**MEMORANDUM**

To: Don Jones, Jr.

From: Aaron Jenniges and Byron Boyle

Subject: Utah Three-Year Business Plan Cost-Effectiveness

Date: April 9, 2014

The tables below present the cost-effectiveness findings of the Utah Three-Year Business Plan based on costs and savings estimates provided by PacifiCorp in a spreadsheet entitled “CE inputs - measure update + small business 031314.xlsx”. The utility discount rate is from the 2013 PacifiCorp Integrated Resource Plan.

Three-year cost-effectiveness inputs and results for the business-as-usual program and four sensitivity scenarios, two commercial measure categories, seven industrial measure categories, the small business offer base case and four sensitivity scenarios, and the portfolio combined are presented in this memo.

1. Business Plan Portfolio
   1. Base Case: Numbers 2 – 5a below combined (Table 5)
   2. 10 Percent Lower Annual Energy Savings than Base Case: (Table 6)
   3. 10 Percent Higher Annual Energy Savings than Base Case: (Table 7)
2. Business-as-Usual
   1. Business-as-Usual (including the impacts of lighting baseline adjustments) (Table 8)
   2. Business-as-Usual w/Low Project Cost Case (Table 9)
   3. Business-as-Usual w/High Project Cost Case (Table 10)
   4. Business-as-Usual w/Lower Energy Savings Case (Table 11)
   5. Business-as-Usual w/High Energy Savings Case (Table 12)
3. Commercial
   1. Food Service (Table 13)
   2. HVAC (Table 14)
   3. Small Business Offer - Base Case (Table 15)
   4. Small Business Offer - Low Project Cost Case (Table 16)
   5. Small Business Offer - High Project Cost Case (Table 17)
   6. Small Business Offer - Lower Energy Savings Case (Table 18)
   7. Small Business Offer - High Energy Savings Case (Table 19)
4. Industrial
   1. Adaptive Refrigeration Control (Table 20)
   2. Compressed Air (Table 21)
   3. End Use Compressed Air Reduction (Table 22
   4. Fast Acting Door (Table 23)
   5. Irrigation (Table 24)
   6. Oil & Gas Pump-Off Controller (Table 25)
   7. Wastewater Mixing Grid Bee (Table 26)

For all measures and scenarios, cost-effectiveness was tested using the 2013 IRP 70% load factor east system decrements. Table 1 lists the discount rate, line losses, and retail rates by sector. Table 2 lists the measure group costs and incentives and Table 3 lists the annual energy savings for each measure group. Table 4 provides a comparative summary of the benefit/cost ratios from the individual measure category, scenario, and portfolio results, from all five test perspectives. Table 5 to Table 26 show the complete cost-effectiveness results by measure category, scenario, and portfolio.

The combined three-year Utah business plan portfolio is cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan Financial Inputs

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Discount Rate | 6.88% |
| Commercial Line Loss | 8.71% |
| Industrial Line Loss | 5.85% |
| Commercial Energy Rate ($/kWh) - 2012 base rate | $0.0785 |
| Industrial Energy Rate ($/kWh) - 2012 base rate | $0.0538 |
| [[1]](#footnote-1)Inflation Rate | 1.9% |

Table : UT Three-Year Business Plan

Business-as-Usual, Commercial, and Industrial Program Costs

| **Measure** | **Year** | **Utility Admin** | **Incentives** | **Total Utility Costs** | **Participant Incremental Cost** |
| --- | --- | --- | --- | --- | --- |
| **Business-as-Usual Measures** | | | | | |
| Business-as-Usual Commercial | 1 | $2,194,811 | $6,545,198 | $8,740,009 | $16,788,819 |
| 2 | $2,194,811 | $6,545,198 | $8,740,009 | $16,788,819 |
| 3 | $2,194,811 | $6,545,198 | $8,740,009 | $16,788,819 |
| Business-as-Usual Industrial | 1 | $2,194,811 | $6,545,198 | $8,740,009 | $16,788,819 |
| 2 | $2,194,811 | $6,545,198 | $8,740,009 | $16,788,819 |
| 3 | $2,194,811 | $6,545,198 | $8,740,009 | $16,788,819 |
| **Commercial Measures** | | | | | |
| Food Service | 1 | $20,124 | ($19,619) | $505 | $189,531 |
| 2 | $25,231 | ($14,169) | $11,063 | $210,581 |
| 3 | $25,996 | ($13,269) | $12,728 | $212,681 |
| HVAC | 1 | $16,797 | $63,172 | $79,970 | $456,563 |
| 2 | $20,663 | $77,061 | $97,724 | $551,838 |
| 3 | $24,730 | $91,766 | $116,496 | $649,055 |
| Small Business Offer - Base Case | 1 | $175,402 | $587,146 | $762,547 | $733,932 |
| 2 | $337,653 | $1,367,362 | $1,705,015 | $1,709,202 |
| 3 | $499,353 | $2,232,211 | $2,731,564 | $2,790,264 |
| Small Business Offer -  Low Project Cost Case | 1 | $175,402 | $293,573 | $468,974 | $366,966 |
| 2 | $337,653 | $683,681 | $1,021,334 | $854,601 |
| 3 | $499,353 | $1,116,106 | $1,615,459 | $1,395,132 |
| Small Business Offer - High Project Cost Case | 1 | $175,402 | $880,718 | $1,056,120 | $1,100,898 |
| 2 | $337,653 | $2,051,042 | $2,388,696 | $2,563,803 |
| 3 | $499,353 | $3,348,317 | $3,847,670 | $4,185,396 |
| Small Business Offer -  Low Energy Savings Case | 1 | $175,402 | $587,146 | $762,547 | $733,932 |
| 2 | $337,653 | $1,367,362 | $1,705,015 | $1,709,202 |
| 3 | $499,353 | $2,232,211 | $2,731,564 | $2,790,264 |
| Small Business Offer - High Energy Savings Case | 1 | $175,402 | $587,146 | $762,547 | $733,932 |
| 2 | $337,653 | $1,367,362 | $1,705,015 | $1,709,202 |
| 3 | $499,353 | $2,232,211 | $2,731,564 | $2,790,264 |
| **Industrial Measures** | | | | | |
| Adaptive Refrigeration Control | 1 | $19,260 | $29,100 | $48,360 | $58,800 |
| 2 | $29,880 | $45,600 | $75,480 | $99,600 |
| 3 | $35,640 | $54,000 | $89,640 | $111,600 |
| Compressed Air | 1 | $30,600 | $51,000 | $81,600 | $122,740 |
| 2 | $30,600 | $51,000 | $81,600 | $122,740 |
| 3 | $30,600 | $51,000 | $81,600 | $122,740 |
| End Use Compressed Air Reduction | 1 | $2,250 | $3,750 | $6,000 | $6,200 |
| 2 | $3,375 | $5,625 | $9,000 | $9,300 |
| 3 | $4,500 | $7,500 | $12,000 | $12,400 |
| Fast Acting Door | 1 | $20,880 | $34,800 | $55,680 | $145,000 |
| 2 | $26,640 | $44,400 | $71,040 | $185,000 |
| 3 | $32,400 | $54,000 | $86,400 | $225,000 |
| Irrigation | 1 | $20,700 | $13,002 | $33,702 | $60,082 |
| 2 | $20,700 | $12,988 | $33,688 | $59,935 |
| 3 | $20,700 | $13,004 | $33,704 | $59,933 |
| Oil & Gas Pump Off Controller | 1 | $12,946 | $21,577 | $34,523 | $50,177 |
| 2 | $12,946 | $21,577 | $34,523 | $50,177 |
| 3 | $12,946 | $21,577 | $34,523 | $50,177 |
| Wastewater Mixing Grid Bee | 1 | $12,600 | $21,000 | $33,600 | $40,000 |
| 2 | $12,600 | $21,000 | $33,600 | $40,000 |
| 3 | $12,600 | $21,000 | $33,600 | $40,000 |

Table : UT Three-Year Business Plan

Business-as-Usual, Commercial, and Industrial Annual Energy Savings

| **Measure** | **Year** | **Gross KWh Savings** | **Realization Rate** | **Adjusted KWh Savings** | **Net-to-Gross Ratio** | **Net KWh Savings** | **Measure Life** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Business-as-Usual Measures** | | | | | | | |
| Business-as-Usual Commercial | 1 | 49,375,000 | 93% | 45,703,205 | 84% | 38,341,899 | 13 |
| 2 | 49,375,000 | 93% | 45,703,205 | 84% | 38,341,899 | 13 |
| 3 | 49,375,000 | 93% | 45,703,205 | 84% | 38,341,899 | 13 |
| Business-as-Usual Industrial | 1 | 49,375,000 | 93% | 45,703,205 | 84% | 38,341,899 | 13 |
| 2 | 49,375,000 | 93% | 45,703,205 | 84% | 38,341,899 | 13 |
| 3 | 49,375,000 | 93% | 45,703,205 | 84% | 38,341,899 | 13 |
| **Commercial Measures** | | | | | | | |
| Food Service | 1 | 335,398 | 93% | 311,920 | 84% | 262,013 | 13 |
| 2 | 420,523 | 93% | 391,086 | 84% | 328,512 | 13 |
| 3 | 433,273 | 93% | 402,944 | 84% | 338,473 | 13 |
| HVAC | 1 | 279,953 | 93% | 260,356 | 84% | 218,699 | 13 |
| 2 | 344,377 | 93% | 320,270 | 84% | 269,027 | 13 |
| 3 | 412,164 | 93% | 383,313 | 84% | 321,983 | 13 |
| Small Business Offer - Base Case | 1 | 1,467,864 | 93% | 1,365,114 | 84% | 1,146,695 | 13 |
| 2 | 3,418,404 | 93% | 3,179,116 | 84% | 2,670,457 | 13 |
| 3 | 5,580,528 | 93% | 5,189,891 | 84% | 4,359,508 | 13 |
| Small Business Offer - Low Project Cost Case | 1 | 1,467,864 | 93% | 1,365,114 | 84% | 1,146,695 | 13 |
| 2 | 3,418,404 | 93% | 3,179,116 | 84% | 2,670,457 | 13 |
| 3 | 5,580,528 | 93% | 5,189,891 | 84% | 4,359,508 | 13 |
| Small Business Offer - High Project Cost Case | 1 | 1,467,864 | 93% | 1,365,114 | 84% | 1,146,695 | 13 |
| 2 | 3,418,404 | 93% | 3,179,116 | 84% | 2,670,457 | 13 |
| 3 | 5,580,528 | 93% | 5,189,891 | 84% | 4,359,508 | 13 |
| Small Business Offer - Low Energy Savings Case | 1 | 838,716 | 93% | 780,006 | 84% | 655,205 | 13 |
| 2 | 1,953,226 | 93% | 1,816,500 | 84% | 1,525,860 | 13 |
| 3 | 3,188,632 | 93% | 2,965,428 | 84% | 2,490,959 | 13 |
| Small Business Offer - High Energy Savings Case | 1 | 2,096,790 | 93% | 1,950,015 | 84% | 1,638,012 | 13 |
| 2 | 4,883,065 | 93% | 4,541,250 | 84% | 3,814,650 | 13 |
| 3 | 7,971,580 | 93% | 7,413,569 | 84% | 6,227,398 | 13 |
| **Industrial Measures** | | | | | | | |
| Adaptive Refrigeration Control | 1 | 214,000 | 93% | 199,020 | 84% | 167,177 | 13 |
| 2 | 332,000 | 93% | 308,760 | 84% | 259,358 | 13 |
| 3 | 396,000 | 93% | 368,280 | 84% | 309,355 | 13 |
| Compressed Air | 1 | 340,000 | 93% | 316,200 | 84% | 265,608 | 13 |
| 2 | 340,000 | 93% | 316,200 | 84% | 265,608 | 13 |
| 3 | 340,000 | 93% | 316,200 | 84% | 265,608 | 13 |
| End Use Compressed Air Reduction | 1 | 25,000 | 93% | 23,250 | 84% | 19,530 | 10 |
| 2 | 37,500 | 93% | 34,875 | 84% | 29,295 | 10 |
| 3 | 50,000 | 93% | 46,500 | 84% | 39,060 | 10 |
| Fast Acting Door | 1 | 232,000 | 93% | 215,760 | 84% | 181,238 | 13 |
| 2 | 296,000 | 93% | 275,280 | 84% | 231,235 | 13 |
| 3 | 360,000 | 93% | 334,800 | 84% | 281,232 | 13 |
| Irrigation | 1 | 230,000 | 93% | 213,900 | 84% | 179,676 | 6 |
| 2 | 230,000 | 93% | 213,900 | 84% | 179,676 | 6 |
| 3 | 230,000 | 93% | 213,900 | 84% | 179,676 | 6 |
| Oil & Gas Pump Off Controller | 1 | 143,847 | 93% | 133,778 | 84% | 112,373 | 13 |
| 2 | 143,847 | 93% | 133,778 | 84% | 112,373 | 13 |
| 3 | 143,847 | 93% | 133,778 | 84% | 112,373 | 13 |
| Wastewater Mixing Grid Bee | 1 | 140,000 | 93% | 130,200 | 84% | 109,368 | 13 |
| 2 | 140,000 | 93% | 130,200 | 84% | 109,368 | 13 |
| 3 | 140,000 | 93% | 130,200 | 84% | 109,368 | 13 |

Table : UT Three-Year Business Plan

Benefit/Cost Ratios by Measure Category and Scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Measure** | **PTRC** | **TRC** | **UCT** | **RIM** | **PCT** |
| **Business-as-Usual Measures** | | | | | |
| Business-as-Usual | 1.85 | 1.68 | 3.13 | 0.78 | 2.28 |
| Business-as-Usual w/Low Project Cost Case | 1.86 | 1.69 | 3.07 | 0.77 | 2.32 |
| Business-as-Usual w/High Project Cost Case | 1.78 | 1.62 | 2.86 | 0.75 | 2.25 |
| Business-as-Usual w/Low Energy Savings Case | 1.79 | 1.63 | 2.92 | 0.76 | 2.25 |
| Business-as-Usual w/High Energy Savings Case | 1.85 | 1.68 | 3.00 | 0.76 | 2.31 |
| **Commercial Measures** | | | | | |
| Food Service | 1.26 | 1.15 | 28.59 | 0.85 | 1.41 |
| HVAC | 0.45 | 0.40 | 2.00 | 0.61 | 0.62 |
| Small Business Offer - Base Case | 1.22 | 1.11 | 1.16 | 0.50 | 2.34 |
| Small Business Offer - Low Project Cost Case | 2.06 | 1.87 | 1.93 | 0.61 | 3.89 |
| Small Business Offer - High Project Cost Case | 0.87 | 0.79 | 0.82 | 0.43 | 1.83 |
| Small Business Offer - Low Energy Savings Case | 0.70 | 0.64 | 0.66 | 0.38 | 1.68 |
| Small Business Offer - High Energy Savings Case | 1.75 | 1.59 | 1.65 | 0.58 | 3.00 |
| **Industrial Measures** | | | | | |
| Adaptive Refrigeration Control | 1.85 | 1.68 | 2.45 | 0.83 | 2.31 |
| Compressed Air | 1.54 | 1.40 | 2.29 | 0.81 | 1.87 |
| End Use Compressed Air Reduction | 1.64 | 1.49 | 1.85 | 0.73 | 2.35 |
| Fast Acting Door | 0.99 | 0.90 | 2.31 | 0.81 | 1.08 |
| Irrigation | 0.96 | 0.88 | 1.85 | 0.70 | 1.30 |
| Oil & Gas Pump Off Controller | 1.58 | 1.44 | 2.29 | 0.81 | 1.93 |
| Wastewater Mixing - Grid Bee | 1.84 | 1.67 | 2.29 | 0.81 | 2.36 |
| **UT Three-Year Business Plan Scenarios** | | | | | |
| **Base Case** | **1.79** | **1.63** | **2.95** | **0.76** | **2.24** |
| **10% Lower Annual Energy Savings** | **1.61** | **1.46** | **2.66** | **0.74** | **2.06** |
| **10% Higher Annual Energy Savings** | **1.97** | **1.79** | **3.25** | **0.78** | **2.43** |

Table 5 shows the cost-effectiveness results for the three-year business plan, which includes the business-as-usual case, two commercial measures, seven industrial measures, and the base small business offer case. The portfolio is cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan Portfolio Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.046 | $100,048,734 | $179,050,972 | $79,002,237 | 1.79 |
| Total Resource Cost Test (TRC) No Adder | $0.046 | $100,048,734 | $162,773,611 | $62,724,876 | 1.63 |
| Utility Cost Test (UCT) | $0.025 | $55,115,999 | $162,773,611 | $107,657,612 | 2.95 |
| Rate Impact Test (RIM) |  | $213,897,480 | $162,773,611 | ($51,123,869) | 0.76 |
| Participant Cost Test (PCT) |  | $102,833,008 | $230,598,352 | $127,765,344 | 2.24 |
| Discounted Participant Payback (years) | 4.41 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00019180 | | | | |

Table 6 shows the impact reducing annual energy savings by 10% has on the cost-effectiveness results for the three-year business plan. The benefit/cost ratios from all perspectives are reduced compared to the results in Table 5, but are still cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan Portfolio Cost-Effectiveness – 10% Lower Annual Energy Savings

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.051 | $100,048,734 | $161,145,875 | $61,097,140 | 1.61 |
| Total Resource Cost Test (TRC) No Adder | $0.051 | $100,048,734 | $146,496,250 | $46,447,515 | 1.46 |
| Utility Cost Test (UCT) | $0.028 | $55,115,999 | $146,496,250 | $91,380,251 | 2.66 |
| Rate Impact Test (RIM) |  | $198,019,332 | $146,496,250 | ($51,523,082) | 0.74 |
| Participant Cost Test (PCT) |  | $102,833,008 | $211,673,139 | $108,840,131 | 2.06 |
| Discounted Participant Payback (years) | 4.83 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00019329 | | | | |

Table 7 shows the impact increasing annual energy savings by 10% has on the cost-effectiveness results for the three-year business plan. The benefit/cost ratios from all perspectives are higher compared to the results in Table 5, and are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan Portfolio Cost-Effectiveness– 10% Higher Annual Energy Savings

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.041 | $100,048,734 | $196,956,069 | $96,907,335 | 1.97 |
| Total Resource Cost Test (TRC) No Adder | $0.041 | $100,048,734 | $179,050,972 | $79,002,237 | 1.79 |
| Utility Cost Test (UCT) | $0.023 | $55,115,999 | $179,050,972 | $123,934,973 | 3.25 |
| Rate Impact Test (RIM) |  | $229,775,628 | $179,050,972 | ($50,724,656) | 0.78 |
| Participant Cost Test (PCT) |  | $102,833,008 | $249,523,565 | $146,690,557 | 2.43 |
| Discounted Participant Payback (years) | 4.08 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00019030 | | | | |

Table 8 shows the cost-effectiveness results for the business-as-usual industrial and commercial measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Business-as-Usual Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044 | $91,522,657 | $169,377,116 | $77,854,459 | 1.85 |
| Total Resource Cost Test (TRC) No Adder | $0.044 | $91,522,657 | $153,979,196 | $62,456,539 | 1.68 |
| Utility Cost Test (UCT) | $0.024 | $49,135,976 | $153,979,196 | $104,843,220 | 3.13 |
| Rate Impact Test (RIM) |  | $198,679,638 | $153,979,196 | ($44,700,442) | 0.78 |
| Participant Cost Test (PCT) |  | $94,386,055 | $215,051,562 | $120,665,508 | 2.28 |
| Discounted Participant Payback (years) | 4.38 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00016770 | | | | |

Table 9 shows the low project cost scenario cost-effectiveness results for the business-as-usual industrial and commercial measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Business-as-Usual w/Low Project Cost Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044 | $94,456,836 | $175,417,722 | $80,960,886 | 1.86 |
| Total Resource Cost Test (TRC) No Adder | $0.044 | $94,456,836 | $159,470,656 | $65,013,820 | 1.69 |
| Utility Cost Test (UCT) | $0.024 | $51,974,643 | $159,470,656 | $107,496,013 | 3.07 |
| Rate Impact Test (RIM) |  | $207,707,622 | $159,470,656 | ($48,236,966) | 0.77 |
| Participant Cost Test (PCT) |  | $96,773,849 | $224,330,031 | $127,556,182 | 2.32 |
| Discounted Participant Payback (years) | 4.28 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00018097 | | | | |

Table 10 shows the low project cost scenario cost-effectiveness results for the business-as-usual industrial and commercial measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Business-as-Usual w/High Project Cost Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.046 | $98,468,332 | $175,417,722 | $76,949,390 | 1.78 |
| Total Resource Cost Test (TRC) No Adder | $0.046 | $98,468,332 | $159,470,656 | $61,002,325 | 1.62 |
| Utility Cost Test (UCT) | $0.026 | $55,795,115 | $159,470,656 | $103,675,541 | 2.86 |
| Rate Impact Test (RIM) |  | $211,528,093 | $159,470,656 | ($52,057,437) | 0.75 |
| Participant Cost Test (PCT) |  | $101,549,439 | $228,150,503 | $126,601,064 | 2.25 |
| Discounted Participant Payback (years) | 4.34 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00019530 | | | | |

Table 11 shows the low energy savings scenario cost-effectiveness results for the business-as-usual industrial and commercial measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Business-as-Usual w/Low Energy Savings Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.045 | $96,462,584 | $172,828,630 | $76,366,046 | 1.79 |
| Total Resource Cost Test (TRC) No Adder | $0.045 | $96,462,584 | $157,116,936 | $60,654,352 | 1.63 |
| Utility Cost Test (UCT) | $0.025 | $53,884,879 | $157,116,936 | $103,232,057 | 2.92 |
| Rate Impact Test (RIM) |  | $206,965,026 | $157,116,936 | ($49,848,090) | 0.76 |
| Participant Cost Test (PCT) |  | $99,161,644 | $223,082,134 | $123,920,490 | 2.25 |
| Discounted Participant Payback (years) | 4.36 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00018701 | | | | |

Table 12 shows the high energy savings scenario cost-effectiveness results for the business-as-usual industrial and commercial measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Business-as-Usual w/Low Energy Savings Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044 | $96,462,584 | $178,005,900 | $81,543,316 | 1.85 |
| Total Resource Cost Test (TRC) No Adder | $0.044 | $96,462,584 | $161,823,546 | $65,360,962 | 1.68 |
| Utility Cost Test (UCT) | $0.025 | $53,884,879 | $161,823,546 | $107,938,667 | 3.00 |
| Rate Impact Test (RIM) |  | $212,269,753 | $161,823,546 | ($50,446,207) | 0.76 |
| Participant Cost Test (PCT) |  | $99,161,644 | $229,397,285 | $130,235,641 | 2.31 |
| Discounted Participant Payback (years) | 4.25 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00018925 | | | | |

Table 13 shows the cost-effectiveness results for the commercial food service measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Commercial Food Service Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.065 | $547,578 | $691,792 | $144,215 | 1.26 |
| Total Resource Cost Test (TRC) No Adder | $0.065 | $547,578 | $628,902 | $81,324 | 1.15 |
| Utility Cost Test (UCT) | $0.003 | $21,997 | $628,902 | $606,905 | 28.59 |
| Rate Impact Test (RIM) |  | $735,800 | $628,902 | ($106,898) | 0.85 |
| Participant Cost Test (PCT) |  | $572,727 | $805,276 | $232,549 | 1.41 |
| Discounted Participant Payback (years) | 9.65 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000040 | | | | |

Table 14 shows the cost-effectiveness results for the commercial HVAC measures, which are cost-effective only from the UCT perspective.

Table : UT Three-Year Business Plan: Commercial HVAC Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.184 | $1,352,243 | $602,197 | ($750,046) | 0.45 |
| Total Resource Cost Test (TRC) No Adder | $0.184 | $1,352,243 | $547,452 | ($804,791) | 0.40 |
| Utility Cost Test (UCT) | $0.037 | $273,378 | $547,452 | $274,073 | 2.00 |
| Rate Impact Test (RIM) |  | $894,192 | $547,452 | ($346,740) | 0.61 |
| Participant Cost Test (PCT) |  | $1,541,031 | $954,665 | ($586,366) | 0.62 |
| Discounted Participant Payback (years) | N/A | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000130 | | | | |

Table 15 shows the base case cost-effectiveness results for the small business offer measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Small Business Offer Base Case Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.068 | $4,939,927 | $6,040,606 | $1,100,679 | 1.22 |
| Total Resource Cost Test (TRC) No Adder | $0.068 | $4,939,927 | $5,491,460 | $551,533 | 1.11 |
| Utility Cost Test (UCT) | $0.065 | $4,748,903 | $5,491,460 | $742,557 | 1.16 |
| Rate Impact Test (RIM) |  | $10,938,219 | $5,491,460 | ($5,446,759) | 0.50 |
| Participant Cost Test (PCT) |  | $4,775,589 | $11,188,705 | $6,413,115 | 2.34 |
| Discounted Participant Payback (years) | 2.91 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00002043 | | | | |

Table 16 shows the low project cost scenario cost-effectiveness results for the small business offer measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Small Business Offer Low Project Cost Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.040 | $2,934,179 | $6,040,606 | $3,106,427 | 2.06 |
| Total Resource Cost Test (TRC) No Adder | $0.040 | $2,934,179 | $5,491,460 | $2,557,281 | 1.87 |
| Utility Cost Test (UCT) | $0.039 | $2,838,668 | $5,491,460 | $2,652,792 | 1.93 |
| Rate Impact Test (RIM) |  | $9,027,984 | $5,491,460 | ($3,536,524) | 0.61 |
| Participant Cost Test (PCT) |  | $2,387,795 | $9,278,469 | $6,890,674 | 3.89 |
| Discounted Participant Payback (years) | 0.91 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00001327 | | | | |

Table 17 shows the high project cost scenario cost-effectiveness results for the small business offer measures, which are cost-effective only from the PCT perspective.

Table : UT Three-Year Business Plan: Small Business Offer High Project Cost Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.095 | $6,945,674 | $6,040,606 | ($905,069) | 0.87 |
| Total Resource Cost Test (TRC) No Adder | $0.095 | $6,945,674 | $5,491,460 | ($1,454,215) | 0.79 |
| Utility Cost Test (UCT) | $0.091 | $6,659,139 | $5,491,460 | ($1,167,679) | 0.82 |
| Rate Impact Test (RIM) |  | $12,848,455 | $5,491,460 | ($7,356,995) | 0.43 |
| Participant Cost Test (PCT) |  | $7,163,384 | $13,098,941 | $5,935,557 | 1.83 |
| Discounted Participant Payback (years) | 3.36 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00002760 | | | | |

Table 18 shows the low energy savings scenario cost-effectiveness results for the small business offer measures, which are cost-effective only from the PCT perspective.

Table : UT Three-Year Business Plan: Small Business Offer Low Energy Savings Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.119 | $4,939,927 | $3,451,514 | ($1,488,413) | 0.70 |
| Total Resource Cost Test (TRC) No Adder | $0.119 | $4,939,927 | $3,137,740 | ($1,802,187) | 0.64 |
| Utility Cost Test (UCT) | $0.114 | $4,748,903 | $3,137,740 | ($1,611,164) | 0.66 |
| Rate Impact Test (RIM) |  | $8,285,388 | $3,137,740 | ($5,147,648) | 0.38 |
| Participant Cost Test (PCT) |  | $4,775,589 | $8,030,572 | $3,254,983 | 1.68 |
| Discounted Participant Payback (years) | 3.71 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00001931 | | | | |

Table 19 shows the high energy savings scenario cost-effectiveness results for the small business offer measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Small Business Offer High Energy Savings Scenario Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.047 | $4,939,927 | $8,628,784 | $3,688,858 | 1.75 |
| Total Resource Cost Test (TRC) No Adder | $0.047 | $4,939,927 | $7,844,350 | $2,904,423 | 1.59 |
| Utility Cost Test (UCT) | $0.046 | $4,748,903 | $7,844,350 | $3,095,446 | 1.65 |
| Rate Impact Test (RIM) |  | $13,590,115 | $7,844,350 | ($5,745,765) | 0.58 |
| Participant Cost Test (PCT) |  | $4,775,589 | $14,345,723 | $9,570,134 | 3.00 |
| Discounted Participant Payback (years) | 0.98 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00002156 | | | | |

Table 20 shows the cost-effectiveness results for the industrial adaptive refrigeration control measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Industrial Adaptive Refrigeration Control Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044 | $288,144 | $532,060 | $243,916 | 1.85 |
| Total Resource Cost Test (TRC) No Adder | $0.044 | $288,144 | $483,691 | $195,547 | 1.68 |
| Utility Cost Test (UCT) | $0.030 | $197,448 | $483,691 | $286,243 | 2.45 |
| Rate Impact Test (RIM) |  | $582,906 | $483,691 | ($99,215) | 0.83 |
| Participant Cost Test (PCT) |  | $249,678 | $577,912 | $328,234 | 2.31 |
| Discounted Participant Payback (years) | 4.14 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000037 | | | | |

Table 21 shows the cost-effectiveness results for the industrial compressed air measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Industrial Compressed Air Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.053 | $375,832 | $578,829 | $202,996 | 1.54 |
| Total Resource Cost Test (TRC) No Adder | $0.053 | $375,832 | $526,208 | $150,375 | 1.40 |
| Utility Cost Test (UCT) | $0.032 | $229,376 | $526,208 | $296,832 | 2.29 |
| Rate Impact Test (RIM) |  | $650,643 | $526,208 | ($124,436) | 0.81 |
| Participant Cost Test (PCT) |  | $345,020 | $644,869 | $299,849 | 1.87 |
| Discounted Participant Payback (years) | 5.30 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000047 | | | | |

Table 22 shows the cost-effectiveness results for the industrial end use compressed air reduction measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Industrial End Use Compressed Air Reduction Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.048 | $30,982 | $50,658 | $19,676 | 1.64 |
| Total Resource Cost Test (TRC) No Adder | $0.048 | $30,982 | $46,052 | $15,071 | 1.49 |
| Utility Cost Test (UCT) | $0.038 | $24,925 | $46,052 | $21,127 | 1.85 |
| Rate Impact Test (RIM) |  | $62,665 | $46,052 | ($16,613) | 0.73 |
| Participant Cost Test (PCT) |  | $25,756 | $60,507 | $34,751 | 2.35 |
| Discounted Participant Payback (years) | 3.09 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000007 | | | | |

Table 23 shows the cost-effectiveness results for the industrial fast acting door measures, which are cost-effective only from the UCT and PCT perspectives.

Table : UT Three-Year Business Plan: Industrial Fast Acting Doors Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.083 | $506,805 | $502,112 | ($4,693) | 0.99 |
| Total Resource Cost Test (TRC) No Adder | $0.083 | $506,805 | $456,466 | ($50,340) | 0.90 |
| Utility Cost Test (UCT) | $0.032 | $197,778 | $456,466 | $258,688 | 2.31 |
| Rate Impact Test (RIM) |  | $562,006 | $456,466 | ($105,540) | 0.81 |
| Participant Cost Test (PCT) |  | $515,046 | $557,216 | $42,170 | 1.08 |
| Discounted Participant Payback (years) | 12.45 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000040 | | | | |

Table 24 shows the cost-effectiveness results for the industrial irrigation measures, which are cost-effective only from the UCT and PCT perspectives.

Table : UT Three-Year Business Plan: Industrial Irrigation Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.073 | $199,829 | $192,371 | ($7,458) | 0.96 |
| Total Resource Cost Test (TRC) No Adder | $0.073 | $199,829 | $174,883 | ($24,946) | 0.88 |
| Utility Cost Test (UCT) | $0.035 | $94,724 | $174,883 | $80,158 | 1.85 |
| Rate Impact Test (RIM) |  | $248,225 | $174,883 | ($73,342) | 0.70 |
| Participant Cost Test (PCT) |  | $168,621 | $219,275 | $50,654 | 1.30 |
| Discounted Participant Payback (years) | 5.14 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000045 | | | | |

Table 25 shows the cost-effectiveness results for the industrial oil and gas pump off controller measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Industrial Oil and Gas Pump Off Controller Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.052 | $154,870 | $244,890 | $90,020 | 1.58 |
| Total Resource Cost Test (TRC) No Adder | $0.052 | $154,870 | $222,628 | $67,758 | 1.44 |
| Utility Cost Test (UCT) | $0.032 | $97,044 | $222,628 | $125,584 | 2.29 |
| Rate Impact Test (RIM) |  | $275,274 | $222,628 | ($52,646) | 0.81 |
| Participant Cost Test (PCT) |  | $141,046 | $272,831 | $131,785 | 1.93 |
| Discounted Participant Payback (years) | 5.02 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000020 | | | | |

Table 26 shows the cost-effectiveness results for the industrial wastewater mixing measures, which are cost-effective from all test perspectives except the RIM.

Table : UT Three-Year Business Plan: Industrial Wastewater Mixing Grid Bee Cost-Effectiveness

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cost-Effectiveness Test** | **Levelized $/kWh** | **Costs** | **Benefits** | **Net Benefits** | **Benefit/Cost Ratio** |
| Total Resource Cost Test (PTRC) + Conservation Adder | $0.044 | $129,867 | $238,341 | $108,474 | 1.84 |
| Total Resource Cost Test (TRC) No Adder | $0.044 | $129,867 | $216,674 | $86,807 | 1.67 |
| Utility Cost Test (UCT) | $0.032 | $94,449 | $216,674 | $122,225 | 2.29 |
| Rate Impact Test (RIM) |  | $267,912 | $216,674 | ($51,238) | 0.81 |
| Participant Cost Test (PCT) |  | $112,439 | $265,534 | $153,095 | 2.36 |
| Discounted Participant Payback (years) | 3.66 | | | | |
| Lifecycle Revenue Impact (LRI) - $/KWh | $0.00000019 | | | | |

1. [↑](#footnote-ref-1)