)  
Table 14 – 2016 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA and NEBs)  
Table 15 – Home Energy Savings Non-Energy Benefits (2016)

**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)	\$0.0836
Commercial Energy Rate (\$/kWh)	\$0.0717
Industrial Energy Rate (\$/kWh)	\$0.0887
Irrigation Energy Rate (\$/kWh)	\$0.1327
Inflation Rate <sup>1</sup>	1.9%

<sup>1</sup> Future rates determined using a 1.9% annual escalator.

**Table 2 – Portfolio Level Costs 2016**

Expense	Cost
School Energy Education	\$62,794
Outreach and Communication	\$184,227
Portfolio Level Expenditures	\$538,498
<b>Total Costs</b>	<b>\$785,519</b>

**Table 3 – NEEA Inputs 2016**

Sector	Savings at Meter (kWh)	NEEA Expenses (\$)
Residential	2,483,827	\$607,047
Industrial	1,033,292	\$252,216
Commercial	44,349	\$10,690
<b>Total</b>	<b>3,561,468</b>	<b>\$869,953</b>

**Table 4 - Benefit/Cost Ratios by Portfolio Type**

Measure Group	PTRC	TRC	UCT	RIM	PCT
Total Portfolio	1.82	1.65	2.74	0.66	3.15
Total Portfolio (Including NEEA)	1.79	1.63	2.62	0.64	3.28
Total Portfolio (Including NEBs)	1.97	1.81	2.74	0.66	3.18
Total Portfolio (Including NEEA & NEBs)	1.94	1.78	2.62	0.64	3.31
C&I Programs	2.07	1.88	3.41	0.69	3.23
C&I Programs (Including NEEA)	2.05	1.87	3.33	0.69	3.28
Residential Programs	1.42	1.29	1.91	0.58	2.88
Residential Programs (Including NEEA)	1.40	1.27	1.77	0.55	3.29
Residential Programs (Including NEBs)	2.06	1.94	1.91	0.58	3.00
Residential Programs (Including NEEA & NEBs)	1.96	1.83	1.77	0.55	3.42

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

**Table 5 – 2016 Total Portfolio Cost-Effectiveness Results**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0452	\$17,199,783	\$31,248,400	\$14,048,617	1.82
Total Resource Cost Test (TRC) No Adder	\$0.0452	\$17,199,783	\$28,407,636	\$11,207,853	1.65
Utility Cost Test (UCT)	\$0.0272	\$10,355,926	\$28,407,636	\$18,051,711	2.74
Rate Impact Test (RIM)		\$43,343,624	\$28,407,636	-\$14,935,988	0.66
Participant Cost Test (PCT)		\$12,168,394	\$38,312,256	\$26,143,862	3.15
Lifecycle Revenue Impacts (\$/kWh)					\$0.0003096407

**Table 6 – 2016 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	\$18,069,736	\$32,407,451	\$14,337,715	1.79
Total Resource Cost Test (TRC) No Adder	\$0.0453	\$18,069,736	\$29,461,319	\$11,391,583	1.63
Utility Cost Test (UCT)	\$0.0282	\$11,225,879	\$29,461,319	\$18,235,441	2.62
Rate Impact Test (RIM)		\$45,868,485	\$29,461,319	-\$16,407,166	0.64
Participant Cost Test (PCT)		\$12,168,394	\$39,967,165	\$27,798,770	3.28
Lifecycle Revenue Impacts (\$/kWh)					\$0.0003710613

**Table 7 – 2016 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	\$0.0452	\$17,199,783	\$33,902,987	\$16,703,203	1.97
Total Resource Cost Test (TRC) No Adder	\$0.0452	\$17,199,783	\$31,062,223	\$13,862,440	1.81
Utility Cost Test (UCT)	\$0.0272	\$10,355,926	\$28,407,636	\$18,051,711	2.74
Rate Impact Test (RIM)		\$43,343,624	\$28,407,636	-\$14,935,988	0.66
Participant Cost Test (PCT)		\$12,168,394	\$38,657,781	\$26,489,387	3.18
Lifecycle Revenue Impacts (\$/kWh)					\$0.0003096407

**Table 8 – 2016 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	\$18,069,736	\$35,062,038	\$16,992,302	1.94
Total Resource Cost Test (TRC) No Adder	\$0.0453	\$18,069,736	\$32,115,906	\$14,046,170	1.78
Utility Cost Test (UCT)	\$0.0282	\$11,225,879	\$29,461,319	\$18,235,441	2.62
Rate Impact Test (RIM)		\$45,868,485	\$29,461,319	-\$16,407,166	0.64
Participant Cost Test (PCT)		\$12,168,394	\$40,312,689	\$28,144,295	3.31
Lifecycle Revenue Impacts (\$/kWh)					\$0.0003710613

**Table 9 – 2016 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	\$0.0398	\$12,288,719	\$25,385,699	\$13,096,980	2.07
Total Resource Cost Test (TRC) No Adder	\$0.0398	\$12,288,719	\$23,077,909	\$10,789,189	1.88
Utility Cost Test (UCT)	\$0.0219	\$6,774,176	\$23,077,909	\$16,303,732	3.41
Rate Impact Test (RIM)		\$33,348,205	\$23,077,909	-\$10,270,296	0.69
Participant Cost Test (PCT)		\$9,457,179	\$30,516,664	\$21,059,485	3.23
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001824311

**Table 10 – 2016 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	\$0.0399	\$12,551,625	\$25,788,858	\$13,237,233	2.05
Total Resource Cost Test (TRC) No Adder	\$0.0399	\$12,551,625	\$23,444,416	\$10,892,791	1.87
Utility Cost Test (UCT)	\$0.0224	\$7,037,082	\$23,444,416	\$16,407,334	3.33
Rate Impact Test (RIM)		\$34,129,953	\$23,444,416	-\$10,685,536	0.69
Participant Cost Test (PCT)		\$9,457,179	\$31,035,506	\$21,578,327	3.28
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001898070

**Table 11 – 2016 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	\$0.0576	\$4,125,545	\$5,862,701	\$1,737,155	1.42
Total Resource Cost Test (TRC) No Adder	\$0.0576	\$4,125,545	\$5,329,728	\$1,204,182	1.29
Utility Cost Test (UCT)	\$0.0391	\$2,796,231	\$5,329,728	\$2,533,497	1.91
Rate Impact Test (RIM)		\$9,209,901	\$5,329,728	-\$3,880,173	0.58
Participant Cost Test (PCT)		\$2,711,215	\$7,795,592	\$5,084,377	2.88
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001378696

**Table 12 – 2016 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	\$0.0562	\$4,732,592	\$6,618,593	\$1,886,001	1.40
Total Resource Cost Test (TRC) No Adder	\$0.0562	\$4,732,592	\$6,016,903	\$1,284,311	1.27
Utility Cost Test (UCT)	\$0.0404	\$3,403,278	\$6,016,903	\$2,613,625	1.77
Rate Impact Test (RIM)		\$10,953,014	\$6,016,903	-\$4,936,111	0.55
Participant Cost Test (PCT)		\$2,711,215	\$8,931,659	\$6,220,443	3.29
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001753890

**Table 13 – 2016 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	\$0.0576	\$4,125,545	\$8,517,287	\$4,391,742	2.06
Total Resource Cost Test (TRC) No Adder	\$0.0576	\$4,125,545	\$7,984,314	\$3,858,769	1.94
Utility Cost Test (UCT)	\$0.0391	\$2,796,231	\$5,329,728	\$2,533,497	1.91
Rate Impact Test (RIM)		\$9,209,901	\$5,329,728	-\$3,880,173	0.58
Participant Cost Test (PCT)		\$2,711,215	\$8,141,117	\$5,429,901	3.00
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001378696

**Table 14 – 2016 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	\$0.0562	\$4,732,592	\$9,273,180	\$4,540,587	1.96
Total Resource Cost Test (TRC) No Adder	\$0.0562	\$4,732,592	\$8,671,489	\$3,938,897	1.83
Utility Cost Test (UCT)	\$0.0404	\$3,403,278	\$6,016,903	\$2,613,625	1.77
Rate Impact Test (RIM)		\$10,953,014	\$6,016,903	-\$4,936,111	0.55
Participant Cost Test (PCT)		\$2,711,215	\$9,277,183	\$6,565,968	3.42
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001753890

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

**Table 15 – Home Energy Savings Non-Energy Benefits (2016)**

Non-Energy Benefits	Non-Energy Benefits Water (\$/yr)	Non-Energy Benefits Other (\$/yr)	Measure Life	Quantity	Total Present Value Benefits
Appliances with NEBs	\$3,823.70	\$482.20	14	171	\$41,013
Energy Kits - DHW with NEBs	\$80,166.42	\$8,738.88	9	2,963	\$641,176
Energy Kits - Lighting with NEBs	\$2,323.12	\$253.24	9	2,963	\$18,580
HVAC with NEBs	\$0.00	\$12,501.27	17	672	\$132,131
Lighting with NEBs	\$0.00	\$237,235.90	10	250,632	\$1,821,686
<b>Total HES NEBs</b>	<b>\$86,313.24</b>	<b>\$259,211.49</b>	<b>12</b>	<b>257,401</b>	<b>\$2,654,587</b>



## Memorandum

**To:** Nikki Karpavich, PacifiCorp/Rocky Mountain Power  
**From:** David Basak, Navigant  
**Date:** April 12, 2017  
**Re:** Cost-Effectiveness Results for the Low Income Weatherization Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Low Income Weatherization Program, based on 2016 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.

Table 1 - Home Energy Savings Inputs  
Table 2 - Low Income Weatherization Annual Program Costs  
Table 3 - Low Income Weatherization Savings by Measure Category  
Table 4 - Low Income Weatherization Program Level Cost-Effectiveness Results  
Table 5 - Low Income Weatherization Non-Energy Benefits  
Table 6 - Low Income Weatherization Program (with NEBs) Level Cost-Effectiveness Results



**Table 1 - Home Energy Savings Inputs**

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Residential Energy Rate (\$/kWh)	\$0.0836
Inflation Rate <sup>1</sup>	1.9%

<sup>1</sup> Future rates determined using a 1.9% annual escalator.

**Table 2 - Low Income Weatherization Annual Program Costs**

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Low Income	\$0	\$32,243	\$91,495	\$607	\$654,175	\$778,519	\$0
<b>Total</b>	<b>\$0</b>	<b>\$32,243</b>	<b>\$91,495</b>	<b>\$607</b>	<b>\$654,175</b>	<b>\$778,519</b>	<b>\$0</b>

**Table 3 - Low Income Weatherization Savings by Measure Category**

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Low Income	294,462	100%	294,462	100%	294,462	30
<b>Total</b>	<b>294,462</b>	<b>100%</b>	<b>294,462</b>	<b>100%</b>	<b>294,462</b>	<b>30</b>

**Table 4 - Low Income Weatherization Program Level Cost-Effectiveness Results  
 (Decrement - West Residential Whole House - 49%, Load Shape – Cooling)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1673	\$778,519	\$463,755	-\$314,764	0.60
Total Resource Cost Test (TRC) No Adder	\$0.1673	\$778,519	\$421,595	-\$356,924	0.54
Utility Cost Test (UCT)	\$0.1673	\$778,519	\$421,595	-\$356,924	0.54
Rate Impact Test (RIM)		\$1,197,724	\$421,595	-\$776,128	0.35
Participant Cost Test (PCT)		\$0	\$1,073,380	\$1,073,380	n/a
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000062041
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
<b>Total</b>	<b>\$360,048</b>	-

**Table 6 - Low Income Weatherization Program (with NEBs) Level Cost-Effectiveness Results  
 (Decrement - West Residential Whole House - 49%, Load Shape – Cooling)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1673	\$778,519	\$823,803	\$45,284	1.06
Total Resource Cost Test (TRC) No Adder	\$0.1673	\$778,519	\$781,643	\$3,124	1.00
Utility Cost Test (UCT)	\$0.1673	\$778,519	\$447,320	-\$331,199	0.57
Rate Impact Test (RIM)		\$1,197,724	\$447,320	-\$750,403	0.37
Participant Cost Test (PCT)		\$0	\$1,104,197	\$1,104,197	n/a
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000059985
Discounted Participant Payback (years)					n/a



## Memorandum

**To:** Nikki Karpavich, PacifiCorp/Rocky Mountain Power  
**From:** David Basak, Navigant  
**Date:** April 12, 2017  
**Re:** Cost-Effectiveness Results for the Home Energy Reporting Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Home Energy Reporting Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for Legacy/Refill and Expansion options.

Cost-effectiveness was tested using the 2015 IRP west residential whole house 49% load factor decrement. The program passes the PTRC, TRC and UCT cost-effectiveness tests.

Table 1 - Home Energy Reporting Inputs  
Table 2 – Home Energy Reporting Annual Program Costs  
Table 3 – Home Energy Reporting Savings by Measure Category  
Table 4 - Benefit/Cost Ratios by Measure Category  
Table 5 – Home Energy Reporting Program Level Cost-Effectiveness Results  
Table 6 - Home Energy Reporting Legacy and Refill Cost-Effectiveness Results  
Table 7 - Home Energy Reporting Expansion Cost-Effectiveness Results

**Table 1 - Home Energy Reporting Inputs**

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Residential Energy Rate (\$/kWh)	\$0.0836
Inflation Rate <sup>1</sup>	1.9%

<sup>1</sup> Future rates determined using a 1.9% annual escalator.

**Table 2 – Home Energy Reporting Annual Program Costs**

Measure Group	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
HER Legacy	\$0	\$1,237	\$130,776	\$4,171	\$0	\$136,183	\$0
HER Expansion	\$0	\$3,519	\$187,131	\$11,870	\$0	\$202,520	\$0
<b>Total</b>	<b>\$0</b>	<b>\$4,756</b>	<b>\$317,907</b>	<b>\$16,041</b>	<b>\$0</b>	<b>\$338,703</b>	<b>\$0</b>

**Table 3 – Home Energy Reporting Savings by Measure Category**

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
HER Legacy	4,697,777	100%	4,697,777	100%	4,697,777	1
HER Expansion	4,466,390	100%	4,466,390	100%	4,466,390	1
<b>Total</b>	<b>9,164,167</b>	<b>100%</b>	<b>9,164,167</b>	<b>100%</b>	<b>9,164,167</b>	<b>1</b>

**Table 4 - Benefit/Cost Ratios by Measure Category**

Measure Group	PTRC	TRC	UCT	RIM	PCT
HER Legacy	1.81	1.64	1.64	0.42	0.00
HER Expansion	1.16	1.05	1.05	0.37	0.00
<b>Total</b>	<b>1.42</b>	<b>1.29</b>	<b>1.29</b>	<b>0.39</b>	<b>0.00</b>

**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	\$0.0387	\$338,703	\$480,302	\$141,599	1.42
Total Resource Cost Test (TRC) No Adder	\$0.0387	\$338,703	\$436,638	\$97,935	1.29
Utility Cost Test (UCT)	\$0.0387	\$338,703	\$436,638	\$97,935	1.29
Rate Impact Test (RIM)		\$1,119,384	\$436,638	-\$682,746	0.39
Participant Cost Test (PCT)		\$0	\$780,681	\$780,681	n/a
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000848807
Discounted Participant Payback (years)					n/a

**Table 6 - Home Energy Reporting Legacy and Refill Cost-Effectiveness Results (Decrement - West Residential Whole House - 49%, Load Shape – Whole House)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0304	\$136,183	\$246,215	\$110,032	1.81
Total Resource Cost Test (TRC) No Adder	\$0.0304	\$136,183	\$223,831	\$87,648	1.64
Utility Cost Test (UCT)	\$0.0304	\$136,183	\$223,831	\$87,648	1.64
Rate Impact Test (RIM)		\$536,379	\$223,831	-\$312,548	0.42
Participant Cost Test (PCT)		\$0	\$400,196	\$400,196	n/a
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000388567
Discounted Participant Payback (years)					0.00

**Table 7 - Home Energy Reporting Expansion Cost-Effectiveness Results (Decrement - West Residential Whole House - 49%, Load Shape – Whole House)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0475	\$202,520	\$234,087	\$31,567	1.16
Total Resource Cost Test (TRC) No Adder	\$0.0475	\$202,520	\$212,807	\$10,286	1.05
Utility Cost Test (UCT)	\$0.0475	\$202,520	\$212,807	\$10,286	1.05
Rate Impact Test (RIM)		\$583,005	\$212,807	-\$370,198	0.37
Participant Cost Test (PCT)		\$0	\$380,485	\$380,485	n/a
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000460240
Discounted Participant Payback (years)					0.00



## Memorandum

**To:** Nikki Karpavich, PacifiCorp/Rocky Mountain Power  
**From:** David Basak, Navigant  
**Date:** April 12, 2017  
**Re:** Cost-Effectiveness Results for the Home Energy Savings Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Home Energy Savings Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 9 measure categories.

Cost-effectiveness was tested using the 2015 IRP west residential heating 17%, west residential lighting 48%, west residential water heating 53%, west plug loads 61%, and west residential whole house load factor decrements. The program passes the cost-effectiveness for all the tests except the RIM test. The memo consists of the following tables.

Table 1 - Home Energy Savings Inputs  
Table 2 – Home Energy Savings Annual Program Costs  
Table 3 – Home Energy Savings – Savings by Measure Category  
Table 4 - Benefit/Cost Ratios by Measure Category  
Table 5 – Home Energy Savings Program Level Cost-Effectiveness Results  
Table 6 - Home Energy Savings Appliance Cost-Effectiveness Results  
Table 7 - Home Energy Savings Building Shell Cost-Effectiveness Results  
Table 8 - Home Energy Savings Electronics Cost-Effectiveness Results  
Table 9 - Home Energy Savings Energy Kits - DHW Cost-Effectiveness Results  
Table 10 - Home Energy Savings Energy Kits - Lighting Cost-Effectiveness Results  
Table 11 - Home Energy Savings HVAC Cost-Effectiveness Results  
Table 12 - Home Energy Savings Lighting Cost-Effectiveness Results  
Table 13 - Home Energy Savings Water Heating Cost-Effectiveness Results  
Table 14 - Home Energy Savings Whole Home Cost-Effectiveness Results  
Table 15 - Home Energy Savings Non-Energy Benefits by Measure  
Table 16 - Home Energy Savings Program (with NEBs) Cost-Effectiveness Results  
Table 17 - Home Energy Savings Appliance (with NEBs) Cost-Effectiveness Results  
Table 18 - Home Energy Savings Energy Kits - DHW (with NEBs) Cost-Effectiveness Results  
Table 19 - Home Energy Savings Energy Kits – Lighting (with NEBs) Cost-Effectiveness Results  
Table 20 - Home Energy Savings HVAC (with NEBs) Cost-Effectiveness Results  
Table 21 - Home Energy Savings Lighting (with NEBs) Cost-Effectiveness Results

**Table 1 - Home Energy Savings Inputs**

Parameter	Value
Discount Rate	6.66%
Residential Line Loss	9.67%
Residential Energy Rate (\$/kWh)	\$0.0836
Inflation Rate <sup>1</sup>	1.9%

<sup>1</sup> Future rates determined using a 1.9% annual escalator.

**Table 2 – Home Energy Savings Annual Program Costs**

Measure Group	Engineering Costs	Utility Admin	Program Dev.	Program Delivery	Incentives	Total Utility Costs	Gross Customer Costs
Appliances	\$0	\$174	\$121	\$7,742	\$8,630	\$16,667	\$24,369
Building Shell	\$0	\$929	\$645	\$41,423	\$59,109	\$102,106	\$185,004
Electronics	\$0	\$206	\$143	\$9,173	\$5,160	\$14,682	\$3,775
Energy Kits - DHW	\$0	\$7,725	\$5,369	\$64,114	\$40,619	\$117,827	\$41,862
Energy Kits - Lighting	\$0	\$224	\$156	\$1,858	\$3,106	\$5,343	\$3,295
HVAC	\$0	\$15,087	\$10,484	\$672,911	\$658,216	\$1,356,698	\$1,534,060
Lighting	\$0	\$30,773	\$21,385	\$143,061	\$548,828	\$744,047	\$825,692
Water Heating	\$0	\$686	\$477	\$30,590	\$40,233	\$71,985	\$58,537
Whole Home	\$0	\$245	\$170	\$10,908	\$18,000	\$29,323	\$34,620
<b>Total</b>	<b>\$0</b>	<b>\$56,048</b>	<b>\$38,949</b>	<b>\$981,781</b>	<b>\$1,381,901</b>	<b>\$2,458,678</b>	<b>\$2,711,215</b>

**Table 3 – Home Energy Savings – Savings by Measure Category**

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Appliances	21,776	100%	21,776	100%	21,776	14
Building Shell	116,503	100%	116,503	100%	116,503	45
Electronics	25,800	100%	25,800	100%	25,800	5
Energy Kits - DHW	969,096	100%	969,096	100%	969,096	9
Energy Kits - Lighting	28,083	100%	28,083	100%	28,083	6
HVAC	1,892,584	100%	1,892,584	100%	1,892,584	17
Lighting	3,860,253	100%	3,860,253	100%	3,860,253	10
Water Heating	86,034	100%	86,034	100%	86,034	14
Whole Home	30,680	100%	30,680	100%	30,680	27
<b>Total</b>	<b>7,030,808</b>	<b>100%</b>	<b>7,030,808</b>	<b>100%</b>	<b>7,030,808</b>	<b>12</b>

**Table 4 - Benefit/Cost Ratios by Measure Category**

Measure Group	PTRC	TRC	UCT	RIM	PCT
Appliances	0.54	0.49	0.96	0.44	1.16
Appliances with NEBs	1.81	1.76	0.96	0.44	1.34
Building Shell	0.97	0.88	1.96	0.68	1.37
Electronics	0.56	0.51	0.46	0.27	4.03
Energy Kits - DHW	4.47	4.06	4.11	0.65	15.86
Energy Kits - DHW with NEBs	9.85	9.45	4.11	0.65	17.83
Energy Kits - Lighting	1.95	1.77	1.83	0.54	4.84
Energy Kits - Lighting with NEBs	5.30	5.13	1.83	0.54	7.57
HVAC	0.96	0.87	1.44	0.59	1.70
HVAC with NEBs	1.02	0.93	1.44	0.59	1.71
Lighting	2.29	2.09	2.86	0.62	3.94
Lighting with NEBs	4.08	3.87	2.86	0.62	4.22
Water Heating	0.77	0.70	0.88	0.42	2.01
Whole Home	0.74	0.67	1.05	0.44	1.72
<b>Total</b>	<b>1.42</b>	<b>1.29</b>	<b>1.99</b>	<b>0.60</b>	<b>2.59</b>
<b>Total (with NEBs)</b>	<b>2.12</b>	<b>1.99</b>	<b>1.99</b>	<b>0.60</b>	<b>2.71</b>

**Table 5 – Home Energy Savings Program Level Cost-Effectiveness Results**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0603	\$3,787,992	\$5,380,244	\$1,592,252	1.42
Total Resource Cost Test (TRC) No Adder	\$0.0603	\$3,787,992	\$4,891,131	\$1,103,139	1.29
Utility Cost Test (UCT)	\$0.0392	\$2,458,678	\$4,891,131	\$2,432,453	1.99
Rate Impact Test (RIM)		\$8,088,460	\$4,891,131	-\$3,197,329	0.60
Participant Cost Test (PCT)		\$2,711,215	\$7,011,683	\$4,300,468	2.59
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000611823
Discounted Participant Payback (years)					2.29



Table 6 through Table 21 provides cost-effectiveness results for all 9 measures.

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

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1480	\$32,406	\$17,640	-\$14,766	0.54
Total Resource Cost Test (TRC) No Adder	\$0.1480	\$32,406	\$16,036	-\$16,370	0.49
Utility Cost Test (UCT)	\$0.0761	\$16,667	\$16,036	-\$631	0.96
Rate Impact Test (RIM)		\$36,297	\$16,036	-\$20,261	0.44
Participant Cost Test (PCT)		\$24,369	\$28,260	\$3,891	1.16
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000003358
Discounted Participant Payback (years)					10.44

**Table 7 - Home Energy Savings Building Shell Cost-Effectiveness Results  
 (Decrement - West Residential Heating - 17%, Load Shape – Heating)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1063	\$228,001	\$220,159	-\$7,842	0.97
Total Resource Cost Test (TRC) No Adder	\$0.1063	\$228,001	\$200,145	-\$27,856	0.88
Utility Cost Test (UCT)	\$0.0476	\$102,106	\$200,145	\$98,039	1.96
Rate Impact Test (RIM)		\$295,993	\$200,145	-\$95,848	0.68
Participant Cost Test (PCT)		\$185,004	\$252,996	\$67,992	1.37
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000005157
Discounted Participant Payback (years)					18.30

**Table 8 - Home Energy Savings Electronics Cost-Effectiveness Results  
 (Decrement - West Plug Loads - 61%, Load Shape – Plug Loads)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1183	\$13,297	\$7,456	-\$5,841	0.56
Total Resource Cost Test (TRC) No Adder	\$0.1183	\$13,297	\$6,778	-\$6,519	0.51
Utility Cost Test (UCT)	\$0.1306	\$14,682	\$6,778	-\$7,904	0.46
Rate Impact Test (RIM)		\$24,733	\$6,778	-\$17,955	0.27
Participant Cost Test (PCT)		\$3,775	\$15,211	\$11,436	4.03
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000007441
Discounted Participant Payback (years)					n/a

**Table 9 - Home Energy Savings Energy Kits - DHW Cost-Effectiveness Results  
 (Decrement - West Residential Water Heating - 53%, Load Shape – Residential Water Heating)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0171	\$119,069	\$532,188	\$413,118	4.47
Total Resource Cost Test (TRC) No Adder	\$0.0171	\$119,069	\$483,807	\$364,737	4.06
Utility Cost Test (UCT)	\$0.0169	\$117,827	\$483,807	\$365,980	4.11
Rate Impact Test (RIM)		\$741,121	\$483,807	-\$257,314	0.65
Participant Cost Test (PCT)		\$41,862	\$663,914	\$622,052	15.86
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000064010
Discounted Participant Payback (years)					0.02

**Table 10 - Home Energy Savings Energy Kits - Lighting Cost-Effectiveness Results  
 (Decrement - West Residential Lighting - 48%, Load Shape – Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0385	\$5,533	\$10,763	\$5,230	1.95
Total Resource Cost Test (TRC) No Adder	\$0.0385	\$5,533	\$9,785	\$4,252	1.77
Utility Cost Test (UCT)	\$0.0372	\$5,343	\$9,785	\$4,441	1.83
Rate Impact Test (RIM)		\$18,188	\$9,785	-\$8,403	0.54
Participant Cost Test (PCT)		\$3,295	\$15,951	\$12,655	4.84
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000002986
Discounted Participant Payback (years)					0.08

**Table 11 - Home Energy Savings HVAC Cost-Effectiveness Results  
 (Decrement - West Residential Heating - 17%, Load Shape – Heating)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1028	\$2,232,543	\$2,146,619	-\$85,924	0.96
Total Resource Cost Test (TRC) No Adder	\$0.1028	\$2,232,543	\$1,951,472	-\$281,071	0.87
Utility Cost Test (UCT)	\$0.0624	\$1,356,698	\$1,951,472	\$594,774	1.44
Rate Impact Test (RIM)		\$3,306,873	\$1,951,472	-\$1,355,401	0.59
Participant Cost Test (PCT)		\$1,534,060	\$2,608,391	\$1,074,330	1.70
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000187082
Discounted Participant Payback (years)					6.10

**Table 12 - Home Energy Savings Lighting Cost-Effectiveness Results  
(Decrement - West Residential Lighting - 48%, Load Shape – Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0339	\$1,020,911	\$2,341,706	\$1,320,795	2.29
Total Resource Cost Test (TRC) No Adder	\$0.0339	\$1,020,911	\$2,128,824	\$1,107,913	2.09
Utility Cost Test (UCT)	\$0.0247	\$744,047	\$2,128,824	\$1,384,777	2.86
Rate Impact Test (RIM)		\$3,444,896	\$2,128,824	-\$1,316,073	0.62
Participant Cost Test (PCT)		\$825,692	\$3,249,677	\$2,423,986	3.94
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000297640
Discounted Participant Payback (years)					0.84

**Table 13 - Home Energy Savings Water Heating Cost-Effectiveness Results  
(Decrement - West Water Heating - 53%, Load Shape – Residential Water Heating)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1044	\$90,289	\$69,693	-\$20,596	0.77
Total Resource Cost Test (TRC) No Adder	\$0.1044	\$90,289	\$63,357	-\$26,932	0.70
Utility Cost Test (UCT)	\$0.0832	\$71,985	\$63,357	-\$8,628	0.88
Rate Impact Test (RIM)		\$149,544	\$63,357	-\$86,187	0.42
Participant Cost Test (PCT)		\$58,537	\$117,792	\$59,255	2.01
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000014286
Discounted Participant Payback (years)					2.60

**Table 14 - Home Energy Savings Whole Home Cost-Effectiveness Results  
(Decrement - West Residential Whole House - 49%, Load Shape – Residential Whole House)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0997	\$45,943	\$34,021	-\$11,922	0.74
Total Resource Cost Test (TRC) No Adder	\$0.0997	\$45,943	\$30,928	-\$15,015	0.67
Utility Cost Test (UCT)	\$0.0636	\$29,323	\$30,928	\$1,605	1.05
Rate Impact Test (RIM)		\$70,815	\$30,928	-\$39,887	0.44
Participant Cost Test (PCT)		\$34,620	\$59,492	\$24,872	1.72
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000003531
Discounted Participant Payback (years)					7.32

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 15 through Table 21 detail the non-energy benefits and the cost-effectiveness results.

**Table 15 - Home Energy Savings Non-Energy Benefits by Measure**

Measure Name	Non-Energy Benefits Water (\$/yr)	Non-Energy Benefits Other (\$/yr)	Quantity	Measure Life	Total NEBs (\$/yr)	Discount Rate	Total Net Present Value Benefits
Appliances	\$3,824	\$482	171	14.0	\$4,306	6.66%	\$41,013.22
Energy Kits - DHW	\$80,166	\$8,739	2,963	9.3	\$88,905	6.66%	\$641,176.04
Energy Kits - Lighting	\$2,323	\$253	2,963	9.3	\$2,576	6.66%	\$18,580.44
HVAC	\$0	\$12,501	672	16.7	\$12,501	6.66%	\$132,131.13
Lighting	\$0	\$237,236	250,632	10.1	\$237,236	6.66%	\$1,821,685.70

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

**Table 16 - 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	\$0.0603	\$3,787,992	\$8,034,831	\$4,246,838	2.12
Total Resource Cost Test (TRC) No Adder	\$0.0603	\$3,787,992	\$7,545,718	\$3,757,725	1.99
Utility Cost Test (UCT)	\$0.0392	\$2,458,678	\$4,891,131	\$2,432,453	1.99
Rate Impact Test (RIM)		\$8,088,460	\$4,891,131	-\$3,197,329	0.60
Participant Cost Test (PCT)		\$2,711,215	\$7,357,208	\$4,645,993	2.71
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000611823
Discounted Participant Payback (years)					2.38

**Table 17 - Home Energy Savings Appliance (with NEBs) Cost-Effectiveness Results  
 (Decrement - West Residential Water Heating - 53%, Load Shape – Residential Water Heating)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1480	\$32,406	\$58,653	\$26,247	1.81
Total Resource Cost Test (TRC) No Adder	\$0.1480	\$32,406	\$57,049	\$24,643	1.76
Utility Cost Test (UCT)	\$0.0761	\$16,667	\$16,036	-\$631	0.96
Rate Impact Test (RIM)		\$36,297	\$16,036	-\$20,261	0.44
Participant Cost Test (PCT)		\$24,369	\$32,566	\$8,197	1.34
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000003358
Discounted Participant Payback (years)					10.44

**Table 18 - Home Energy Savings Energy Kits - DHW (with NEBs) Cost-Effectiveness Results  
 (Decrement - West Residential Water Heating -53%, Load Shape – Residential Water Heating)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0171	\$119,069	\$1,173,364	\$1,054,294	9.85
Total Resource Cost Test (TRC) No Adder	\$0.0171	\$119,069	\$1,124,983	\$1,005,914	9.45
Utility Cost Test (UCT)	\$0.0169	\$117,827	\$483,807	\$365,980	4.11
Rate Impact Test (RIM)		\$741,121	\$483,807	-\$257,314	0.65
Participant Cost Test (PCT)		\$41,862	\$746,403	\$704,541	17.83
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000064010
Discounted Participant Payback (years)					0.02

**Table 19 - Home Energy Savings Energy Kits – Lighting (with NEBs) Cost-Effectiveness Results**

**(Decrement - West Residential Lighting - 48%, Load Shape – Lighting)**

<b>Cost-Effectiveness Test</b>	<b>Levelized \$/kWh</b>	<b>Costs</b>	<b>Benefits</b>	<b>Net Benefits</b>	<b>Benefit/Cost Ratio</b>
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0385	\$5,533	\$29,344	\$23,811	5.30
Total Resource Cost Test (TRC) No Adder	\$0.0385	\$5,533	\$28,365	\$22,832	5.13
Utility Cost Test (UCT)	\$0.0372	\$5,343	\$9,785	\$4,441	1.83
Rate Impact Test (RIM)		\$18,188	\$9,785	-\$8,403	0.54
Participant Cost Test (PCT)		\$3,295	\$24,943	\$21,647	7.57
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000002986
Discounted Participant Payback (years)					0.08

**Table 20 - Home Energy Savings HVAC (with NEBs) Cost-Effectiveness Results**  
**(Decrement - West Residential Heating - 17%, Load Shape – Heating))**

<b>Cost-Effectiveness Test</b>	<b>Levelized \$/kWh</b>	<b>Costs</b>	<b>Benefits</b>	<b>Net Benefits</b>	<b>Benefit/Cost Ratio</b>
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1028	\$2,232,543	\$2,278,750	\$46,207	1.02
Total Resource Cost Test (TRC) No Adder	\$0.1028	\$2,232,543	\$2,083,603	-\$148,940	0.93
Utility Cost Test (UCT)	\$0.0624	\$1,356,698	\$1,951,472	\$594,774	1.44
Rate Impact Test (RIM)		\$3,306,873	\$1,951,472	-\$1,355,401	0.59
Participant Cost Test (PCT)		\$1,534,060	\$2,620,892	\$1,086,832	1.71
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000187082
Discounted Participant Payback (years)					6.10

**Table 21 - Home Energy Savings Lighting (with NEBs) Cost-Effectiveness Results  
(Decrement - West Residential Lighting - 48%, Load Shape – Lighting)**

<b>Cost-Effectiveness Test</b>	<b>Levelized \$/kWh</b>	<b>Costs</b>	<b>Benefits</b>	<b>Net Benefits</b>	<b>Benefit/Cost Ratio</b>
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0339	\$1,020,911	\$4,163,392	\$3,142,481	4.08
Total Resource Cost Test (TRC) No Adder	\$0.0339	\$1,020,911	\$3,950,509	\$2,929,599	3.87
Utility Cost Test (UCT)	\$0.0247	\$744,047	\$2,128,824	\$1,384,777	2.86
Rate Impact Test (RIM)		\$3,444,896	\$2,128,824	-\$1,316,073	0.62
Participant Cost Test (PCT)		\$825,692	\$3,486,913	\$2,661,221	4.22
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000297640
Discounted Participant Payback (years)					0.84



## Memorandum

**To:** Nikki Karpavich, PacifiCorp/Rocky Mountain Power  
**From:** David Basak, Navigant  
**Date:** April 12, 2017  
**Re:** Cost-Effectiveness Results for the Wattsmart Business Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Wattsmart Business Program, based on 2016 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 11 measure categories.

Cost-effectiveness was tested using the 2015 IRP west industrial 44%, west plug loads 61%, west commercial lighting 46% and west commercial cooling 13% load factor decrements. The program passes the cost-effectiveness for all the tests except the RIM test. The memo consists of the following tables.

Table 1 - Utility Inputs  
Table 2 – Annual Wattsmart Business Program Costs by Measure Category  
Table 3 – Annual Wattsmart Business Program Savings by Measure Category  
Table 4 - Benefit/Cost Ratios by Measure Category  
Table 5 – Wattsmart Business Program Level Cost-Effectiveness Results  
Table 6 - Wattsmart Business Building Shell Cost-Effectiveness Results  
Table 7 - Wattsmart Business Compressed Air Cost-Effectiveness Results  
Table 8 - Wattsmart Business Energy Management Cost-Effectiveness Results  
Table 9 - Wattsmart Business Farm & Dairy Cost-Effectiveness Results  
Table 10 - Wattsmart Business Food Service Equipment Cost-Effectiveness Results  
Table 11 - Wattsmart Business HVAC Cost-Effectiveness Results  
Table 12 - Wattsmart Business Irrigation Cost-Effectiveness Results  
Table 13 - Wattsmart Business Lighting Cost-Effectiveness Results  
Table 14 - Wattsmart Business Motors Cost-Effectiveness Results  
Table 15 - Wattsmart Business Refrigeration Cost-Effectiveness Results  
Table 16 - Wattsmart Business Wastewater Cost-Effectiveness Results



**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) (base year 2016)	\$0.0836
Commercial Energy Rate (\$/kWh) (base year 2016)	\$0.0717
Industrial Energy Rate (\$/kWh) (base year 2016)	\$0.0887
Irrigation Energy Rate (\$/kWh) (base year 2016)	\$0.1327
Inflation Rate <sup>1</sup>	1.9%

<sup>1</sup> Future rates determined using a 1.9% annual escalator.

**Table 2 – Annual Wattsmart Business Program Costs by Measure Category**

Measure Group	Engineering Costs	Utility Admin	Program Admin	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Building Shell	\$996	\$751	\$65,771	\$271	\$35,776	\$103,565	\$166,363
Compressed Air	\$24,968	\$18,827	\$53,681	\$6,799	\$169,460	\$273,735	\$354,368
Energy Management	\$26,914	\$20,294	\$94,207	\$7,329	\$31,429	\$180,173	\$44,925
Farm & Dairy	\$1,768	\$1,333	\$11,500	\$482	\$9,165	\$24,248	\$32,531
Food Service Equipment	\$2,685	\$2,025	\$207,110	\$731	\$10,000	\$222,551	\$16,850
HVAC	\$16,485	\$12,430	\$791,965	\$4,489	\$125,527	\$950,897	\$578,488
Irrigation	\$0	\$10,064	\$74,517	\$3,210	\$90,240	\$178,031	\$290,507
Lighting	\$305,355	\$230,249	\$101,959	\$267,436	\$2,380,026	\$3,285,025	\$5,578,641
Motors	\$1,675	\$1,263	\$54,073	\$456	\$12,732	\$70,199	\$25,317
Refrigeration	\$95,962	\$72,359	\$146,248	\$26,131	\$798,659	\$1,139,359	\$1,695,890
Wastewater	\$32,952	\$24,847	\$0	\$8,973	\$279,621	\$346,394	\$673,298
<b>Total</b>	<b>\$509,761</b>	<b>\$394,442</b>	<b>\$1,601,031</b>	<b>\$326,307</b>	<b>\$3,942,636</b>	<b>\$6,774,176</b>	<b>\$9,457,179</b>

**Table 3 – Annual Wattsmart Business Program Savings by Measure Category**

Measure Group	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Building Shell	58,143	100%	58,143	100%	58,143	15
Compressed Air	1,457,871	100%	1,457,871	100%	1,457,871	15
Energy Management	1,571,461	100%	1,571,461	100%	1,571,461	11
Farm & Dairy	103,251	100%	103,251	100%	103,251	14
Food Service Equipment	156,774	100%	156,774	100%	156,774	9
HVAC	962,554	100%	962,554	100%	962,554	16
Irrigation	779,279	100%	779,279	100%	779,279	11
Lighting	17,829,274	100%	17,829,274	100%	17,829,274	13
Motors	97,810	100%	97,810	100%	97,810	11
Refrigeration	5,603,090	100%	5,603,090	100%	5,603,090	12
Wastewater	1,924,052	100%	1,924,052	100%	1,924,052	16
<b>Total</b>	<b>30,543,559</b>	<b>100%</b>	<b>30,543,559</b>	<b>100%</b>	<b>30,543,559</b>	<b>13</b>

**Table 4 - Benefit/Cost Ratios by Measure Category**

Measure Group	PTRC	TRC	UCT	RIM	PCT
Building Shell	0.45	0.41	0.92	0.61	0.54
Compressed Air	2.62	2.38	3.99	0.65	4.42
Energy Management	5.62	5.11	5.50	0.66	30.18
Farm & Dairy	1.63	1.48	2.91	0.68	2.74
Food Service Equipment	0.48	0.43	0.45	0.31	6.61
HVAC	0.62	0.56	0.83	0.45	1.57
Irrigation	2.27	2.06	4.39	0.84	2.91
Lighting	2.26	2.06	4.06	0.74	3.08
Motors	0.76	0.69	0.81	0.40	3.37
Refrigeration	2.25	2.05	3.66	0.67	3.48
Wastewater	2.40	2.18	4.66	0.66	3.54
<b>Total</b>	<b>2.07</b>	<b>1.88</b>	<b>3.41</b>	<b>0.69</b>	<b>3.23</b>

**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	\$0.0398	\$12,288,719	\$25,385,699	\$13,096,980	2.07
Total Resource Cost Test (TRC) No Adder	\$0.0398	\$12,288,719	\$23,077,909	\$10,789,189	1.88
Utility Cost Test (UCT)	\$0.0219	\$6,774,176	\$23,077,909	\$16,303,732	3.41
Rate Impact Test (RIM)		\$33,348,205	\$23,077,909	-\$10,270,296	0.69
Participant Cost Test (PCT)		\$9,457,179	\$30,516,664	\$21,059,485	3.23
Lifecycle Revenue Impacts (\$/kWh)					\$0.0001824311

Table 6 through Table 16 provide cost-effectiveness results for all 11 measures.

**Table 6 - Wattsmart Business Building Shell Cost-Effectiveness Results (Decrement - West Commercial Cooling - 13%, Load Shape – HVAC)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.3381	\$234,152	\$104,598	-\$129,554	0.45
Total Resource Cost Test (TRC) No Adder	\$0.3381	\$234,152	\$95,089	-\$139,063	0.41
Utility Cost Test (UCT)	\$0.1495	\$103,565	\$95,089	-\$8,476	0.92
Rate Impact Test (RIM)		\$156,904	\$95,089	-\$61,815	0.61
Participant Cost Test (PCT)		\$166,363	\$89,115	-\$77,248	0.54
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000009604
Discounted Participant Payback (years)					n/a

**Table 7 - Wattsmart Business Compressed Air Cost-Effectiveness Results (Decrement - West Industrial - 44%, Load Shape – Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0303	\$458,643	\$1,201,300	\$742,657	2.62
Total Resource Cost Test (TRC) No Adder	\$0.0303	\$458,643	\$1,092,091	\$633,448	2.38
Utility Cost Test (UCT)	\$0.0181	\$273,735	\$1,092,091	\$818,356	3.99
Rate Impact Test (RIM)		\$1,671,783	\$1,092,091	-\$579,692	0.65
Participant Cost Test (PCT)		\$354,368	\$1,567,508	\$1,213,140	4.42
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000090066
Discounted Participant Payback (years)					1.47

**Table 8 - Wattsmart Business Energy Management Cost-Effectiveness Results  
(Decrement - West Plug Loads - 61%, Load Shape - Plug Loads)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0138	\$193,668	\$1,089,343	\$895,674	5.62
Total Resource Cost Test (TRC) No Adder	\$0.0138	\$193,668	\$990,311	\$796,643	5.11
Utility Cost Test (UCT)	\$0.0128	\$180,173	\$990,311	\$810,139	5.50
Rate Impact Test (RIM)		\$1,504,536	\$990,311	-\$514,225	0.66
Participant Cost Test (PCT)		\$44,925	\$1,355,793	\$1,310,868	30.18
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000106605
Discounted Participant Payback (years)					0.10

**Table 9 - Wattsmart Business Farm & Dairy Cost-Effectiveness Results  
(Decrement - West Plug Loads - 61%, Load Shape - Plug Loads)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0459	\$47,614	\$77,532	\$29,918	1.63
Total Resource Cost Test (TRC) No Adder	\$0.0459	\$47,614	\$70,483	\$22,870	1.48
Utility Cost Test (UCT)	\$0.0234	\$24,248	\$70,483	\$46,235	2.91
Rate Impact Test (RIM)		\$104,078	\$70,483	-\$33,595	0.68
Participant Cost Test (PCT)		\$32,531	\$88,995	\$56,464	2.74
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000005569
Discounted Participant Payback (years)					3.26

**Table 10 - Wattsmart Business Food Service Equipment Cost-Effectiveness Results  
(Decrement - West Industrial - 44%, Load Shape – HVAC)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1739	\$229,401	\$109,408	-\$119,993	0.48
Total Resource Cost Test (TRC) No Adder	\$0.1739	\$229,401	\$99,462	-\$129,939	0.43
Utility Cost Test (UCT)	\$0.1688	\$222,551	\$99,462	-\$123,089	0.45
Rate Impact Test (RIM)		\$323,881	\$99,462	-\$224,419	0.31
Participant Cost Test (PCT)		\$16,850	\$111,330	\$94,480	6.61
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000055827
Discounted Participant Payback (years)					0.60

**Table 11 - Wattsmart Business HVAC Cost-Effectiveness Results  
(Decrement - West Industrial - 44%, Load Shape - HVAC)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1382	\$1,403,858	\$865,583	-\$538,275	0.62
Total Resource Cost Test (TRC) No Adder	\$0.1382	\$1,403,858	\$786,894	-\$616,965	0.56
Utility Cost Test (UCT)	\$0.0936	\$950,897	\$786,894	-\$164,004	0.83
Rate Impact Test (RIM)		\$1,732,226	\$786,894	-\$945,332	0.45
Participant Cost Test (PCT)		\$578,488	\$906,856	\$328,367	1.57
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000138207
Discounted Participant Payback (years)					7.44

**Table 12 - Wattsmart Business Irrigation Cost-Effectiveness Results  
(Decrement - West Commercial Cooling - 13%, Load Shape – Irrigation)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0653	\$378,298	\$858,841	\$480,543	2.27
Total Resource Cost Test (TRC) No Adder	\$0.0653	\$378,298	\$780,765	\$402,466	2.06
Utility Cost Test (UCT)	\$0.0307	\$178,031	\$780,765	\$602,734	4.39
Rate Impact Test (RIM)		\$934,492	\$780,765	-\$153,727	0.84
Participant Cost Test (PCT)		\$290,507	\$846,701	\$556,194	2.91
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000031870
Discounted Participant Payback (years)					2.10

**Table 13 - Wattsmart Business Lighting Cost-Effectiveness Results  
(Decrement - West Commercial Lighting - 46%, Load Shape - Lighting)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0357	\$6,483,639	\$14,658,462	\$8,174,823	2.26
Total Resource Cost Test (TRC) No Adder	\$0.0357	\$6,483,639	\$13,325,874	\$6,842,235	2.06
Utility Cost Test (UCT)	\$0.0181	\$3,285,025	\$13,325,874	\$10,040,850	4.06
Rate Impact Test (RIM)		\$18,076,905	\$13,325,874	-\$4,751,030	0.74
Participant Cost Test (PCT)		\$5,578,641	\$17,171,907	\$11,593,266	3.08
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000843925
Discounted Participant Payback (years)					2.40

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

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.1021	\$82,784	\$62,853	-\$19,932	0.76
Total Resource Cost Test (TRC) No Adder	\$0.1021	\$82,784	\$57,139	-\$25,646	0.69
Utility Cost Test (UCT)	\$0.0866	\$70,199	\$57,139	-\$13,060	0.81
Rate Impact Test (RIM)		\$142,682	\$57,139	-\$85,543	0.40
Participant Cost Test (PCT)		\$25,317	\$85,215	\$59,898	3.37
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000017734
Discounted Participant Payback (years)					1.56

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

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0362	\$2,036,590	\$4,582,302	\$2,545,712	2.25
Total Resource Cost Test (TRC) No Adder	\$0.0362	\$2,036,590	\$4,165,729	\$2,129,139	2.05
Utility Cost Test (UCT)	\$0.0202	\$1,139,359	\$4,165,729	\$3,026,370	3.66
Rate Impact Test (RIM)		\$6,250,775	\$4,165,729	-\$2,085,046	0.67
Participant Cost Test (PCT)		\$1,695,890	\$5,910,075	\$4,214,185	3.48
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000398982
Discounted Participant Payback (years)					0.67

**Table 16 - Wattsmart Business Wastewater Cost-Effectiveness Results  
(Decrement - West Industrial - 44%, Load Shape – Machinery General)**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.0335	\$740,071	\$1,775,479	\$1,035,408	2.40
Total Resource Cost Test (TRC) No Adder	\$0.0335	\$740,071	\$1,614,072	\$874,001	2.18
Utility Cost Test (UCT)	\$0.0157	\$346,394	\$1,614,072	\$1,267,678	4.66
Rate Impact Test (RIM)		\$2,449,943	\$1,614,072	-\$835,871	0.66
Participant Cost Test (PCT)		\$673,298	\$2,383,170	\$1,709,872	3.54
Lifecycle Revenue Impacts (\$/kWh)					\$0.0000122204
Discounted Participant Payback (years)					2.34



## Appendix 2

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# Washington Measure Installation Verifications

Pacific Power

# 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  $\geq 5$  percent of single family homes,  $\geq 5$  percent of manufactured homes, 100 percent of multifamily projects, and 100 percent of new homes projects.

- Air sealing
- Central air conditioning best practices installation and sizing
- Duct sealing
- Duct sealing and insulation
- Heat pump performance tested comfort systems, commissioning, controls, and sizing
- Heat pump water heaters
- Insulation
- Windows

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)
- Heat pumps
- Refrigerators

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.



## Appendix 3

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# Home Energy Savings Retailers

## Table of Contents

2016 Participating Upstream/Midstream Retailers and Redemptions .....	3
2016 Participating Upstream/Midstream Appliance Retailers .....	4
2016 Downstream Retailers and Redemptions .....	5
2016 HVAC Trade Allies.....	6
2016 Plumbing Trade Allies.....	7
2016 Weatherization Trade Allies.....	8
2016 Manufactured Homes Trade Allies .....	9

**Table 1**  
**2016 Participating Upstream/Midstream Retailers and Redemptions**

<b>Retailer</b>	<b>City</b>	<b>State</b>	<b>CFLs</b>	<b>LEDs</b>	<b>Fixtures</b>
Ace Hardware - Stein's #7047	Yakima	WA		x	x
Ace Hardware #14965	Walla Walla	WA		x	
Ace Hardware #15365	Kennewick	WA	x	x	
Bi-Mart #619	Walla Walla	WA	x		
Costco #1013	Union Gap	WA	x	x	x
Costco 486	Kennewick	WA	x	x	x
Fred Meyer #163	Kennewick	WA		x	
Grigg's Department Store	Pasco	WA	x	x	
Habitat for Humanity ReStore #2	Yakima	WA	x		
Home Depot #4727	Yakima	WA	x	x	x
Home Depot #4735	College Place	WA	x	x	x
Home Depot #4739	Kennewick	WA	x	x	x
Hometown Ace Hardware #11909	Yakima	WA		x	x
Kmart #7034	Walla Walla	WA	x		
Kroger - Fred Meyer #70100486	Yakima	WA		x	
Lowe's #249	Kennewick	WA	x	x	
Lowe's #3240	Yakima	WA	x	x	
Lowes 2344	Pasco	WA		x	x
Roy's Ace Hardware #10640	Yakima	WA		x	x
Safeway #0563	Sunnyside	WA	x		
Safeway #1123	Hood River	WA	x		
Safeway #1160	Walla Walla	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	x	
Wal-Mart - Supercenter #2476	College Place	WA	x	x	
Wal-Mart - Supercenter #3380	Pasco	WA		x	
Wal-Mart - Supercenter #5078	Yakima	WA	x	x	x
Wal-Mart #1876	Hood River	WA	x		
Wal-Mart #2269	Yakima	WA	x	x	x

**Table 2**

**2016 Participating Upstream/Midstream Appliance Retailers**

<b>Retailer</b>	<b>City</b>	<b>Room Air Conditioners</b>	<b>Advanced Power Strips</b>
Plug Load Savers, <a href="http://www.plugloadsavers.com">www.plugloadsavers.com</a>	N/A		x
*There were no participating retailer for room air conditioners in Washington for 2016.			

**Table 3**  
**2016 Downstream Retailers and Redemptions**

<b>Participating Retailer (Retailers who are actively enrolled in the program)</b>	<b>City</b>	<b>State</b>	<b>Clothes Washer</b>	<b>Clothes Dryer</b>	<b>Smart Thermostat</b>	<b>Freezer</b>	<b>Heat Pump Water Heater</b>	<b>Insulation-Attic</b>	<b>Insulation-Floor</b>	<b>Windows</b>
Bemis Home Appliance & Tv Ctr	Yakima	WA	x			x				
Best Buy #831	Yakima	WA	x		x					
Ferguson Enterprises, Inc #3139	Walla Walla	WA					x			
Home Depot #4727	Yakima	WA	x		x	x		x	x	x
Home Depot #4735	College Place	WA	x		x	x				
Lowe's #3240	Yakima	WA	x		x		x	x		x
Sears #2029	Union Gap	WA	x	x		x	x			
Sears #3088	Sunnyside	WA	x							
Sears #5332	Toppenish	WA	x				x			
Sears #6914	Walla Walla	WA	x							

<b>Redemptions from Non- Participating Retailer's (Retailer may not be located in the service territory)</b>										
AJ MADISON INC	Brooklyn	NY	x							
Amazon.com	Online	N/A			x					
Appliancesconnection.com	Online	N/A					x			
Best Buy #590	Kennewick	WA	x							
Costco.com	Online	N/A	x							
E-Bay	Online	N/A			x					
Elgin Appliance Center	Milton Freewater	OR	x							
Elgin Electric	Elgin	OR	x							
Fred's Appliance - Parts and Service	Spokane	WA	x							
gpconservation.com	Online	N/A					x			
Helliesen Lumber & Supply Company	Yakima	WA							x	
HomeDepot.com	Online	N/A	x	x	x				x	
Lowe's #1114	Wood Village	OR					x			
Lowe's of Pasco	Pasco	WA					x			
Lowes.com	Online	N/A	x				x			
Sears	Ann Arbor	MI	x							
Sears #3439	Hermiston	OR	x							
Sears.com	Online	N/A	x							
Whirlpool Corporation	Centerville	WA	x							

**Table 4  
2016 HVAC Trade Allies**

<b>Trade Ally Name (Trade ally may be located outside of the territory)</b>	<b>City</b>	<b>State</b>	<b>Central Air Conditioner Equipment</b>	<b>Electric System to Heat Pump Conversion</b>	<b>Electric System to Heat Pumo Conversion - Tier 1</b>	<b>Electric System to Heat Pump Conversion - Tier 2</b>	<b>Evaporative Cooler - Tier 2</b>	<b>Heat Pump - PTCS Commissioning, Controls,</b>	<b>Heat Pump to Heat Pump Upgrade</b>	<b>Heat Pump to Heat Pump Upgrade - Tier 1</b>	<b>Heat Pump, Ductless</b>	<b>Heat Pump, Multi-Head, Ductless</b>	<b>Heat Pump, Single-Head, Ductless</b>
Absolute Comfort Technology, LLC	Selah	WA		x							x		
AccuTemp Heating and Air Conditioning	Yakima	WA		x							x		
Ackerman Heating & Air	Colfax	WA		x									
AEH Inc.	Kennewick	WA									x		
All Seasons Heating & Air Conditioning	Yakima	WA		x					x		x		
American Air Heating and Conditioning, LLC	Walla Walla	WA		x							x		
Apollo Sheet Metal Inc.	Kennewick	WA		x				x			x		
Aztec Heating & AC, Inc.	Grandview	WA		x							x		
Bid Mechanical	Kittitas	WA									x		
Blaze to Blizzard Heating & Cooling	Walla Walla	WA									x		
Campbell & Company	Pasco	WA	x	x				x	x		x		
Chapman Heating & Air Conditioning Inc	Dayton	WA									x		
CK Home Comfort Systems	Grandview	WA		x							x		
College Place Heating & Air Conditioning	College Place	WA		x				x			x		
Dayco Inc	Kennewick	WA		x									
Delta Heating and Cooling, Inc.	Richland	WA		x				x					
Farwest Climate Control	Yakima	WA		x					x		x		
Four Seasons HVAC	Yakima	WA		x					x		x		
Grassi Refrigeration	Walla Walla	WA		x							x		
Jacobs & Rhodes	Kennewick	WA						x					
Miller & Trujillo Heating and AC, LLC.	Zillah	WA		x									
Nico Enterprises, LLC	Walla Walla	WA									x		
One Hour Heating and A/C	Yakima	WA									x		
Panchos Heating & Cooling LLC	Kennewick	WA		x				x			x		
Paul's Air F/X	Yakima	WA									x		
Platte Heating & AC	Yakima	WA		x									
Quality Comfort	Yakima	WA		x									
Thermex Valley Heating and AC	Yakima	WA									x		
TJ's Refrigeration, Heating & Air	Sunnyside	WA									x		
TNG Heating & Refrigeration	Toppenish	WA		x							x		
Total Comfort Solutions, LLC	Walla Walla	WA	x	x					x		x		
Vance Heating and AC	Yakima	WA	x	x					x		x		
Young's Heating & Cooling, LLC	Walla Walla	WA		x							x		



**Table 5**  
**2016 Plumbing Trade Allies**

<b>Trade Ally Name (Trade ally may be located outside of the territory)</b>	<b>City</b>	<b>State</b>	<b>Heat Pump Water Heaters</b>
Burke's Plumbing	Selah	WA	x
Central Mechanical Services	Yakima	WA	x
Chris Johnson Plumbing	Walla Walla	WA	x
Miller & Trujillo Heating and AC, LLC.	Zillah	WA	x
Ray's Plumbing, Inc.	Yakima	WA	x
Vance Heating and AC	Yakima	WA	x
KIE Supply	Walla Walla	WA	x

**Table 6  
2016 Weatherization Trade Allies**

<b>Trade Ally Name (Trade ally may be located outside of the territory)</b>	<b>City</b>	<b>State</b>	<b>Air Sealing</b>	<b>Duct Sealing</b>	<b>Duct Sealing &amp; Insulation</b>	<b>Insulation-Attic</b>	<b>Insulation-Floor</b>	<b>Insulation-Wall</b>	<b>Windows</b>
Campbell & Company	Pasco	WA			x				
Central Valley Glass	Yakima	WA							x
Chon Insulation and Drywall	Walla Walla	WA				x			
Don Jordan Energy Systems	Yakima	WA				x	x		
Farwest Climate Control	Yakima	WA			x				
Intermountain West Insulation	Kennewick	WA				x	x	x	
K-5 Contracting, Inc.	Yakima	WA				x			
McKinney Glass Inc.	Yakima	WA							x
One Hour Heating and A/C	Yakima	WA			x				
Pro Build	Yakima	WA					x		
Probuild Northwest	Yakima	WA				x	x	x	
Smith Insulation	Walla Walla	WA	x	x	x	x	x	x	x
Specialty Weatherization & Technologies	Naches	WA	x						x
Vance Heating and AC	Yakima	WA		x					
Vinyl Products Inc	Spokane	WA							x
Windows Walla Walla	Walla Walla	WA							x

**Table 7**  
**2016 Manufactured Homes Trade Allies**

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Manufactured Homes Duct Sealing
Elite Energy Solutions	Lindon	UT	x



## Appendix 4

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### *wattsmart* Business Trade Allies

The following is a list of contractors, distributors and other businesses participating in Pacific Power's Energy Efficiency Alliance 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.

An asterisk (\*) indicates Pacific Power Outstanding Contribution Award winning trade allies in 2013, 2014 and/or 2015.

## Search Criteria:

**Selected State(s):** Washington  
**Specialties:** Lighting  
 HVAC - unitary  
 HVAC - evaporative  
 Motors and VFDs  
 Controls  
 Building envelope  
 Appliances  
 Office equipment  
 Food Service  
 Compressed Air  
 Farm and Dairy  
 Irrigation  
 Other  
**Business Type:** --ANY--

## Search Results: 83 - Date and Time: 01/31/2017 03:55:11 PM

Company Name	Specialties	Business Type	Join Date	Projects Completed
<b>AirCon Electric</b> 9904 NE 359th St. La Center, WA - 98629 Phone: 360-909-5095	Lighting Other: Other Specialty	Contractor	04/23/2015	Projects Completed
<b>All Seasons Heating &amp; Air Conditioning</b> 302 S. 3rd Ave. Yakima, WA - 98902 Phone: 509-248-6380 Website: www.allseasonsheating.com	HVAC - unitary	Contractor	06/01/2004	4
<b>All-Phase Electric, Inc. - Union Gap</b> 2500 S 12th Ave Union Gap, WA - 98903 Phone: 509-454-5093 Website: allphaseelectric.org	Lighting	Contractor	06/08/2006	41
<b>All-State Electric Co.</b> 310 S. 1st Street Selah, WA - 98942 Phone: 509-941-8739 Website: telkonet.com	Lighting Motors and VFDs Other: Other Specialty	Contractor	01/20/2009	37
<b>Allard Enterprises</b> 4506 Maple Ave. Yakima, WA - 98901 Phone: 509-575-0955	HVAC - unitary Motors and VFDs	Contractor	04/01/2006	Projects Completed
<b>Alternative LED LLC</b> 1200 Westlake Ave N Suite 1006 Seattle, WA - 98109 Phone: 800-330-0828 Website: www.alternativeled.com	Controls Lighting	Distributor Manufacturer - Rep	09/29/2015	Projects Completed
<b>Ambro, Inc*</b> 321 N Columbia Center Blvd Kennewick, WA - 99336 Phone: 509-783-3400 Website: www.batteriesplus.com	Lighting	Distributor	09/09/2015	Projects Completed

<b>Apollo Sheet Metal</b> 1207 W. Columbia Dr. Kennewick, WA - 99336 Phone: 509-586-1104 Website: apolloism.com	<b>Specialties</b> HVAC - unitary Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 04/01/2006	<b>Projects Completed</b> 17
<b>Batteries Plus Bulbs - Walla Walla</b> 632 S 9TH AVE Walla Walla, WA - 99362 Phone: 509-529-7001	<b>Specialties</b> Lighting Other: Other Specialty	<b>Business Type</b> Distributor	<b>Join Date</b> 07/23/2014	<b>Projects Completed</b> 3
<b>Champion Lighting, Inc.</b> 4523 S. Saint Andrews Ln Spokane, WA - 99223 Phone: 509-448-4477	<b>Specialties</b> Lighting	<b>Business Type</b> Other: Other	<b>Join Date</b> 01/20/2007	<b>Projects Completed</b> 10
<b>Columbia Electric Supply - Pasco</b> 1913 Washington Street Pasco, WA - 99301 Phone: 509-547-9733 Website: www.columbiaelectricupplypasco.com	<b>Specialties</b> Controls Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 09/09/2014	<b>Projects Completed</b> 1
<b>Columbia Electric Supply - Sunnyside</b> 3211 Allen Rd Sunnyside, WA - 98944 Phone: 509-837-6033	<b>Specialties</b> Controls Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 10/23/2014	<b>Projects Completed</b> 3
<b>Columbia Electric Supply - Walla Walla</b> 932 N 13TH AVE Walla Walla, WA - 99362 Phone: 509-522-1419	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 01/01/2008	<b>Projects Completed</b> 3
<b>Consolidated Electrical Distributors</b> 1920 Fowler St Richland, WA - 99352 Phone: 509-737-8282	<b>Specialties</b> Controls Irrigation Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 09/18/2015	<b>Projects Completed</b> 7
<b>Consolidated Electrical Distributors - Yakima</b> 131 S. 1st Ave. Yakima, WA - 98902 Phone: 509-248-0872	<b>Specialties</b> Lighting	<b>Business Type</b> Distributor	<b>Join Date</b> 01/01/2008	<b>Projects Completed</b> 20
<b>Core Northwest LLC</b> 5836 Scenic Ridge Loop Yakima, WA - 98908 Phone: 509-248-2673 Website: www.corenorthwest.com	<b>Specialties</b> Controls Irrigation Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 02/02/2016	<b>Projects Completed</b> 10
<b>CP Mechanical LLC</b> 1505 S 70th Ave Yakima, WA - 98908 Phone: 509-910-5027	<b>Specialties</b> Controls HVAC - unitary	<b>Business Type</b> Contractor	<b>Join Date</b> 01/10/2016	<b>Projects Completed</b> 1
<b>Current Electric Solution</b> 11979 W. Hwy 12 Lowden, WA - 99360 Phone: 509-526-0161 Website: www.currentelectricsolutions.com	<b>Specialties</b> Controls Irrigation Lighting Motors and VFDs Other: Other Specialty	<b>Business Type</b> Contractor	<b>Join Date</b> 12/14/2012	<b>Projects Completed</b> 2
<b>Dayco Heating &amp; Air</b> 11 N. Auburn Kennewick, WA - 99337 Phone: 509-586-9464	<b>Specialties</b> HVAC - unitary	<b>Business Type</b> Contractor	<b>Join Date</b> 04/01/2006	<b>Projects Completed</b> 1

<b>Dilbeck Electric, Inc.</b> 517 S. 2nd Avenue Yakima, WA - 98902 Phone: 509-575-4666	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 06/01/2005	<b>Projects Completed</b> 10
<b>Doyle Electric Inc.</b> 1421 Dell Avenue Walla Walla, WA - 99362 Phone: 509-529-2500 Website: doyleelectric.com	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 10/15/2006	<b>Projects Completed</b> 8
<b>ecomodus*</b> 5110 Tieton Drive Yakima, WA - 98908 Phone: 509-307-4363	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 02/01/2012	<b>Projects Completed</b> 92
<b>Ecosafe Technologies LLC DBA EcoSafe Lighting</b> 4600 NW Camas Meadows Drive #210 Camas, WA - 98607 Phone: 360-567-1923 Website: www.ecosafelighting.com	<b>Specialties</b> Lighting	<b>Business Type</b> Distributor Manufacturer - Rep	<b>Join Date</b> 07/06/2015	<b>Projects Completed</b>
<b>Electrical Frontier Inc.</b> 4240 Thorp Road Moxee, WA - 98936 Phone: 509-945-5703	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 07/01/2012	<b>Projects Completed</b> 1
<b>Evolve Guest Controls</b> 85 Denton Avenue New Hyde Park, NY - 11040 Phone: 516-448-1862 Website: eguestcontrols.com	<b>Specialties</b> Other: Other Specialty	<b>Business Type</b> Manufacturer - Rep Other: Other	<b>Join Date</b> 06/01/2012	<b>Projects Completed</b>
<b>Extra Effort Consulting &amp; Supply</b> 14530 SW 144th Ave. Tigard, OR - 97224 Phone: 503-780-2359 Website: www.ExtraEffortLLC.com	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 04/01/2012	<b>Projects Completed</b> 4
<b>Great Western Coatings</b> PO Box 12793 Everett, WA - 98206 Phone: 425-750-4250 Website: www.greatwesterncoatings.com	<b>Specialties</b> Building envelope	<b>Business Type</b> Contractor	<b>Join Date</b> 03/02/2015	<b>Projects Completed</b> 1
<b>Greenwalt Electric LLC</b> PO Box 850 Naches, WA - 98937 Phone: 509-949-8223	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 10/28/2008	<b>Projects Completed</b> 12
<b>Hultz BHU Engineers Inc.</b> 1111 Fawcett Avenue Suite 100, Tacoma, WA - 98402 Phone: 253-383-3257 Website: hultzbhu.com	<b>Specialties</b> Compressed Air Controls HVAC - evaporative HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Engineering Firm	<b>Join Date</b> 04/23/2016	<b>Projects Completed</b>
<b>Hutchinson Electric Inc.</b> 113 Sky Vista Place Yakima, WA - 98901 Phone: 509-391-0770	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 02/26/2007	<b>Projects Completed</b> 13
<b>Jaime Campos DBA JC Electrico</b> 604 S. 6TH ST YAKIMA, WA - 98901 Phone: 509-480-2097 x 0000	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 04/08/2015	<b>Projects Completed</b>

<b>KAPCO LLC*</b> 4207 Ahtanum Rd. Yakima, WA - 98903 Phone: 509-966-4540	<b>Specialties</b> Controls Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 03/04/2014	<b>Projects Completed</b> 49
<b>Kennewick Industrial &amp; Electrical Supply, Inc - Walla Walla</b> 1219 W POPLAR WALLA WALLA, WA - 99362 Phone: 509-529-5590 Website: www.kiesupply.com	<b>Specialties</b> Appliances Controls Irrigation Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 12/08/2015	<b>Projects Completed</b> 7
<b>Kinter Electric</b> 2761 E. Edison Rd. PO Box 1058, Sunnyside, WA - 98944 Phone: 509-839-3900 Website: www.kinterelectric.com	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 10/31/2009	<b>Projects Completed</b> 63
<b>Knobel's Electric Inc.</b> 801 Tenant Lane yakima, WA - 98901 Phone: 509-452-9157 Website: knobelselectric.com	<b>Specialties</b> Controls Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 12/30/2014	<b>Projects Completed</b> 2
<b>Lake Shore Electric, Inc.*</b> 9702 Tieton Dr. Yakima, WA - 98908 Phone: 509-965-4281	<b>Specialties</b> Lighting Motors and VFDs Other: Other Specialty	<b>Business Type</b> Contractor	<b>Join Date</b> 05/12/2009	<b>Projects Completed</b> 17
<b>Leading Force Energy &amp; Design Center</b> 17 N 3rd Street Suite 101, Yakima, WA - 98901 Phone: 509-571-1351 Website: www.leading forceedc.com	<b>Specialties</b> Building envelope HVAC - evaporative HVAC - unitary Lighting	<b>Business Type</b> Other: Green Building Product Consultant	<b>Join Date</b> 08/10/2015	<b>Projects Completed</b> 1
<b>Linden Electric, Inc.</b> 9401 Mieras Rd Yakima, WA - 98901 Phone: 509-575-1191	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 07/06/2006	<b>Projects Completed</b> 17
<b>M &amp; R Electric Inc.</b> 3806 OAK AVE. YAKIMA, WA - 98903 Phone: 509-965-1706	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 09/08/2014	<b>Projects Completed</b> 2
<b>M. Campbell &amp; Company, Inc.</b> 2828 W Irving St Pasco, WA - 99301 Phone: 509-545-9848 Website: www.callcampbell.com	<b>Specialties</b> HVAC - unitary	<b>Business Type</b> Contractor	<b>Join Date</b> 06/01/2004	<b>Projects Completed</b> 1
<b>Mantey Heating &amp; Air</b> 3703 W. Nobhill Blvd. Yakima, WA - 98902 Phone: 509-966-5520	<b>Specialties</b> HVAC - unitary Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 10/01/2005	<b>Projects Completed</b> 1
<b>Meier Architecture &amp; Engineering</b> 8697 W. Gage Blvd. Kennewick, WA - 99336 Phone: 509-735-1589 Website: meierinc.com	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs Other: Other Specialty	<b>Business Type</b> Architect	<b>Join Date</b> 02/01/2012	<b>Projects Completed</b> 1
<b>MH Electric Inc.*</b> Po Box 11224 Yakima, WA - 98909 Phone: 509-452-6039	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 01/06/2010	<b>Projects Completed</b> 165



<b>Nico Electrical Contracting</b> P.O. Box 476 Walla Walla, WA - 99362 Phone: 509-526-9658	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 09/21/2012	<b>Projects Completed</b> 3
<b>Norstar Electric</b> 11780 Mieras Rd. Yakima, WA - 98901 Phone: 509-961-8161	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 01/01/2006	<b>Projects Completed</b> 5
<b>North Coast Electric - Ellensburg</b> 2060 Vantage Highway, Suite 15 Ellensburg, WA - 98926 Phone: 509-962-3001	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 03/23/2016	<b>Projects Completed</b> 3
<b>North Coast Electric - Hermiston</b> 30597 Lauback Street Hermiston, OR - 97838 Phone: 541-564-9009	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 03/23/2016	<b>Projects Completed</b> 3
<b>North Coast Electric - Moses Lake</b> 1329 East Wheeler Road, suite 202 Moses Lake, WA - 98837 Phone: 509-764-0734	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 03/23/2016	<b>Projects Completed</b> 3
<b>North Coast Electric - Pasco</b> 1928 West A Street Pasco, WA - 99301 Phone: 509-547-9514 Website: www.northcoastelectric.com	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 09/21/2012	<b>Projects Completed</b> 4
<b>North Coast Electric - Seattle</b> 2424 8th Ave. So. Seattle, WA - 98134 Phone: 503-310-7710 Website: www.ncelec.com	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 06/27/2014	<b>Projects Completed</b> 3
<b>North Coast Electric - Spokane</b> 4216 E. Main Avenue Spokane, WA - 99202 Phone: 503-310-7710	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 03/28/2013	<b>Projects Completed</b> 3
<b>North Coast Electric - Spokane Service Center</b> 4216 East Main Ave Spokane, WA - 99202 Phone: 509-328-1020	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 03/23/2016	<b>Projects Completed</b> 3
<b>North Coast Electric - Wenatchee</b> 1415 N Miller Wenatchee, WA - 98801 Phone: 509-663-8603 Website: www.northcoastelectric.com	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 09/21/2012	<b>Projects Completed</b> 3
<b>Northwest Electrical Supply Company (NESCO)</b> 111 S. 3rd Ave. Yakima, WA - 98902 Phone: 509-575-0354	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 09/21/2012	<b>Projects Completed</b> 19
<b>Orange Dairy Service, Inc.</b> PO Box 522 2225 E Edison, Sunnyside, WA - 98944 Phone: 509-837-5078	<b>Specialties</b> Farm and Dairy Other: Other Specialty	<b>Business Type</b> Contractor	<b>Join Date</b> 12/01/2005	<b>Projects Completed</b> 3
<b>Picatti Brothers Inc.</b> 105 S. 3rd St. Yakima, WA - 98902 Phone: 509-248-2540	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 06/18/2009	<b>Projects Completed</b> 5

<b>PLANLED INC</b> 1800 S 341st PL Federal Way, WA - 98003 Phone: 866-552-5529 Website: www.planled.com	<b>Specialties</b> Controls Lighting	<b>Business Type</b> Distributor Manufacturer - Rep	<b>Join Date</b> 09/15/2015	<b>Projects Completed</b> 1
<b>Platt Electric Supply - Grandview*</b> 100 Stover Loop Rd Grandview, WA - 98930 Phone: 509-882-1616 Website: www.platt.com	<b>Specialties</b> Lighting	<b>Business Type</b> Distributor	<b>Join Date</b> 07/13/2015	<b>Projects Completed</b> 1
<b>Platt Electric Supply - Walla Walla*</b> 415 West Main Walla Walla, WA - 99362 Phone: 509-522-0611 Website: platt.com	<b>Specialties</b> Lighting	<b>Business Type</b> Distributor	<b>Join Date</b> 04/07/2007	<b>Projects Completed</b> 28
<b>Platt Electric Supply - Yakima*</b> 16 S. 1st Avenue Yakima, WA - 98902 Phone: 509-452-6444 Website: platt.com	<b>Specialties</b> Lighting	<b>Business Type</b> Distributor	<b>Join Date</b> 08/16/2006	<b>Projects Completed</b> 174
<b>Pro Controls Inc.</b> 1312 Gordon Rd Yakima, WA - 98901 Phone: 509-388-4186 Website: procontrolsyakima.com	<b>Specialties</b> Controls HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 07/01/2012	<b>Projects Completed</b> 1
<b>Rainbow Electric, Inc.</b> 1312 Dazet Rd Yakima, WA - 98908 Phone: 509-972-2558 x 105	<b>Specialties</b> Building envelope Food Service Lighting Other: Other Specialty	<b>Business Type</b> Contractor	<b>Join Date</b> 06/11/2014	<b>Projects Completed</b> 5
<b>Rexel - Capitol Light - Hartford, CT</b> 270 Locust Street Hartford, CT - 06141 Phone: 866-520-2388 Website: www.capitollight.com	<b>Specialties</b> Controls Lighting	<b>Business Type</b> Distributor	<b>Join Date</b> 06/13/2014	<b>Projects Completed</b>
<b>Roberts Electrical Inc.</b> 13761 US Highway 12 PO Box 757, Naches, WA - 98937 Phone: 509-930-3803	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 05/01/2012	<b>Projects Completed</b>
<b>Sage Electric of Selah LLC</b> 675 Gore Rd Selah, WA - 98942 Phone: 509-697-9334	<b>Specialties</b> Controls Irrigation Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 03/15/2016	<b>Projects Completed</b>
<b>Schaefer Refrigeration, Inc.</b> 2929 E. Isaacs Walla Walla, WA - 99362 Phone: 509-525-2076	<b>Specialties</b> HVAC - unitary Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 06/01/2004	<b>Projects Completed</b> 2
<b>Schneider Electric Buildings Americas, Inc.</b> 7525 SE 24th Street, Ste 470 Mercer Island, WA - 98040 Phone: 360-823-3040 Website: www.se-enable.com	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Engineering Firm	<b>Join Date</b> 10/10/2010	<b>Projects Completed</b> 6
<b>Stanley inc DBA Ahtanum Electric</b> PO Box 8186 yakima, WA - 98908 Phone: 509-945-7414	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 11/12/2015	<b>Projects Completed</b> 1

<b>Stoneway Electric Supply - Walla Walla*</b> 44 S Palouse Street Walla Walla, WA - 99362 Phone: 509-522-1550 Website: stoneway.com	<b>Specialties</b> Lighting	<b>Business Type</b> Distributor	<b>Join Date</b> 06/08/2006	<b>Projects Completed</b> 7
<b>Stoneway Electric Supply - Yakima*</b> 23 N. 3rd Ave Yakima, WA - 98902 Phone: 509-469-6154	<b>Specialties</b> Controls HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 02/26/2008	<b>Projects Completed</b> 5
<b>Stoneway Electric Supply Co. - Richland*</b> 630 Railroad Street Richland, WA - 99352 Phone: 509-943-4664	<b>Specialties</b> Controls Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 08/26/2015	<b>Projects Completed</b> Completed
<b>Stusser Electric Company*</b> 116 N. 2nd Ave. Yakima, WA - 98902 Phone: 509-453-0378	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Distributor	<b>Join Date</b> 04/28/2007	<b>Projects Completed</b> 28
<b>T&amp;M Heating</b> PO Box 3120 2711 S. 5th Ave, Union Gap, WA - 98903 Phone: 509-575-1088	<b>Specialties</b> HVAC - unitary	<b>Business Type</b> Contractor	<b>Join Date</b> 07/01/2004	<b>Projects Completed</b> 1
<b>Thermex Valley Heating &amp; AC</b> 1916 Fruitvale Blvd. Yakima, WA - 98902 Phone: 509-965-0630 Website: thermexvalley.com	<b>Specialties</b> HVAC - unitary Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 07/01/2004	<b>Projects Completed</b> Completed
<b>Thunder Electric Inc.</b> 704 River Road Yakima, WA - 98902 Phone: 509-575-8362	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 09/11/2014	<b>Projects Completed</b> Completed
<b>Titan Electrical LLC</b> 651 North Keys Road Yakima, WA - 98901 Phone: 509-941-8306	<b>Specialties</b> Lighting Other: Other Specialty	<b>Business Type</b> Contractor	<b>Join Date</b> 09/15/2015	<b>Projects Completed</b> 1
<b>TJ's Refrigeration Heating and Air Conditioning LLC</b> 329 S 6th Street Sunnyside, WA - 98944 Phone: 509-839-8840	<b>Specialties</b> Appliances Building envelope Controls Food Service HVAC - evaporative HVAC - unitary Motors and VFDs	<b>Business Type</b> Other: General Contractor	<b>Join Date</b> 10/07/2015	<b>Projects Completed</b> Completed
<b>Tolman Electric</b> 380 Canyon Road Grandview, WA - 98930 Phone: 509-830-1164	<b>Specialties</b> HVAC - unitary Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 04/10/2010	<b>Projects Completed</b> 3
<b>Total Control Electric Inc.</b> 5 East F Street Yakima, WA - 98902 Phone: 509-453-1021	<b>Specialties</b> Lighting Motors and VFDs	<b>Business Type</b> Contractor	<b>Join Date</b> 06/08/2006	<b>Projects Completed</b> 11
<b>Total Digital Systems</b> 13433 NE 20th St STE O, Bellevue, WA - 98005 Phone: 425-643-2728 Website: www.totaldigitalsystems.com	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 06/24/2016	<b>Projects Completed</b> Completed

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<b>Transformative Wave Technologies</b> 1012 central ave s kent, WA - 98032 Phone: 253-867-2333 x 794 Website: <a href="http://transformativewave.com/">http://transformativewave.com/</a>	<b>Specialties</b> Motors and VFDs Other: Other Specialty	<b>Business Type</b> Manufacturer - Rep	<b>Join Date</b> 08/09/2016	<b>Projects Completed</b>
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<b>Twice the Light, Inc.</b> 6137 NE 63rd Street Vancouver, WA - 98661 Phone: 360-573-6101 Website: <a href="http://www.twicethelight.com">www.twicethelight.com</a>	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor Distributor Manufacturer - Rep	<b>Join Date</b> 06/28/2016	<b>Projects Completed</b> 1
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<b>Walla Walla Electric*</b> 1225 W. Poplar Walla Walla, WA - 99362 Phone: 509-525-8672 Website: <a href="http://wwelectric.com">wwelectric.com</a>	<b>Specialties</b> Lighting	<b>Business Type</b> Contractor	<b>Join Date</b> 04/09/2001	<b>Projects Completed</b> 100
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## Appendix 5

### Communications

## Energy Efficiency Communications 2016 (only showing new creative)

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

### TV

- [Washington efficiency for business customers” Baker”](#)
- [Washington hidden savings for business customers “Vet”](#)

### Radio

- [Hidden Savings for business customers](#)
- [Well-oiled machine for business customers](#)

### Print

- [Farm Bureau ad](#) *Neighbor's Magazine, Farm Bureau Newspaper, and Yakima Valley Business Times – special ag and dairy sections*
- [Ad to thank business customers and vendors](#) for being wattsmart in 2016
- [Newspaper ad \(b/w\)featuring business customer Walla Walla Public Schools](#)
- [Color ad featuring business customer Walla Walla Public Schools](#)
- [Newspaper ad \(b/w\) featuring business customer CPC International](#)
- [Color ad featuring business customer CPC International](#)
- [Newspaper ad featuring several business customers – Spring 2016](#)
- [Newspaper ad featuring several business customers – Fall 2016](#)

### Digital Ads:

- [Facebook ad – wattsmart Starter Kit](#)
- [“Hidden Savings for business" \(Static\)](#)
- ["Hidden Savings for business" \(Animated\)](#)

### Inserts:

- [February Smart Thermostat Insert](#)
- [June Cooling Ductless Heat Pump Insert](#)

### Press releases:

- [CPC International Apple Co. and Wray's Marketfresh IGA Recognized as Leaders in Energy Savings – September 7, 2016](#)
- [Five Ways to Beat the Heat – August 12, 2016](#)
- [Five Ways to Beat the Heat – June 3, 2016](#)

Newsletters:

- [January Voices](#)
- [January energy connections](#)
- [Winter Energy Insights](#)
  - Tech school masters efficiency
  - System upgrades improve reliability
  - Blue Sky boosts solar projects
  - Services help businesses thrive
- [February energy connections](#)
- [March Voices](#)
- [March energy connections](#)
- [April Voices](#)
- [April energy connections](#)
- [May wattsup insert](#)
- [May energy connections](#)
- [Spring Energy Insights](#)
  - Wray's Marketfresh IGA efficiency efforts honored
  - For the environment, with respect
  - Walla Walla moves up in contest
  - Grants lift local communities
- [June energy connections](#)
- [July Voices](#)
- [July energy connections](#)
- [Summer Energy Insights](#)
  - CPC wins wattsmart Business award
  - Birds get home away from wires
  - More features added to mobile app
  - Wildlife habitat work earns honor
- [August energy connections](#)
- [September Voices](#)
- [September energy connections](#)
- [October wattsup insert](#)
- [October energy connections](#)
- [November Voices](#)
- [November Energy Insights](#)
  - LED upgrade keeps car wash in gear
  - Choices meet energy needs
  - A river runs through it
  - Involved for stronger communities
- [November energy connections](#)

Direct mail:

- [wattsmart Starter Kit](#)
- [Monthly low-income weatherization mailing](#)
- Mailing to irrigation customers encouraging application for incentives:
  - [Letter](#)
  - [Application](#)

Emails:

- [Energy Connections for midsize business customers 1/16](#)
- [wattsmart Business lighting 2/17/16](#)
- [eVite CRES training 2/22/16](#)
- [Energy Connections for midsize business customers \(3/16/16\)](#)
- [wattsmart Business small office/retail 3/29/16](#)
- [Energy efficiency and the environment 4/16](#)
- [Seasonal change 5/26/16](#)
- [wattsmart Business food/lodging email 6/7/16](#)
- [wattsmart Business food service webinar evite 8/30/16](#)
- [Energy Connections for midsize business customers \(6/16\)](#)
- [Energy Connections for midsize business customers \(7/16\)](#)
- [wattsmart Business convenience/grocery email \(9/15/16\)](#)
- [Energy Connections for midsize business customers \(9/16\)](#)
- [eVite Compressed Air CAC1 9/16](#)
- [wattsmart Business lighting incentives email \(10/11/16\)](#)
- [wattsmart Business lighting controls email \(11/15/16\)](#)

Collateral:

- [Winter wattsmart handout](#)
- [Summer wattsmart handout](#)
- [wattsmart Business - overview](#)
- [wattsmart Business – overview Spanish](#)
- [wattsmart Business - brochure](#)



- wattsmart Business (office/small retail businesses):
  - [Printed](#)
  - [Co-branded version](#)
- wattsmart Business (grocery and convenience stores):
  - [Printed](#)
  - [Co-branded version](#)
- wattsmart Business (restaurant and lodging businesses):
  - [Printed](#)
  - [Co-branded version](#)
- [wattsmart Business LED instant incentives](#)
- [wattsmart Small Business lighting incentives](#)
- [wattsmart Business wastewater incentives](#)



## Appendix 6

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# Washington Program Evaluations

Pacific Power

## Washington 2016 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 2016 and the third party evaluator who completed the evaluation. Program evaluations are available for review at [www.pacificorp.com/es/dsm/washington.html](http://www.pacificorp.com/es/dsm/washington.html)

Program	Years Evaluated	Evaluator
Home Energy Savings	2013 - 2014	Cadmus
Home Energy Reports	2014 – 2015	Navigant

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

**Table 1**  
**Home Energy Savings Evaluation Recommendations**

<b>Evaluation Recommendations</b>	<b>Pacific Power Action Plan</b>
<p>Assign measure categories by end use in the program administrator's tracking database (instead of delivery channel) to ensure the most appropriate cost-effectiveness results instead of delivery channel.</p>	<p>The program administrator worked with Pacific Power to update the measure categories so they align with end uses instead of delivery channels. These updates were completed coincident with the January 1, 2016 program changes and are reflected in the Pacific Power's Technical Reference Library (TRL).</p>
<p>For the upstream lighting database, track all data in a consistent manner across each program evaluation period. Cadmus had difficulty mapping the program administrator's lighting database to the price-scheduling database.</p>	<p>The program administrator worked with Cadmus in 2016 to develop a standardized lighting template. Also, the process was updated to ensure alignment between Cadmus and the program administrator regarding both the template and field definitions. The new process and templates were used for the most current (2015-2016) evaluation.</p>
<p>Consider accounting for commercial installation of upstream bulbs in the reported savings. Currently, Pacific Power does not account for cross-sector sales from the upstream lighting incentives.</p>	<p>The most recent RTF workbook (January 2017, V5) for residential lighting includes information about commercial installations resulting from retail incentives. This information will be evaluated during 2017 as part of 2018-2019 biennium planning. Any changes in savings reporting would begin in 2018.</p>
<p>Continue to pursue a multi-touch marketing strategy, using a mix of bill inserts and retailer/contractor training. Given the large percentage of customers who learned of wattsmart offerings through bill inserts, examine the proportion of customers selecting to receive online bills and ensure these online channels proportionately advertise the programs with the messages that motivated customers to participate: long-lasting products, saving energy, replacing equipment and reducing costs.</p>	<p>About a third of Pacific Power customers receive online bills. Customers who receive online bills are provided with online access to the bill messages provided in printed bills. Key messages are consistent across both paper and online bill inserts. The multi-touch marketing strategy is ongoing and a customer propensity model to improve targeting has recently been added by the program administrator.</p>
<p>Continue regular trainings with trade allies (e.g., distributors, retailers, sales associates, contractors), updating them on tariff changes and, where appropriate, supporting them with sales and marketing training.</p>	<p>Program administrator will continue retailer and trade ally trainings. Focus will be placed on when program offerings are updated, implementation is changed, and marketing changes. The program administrator will provide regular trainings to both retail and trade ally groups concentrating on priority measures, product/service quality, and program qualifications.</p>

<b>Evaluation Recommendations</b>	<b>Pacific Power Action Plan</b>
For energy savings kits, consider allowing customer to opt out of either the showerhead or faucet aerator offering. Lighting only kits are already available.	Potential changes to energy kit configurations will be evaluated during 2017 as part of planning for the 2018-2019 biennium. Any changes in configuration will be included in the 2018-2019 conservation plan.

**Table 2**  
**Home Energy Reports Evaluation Recommendations**

<b>Evaluation Recommendations</b>	<b>Pacific Power Action Plan</b>
Future refill waves should target the highest usage customers not already in the program. Prior to adding future refill waves, the program should verify that the allocation of households across the treatment and control groups is consistent with a RCT (randomized control trial).	OPower delivers the program for Pacific Power in Washington. Highest usage customers are targeted by OPower when customers are added to the refill wave to maximize savings opportunity. Households (for treatment and control groups) continue to be added in a manner consistent with established RCT protocols. In addition, to increase savings for program participants, digital engagements are layered on top of paper home energy reports.