



Date: April 21, 2010
To: Don Jones Jr.
From: Brian Hedman
Re: Utah Home Energy Savings 2010 Program Cost Effectiveness Sensitivity Analysis

The tables below present the cost effectiveness findings of the Utah Home Energy Savings program based on 2010 costs and savings estimates provided by PacifiCorp in Attachment M in the tab labeled 2010 cost effectiveness inputs. The Utility discount rate is from the 2008 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2008 IRP 46% east residential whole house load factor decrement. Multiple scenarios were tested and summarized in Table 1. The base case is \$45/ton CO2. Additional scenarios include \$8/ton CO2, \$45/ton CO2 with savings adjusted +/- 10%, and \$45/ton CO2 with measure lives adjusted +/- 10%. We have also calculated the discounted savings and the discounted measure life at which the utility cost test breaks even.

**Table 1: Summary of Scenarios
(Benefit/Cost Ratios)**

	\$45/ton base case	\$8/ton	\$45/ton +10% Savings	\$45/ton -10% Savings	Savings Break Even @ 63%	\$45/ton +10% Measure Life	\$45/ton -10% Measure Life	Measure Life Break Even @ 68%
Total Resource Cost Test (PTRC) + Conservation Adder	1.24	0.84	1.37	1.12	0.78	1.43	1.21	0.78
Total Resource Cost Test (TRC) No Adder	1.13	0.77	1.24	1.02	0.71	1.30	1.10	0.71
Utility Cost Test (UCT)	1.59	1.08	1.75	1.44	1.00	1.83	1.55	1.00
Rate Impact Test (RIM)	0.62	0.42	0.64	0.60	0.51	0.66	0.61	0.48
Participant Cost Test (PCT)	4.87	4.87	5.36	4.39	3.07	5.48	4.78	3.37

Tables 2, 3 and 4 list the basic assumptions used in all scenarios. Individual cost effectiveness results for each of the scenarios follow.

**Table 2: Home Energy Savings
 Inputs**

Parameter	Value
Discount Rate	7.4%
Line Loss	9.72%
Residential Energy Rate (\$/kWh)	\$0.0857

**Table 3: Home Energy Savings
 Annual Program Costs and Savings**

	Program Costs	Utility Admin	Evaluation	Incentives	Total Utility Costs	Net Participant Incremental Cost
Lighting	\$749,539	\$25,000	\$75,000	\$1,701,617	\$2,551,156	\$5,852,805
Appliance	\$1,353,686	\$25,000	\$75,000	\$1,508,775	\$2,962,461	\$3,869,335
Shell	\$3,151,643	\$25,000	\$75,000	\$8,046,105	\$11,297,749	\$8,473,766
HVAC	\$117,222	\$25,000	\$75,000	\$228,670	\$445,892	\$375,096
Total	\$5,372,090	\$100,000	\$300,000	\$11,485,167	\$17,257,257	\$18,571,002

**Table 4: Home Energy Savings
 Savings by Measure Type**

	Gross kWh Savings	Realization Rate	Adjusted Gross Savings	Net to Gross Percentage	Net kWh Savings	Measure Life
Lighting	61,446,596	97%	59,603,198	82%	48,874,623	5
Appliance	3,951,625	100%	3,951,625	82%	3,240,332	14
Shell	9,200,147	76%	6,992,112	82%	5,733,532	30
HVAC	342,190	100%	342,190	82%	280,596	14
Total	74,940,558		70,889,125		58,129,083	

Table 5: \$45/ton CO2 Base Case

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0634	\$24,343,092	\$30,266,353	\$5,923,261	1.243
Total Resource Cost Test (TRC) No Adder	0.0634	\$24,343,092	\$27,514,866	\$3,171,774	1.130
Utility Cost Test (UCT)	0.0450	\$17,257,257	\$27,514,866	\$10,257,609	1.594
Rate Impact Test (RIM)		\$44,380,642	\$27,514,866	(\$16,865,776)	0.620
Participant Cost Test (PCT)		\$7,085,835	\$34,527,357	\$27,441,522	4.873
Lifecycle Revenue Impacts (\$/kWh)				\$0.0004671064	
Discounted Participant Payback (years)				1.26	

Table 6: \$8/ton CO2

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0634	\$24,343,092	\$20,549,125	(\$3,793,967)	0.844
Total Resource Cost Test (TRC) No Adder	0.0634	\$24,343,092	\$18,681,022	(\$5,662,070)	0.767
Utility Cost Test (UCT)	0.0450	\$17,257,257	\$18,681,022	\$1,423,765	1.083
Rate Impact Test (RIM)		\$44,380,642	\$18,681,022	(\$25,699,620)	0.421
Participant Cost Test (PCT)		\$7,085,835	\$34,527,357	\$27,441,522	4.873
Lifecycle Revenue Impacts (\$/kWh)				\$0.0007117643	
Discounted Participant Payback (years)				1.26	

Table 7: \$45/ton CO2 +10% Savings

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0577	\$24,343,092	\$33,292,988	\$8,949,896	1.368
Total Resource Cost Test (TRC) No Adder	0.0577	\$24,343,092	\$30,266,353	\$5,923,261	1.243
Utility Cost Test (UCT)	0.0409	\$17,257,257	\$30,266,353	\$13,009,095	1.754
Rate Impact Test (RIM)		\$47,211,886	\$30,266,353	(\$16,945,533)	0.641
Participant Cost Test (PCT)		\$7,085,835	\$37,980,093	\$30,894,258	5.360
Lifecycle Revenue Impacts (\$/kWh)				\$0.0004693153	
Discounted Participant Payback (years)				1.15	

Table 8: \$45/ton CO2 -10% Savings

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0705	\$24,343,092	\$27,239,717	\$2,896,625	1.119
Total Resource Cost Test (TRC) No Adder	0.0705	\$24,343,092	\$24,763,379	\$420,287	1.017
Utility Cost Test (UCT)	0.0500	\$17,257,257	\$24,763,379	\$7,506,122	1.435
Rate Impact Test (RIM)		\$41,549,399	\$24,763,379	(\$16,786,020)	0.596
Participant Cost Test (PCT)		\$7,085,835	\$31,074,621	\$23,988,787	4.385
Lifecycle Revenue Impacts (\$/kWh)				\$0.0004648975	
Discounted Participant Payback (years)				1.41	

Table 9: \$45/ton CO2 63% Savings – UCT Breakeven Point

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.1007	\$24,343,092	\$19,067,802	(\$5,275,290)	0.783
Total Resource Cost Test (TRC) No Adder	0.1007	\$24,343,092	\$17,334,366	(\$7,008,726)	0.712
Utility Cost Test (UCT)	0.0714	\$17,257,257	\$17,334,366	\$77,108	1.004
Rate Impact Test (RIM)		\$33,905,042	\$17,334,366	(\$16,570,677)	0.511
Participant Cost Test (PCT)		\$7,085,835	\$21,752,235	\$14,666,400	3.070
Lifecycle Revenue Impacts (\$/kWh)				\$0.0004589335	
Discounted Participant Payback (years)				2.04	

Table 10: \$45/ton CO2 +10% Measure Life

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0823	\$24,343,092	\$34,713,181	\$10,370,089	1.426
Total Resource Cost Test (TRC) No Adder	0.0823	\$24,343,092	\$31,557,438	\$7,214,346	1.296
Utility Cost Test (UCT)	0.0583	\$17,257,257	\$31,557,438	\$14,300,180	1.829
Rate Impact Test (RIM)		\$47,892,978	\$31,557,438	(\$16,335,541)	0.659
Participant Cost Test (PCT)		\$7,085,835	\$38,810,693	\$31,724,859	5.477
Lifecycle Revenue Impacts (\$/kWh)				\$0.0003984569	
Discounted Participant Payback (years)				1.26	

Table 11: \$45/ton CO2 -10% Measure Life

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0959	\$24,343,092	\$29,417,751	\$5,074,659	1.208
Total Resource Cost Test (TRC) No Adder	0.0959	\$24,343,092	\$26,743,410	\$2,400,318	1.099
Utility Cost Test (UCT)	0.0680	\$17,257,257	\$26,743,410	\$9,486,153	1.550
Rate Impact Test (RIM)		\$43,856,016	\$26,743,410	(\$17,112,606)	0.610
Participant Cost Test (PCT)		\$7,085,835	\$33,887,569	\$26,801,734	4.782
Lifecycle Revenue Impacts (\$/kWh)				\$0.0005462138	
Discounted Participant Payback (years)				1.26	

Table 12: \$45/ton CO2 68% UTC Measure Life Breakeven

All Measures				AC: IRP 46% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.0873	\$24,343,092	\$18,891,317	(\$5,451,775)	0.776
Total Resource Cost Test (TRC) No Adder	0.0873	\$24,343,092	\$17,173,925	(\$7,169,167)	0.705
Utility Cost Test (UCT)	0.0619	\$17,257,257	\$17,173,925	(\$83,332)	0.995
Rate Impact Test (RIM)		\$35,626,893	\$17,173,925	(\$18,452,968)	0.482
Participant Cost Test (PCT)		\$7,085,835	\$23,852,053	\$16,766,218	3.366
Lifecycle Revenue Impacts (\$/kWh)				\$0.0008381817	
Discounted Participant Payback (years)				1.26	