



**MEMORANDUM**

**Date:** November 5, 2013  
**To:** Don Jones, Jr.  
**From:** Aaron Jenniges  
**Re:** WA Business Program 2014-2015 Cost-Effectiveness by Scenario

The tables below present the cost-effectiveness findings of the Washington Business Program scenarios and measures based on 2014-15 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “Copy of 2014-2015 Business Plan Tables 10232013 - REV for Energy management 102613.xlsx” and in an email on November 4, 2013. The utility discount rate is from the 2013 PacifiCorp Integrated Resource Plan.

Cost-effectiveness was tested using the 2013 IRP 71% load factor west system decrements. Table 1 shows the financial input assumptions.

**Table 1: Business Program Financial Inputs**

Input Description	2014	2015	2014-15
Discount Rate	6.88%	6.88%	6.88%
Commercial Line Loss	9.53%	9.53%	9.53%
Industrial Line Loss	8.16%	8.16%	8.16%
Irrigation Line Loss	9.67%	9.67%	9.67%
Inflation Rate	1.90%	1.90%	1.90%

Table 2 shows the 2014-15 utility and participant costs by scenario. Table 3 shows the 2014-15 KWh savings, realization rates, and measure lives by scenario.

**Table 2: 2014-15 Utility and Participant Costs by Scenario**

Scenario	Year	Program Delivery Costs	Utility Delivery Costs	Incentives	Total Utility Costs	Participant Measure Costs
Energy FinAnswer	2014	\$660,413	\$233,771	\$1,562,433	\$2,456,616	\$4,206,056
	2015	\$726,454	\$257,148	\$1,718,676	\$2,702,278	\$4,626,661
Portfolio - Business As Usual	2014	\$1,430,462	\$414,423	\$2,532,628	\$4,377,512	\$7,906,221
	2015	\$1,498,275	\$438,215	\$2,691,103	\$4,627,594	\$8,335,340
Increase Custom Incentive Project Cost Cap	2014	\$14,221	\$5,034	\$136,751	\$156,006	\$90,570
	2015	\$15,643	\$5,537	\$150,426	\$171,606	\$99,627
Eliminate kW \$ and Fund Cx	2014	\$68,543	\$0	(\$41,815)	\$26,728	(\$68,543)
	2015	\$75,397	\$0	(\$45,996)	\$29,401	(\$75,397)
Food Service	2014	\$2,294	\$538	(\$850)	\$1,982	\$30,198
	2015	\$5,837	\$1,370	\$4,531	\$11,738	\$54,836
HVAC	2014	\$1,446	\$339	\$5,000	\$6,785	\$42,500
	2015	\$2,726	\$640	\$9,500	\$12,865	\$77,650
Irrigation	2014	\$11,254	\$2,641	\$7,800	\$21,694	\$27,083
	2015	\$11,254	\$2,641	\$7,841	\$21,735	\$27,056
Compressed Air	2014	\$10,433	\$2,448	\$17,958	\$30,840	\$43,510
	2015	\$10,433	\$2,448	\$17,958	\$30,840	\$43,510
Potato storage Van VFD	2014	\$2,683	\$630	\$4,650	\$7,963	\$9,900
	2015	\$2,683	\$630	\$4,650	\$7,963	\$9,900
Adaptive Refrigeration Control	2014	\$8,512	\$2,510	\$17,100	\$28,122	\$34,000
	2015	\$8,917	\$2,629	\$18,000	\$29,546	\$37,200
Fast Acting Door	2014	\$3,513	\$1,036	\$7,800	\$12,349	\$32,500
	2015	\$7,836	\$2,310	\$17,400	\$27,547	\$72,500
End Use Compressed Air Reduction	2014	\$3,895	\$914	\$6,750	\$11,560	\$11,200
	2015	\$4,112	\$965	\$7,125	\$12,202	\$11,800
Wastewater - Low Power Mixing	2014	\$5,998	\$1,727	\$13,500	\$21,225	\$40,000
	2015	\$5,998	\$1,727	\$13,500	\$21,225	\$40,000
Energy Management	2014	\$67,355	\$7,000	\$10,506	\$84,861	\$27,086
	2015	\$135,989	\$7,000	\$21,055	\$164,044	\$54,727

**Table 3: 2014-15 Energy Savings and Measure Lives by Scenario**

Scenario	Year	Gross KWh Savings	Realization Rate	Adjusted Gross KWh Savings	Net-to-Gross Ratio	Net Adjusted KWh Savings	Measure Life (Years)
Energy FinAnswer	2014	12,504,708	95%	11,890,420	100%	11,890,420	14
	2015	13,755,179	95%	13,079,462	100%	13,079,462	14
Portfolio - Business As Usual	2014	20,395,389	97%	19,742,722	100%	19,742,722	14
	2015	21,664,015	97%	20,949,831	100%	20,949,831	14
Increase Custom Incentive Project Cost Cap	2014	269,268	95%	256,040	100%	256,040	14
	2015	296,195	95%	281,644	100%	281,644	14
Eliminate kW \$ and Fund Cx	2014	0	95%	0	100%	0	14
	2015	0	95%	0	100%	0	14
Food Service	2014	26,500	97%	25,705	100%	25,705	12
	2015	67,438	97%	65,414	100%	65,414	12
HVAC	2014	22,500	72%	16,200	100%	16,200	15
	2015	42,425	72%	30,546	100%	30,546	15
Irrigation	2014	130,000	97%	126,100	100%	126,100	6
	2015	130,000	97%	126,100	100%	126,100	6
Compressed Air	2014	120,525	97%	116,909	100%	116,909	9
	2015	120,525	97%	116,909	100%	116,909	9
Potato storage Van VFD	2014	31,000	97%	30,070	100%	30,070	10
	2015	31,000	97%	30,070	100%	30,070	10
Adaptive Refrigeration Control	2014	126,000	94%	118,440	100%	118,440	14
	2015	132,000	94%	124,080	100%	124,080	14
Fast Acting Door	2014	52,000	94%	48,880	100%	48,880	14
	2015	116,000	94%	109,040	100%	109,040	14
End Use Compressed Air Reduction	2014	45,000	97%	43,650	100%	43,650	9
	2015	47,500	97%	46,075	100%	46,075	9
Wastewater - Low Power Mixing	2014	90,000	95%	85,500	100%	85,500	14
	2015	90,000	95%	85,500	100%	85,500	14
Energy Management	2014	525,293	95%	499,028	100%	499,028	3
	2015	1,033,105	95%	981,450	100%	981,450	3

Table 4 provides a summary of the benefit/cost ratios from each of the five cost-effectiveness test perspectives by scenario. All scenarios were cost-effective with the following exceptions:

- Eliminate kW \$ and Fund Cx, Food Service, and HVAC are not cost-effective (benefit/cost ratio is less than 1.0) from the PTRC (Total Resource Cost Test + Conservation Adder) and TRC (Total Resource Cost) perspectives.
- Fast Acting Doors and Energy Management are not cost-effective from the TRC perspective but are cost-effective from the PTRC perspective.

- Only Eliminate kW \$ and Fund Cx does not have a UCT (Utility Cost Test) benefit/cost ratio greater than 1.0.
- No scenarios are cost-effective from the RIM (Ratepayer Impact) perspective.
- Eliminate kW \$ and Fund Cx, Food Service, and HVAC are not cost-effective from the PCT (Participant Cost Test).

**Table 4: Benefit/Cost Ratios by Scenario**

Scenario	PTRC	TRC	UCT	RIM	PCT
Energy FinAnswer	1.87	1.70	3.53	0.77	2.45
Portfolio - Business As Usual	1.62	1.48	3.28	0.73	2.26
Increase Custom Incentive Project Cost Cap	1.88	1.71	1.20	0.53	3.71
Eliminate kW \$ and Fund Cx	0.00	0.00	0.00	0.00	0.00
Food Service	0.69	0.62	4.38	0.72	0.85
HVAC	0.32	0.29	1.85	0.61	0.45
Irrigation	1.15	1.04	1.97	0.63	2.01
Compressed Air	1.14	1.04	1.90	0.63	1.84
Potato storage Van VFD	1.38	1.25	2.08	0.65	2.25
Adaptive Refrigeration Control	2.07	1.88	3.06	0.77	2.92
Fast Acting Door	1.06	0.97	2.90	0.76	1.31
End Use Compressed Air Reduction	1.50	1.37	1.89	0.63	2.68
Wastewater - Low Power Mixing	1.43	1.30	2.93	0.76	1.86
Energy Management	1.00	0.91	1.09	0.51	3.92
<b>Business Program Portfolio</b>	<b>1.60</b>	<b>1.45</b>	<b>3.12</b>	<b>0.72</b>	<b>2.27</b>

Complete cost-effectiveness results are presented for the following scenarios and measures:

- Energy FinAnswer (Table 5)
- Portfolio – Business as Usual (Table 6)
- Increase Custom Incentive Project Cost Cap (Table 7)
- Eliminate KW \$ and Fund Cx (Table 8)
- Food Service (Table 9)
- HVAC (Table 10)
- Irrigation (Table 11)
- Compressed Air (Table 12)

- Potato Storage Van VFD (Table 13)
- Adaptive Refrigeration Control (Table 14)
- Fast Acting Door (Table 15)
- End Use Compressed Air Reduction (Table 16)
- Wastewater – Low Power Mixing (Table 17)
- Energy Management (Table 18)
- Business Program Portfolio (Table 19): Includes Portfolio – Business as Usual , Eliminate KW \$ and Fund Cx, Increase Custom Incentive Project Cost Cap, Food Service, HVAC, Irrigation, Compressed Air, Potato Storage Van VFD, Adaptive Refrigeration Control, Fast Acting Door, End Use Compressed Air Reduction, Wastewater – Low Power Mixing, and Energy Management

**Table 5: WA 2014-15 Business Program – Energy FinAnswer**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.042	\$10,349,265	\$19,363,567	\$9,014,302	1.87
Total Resource Cost Test (TRC) No Adder	\$0.042	\$10,349,265	\$17,603,243	\$7,253,978	1.70
Utility Cost Test (UCT)	\$0.020	\$4,984,898	\$17,603,243	\$12,618,345	3.53
Rate Impact Test (RIM)		\$22,721,387	\$17,603,243	(\$5,118,144)	0.77
Participant Cost Test (PCT)		\$8,534,812	\$20,906,934	\$12,372,122	2.45
Lifecycle Revenue Impact (\$/kWh)	0.000091739				
Discounted Participant Payback (years)	3.86				

**Table 6: WA 2014-15 Business Program – Portfolio Business As Usual**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.048	\$19,361,545	\$31,453,664	\$12,092,120	1.62
Total Resource Cost Test (TRC) No Adder	\$0.048	\$19,361,545	\$28,594,240	\$9,232,696	1.48
Utility Cost Test (UCT)	\$0.022	\$8,707,141	\$28,594,240	\$19,887,099	3.28
Rate Impact Test (RIM)		\$39,082,623	\$28,594,240	(\$10,488,383)	0.73
Participant Cost Test (PCT)		\$15,704,858	\$35,425,936	\$19,721,078	2.26
Lifecycle Revenue Impact (\$/KWh)	0.000187996				
Discounted Participant Payback (years)	4.41				

**Table 7: WA 2014-15 Business Program – Increase Custom Incentive Project Cost Cap**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.042	\$222,854	\$418,615	\$195,760	1.88
Total Resource Cost Test (TRC) No Adder	\$0.042	\$222,854	\$380,559	\$157,705	1.71
Utility Cost Test (UCT)	\$0.059	\$316,562	\$380,559	\$63,996	1.20
Rate Impact Test (RIM)		\$720,460	\$380,559	(\$339,901)	0.53
Participant Cost Test (PCT)		\$183,783	\$681,389	\$497,606	3.71
Lifecycle Revenue Impact (\$/KWh)	0.000006092				
Discounted Participant Payback (years)	0.58				

**Table 8: WA 2014-15 Business Program – Eliminate kW \$ and Fund Cx**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.000	\$0	\$0	\$0	0.00
Total Resource Cost Test (TRC) No Adder	\$0.000	\$0	\$0	\$0	0.00
Utility Cost Test (UCT)	\$0.000	\$54,236	\$0	(\$54,236)	0.00
Rate Impact Test (RIM)		\$54,236	\$0	(\$54,236)	0.00
Participant Cost Test (PCT)		(\$139,085)	(\$84,849)	\$54,236	0.00
Lifecycle Revenue Impact (\$/KWh)	N/A				
Discounted Participant Payback (years)	N/A				

**Table 9: WA 2014-15 Business Program – Food Service**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.112	\$91,078	\$62,424	(\$28,654)	0.69
Total Resource Cost Test (TRC) No Adder	\$0.112	\$91,078	\$56,749	(\$34,329)	0.62
Utility Cost Test (UCT)	\$0.016	\$12,964	\$56,749	\$43,786	4.38
Rate Impact Test (RIM)		\$78,666	\$56,749	(\$21,917)	0.72
Participant Cost Test (PCT)		\$81,503	\$69,092	(\$12,412)	0.85
Lifecycle Revenue Impact (\$/KWh)	0.000000436				
Discounted Participant Payback (years)	N/A				

**Table 10: WA 2014-15 Business Program – HVAC**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.251	\$120,084	\$38,214	(\$81,870)	0.32
Total Resource Cost Test (TRC) No Adder	\$0.251	\$120,084	\$34,740	(\$85,344)	0.29
Utility Cost Test (UCT)	\$0.039	\$18,822	\$34,740	\$15,918	1.85
Rate Impact Test (RIM)		\$56,623	\$34,740	(\$21,883)	0.61
Participant Cost Test (PCT)		\$115,150	\$51,689	(\$63,461)	0.45
Lifecycle Revenue Impact (\$/KWh)	0.000000375				
Discounted Participant Payback (years)	N/A				

**Table 11: WA 2014-15 Business Program – Irrigation**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.058	\$79,291	\$91,057	\$11,765	1.15
Total Resource Cost Test (TRC) No Adder	\$0.058	\$79,291	\$82,779	\$3,487	1.04
Utility Cost Test (UCT)	\$0.031	\$42,030	\$82,779	\$40,749	1.97
Rate Impact Test (RIM)		\$132,035	\$82,779	(\$49,257)	0.63
Participant Cost Test (PCT)		\$52,397	\$105,142	\$52,744	2.01
Lifecycle Revenue Impact (\$/KWh)	0.000001609				
Discounted Participant Payback (years)	2.78				



**Table 12: WA 2014-15 Business Program – Compressed Air**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.064	\$109,151	\$124,491	\$15,340	1.14
Total Resource Cost Test (TRC) No Adder	\$0.064	\$109,151	\$113,174	\$4,023	1.04
Utility Cost Test (UCT)	\$0.035	\$59,694	\$113,174	\$53,480	1.90
Rate Impact Test (RIM)		\$180,238	\$113,174	(\$67,064)	0.63
Participant Cost Test (PCT)		\$84,218	\$155,305	\$71,087	1.84
Lifecycle Revenue Impact (\$/KWh)	0.000001632				
Discounted Participant Payback (years)	3.74				

**Table 13: WA 2014-15 Business Program – Potato Storage Van VFD**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.054	\$25,575	\$35,218	\$9,642	1.38
Total Resource Cost Test (TRC) No Adder	\$0.054	\$25,575	\$32,016	\$6,441	1.25
Utility Cost Test (UCT)	\$0.032	\$15,413	\$32,016	\$16,603	2.08
Rate Impact Test (RIM)		\$49,560	\$32,016	(\$17,544)	0.65
Participant Cost Test (PCT)		\$19,163	\$43,147	\$23,985	2.25
Lifecycle Revenue Impact (\$/KWh)	0.000000396				
Discounted Participant Payback (years)	3.01				

**Table 14: WA 2014-15 Business Program – Adaptive Refrigeration Control**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.038	\$90,629	\$187,735	\$97,106	2.07
Total Resource Cost Test (TRC) No Adder	\$0.038	\$90,629	\$170,668	\$80,039	1.88
Utility Cost Test (UCT)	\$0.023	\$55,766	\$170,668	\$114,903	3.06
Rate Impact Test (RIM)		\$222,787	\$170,668	(\$52,119)	0.77
Participant Cost Test (PCT)		\$68,805	\$200,963	\$132,158	2.92
Lifecycle Revenue Impact (\$/KWh)	0.000000934				
Discounted Participant Payback (years)	2.76				

**Table 15: WA 2014-15 Business Program – Fast Acting Door**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.074	\$114,374	\$121,455	\$7,081	1.06
Total Resource Cost Test (TRC) No Adder	\$0.074	\$114,374	\$110,413	(\$3,960)	0.97
Utility Cost Test (UCT)	\$0.025	\$38,122	\$110,413	\$72,292	2.90
Rate Impact Test (RIM)		\$145,821	\$110,413	(\$35,408)	0.76
Participant Cost Test (PCT)		\$100,332	\$131,779	\$31,447	1.31
Lifecycle Revenue Impact (\$/KWh)	0.000000635				
Discounted Participant Payback (years)	9.56				

**Table 16: WA 2014-15 Business Program – End Use Compressed Air Reduction**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.048	\$31,800	\$47,754	\$15,955	1.50
Total Resource Cost Test (TRC) No Adder	\$0.048	\$31,800	\$43,413	\$11,614	1.37
Utility Cost Test (UCT)	\$0.035	\$22,976	\$43,413	\$20,438	1.89
Rate Impact Test (RIM)		\$69,203	\$43,413	(\$25,790)	0.63
Participant Cost Test (PCT)		\$22,240	\$59,644	\$37,404	2.68
Lifecycle Revenue Impact (\$/KWh)	0.000000628				
Discounted Participant Payback (years)	1.98				

**Table 17: WA 2014-15 Business Program – Wastewater Low Power Mixing**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.055	\$92,377	\$132,415	\$40,038	1.43
Total Resource Cost Test (TRC) No Adder	\$0.055	\$92,377	\$120,378	\$28,000	1.30
Utility Cost Test (UCT)	\$0.024	\$41,083	\$120,378	\$79,294	2.93
Rate Impact Test (RIM)		\$158,773	\$120,378	(\$38,395)	0.76
Participant Cost Test (PCT)		\$77,424	\$143,820	\$66,396	1.86
Lifecycle Revenue Impact (\$/KWh)	0.000000688				
Discounted Participant Payback (years)	5.50				

**Table 18: WA 2014-15 Business Program – Energy Management**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.066	\$286,426	\$286,480	\$54	1.00
Total Resource Cost Test (TRC) No Adder	\$0.066	\$286,426	\$260,437	(\$25,990)	0.91
Utility Cost Test (UCT)	\$0.055	\$238,342	\$260,437	\$22,095	1.09
Rate Impact Test (RIM)		\$515,090	\$260,437	(\$254,653)	0.51
Participant Cost Test (PCT)		\$78,289	\$306,953	\$228,663	3.92
Lifecycle Revenue Impact (\$/KWh)	0.000013645				
Discounted Participant Payback (years)	0.61				

**Table 19: WA 2014-15 Business Program Portfolio**

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	\$0.049	\$20,625,185	\$32,999,523	\$12,374,339	1.60
Total Resource Cost Test (TRC) No Adder	\$0.049	\$20,625,185	\$29,999,567	\$9,374,382	1.45
Utility Cost Test (UCT)	\$0.023	\$9,623,150	\$29,999,567	\$20,376,416	3.12
Rate Impact Test (RIM)		\$41,466,116	\$29,999,567	(\$11,466,549)	0.72
Participant Cost Test (PCT)		\$16,449,077	\$37,290,008	\$20,840,931	2.27
Lifecycle Revenue Impact (\$/KWh)	0.000196463				
Discounted Participant Payback (years)	4.26				