|  |
| --- |
| Appendix 1 |
| Cost Effectiveness2011 Annual Report on Conservation Acquisition-Washington |
|  |
| Pacific Power  |
| 3/30/2012 |

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# Total Portfolio

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington 2011 DSM Portfolio Cost Effectiveness

The tables below present the cost effectiveness analysis for the Washington Energy Efficiency Portfolio based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan. Individual program cost effectiveness is provided in separate memos.

The portfolio is cost effective cost effective from all perspectives, except for the RIM.

Table 1: Common Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Residential Line Loss | 8.87% |
| Commercial Line Loss | 8.73% |
| Industrial Line Loss | 7.54% |
| Residential Energy Rate ($/kWh)(base year 2010) | $0.0767 |
| Commercial Energy Rate ($/kWh) (base year 2010) | $0.0688 |
| Industrial Energy Rate ($/kWh)(base year 2010) | $0.0577 |
| Inflation Rate[[1]](#footnote-1) | 1.8% |

Table 2: CFL Adjustment

|  |  |
| --- | --- |
| **Program** | **Value** |
| kWh | (594,829) |
| Incremental Cost | ($37,342) |

Table 3: NEEA

|  |  |
| --- | --- |
| **Program** | **Value** |
| kWh | 11,388,000 |
| Incremental Cost | $1,275,734 |

Table 4: 2011 Total Portfolio Including NEEA and CFL Adjustment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.038  | $15,279,778  | $40,250,034  | $24,970,257  | 2.63 |
| Total Resource Cost Test (TRC) No Adder | $0.038  | $15,279,778  | $36,563,378  | $21,283,600  | 2.39 |
| Utility Cost Test (UCT) | $0.023  | $9,361,447  | $36,563,378  | $27,201,931  | 3.91 |
| Rate Impact Test (RIM) |   | $37,895,510  | $36,563,378  | ($1,332,133) | 0.96 |
| Participant Cost Test (PCT) |   | $9,540,860  | $32,156,593  | $22,615,733  | 3.37 |
| Lifecycle Revenue Impacts ($/kWh) |   |   |   | $0.00001753  |   |

Table 5: 2011 C&I Energy Efficiency Portfolio

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044  | $8,370,974  | $19,204,509  | $10,833,535  | 2.29 |
| Total Resource Cost Test (TRC) No Adder | $0.044  | $8,370,974  | $17,458,645  | $9,087,671  | 2.09 |
| Utility Cost Test (UCT) | $0.021  | $3,961,823  | $17,458,645  | $13,496,822  | 4.41 |
| Rate Impact Test (RIM) |   | $16,216,389  | $17,458,645  | $1,242,256  | 1.08 |
| Participant Cost Test (PCT) |   | $6,563,813  | $14,409,228  | $7,845,414  | 2.20 |
| Lifecycle Revenue Impacts ($/kWh) |   |   |   | ($0.00002537) |   |

Table 6: 2011 Residential Energy Efficiency Portfolio
(including NEEA and CFL Adjustment)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.027  | $5,526,938  | $21,045,525  | $15,518,588  | 3.81 |
| Total Resource Cost Test (TRC) No Adder | $0.027  | $5,526,938  | $19,104,733  | $13,577,796  | 3.46 |
| Utility Cost Test (UCT) | $0.019  | $4,017,758  | $19,104,733  | $15,086,975  | 4.76 |
| Rate Impact Test (RIM) |   | $20,297,256  | $19,104,733  | ($1,192,523) | 0.94 |
| Participant Cost Test (PCT) |   | $2,977,047  | $17,747,365  | $14,770,318  | 5.96 |
| Lifecycle Revenue Impacts ($.kWh) |   |   |   | $0.00001569  |   |

The following tables reflect the cost-effectiveness analysis with non-energy benefits.

Table 7: 2011 Total Portfolio Including NEEA, CFL Adjustment, and Non-Energy Benefits

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.038  | $15,279,778  | $41,857,542  | $26,577,765  | 2.74 |
| Total Resource Cost Test (TRC) No Adder | $0.038  | $15,279,778  | $38,170,886  | $22,891,108  | 2.50 |
| Utility Cost Test (UCT) | $0.023  | $9,361,447  | $36,571,890  | $27,210,443  | 3.91 |
| Rate Impact Test (RIM) |   | $37,895,510  | $36,571,890  | ($1,323,621) | 0.97 |
| Participant Cost Test (PCT) |   | $9,540,860  | $33,554,242  | $24,013,382  | 3.52 |
| Lifecycle Revenue Impacts ($.kWh) |   |   |   | $0.00001742  |   |

Table 8: 2011 C&I Energy Efficiency Portfolio with Non-Energy Benefits

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044  | $8,370,974  | $19,204,509  | $10,833,535  | 2.29 |
| Total Resource Cost Test (TRC) No Adder | $0.044  | $8,370,974  | $17,458,645  | $9,087,671  | 2.09 |
| Utility Cost Test (UCT) | $0.021  | $3,961,823  | $17,458,645  | $13,496,822  | 4.41 |
| Rate Impact Test (RIM) |   | $16,216,389  | $17,458,645  | $1,242,256  | 1.08 |
| Participant Cost Test (PCT) |   | $6,563,813  | $14,409,228  | $7,845,414  | 2.20 |
| Lifecycle Revenue Impacts ($.kWh) |   |   |   | ($0.00002537) |   |

Table 9: 2011 Residential Energy Efficiency Portfolio with Non-Energy Benefits
(including NEEA and CFL Adjustment)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.027  | $5,526,938  | $22,653,033  | $17,126,096  | 4.10 |
| Total Resource Cost Test (TRC) No Adder | $0.027  | $5,526,938  | $20,712,241  | $15,185,304  | 3.75 |
| Utility Cost Test (UCT) | $0.019  | $4,017,758  | $19,113,245  | $15,095,487  | 4.76 |
| Rate Impact Test (RIM) |   | $20,297,256  | $19,113,245  | ($1,184,011) | 0.94 |
| Participant Cost Test (PCT) |   | $2,977,047  | $19,145,014  | $16,167,968  | 6.43 |
| Lifecycle Revenue Impacts ($.kWh) |   |   |   | $0.00001558  |   |

The tables below summarize the non-energy benefits for the Low Income, Home Energy Savings and Energy Education programs.

Table 10: Low Income Weatherization Non-Energy Benefits

|  |  |  |
| --- | --- | --- |
| **Non-Energy Benefit** | **Program Impact** | **Perspective Adjusted** |
| Mobility | $18,620 | TRC |
| Arrearage | $8,512 | UCT, RIM, TRC |
| Economic | $182,726 | TRC |
| **Total** | **$209,858** |  |

Table 11: Home Energy Savings (Appliance) Non-Energy Benefits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Non-Energy Benefit** | **Non-Energy Benefits per Measure** | **Total Installs** | **Measure Life** | **Total Present Value Benefits** |
| Clothes Washer – Tier One (1.72 – 1.99 MEF) | $45.74  | 19 | 14 | $8,063  |
| Clothes Washer – Tier Two (2.0+ MEF) | $60.26  | 2,236 | 14 | $1,250,070  |
| Dishwasher | $0.31  | 666 | 9 | $1,409  |
| New Homes Dishwashers | $0.31  | 10 | 12 | $26  |
| **Total** |  |  |  | **$1,259,568**  |

Table 12: Energy Education Non-Energy Benefits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Non-Energy Benefit** | **Non-Energy Benefits per Measure** | **Total Installs** | **Measure Life** | **Total Present Value Benefits** |
| Showerheads | $6.62 | 2,014 | 8.0 | $84,771 |
| Aerators | $3.49 | 3,488 | 5.0 | $53,310 |
| Total Benefits |   |   |   | $138,082 |

# Home Energy Savings

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington Home Energy Savings 2011 Program Cost Effectiveness

The tables below present the cost effectiveness findings of the Washington Home Energy Savings program based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2011 IRP west residential lighting, whole house, or cooling load factor decrements, depending on the measure group. Table 1 lists modeling inputs.

Table 1: Home Energy Savings
Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Line Loss | 8.87% |
| Residential Energy Rate ($/kWh) (base year 2010) | $0.0767 |
| Inflation Rate[[2]](#footnote-2) | 1.8% |

Table 2: Home Energy Savings
Annual Program Costs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Program Costs** | **Utility Admin** | **Evaluation** | **Incentives** | **Total Utility Costs** | **Net Participant Incremental Cost** |
| Lighting  | $50,234  | $12,955  | $0  | $249,182  | $312,371  | $1,014,320  |
| Appliance  | $192,024  | $49,521  | $0  | $267,750  | $509,295  | $632,104  |
| Home Improvement | $135,731  | $35,003  | $0  | $275,307  | $446,041  | $548,466  |
| HVAC | $131,406  | $33,888  | $0  | $75,910  | $241,204  | $226,051  |
| New Construction | $73,000  | $18,826  | $0  | $83,375  | $175,200  | $162,323  |
| Total | $582,395  | $150,193  | $0  | $951,524  | $1,684,111  | $2,583,264  |

 Table 3: Home Energy Savings
Savings by Measure Type

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Gross kWh Savings** | **Realization Rate** | **Adjusted Gross Savings** | **Net to Gross Percentage** | **Net kWh Savings** | **Measure Life** | **Load Factor Decrement** |
| Lighting  | 7,422,611 | 84% | 6,234,993 | 100% | 6,234,993 | 6.60 | Lighting |
| Appliance  | 805,920 | 137% | 1,104,110 | 100% | 1,104,110 | 14.55 | Whole House |
| Home Improvement | 569,658 | 102% | 581,051 | 100% | 581,051 | 45.00 | Cooling |
| HVAC | 551,508 | 92% | 507,387 | 100% | 507,387 | 18.03 | Cooling |
| New Construction | 306,377 | 70% | 214,464 | 100% | 214,464 | 20.98 | Cooling |
| Total | 9,656,073 |   | 8,642,005 |   | 8,642,005 |  |  |

Table 4: Home Energy Savings

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.049  | $3,315,852  | $7,057,902  | $3,742,050  | 2.13 |
| Total Resource Cost Test (TRC) No Adder | $0.049  | $3,315,852  | $6,416,274  | $3,100,423  | 1.94 |
| Utility Cost Test (UCT) | $0.025  | $1,684,112  | $6,416,274  | $4,732,162  | 3.81 |
| Rate Impact Test (RIM) |   | $6,936,719  | $6,416,274  | ($520,444) | 0.92 |
| Participant Cost Test (PCT) |   | $2,583,264  | $6,204,131  | $3,620,867  | 2.40 |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000006849 |  |
| Discounted Participant Payback (years) |  |  |  | 2.52  |  |

Table 5: Lighting (West Res Lighting 48% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0276  | $1,077,509  | $3,495,810  | $2,418,302  | 3.24 |
| Total Resource Cost Test (TRC) No Adder | $0.0276  | $1,077,509  | $3,178,009  | $2,100,501  | 2.95 |
| Utility Cost Test (UCT) | $0.0080  | $312,371  | $3,178,009  | $2,865,638  | 10.17 |
| Rate Impact Test (RIM) |   | $3,248,625  | $3,178,009  | ($70,616) | 0.98 |
| Participant Cost Test (PCT) |   | $1,014,320  | $3,185,436  | $2,171,116  | 3.14 |
| Discounted Participant Payback (years) |   |   |   | 1.56 |   |

Table 6: Appliance (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0753  | $873,649  | $1,189,169  | $315,520  | 1.36 |
| Total Resource Cost Test (TRC) No Adder | $0.0753  | $873,649  | $1,081,063  | $207,414  | 1.24 |
| Utility Cost Test (UCT) | $0.0439  | $509,295  | $1,081,063  | $571,768  | 2.12 |
| Rate Impact Test (RIM) |   | $1,434,052  | $1,081,063  | ($352,989) | 0.75 |
| Participant Cost Test (PCT) |   | $632,104  | $1,192,507  | $560,403  | 1.89 |
| Discounted Participant Payback (years) |   |   |   | 4.11 |   |

Table 7: Home Improvement (West Res Cooling 7% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0879  | $719,200  | $1,180,712  | $461,511  | 1.64 |
| Total Resource Cost Test (TRC) No Adder | $0.0879  | $719,200  | $1,073,374  | $354,174  | 1.49 |
| Utility Cost Test (UCT) | $0.0545  | $446,041  | $1,073,374  | $627,333  | 2.41 |
| Rate Impact Test (RIM) |   | $1,124,056  | $1,073,374  | ($50,682) | 0.95 |
| Participant Cost Test (PCT) |   | $548,466  | $953,322  | $404,856  | 1.74 |
| Discounted Participant Payback (years) |   |   |   | 5.77 |   |

Table 8: HVAC (West Res Cooling 7% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0648  | $391,345  | $828,958  | $437,613  | 2.12 |
| Total Resource Cost Test (TRC) No Adder | $0.0648  | $391,345  | $753,598  | $362,253  | 1.93 |
| Utility Cost Test (UCT) | $0.0399  | $241,204  | $753,598  | $512,394  | 3.12 |
| Rate Impact Test (RIM) |   | $734,136  | $753,598  | $19,462  | 1.03 |
| Participant Cost Test (PCT) |   | $226,051  | $568,842  | $342,791  | 2.52 |
| Discounted Participant Payback (years) |   |   |   | 3.70 |   |

Table 9: New Construction (West Res Cooling 7% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0950  | $254,149  | $363,253  | $109,104  | 1.43 |
| Total Resource Cost Test (TRC) No Adder | $0.0950  | $254,149  | $330,230  | $76,081  | 1.30 |
| Utility Cost Test (UCT) | $0.0655  | $175,201  | $330,230  | $155,029  | 1.88 |
| Rate Impact Test (RIM) |   | $395,850  | $330,230  | ($65,620) | 0.83 |
| Participant Cost Test (PCT) |   | $162,323  | $304,024  | $141,701  | 1.87 |
| Discounted Participant Payback (years) |   |   |   | 4.56 |   |

The results above do not reflect non-energy benefits. Appliances in this program have significant non-energy benefits (water). Those benefits, by measure, are outlined in the table below.

Table 10: Non-Energy Benefits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Non-Energy Benefit** | **Non-Energy Benefits per Measure** | **Total Installs** | **Measure Life** | **Total Present Value Benefits** |
| Clothes Washer – Tier One (1.72 – 1.99 MEF) | $45.74  | 19 | 14 | $8,063  |
| Clothes Washer – Tier Two (2.0+ MEF) | $60.26  | 2,236 | 14 | $1,250,070  |
| Dishwasher | $0.31  | 666 | 9 | $1,409  |
| New Homes Dishwashers | $0.31  | 10 | 12 | $26  |
| **Total** |  |  |  | **$1,259,568**  |

When these non-energy benefits are incorporated in the cost-effectiveness analysis for appliances, the TRC improves to 2.68, as shown in Table 11.

Table 11: 2010- Appliance with Non-Energy Benefits

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0753  | $873,649  | $2,448,737  | $1,575,088  | 2.80 |
| Total Resource Cost Test (TRC) No Adder | $0.0753  | $873,649  | $2,340,631  | $1,466,982  | 2.68 |
| Utility Cost Test (UCT) | $0.0439  | $509,295  | $1,081,063  | $571,768  | 2.12 |
| Rate Impact Test (RIM) |   | $1,434,052  | $1,081,063  | ($352,989) | 0.75 |
| Participant Cost Test (PCT) |   | $632,104  | $2,452,075  | $1,819,971  | 3.88 |
| Discounted Participant Payback (years) |   |   |   | 4.11 |   |

Similarly, the overall program TRC improves to 2.31 when non-energy benefits are included, as shown in table 12.

Table 12: Home Energy Savings with Non-Energy Benefits

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Levelized $/kWh | Costs | Benefits | Net Benefits | Benefit/CostRatio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0490  | $3,315,852  | $8,317,470  | $5,001,618  | 2.51 |
| Total Resource Cost Test (TRC) No Adder | $0.0490  | $3,315,852  | $7,675,842  | $4,359,990  | 2.31 |
| Utility Cost Test (UCT) | $0.0250  | $1,684,112  | $6,416,274  | $4,732,162  | 3.81 |
| Rate Impact Test (RIM) |  | $6,936,719  | $6,416,274  | ($520,444) | 0.92 |
| Participant Cost Test (PCT) |  | $2,583,264  | $7,463,699  | $4,880,435  | 2.89 |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000006849 |  |
| Discounted Participant Payback (years) |  |  |  | 2.52 |  |

# See ya later, refrigerator®

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington See ya later, refrigerator® 2011 Program Cost Effectiveness

The tables below present the cost effectiveness findings of the Washington See-Ya-Later Refrigerator program based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2011 IRP west residential whole house load factor decrement. Table 1 lists modeling inputs.

The program is cost effective from the TRC, UCT and PCT perspectives.

Table 1: See ya later, refrigerator®
Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Line Loss | 8.87% |
| Residential Energy Rate ($/kWh) (base year 2010) | $0.0767 |
| Inflation Rate[[3]](#footnote-3) | 1.8% |

Table 2: See ya later, refrigerator®
Annual Program Costs and Savings

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Program Costs** | **Utility Admin** | **Evaluation** | **Incentives** | **Total Utility Costs** | **Net Participant Incremental Cost** |
| Refrigerators  | $168,574 | $32,207 | $0 | $48,720 | $249,501 | $0 |
| Freezers | $32,782 | $6,263 | $0 | $11,760 | $50,805 | $0 |
| Kits  | $13,511 | $2,581 | $0 | $0 | $16,093 | $0 |
| Total | $214,868 | $41,052 | $0 | $60,480 | $316,400 | $0 |

Table 3: See ya later, refrigerator®
Savings by Measure Type

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Gross kWh Savings** | **Realization Rate** | **Adjusted Gross Savings** | **Net to Gross Percentage** | **Net kWh Savings** | **Measure Life** |
| Refrigerators  | 2,030,000 | 92% | 1,867,600 | 100% | 1,867,600 | 5 |
| Freezers | 726,376 | 50% | 363,188 | 100% | 363,188 | 5 |
| Kits  | 134,856 | 111% | 149,690 | 100% | 149,690 | 6.6 |
| Total | 2,891,232 |  | 2,380,478 |  | 2,380,478 |  |

Table 4: See ya later, refrigerator® (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.022  | $255,919  | $986,099  | $730,180  | 3.85 |
| Total Resource Cost Test (TRC) No Adder | $0.022  | $255,919  | $896,454  | $640,535  | 3.50 |
| Utility Cost Test (UCT) | $0.027  | $316,399  | $896,454  | $580,055  | 2.83 |
| Rate Impact Test (RIM) |   | $1,174,786  | $896,454  | ($278,332) | 0.76 |
| Participant Cost Test (PCT) |   | $0  | $918,867  | $918,867  | N/A |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000009761 |  |
| Discounted Participant Payback (years) |   |   |   | N/A  |   |

Table 5: Refrigerators (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0226  | $200,781  | $754,781  | $554,000  | 3.76 |
| Total Resource Cost Test (TRC) No Adder | $0.0226  | $200,781  | $686,165  | $485,384  | 3.42 |
| Utility Cost Test (UCT) | $0.0281  | $249,501  | $686,165  | $436,664  | 2.75 |
| Rate Impact Test (RIM) |   | $909,120  | $686,165  | ($222,955) | 0.75 |
| Participant Cost Test (PCT) |   | $0  | $708,339  | $708,339  | N/A |
| Discounted Participant Payback (years) |   |   |   | N/A |   |

Table 6: Freezers (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0226  | $39,045  | $146,781  | $107,735  | 3.76 |
| Total Resource Cost Test (TRC) No Adder | $0.0226  | $39,045  | $133,437  | $94,392  | 3.42 |
| Utility Cost Test (UCT) | $0.0294  | $50,805  | $133,437  | $82,632  | 2.63 |
| Rate Impact Test (RIM) |   | $179,080  | $133,437  | ($45,643) | 0.75 |
| Participant Cost Test (PCT) |   | $0  | $140,035  | $140,035  | N/A |
| Discounted Participant Payback (years) |   |   |   | N/A  |   |

Table 7: Kits (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0172  | $16,092  | $84,537  | $68,445  | 5.25 |
| Total Resource Cost Test (TRC) No Adder | $0.0172  | $16,092  | $76,852  | $60,759  | 4.78 |
| Utility Cost Test (UCT) | $0.0172  | $16,092  | $76,852  | $60,759  | 4.78 |
| Rate Impact Test (RIM) |   | $86,586  | $76,852  | ($9,734) | 0.89 |
| Participant Cost Test (PCT) |   | $0  | $70,494  | $70,494  | N/A |
| Discounted Participant Payback (years) |   |   |   | N/A |   |

# Low Income

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington Low Income Weatherization 2011 Program Cost Effectiveness

The tables below present the cost effectiveness findings of the Washington Low Income Weatherization program based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2011 IRP west residential whole house load factor decrement. Table 1 lists modeling inputs.

The program is not cost effective from the TRC, UCT or RIM perspectives.

Table 1: Low Income Weatherization
Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Line Loss | 8.87% |
| Residential Energy Rate ($/kWh) (base year 2010) | $0.0767 |
| Inflation Rate[[4]](#footnote-4) | 1.8% |

Table 2: Low Income Weatherization
Annual Program Costs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Program Costs** | **Utility Admin** | **Evaluation** | **Incentives** | **Total Utility Costs** | **Net Participant Incremental Cost** |
| Low Income weatherization  | $60,186 | $15,721 | $0 | $431,125 | $507,032 | $0 |
| Total | $60,186 | $15,721 | $0 | $431,125 | $507,032 | $0 |

 Table 3: Low Income Weatherization
Savings by Measure Type

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Gross kWh Savings** | **Realization Rate** | **Adjusted Gross Savings** | **Net to Gross Percentage** | **Net kWh Savings** | **Measure Life** |
| Low Income weatherization  | 244,720 | 100% | 244,720 | 100% | 244,720 | 30 |
| Total | 244,720 |  | 244,720 |  | 244,720 |  |

Table 4: Low Income Weatherization (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.1471 | $507,032  | $395,735  | ($111,297) | 0.78 |
| Total Resource Cost Test (TRC) No Adder | $0.1471 | $507,032  | $359,759  | ($147,273) | 0.71 |
| Utility Cost Test (UCT) | $0.1471  | $507,032  | $359,759  | ($147,273) | 0.71 |
| Rate Impact Test (RIM) |   | $792,590  | $359,759  | ($432,831) | 0.45 |
| Participant Cost Test (PCT) |   | $0  | $716,683  | $716,683  | N/A |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000005696 |  |
| Discounted Participant Payback (years) |   |   |   | N/A  |   |

However, these results do not incorporate the non-energy benefits that were analyzed in the 2006 program evaluation, including the Program’s impact on forced mobility, arrearages, and economic impacts. These benefits are presented in Table 5.

Table 5: Total Program Non-Energy Benefits

|  |  |  |
| --- | --- | --- |
| **Non-Energy Benefit** | **Program Impact** | **Perspective Adjusted** |
| Mobility | $18,620 | TRC |
| Arrearage | $8,512 | UCT, RIM, TRC |
| Economic | $182,726 | TRC |
| **Total** | **$209,858** |  |

When these benefits are included in the analysis the Program becomes more cost effective. As presented in Table 6, the Program passes the TRC test with a benefit cost ratio of 1.12.

Table 6: Low Income Weatherization with Non Energy Benefits

|  |  |
| --- | --- |
| **All Measures** | **AC: IRP 35% LF Decrement** |
|  | Levelized $/kWh | Costs | Benefits | Net Benefits | Benefit/CostRatio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.1471  | $507,032  | $605,593  | $98,561  | 1.19 |
| Total Resource Cost Test (TRC) No Adder | $0.1471  | $507,032  | $569,617  | $62,585  | 1.12 |
| Utility Cost Test (UCT) | $0.1471  | $507,032  | $368,271  | ($138,761) | 0.73 |
| Rate Impact Test (RIM) |  | $792,590  | $368,271  | ($424,319) | 0.46 |
| Participant Cost Test (PCT) |  | $0  | $716,683  | $716,683  | N/A |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000005584  |  |
| Discounted Participant Payback (years) |  |  |  | N/A  |  |

# Energy Education

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington Energy Education 2011 Program Cost Effectiveness

The tables below present the cost effectiveness findings of the Washington Energy Education program based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2011 IRP west residential whole house load factor decrement. Table 1 lists modeling inputs.

The program is cost effective from the TRC, UCT and PCT perspectives.

Table 1: Energy Education
Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Line Loss | 8.87% |
| Residential Energy Rate ($/kWh) (base year 2010) | $0.0767 |
| Inflation Rate[[5]](#footnote-5) | 1.8% |

Table 2: Energy Education
Annual Program Costs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Program Costs** | **Utility Admin** | **Evaluation** | **Incentives** | **Total Utility Costs** | **Net Participant Incremental Cost** |
| Energy Education  | $173,959  | $35,784 | $0 | $24,738 | $234,481 | $0 |
| Total | $173,959  | $35,784 | $0 | $24,738 | $234,481 | $0 |

 Table 3: Energy Education
Savings

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Gross kWh Savings** | **Realization Rate** | **Adjusted Gross Savings** | **Net to Gross Percentage** | **Net kWh Savings** | **Measure Life** |
| Energy Education | 2,246,408 | 100% | 2,246,408 | 100% | 2,246,408 | 6.57 |
| Total | 2,246,408 |  | 2,246,408 |  | 2,246,408 |  |

Table 4: Energy Education (West Res Whole House 49% LF Decrement)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0149  | $209,743  | $1,268,651  | $1,058,908  | 6.05 |
| Total Resource Cost Test (TRC) No Adder | $0.0149  | $209,743  | $1,153,319  | $943,576  | 5.50 |
| Utility Cost Test (UCT) | $0.0167  | $234,481  | $1,153,319  | $918,838  | 4.92 |
| Rate Impact Test (RIM) |   | $1,292,385  | $1,153,319  | ($139,066) | 0.89 |
| Participant Cost Test (PCT) |   | $0  | $1,082,642  | $1,082,642  | N/A |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000004877 |  |
| Discounted Participant Payback (years) |   |   |   | N/A  |   |

 The results above do not reflect non-energy benefits. Showerheads and faucet aerators in this program have significant water benefits. Those benefits, by measure, are outlined in the table below.

Table 5: Non-Energy Benefits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Non-Energy Benefit** | **Non-Energy Benefits per Measure** | **Total Installs** | **Measure Life** | **Total Present Value Benefits** |
| Showerheads | $6.62 | 2,014 | 8.0 | $84,771 |
| Aerators | $3.49 | 3,488 | 5.0 | $53,310 |
| Total Benefits |   |   |   | $138,082 |

When these non-energy benefits are incorporated in the cost-effectiveness analysis for appliances, the TRC improves to 6.16, as shown in Table 6.

Table 6: Energy Education with Non-Energy Benefits

|  |  |
| --- | --- |
| **All Measures** | **AC: IRP 35% LF Decrement** |
|  | Levelized $/kWh | Costs | Benefits | Net Benefits | Benefit/CostRatio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0149  | $209,743  | $1,406,733  | $1,196,990  | 6.71 |
| Total Resource Cost Test (TRC) No Adder | $0.0149  | $209,743  | $1,291,401  | $1,081,658  | 6.16 |
| Utility Cost Test (UCT) | $0.0167  | $234,481  | $1,153,319  | $918,838  | 4.92 |
| Rate Impact Test (RIM) |  | $1,292,385  | $1,153,319  | ($139,066) | 0.89 |
| Participant Cost Test (PCT) |  | $0  | $1,220,724  | $1,220,724  | N/A |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | $0.000004877  |  |
| Discounted Participant Payback (years) |  |  |  | N/A  |  |

# FinAnswer Express

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington FinAnswer Express 2011 Program Cost Effectiveness

The tables below present the cost effectiveness findings of the Washington FinAnswer Express program based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2011 IRP west system load factor decrement. Table 1 lists modeling inputs.

The program is cost effective from all perspectives.

Table 1: FinAnswer Express
Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Commercial Line Loss | 8.73% |
| Industrial Line Loss | 7.54% |
| Commercial Energy Rate ($/kWh)(base year 2010) | $0.0688 |
| Industrial Energy Rate ($/kWh)(base year 2010) | $0.0577 |
| Inflation Rate[[6]](#footnote-6) | 1.8% |

Table 2: FinAnswer Express
Annual Program Costs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Program Costs** | **Utility Admin** | **Evaluation** | **Incentives** | **Total Utility Costs** | **Net Participant Incremental Cost** |
| Appliance | $6  | $4  | $0  | $50  | $60  | $351  |
| HVAC | $4,849  | $2,900  | $0  | $16,512  | $24,260  | $36,716  |
| Compressed Air | $8,297  | $5,483  | $0  | $21,930  | $35,710  | $70,355  |
| Building Envelope | $980  | $586  | $0  | $8,822  | $10,389  | $19,954  |
| Dairy & Farm | $11,763  | $7,033  | $0  | $22,700  | $41,496  | $116,565  |
| Food Services | $11,861  | $7,092  | $0  | $26,410  | $45,362  | $133,796  |
| Lighting | $544,434  | $344,526  | $0  | $866,560  | $1,755,520  | $2,557,976  |
| Motor | $1,350  | $825  | $0  | $6,721  | $8,897  | $8,474  |
| Other | $6,151  | $4,225  | $0  | $10,337  | $20,714  | $101,347  |
| Refrigeration | $324  | $193  | $0  | $720  | $1,237  | $257  |
| Irrigation | $4,424  | $3,018  | $0  | $5,695  | $13,137  | $18,515  |
| Total | $594,439  | $375,885 | $0  |  986,457  | $1,956,781  |  3,064,306  |

Table 3: FinAnswer Express
Savings by Measure Type

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Gross kWh Savings** | **Realization Rate** | **Adjusted Gross Savings** | **Net to Gross Percentage** | **Net kWh Savings** | **Measure Life** |
| Appliance | 91 | 100% | 91 | 100% | 91 | 14 |
| HVAC | 98,421 | 72% | 70,863 | 100% | 70,863 | 14 |
| Compressed Air | 145,035 | 97% | 140,684 | 100% | 140,684 | 14 |
| Building Envelope | 14,766 | 97% | 14,323 | 100% | 14,323 | 14 |
| Dairy & Farm | 177,205 | 97% | 171,889 | 100% | 171,889 | 14 |
| Food Services | 178,680 | 97% | 173,319 | 100% | 173,319 | 14 |
| Lighting | 8,840,200 | 98% | 8,663,396 | 100% | 8,663,396 | 14 |
| Motor | 13,240 | 154% | 20,390 | 100% | 20,390 | 14 |
| Other | 110,271 | 100% | 110,271 | 100% | 110,271 | 14 |
| Refrigeration | 4,875 | 97% | 4,729 | 100% | 4,729 | 14 |
| Irrigation | 80,977 | 97% | 78,548 | 100% | 78,548 | 14 |
| Total | 9,663,761 |   | 9,448,502 |   | 9,448,502 |   |

Table 4: Load Factor Decrement (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.042  | $4,034,632  | $9,668,258  | $5,633,626  | 2.40 |
| Total Resource Cost Test (TRC) No Adder | $0.042  | $4,034,632  | $8,789,326  | $4,754,693  | 2.18 |
| Utility Cost Test (UCT) | $0.021  | $1,956,783  | $8,789,326  | $6,832,543  | 4.49 |
| Rate Impact Test (RIM) |   | $8,370,309  | $8,789,326  | $419,016  | 1.05 |
| Participant Cost Test (PCT) |   | $3,064,306  | $7,399,983  | $4,335,677  | 2.41 |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | ($0.00000856) |  |
| Discounted Participant Payback (years) |   |   |   | 3.54  |   |

Table 5: Appliance (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.3935  | $361  | $92  | ($270) | 0.25 |
| Total Resource Cost Test (TRC) No Adder | $0.3935  | $361  | $83  | ($278) | 0.23 |
| Utility Cost Test (UCT) | $0.0654  | $60  | $83  | $23  | 1.39 |
| Rate Impact Test (RIM) |   | $125  | $83  | ($42) | 0.66 |
| Participant Cost Test (PCT) |   | $351  | $115  | ($236) | 0.33 |
| Discounted Participant Payback (years) |   |   |   | - |   |

Table 6: HVAC (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0622  | $44,465  | $72,961  | $28,496  | 1.64 |
| Total Resource Cost Test (TRC) No Adder | $0.0622  | $44,465  | $66,328  | $21,863  | 1.49 |
| Utility Cost Test (UCT) | $0.0339  | $24,261  | $66,328  | $42,067  | 2.73 |
| Rate Impact Test (RIM) |   | $75,083  | $66,328  | ($8,755) | 0.88 |
| Participant Cost Test (PCT) |   | $36,716  | $67,334  | $30,618  | 1.83 |
| Discounted Participant Payback (years) |   |   |   | 3.96 |   |

Table 7: Compressed Air (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0597  | $84,135  | $141,095  | $56,960  | 1.68 |
| Total Resource Cost Test (TRC) No Adder | $0.0597  | $84,135  | $128,268  | $44,133  | 1.52 |
| Utility Cost Test (UCT) | $0.0253  | $35,710  | $128,268  | $92,559  | 3.59 |
| Rate Impact Test (RIM) |   | $127,351  | $128,268  | $918  | 1.01 |
| Participant Cost Test (PCT) |   | $70,355  | $113,571  | $43,216  | 1.61 |
| Discounted Participant Payback (years) |   |   |   | 6.16 |   |

Table 8: Building Envelope (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.1489  | $21,520  | $14,747  | ($6,773) | 0.69 |
| Total Resource Cost Test (TRC) No Adder | $0.1489  | $21,520  | $13,406  | ($8,113) | 0.62 |
| Utility Cost Test (UCT) | $0.0719  | $10,388  | $13,406  | $3,018  | 1.29 |
| Rate Impact Test (RIM) |   | $20,661  | $13,406  | ($7,254) | 0.65 |
| Participant Cost Test (PCT) |   | $19,954  | $19,095  | ($859) | 0.96 |
| Discounted Participant Payback (years) |   |   |   | 10.21 |   |

Table 9: Dairy and Farm (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0781  | $135,361  | $163,845  | $28,484  | 1.21 |
| Total Resource Cost Test (TRC) No Adder | $0.0781  | $135,361  | $148,950  | $13,589  | 1.10 |
| Utility Cost Test (UCT) | $0.0239  | $41,496  | $148,950  | $107,454  | 3.59 |
| Rate Impact Test (RIM) |   | $164,773  | $148,950  | ($15,822) | 0.90 |
| Participant Cost Test (PCT) |   | $116,565  | $145,977  | $29,411  | 1.25 |
| Discounted Participant Payback (years) |   |   |   | 7.36 |   |

Table 10: Food Services (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0874  | $152,749  | $175,744  | $22,996  | 1.15 |
| Total Resource Cost Test (TRC) No Adder | $0.0874  | $152,749  | $159,768  | $7,019  | 1.05 |
| Utility Cost Test (UCT) | $0.0259  | $45,363  | $159,768  | $114,405  | 3.52 |
| Rate Impact Test (RIM) |   | $169,666  | $159,768  | ($9,898) | 0.94 |
| Participant Cost Test (PCT) |   | $133,796  | $150,713  | $16,917  | 1.13 |
| Discounted Participant Payback (years) |   |   |   | 8.28 |   |

Table 10: Lighting (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0396 | $3,446,936 | $8,891,678 | $5,444,742  | 2.58 |
| Total Resource Cost Test (TRC) No Adder | $0.0396 | $3,446,936 | $8,083,344 | $4,636,408  | 2.35 |
| Utility Cost Test (UCT) | $0.0202 | $1,755,520 | $8,083,344 | $6,327,824  | 4.60 |
| Rate Impact Test (RIM) |   | $7,631,872 | $8,083,344 | $451,472  | 1.06 |
| Participant Cost Test (PCT) |   | $2,557,976 | $6,742,912 | $4,184,935  | 2.64 |
| Discounted Participant Payback (years) |   |   |   | 3.11 |   |

Table 11: Motor (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0519  | $10,650  | $20,121  | $9,471  | 1.89 |
| Total Resource Cost Test (TRC) No Adder | $0.0519  | $10,650  | $18,292  | $7,642  | 1.72 |
| Utility Cost Test (UCT) | $0.0433  | $8,897  | $18,292  | $9,395  | 2.06 |
| Rate Impact Test (RIM) |   | $23,208  | $18,292  | ($4,916) | 0.79 |
| Participant Cost Test (PCT) |   | $8,474  | $21,032  | $12,558  | 2.48 |
| Discounted Participant Payback (years) |   |   |   | 1.27 |   |

Table 12: Other (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.1013  | $111,724  | $108,977  | ($2,747) | 0.98 |
| Total Resource Cost Test (TRC) No Adder | $0.1013  | $111,724  | $99,070  | ($12,654) | 0.89 |
| Utility Cost Test (UCT) | $0.0188  | $20,714  | $99,070  | $78,356  | 4.78 |
| Rate Impact Test (RIM) |   | $90,095  | $99,070  | $8,975  | 1.10 |
| Participant Cost Test (PCT) |   | $101,347  | $79,718  | ($21,629) | 0.79 |
| Discounted Participant Payback (years) |   |   |   | - |   |

Table 13: Refrigeration (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0162  | $774  | $4,722  | $3,948  | 6.10 |
| Total Resource Cost Test (TRC) No Adder | $0.0162  | $774  | $4,293  | $3,519  | 5.55 |
| Utility Cost Test (UCT) | $0.0259  | $1,237  | $4,293  | $3,056  | 3.47 |
| Rate Impact Test (RIM) |   | $4,628  | $4,293  | ($335) | 0.93 |
| Participant Cost Test (PCT) |   | $257  | $4,111  | $3,854  | 16.00 |
| Discounted Participant Payback (years) |   |   |   | - |   |

Table 14: Irrigation (West System 71%)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0330 | $25,957 | $74,275 | $48,318  | 2.86 |
| Total Resource Cost Test (TRC) No Adder | $0.0330 | $25,957 | $67,523 | $41,566  | 2.60 |
| Utility Cost Test (UCT) |  $0.0167 | $13,137 | $67,523 | $54,386  | 5.14 |
| Rate Impact Test (RIM) |   | $62,848 | $67,523 | $4,674  | 1.07 |
| Participant Cost Test (PCT) |   | $18,515 | $55,406 | $36,891  | 2.99 |
| Discounted Participant Payback (years) |   |   |   | 2.77 |   |

# Energy FinAnswer

Date: March 23, 2012

To: Shawn Grant

From: Aaron Jenniges and Niko Drake-McLaughlin

Re: Washington Energy FinAnswer 2011 Program Cost Effectiveness

The tables below present the cost effectiveness findings of the Washington Energy FinAnswer program based on 2011 costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “WA Tables and Charts Final CE inputs 031612.” The Utility discount rate is from the 2011 PacifiCorp Integrated Resource Plan.

Cost effectiveness was tested using the 2011 IRP west system load factor decrement. Table 1 lists modeling inputs.

The program is cost effective from all perspectives.

Table 1: Energy FinAnswer
Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate  | 7.17% |
| Commercial Line Loss | 8.73% |
| Industrial Line Loss | 7.54% |
| Commercial Energy Rate ($/kWh)(base year 2010) | $0.0688 |
| Industrial Energy Rate ($/kWh)(base year 2010) | $0.0577 |
| Inflation Rate[[7]](#footnote-7) | 1.8% |

Table : Energy FinAnswer
Annual Program Costs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Program Costs** | **Utility Admin** | **Engineering** | **Incentives** | **Total Utility Costs** | **Net Participant Incremental Cost** |
| Additional Measures | $4,339  | $16,374  | $59,622  | $172,871  | $253,206  | $977,777  |
| Building Shell | $18  | $69  | $250  | $586  | $923  | $18,124  |
| Compressed Air | $573  | $2,163  | $7,877  | $25,689  | $36,302  | $89,677  |
| Controls | $30  | $114  | $414  | $1,622  | $2,180  | $5,922  |
| HVAC | $11,860  | $44,045  | $135,555  | $103,977  | $295,437  | $365,692  |
| Lighting | $635  | $2,357  | $7,173  | $6,787  | $16,952  | $20,479  |
| Motors | $3,650  | $13,773  | $50,152  | $166,684  | $234,259  | $459,955  |
| Refrigeration | $25,697  | $96,977  | $353,118  | $689,989  | $1,165,781  | $1,561,881  |
| Total | $46,802  | $175,871  | $614,161  | $1,168,205  | $2,005,039  | $3,499,507  |

 Table : Energy FinAnswer
Savings by Measure Type

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Gross kWh Savings** | **Realization Rate** | **Adjusted Gross Savings** | **Net to Gross Percentage** | **Net kWh Savings** | **Measure Life** |
| Additional Measures | 1,130,805 | 97% | 1,096,881 | 100% | 1,096,881 | 14 |
| Building Shell | 4,601 | 100% | 4,601 | 100% | 4,601 | 14 |
| Compressed Air | 174,590 | 83% | 144,910 | 100% | 144,910 | 14 |
| Controls | 7,614 | 100% | 7,614 | 100% | 7,614 | 14 |
| HVAC | 948,153 | 100% | 948,153 | 100% | 948,153 | 14 |
| Lighting | 43,719 | 101% | 44,156 | 100% | 44,156 | 14 |
| Motors | 1,246,832 | 74% | 922,656 | 100% | 922,656 | 14 |
| Refrigeration | 6,432,095 | 101% | 6,496,416 | 100% | 6,496,416 | 14 |
| Total | 9,988,409 |   | 9,665,386 |   | 9,665,386 |   |

Table : Energy FinAnswer – All Measures

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.045 | $4,336,342  | $9,536,251  | $5,199,909  | 2.20 |
| Total Resource Cost Test (TRC) No Adder | $0.045 | $4,336,342  | $8,669,319  | $4,332,977  | 2.00 |
| Utility Cost Test (UCT) | $0.021 | $2,005,040  | $8,669,319  | $6,664,279  | 4.32 |
| Rate Impact Test (RIM) |   | $7,846,079  | $8,669,319  | $823,240  | 1.10 |
| Participant Cost Test (PCT) |   | $3,499,507  | $7,009,244  | $3,509,738  | 2.00 |
| Lifecycle Revenue Impacts ($/kWh) |  |  |  | ($0.00001681) |  |
| Discounted Participant Payback (years) |   |   |   | 4.46  |   |

Table : Additional Measures

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0967  | $1,058,112  | $1,077,886  | $19,774  | 1.02 |
| Total Resource Cost Test (TRC) No Adder | $0.0967  | $1,058,112  | $979,896  | ($78,216) | 0.93 |
| Utility Cost Test (UCT) | $0.0231  | $253,206  | $979,896  | $726,690  | 3.87 |
| Rate Impact Test (RIM) |   | $912,957  | $979,896  | $66,939  | 1.07 |
| Participant Cost Test (PCT) |   | $977,777  | $832,622  | ($145,155) | 0.85 |
| Discounted Participant Payback (years) |   |   |   | 11.37 |   |

Table : Building Shell

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.4022  | $18,461  | $4,685  | ($13,776) | 0.25 |
| Total Resource Cost Test (TRC) No Adder | $0.4022  | $18,461  | $4,259  | ($14,202) | 0.23 |
| Utility Cost Test (UCT) | $0.0201  | $923  | $4,259  | $3,336  | 4.61 |
| Rate Impact Test (RIM) |   | $3,690  | $4,259  | $569  | 1.15 |
| Participant Cost Test (PCT) |   | $18,124  | $3,353  | ($14,771) | 0.19 |
| Discounted Participant Payback (years) |   |   |   | - |   |

Table : Compressed Air Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0694  | $100,290  | $142,400  | $42,110  | 1.42 |
| Total Resource Cost Test (TRC) No Adder | $0.0694  | $100,290  | $129,455  | $29,165  | 1.29 |
| Utility Cost Test (UCT) | $0.0251  | $36,302  | $129,455  | $93,153  | 3.57 |
| Rate Impact Test (RIM) |   | $123,462  | $129,455  | $5,993  | 1.05 |
| Participant Cost Test (PCT) |   | $89,677  | $112,849  | $23,172  | 1.26 |
| Discounted Participant Payback (years) |   |   |   | 7.11 |   |

Table : Controls Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0853  | $6,480  | $7,482  | $1,002  | 1.15 |
| Total Resource Cost Test (TRC) No Adder | $0.0853  | $6,480  | $6,802  | $322  | 1.05 |
| Utility Cost Test (UCT) | $0.0287  | $2,180  | $6,802  | $4,622  | 3.12 |
| Rate Impact Test (RIM) |   | $6,760  | $6,802  | $42  | 1.01 |
| Participant Cost Test (PCT) |   | $5,922  | $6,202  | $280  | 1.05 |
| Discounted Participant Payback (years) |   |   |   | 8.95 |   |

Table : HVAC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.059  | $557,152 | $968,069 | $410,917  | 1.74 |
| Total Resource Cost Test (TRC) No Adder | $0.059  | $557,152 | $880,063 | $322,911  | 1.58 |
| Utility Cost Test (UCT) |  $0.031 | $295,437 | $880,063 | $584,626  | 2.98 |
| Rate Impact Test (RIM) |   | $891,760 | $880,063 | ($11,697) | 0.99 |
| Participant Cost Test (PCT) |   | $365,692 | $700,300 | $334,608  | 1.92 |
| Discounted Participant Payback (years) |   |   |   | 4.96 |   |

Table : Lighting

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.069  | $30,644  | $45,133  | $14,489  | 1.47 |
| Total Resource Cost Test (TRC) No Adder | $0.069   | $30,644  | $41,030  | $10,386  | 1.34 |
| Utility Cost Test (UCT) | $0.038   | $16,952  | $41,030  | $24,078  | 2.42 |
| Rate Impact Test (RIM) |   | $44,990  | $41,030  | ($3,959) | 0.91 |
| Participant Cost Test (PCT) |   | $20,479  | $34,825  | $14,346  | 1.70 |
| Discounted Participant Payback (years) |   |   |   | 5.62 |   |

Table : Motors

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0573  | $527,530  | $906,678  | $379,148  | 1.72 |
| Total Resource Cost Test (TRC) No Adder | $0.0573  | $527,530  | $824,253  | $296,723  | 1.56 |
| Utility Cost Test (UCT) | $0.0254  | $234,259  | $824,253  | $589,994  | 3.52 |
| Rate Impact Test (RIM) |   | $789,218  | $824,253  | $35,035  | 1.04 |
| Participant Cost Test (PCT) |   | $459,955  | $721,643  | $261,688  | 1.57 |
| Discounted Participant Payback (years) |   |   |   | 5.21 |   |

Table : Refrigeration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Levelized | Costs | Benefits | Net Benefits | Benefit/Cost |
| $/kWh | Ratio |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.0314  | $2,037,673  | $6,383,917  | $4,346,244  | 3.13 |
| Total Resource Cost Test (TRC) No Adder | $0.0314  | $2,037,673  | $5,803,561  | $3,765,888  | 2.85 |
| Utility Cost Test (UCT) | $0.0180  | $1,165,781  | $5,803,561  | $4,637,780  | 4.98 |
| Rate Impact Test (RIM) |   | $5,073,242  | $5,803,561  | $730,318  | 1.14 |
| Participant Cost Test (PCT) |   | $1,561,881  | $4,597,450  | $3,035,569  | 2.94 |
| Discounted Participant Payback (years) |   |   |   | 2.26 |   |

1. Used to escalate future year energy rates. [↑](#footnote-ref-1)
2. Used to escalate future year energy rates. [↑](#footnote-ref-2)
3. Used to escalate future year energy rates. [↑](#footnote-ref-3)
4. Used to escalate future year energy rates. [↑](#footnote-ref-4)
5. Used to escalate future year energy rates. [↑](#footnote-ref-5)
6. Used to escalate future year energy rates. [↑](#footnote-ref-6)
7. Used to escalate future year energy rates. [↑](#footnote-ref-7)